FIVE ESTUARIES
OFFSHORE WIND FARM

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ENVIRONMENTAL STATEMENT

VOLUME 6, PART 8, ANNEX 1.3 LESSER BLACK BACK GULL COMPENSATION SITE - ECOLOGICAL IMPACT ASSESSMENT

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DEFINITION OF ACRONYMS

Term	Definition
AEoI	Adverse Effects on Integrity
AOE	Alde-Ore Estuary
AON	Apparently Occupied Nests
AOT	Apparently Occupied Territories
DCO	Development Consent Order
EcIA	Ecological Impact Assessment
ES	Environmental Statement
ETG	Expert Topic Group
HRA	Habitats Regulations Assessment
IROPI	Imperative reasons of overriding public interest
LBBG	Lesser Black-backed Gull
MMF	Mean-max foraging range
NNR	National Nature Reserve
OOEG	Offshore Ornithology Engagement Group
PCS	Proposed Compensation Site
PIER	Preliminary Environmental Information Report
RAG	Red, Amber, Green
RIAA	Report to Inform the Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SD	Standard Deviation
SMP	Seabird Monitoring Programme
SNCO	Statutory Nature Conservation Organisation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
VE	Five Estuaries Offshore Wind Farm
VE OWFL	Five Estuaries Offshore Wind Farm Limited

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Five Estuaries Offshore Wind Farm (VE) is a proposed extension to the operational Galloper Offshore Wind Farm. VE will be situated approximately 37 km off the coast of Suffolk, England (at its closest point). VE is the subject of an assessment under the Habitats Regulations (a Habitats Regulations Assessment, HRA) including a Stage 1 screening assessment and a Stage 2 Appropriate Assessment (AA). These assessments can only be completed by the competent authority, in this case the Secretary of State for Energy Security and Net Zero. To support the AA, the Applicant has produced a Report to Inform the Appropriate Assessment (RIAA) as part of the Development Consent Order (DCO) application. The RIAA identified that an Adverse Effect on Integrity cannot be ruled out for the lesser black-backed gull feature of the Alde-Ore Estuary Special Protection Area (SPA). Therefore, compensatory measures are proposed to ensure the overall coherence of the National Site Network is protected.

1.2 SITE DESCRIPTION

1.2.1 To fulfil the requirement for compensatory measures, the Applicant has identified a Proposed Compensation Site (PCS) at Orford Ness, Suffolk (see Drawing 1). Orford Ness is a shingle spit which forms part of the Alde-Ore Estuary SPA.

1.3 DETAILS OF THE PROPOSED DEVELOPMENT

1.3.1 There is an existing breeding colony of Lesser Black-Backed Gull (LBBG) at Orford Ness which has declined dramatically since the late 1990s. A factor which may be contributing to this decline is predation of the LBBG eggs by foxes and other predators (Davis, et al., 2018). The PCS selection process and rationale are provided separately in the LBBG Evidence, Site Selection & Roadmap document (Volume 5 Report 5.3). The PCS will take the form of predator exclusion fencing around an area(s) of Orford Ness (not at the location of the existing breeding colony) with the aim of excluding mammalian predators, especially foxes, providing a safe refuge for breeding LBBG, and therefore boosting productivity to compensate for losses associated with VE in combination with other offshore wind farms.

1.4 PURPOSE OF THIS REPORT

1.4.1 The installation of the predator exclusion fence may also have ecological impacts. This report provides an assessment of the potential ecological impacts in the format of an ecological impact assessment (EcIA) (CIEEM, 2018).

1.5 EVIDENCE OF TECHNICAL COMPETENCE AND EXPERIENCE

1.5.1 The report was prepared by Richard Arnold BSc Hons MRes MCIEEM CEnv, a technical director at SLR Consulting. Richard has 25 years of experience in ecological consultancy.

1.6 RELEVANT LEGISLATION AND POLICY

1.6.1 Relevant legislation is provided in Section 4.2 of Volume 6, Part 3, Chapter 4: Onshore Biodiversity and Nature Conservation which identifies the legislation and policy that has informed the assessment of effects with respect to Onshore Biodiversity and Nature Conservation. A summary of the key provisions within the relevant legislation and policy is provided in Table 4.1 of Chapter 4. Further information on policies relevant to the EIA and their status is provided in Volume 6, Part 1, Chapter 2: Policy and Legislation.

2 METHODOLOGY

2.1 BASELINE DATA COLLECTION

DESK STUDY

2.1.1 A desk study was undertaken to collate existing information on the designated sites and habitats present within the PCS and 2km from its boundary. This included a review of the information on MAGIC, Natural England's designated sites viewer and reports prepared by MacArthur Green and Royal Haskoning DHV with respect to similar works at Orford Ness, associated with the Norfolk Projects Offshore Wind Farms. Searches for reports on the vegetation communities and ecology of the area were undertaken on Google Scholar and the internet generally.

FIELD SURVEY(S)

2.1.2 A field survey was conducted on 11th January 2024. This comprised walking along the proposed fence line. During the survey, the vegetation communities present in accordance with the Annex I (EC, 2013), UKBAP priority habitats (BRIG., 2011) and vegetated shingle classification systems (Sneddon & Randall, 1993) were identified and mapped as far as possible (see limitations), as were the habitats of the qualifying interest species of designated sites, insofar as these are known/ published. Observations of any other species were also recorded. The survey was focused on the fence line but included the area proposed to be included in the fence and just outside. The weather during the survey was clear, dry and cold.

LIMITATIONS

DESK STUDY

2.1.3 Records of species were not sought from the local biological records centre, with the desk study derived from published and online sources only.

FIELD SURVEY(S)

2.1.4 The field survey was undertaken in January 2024 and therefore outside the optimal season for habitat and botanical surveys which limits the results. Species that are present may not have been visible and the indentation of others was hampered by the lack of flowers or living parts. Species and vegetation community identification is therefore putative. Invertebrate species were similarly not visible.

2.1.5 The presence of fungi, lichens and mosses was noted however these were not identified to species.

2.2 ASSESSMENT APPROACH

2.2.1 The ecological evaluation and impact assessment approach used in this report is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland ("CIEEM guidelines") (CIEEM, 2018).

IMPORTANT ECOLOGICAL FEATURES

2.2.2 Ecological Features are sites, habitats, trees, communities and populations of species. Those that are protected by law or policy, plus any that are of value for other reasons, and biodiversity in general, are Important Ecological Features which should be considered in any ecological impact assessment.

2.2.3 Important Ecological Features therefore include:

- Sites designated for nature conservation (SPA, SAC, Ramsar, SSSI, LWS etc);
- Areas of habitats listed on Annex I of the Habitats Directive;
- Areas of habitats listed under Section 41 of the NERC Act (priority habitats);
- Areas of irreplaceable habitats including ancient woodland and veteran trees;
- Populations of species listed on Annex II and Annex IV of the Habitats Directive;
- Populations of bird species listed on Annex I of the Birds Directive;
- Populations of species listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act;
- Populations of species listed under Section 41 of the NERC Act (priority species);
- Populations of badgers;
- Other habitats, communities and populations which have ecological value;
- Biodiversity.

2.2.4 Published definitions are used to determine whether an area of habitat should be considered an Important Ecological Feature (EC, 2013) (BRIG., 2011).

2.2.5 Any Important Ecological Features which are found during the baseline data collection process are described along with their legal and policy protection.

ECOLOGICAL VALUE

2.2.6 Habitats areas (individually and in aggregate), communities and populations (whether listed or not) present within the study area are assigned a level of value in accordance with the CIEEM geographic scale, as follows:

- International;
- National (i.e. England);
- Regional (i.e. East Anglia);
- County (i.e. Suffolk); and
- Local (i.e. within circa 5km)
- Negligible

2.2.7 The value of features is determined through reference to published criteria (JNCC, 1989 et seq) (Stroud, et al., 2001) (Defra, 2006), the position of the feature within its natural range and its conservation status.

IMPACT ASSESSMENT

2.2.8 The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement (if appropriate).

2.2.9 When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

2.2.10 The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature.

AVOIDANCE, MITIGATION, COMPENSATION AND ENHANCEMENT

2.2.11 Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied, residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

2.2.12 It is important for the EcIA to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g. through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible; and
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

CUMULATIVE EFFECTS

2.2.13 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered cumulatively with impacts of other proposed or consented projects, can result in significant effects.

SIGNIFICANT EFFECTS

2.2.14 A significant effect in EIA terms is one which the decision maker should be aware of when determining the application. This includes any effect which might contravene or support its policies, including an effect which results in a change in biodiversity. This is aligned with the approach set out in section 4.6 of Volume 6, Part 3, Chapter 4: Onshore Biodiversity and Nature Conservation.

3 BASELINE ECOLOGICAL CONDITIONS

3.1 DESIGNATED SITES

3.1.1 The PCS lies within Orford Ness; a 16km long shingle spit. Coastal vegetated shingle structures are globally rare and Orford Ness supports '*some of the largest and most natural sequences in the UK of shingle vegetation affected by salt spray*' (JNCC, 2024). Consequently, Orford Ness is the subject of multiple nature conservation designations, see Table 3.1 and Drawing 2. A general description of its ecology is provided by Warrington, Lohoar, & Mason (2013).

Table 3.1 Designated Sites within 2 km of the PCS

Site Name (Code)	Brief Description	Distance from PCS	Legal & Policy Protection	Evaluation
Alde-Ore Estuary Ramsar (UK11002)	The Alde-Ore Estuary Ramsar comprises the estuaries of the Rivers Alde, Butley and Ore, including Havergate Island and the shingle spit of Orford Ness. It is 2534ha in size, The qualifying interest of the Ramsar are: Plants: Marsh mallow *Althaea officinalis* Sea heath *Frankania laevis* Sea pea *Lathyrus japonicus* Dittander *Lepidum latifolium* Bur meddick *Medicago minima* Curved hard-grass *Parapholis incurve* Borrer's saltmarsh grass *Puccinellia fasciuculata* Spiral tasselweed *Ruppia cirrhosa* Perennial glasswort *Sarcocornia perennis* Marsh sowthistle *Sonchus palustris*	0m, 100% overlap	Ramsar Convention, NPPF para 187, Suffolk Coastal LP Policy SCLP10.1:	International

Site Name (Code)	Brief Description	Distance from PCS	Legal & Policy Protection	Evaluation
	Suffocated clover *Trifolium suffocatum* Yellow-vetch *Vicia lutea* Narrow-leaved Eelgrass *Zostera angustifolia* Invertebrates: Ground Lackey *Malacosoma castrensis* Fancy-legged fly *Campsicnemus magius* *Cheilosia velutina* a hoverfly *Empis prodomus* a fly *Dixella attica* a fly *Shingle* Yellow-face Bee *Hylaeus euryscapu* *Pseudamnicola confuse* a snail Starlet sea anemone *Nematolstella vectensis* Lagoon sand shrimp *Gammarus insnensibili* *Euophrys browning* a jumping spider Duffy's Bell-headed Spider *Baryphyma duffeyi* *Haplodrassus minor a spider* *Trichoncus affinis a spider* Birds - Breeding Lesser black-backed gull *Larus fuscus* Avocet *Recurvirostra avosetta* Little tern *Sternula albifrons*			

Site Name (Code)	Brief Description	Distance from PCS	Legal & Policy Protection	Evaluation
	Sandwich tern *Thalasseus sandvicensis* Marsh harrier *Circus aeruginosus* Bird - Non-breeding Avocet Recurvirostra avosetta Redshank *Tringa totanus* Black-tailed godwit *Limosa limosa islandica* Shelduck *Taodorna tadorna* Shoveler *Anas clypeata* Spotted redshank *Tringa erythropus* Teal *Anas crecca* White-fronted goose *Anser albifrons albifrons* Wgeon *Anas penelope*			
Alde-Ore Estuary SPA (UK9009112)	The Alde-Ore SPA 2403.63 ha has the same boundary as the Ramsar except the SPA excludes the southern 6.8km of the Ordfordness shingle spit (130.4ha). Breeding Avocet Lesser black-backed gull Little tern Sandwich tern Marsh harrier Non-breeding Avocet Redshank Ruff *Calidris pugnax*	0m, 100% overlap	Habitats Regulations, NPPF para 188, Suffolk Coastal LP Policy SCLP10.1:	

Site Name (Code)	Brief Description	Distance from PCS	Legal & Policy Protection	Evaluation
Orfordness - Shingle Street SAC (UK0014780)	Orfordness - Shingle Street SAC encompasses the whole shingle spit 888.01 ha. The qualifying interest features are: 1150 Coastal lagoons* (Priority feature) 1210 Annual vegetation of drift lines 1220 Perennial vegetation of stony banks	0m, 100% overlap	Habitats Regulations, NPPF para 188, Suffolk Coastal LP Policy SCLP10.1:	
Alde-Ore & Butley Estuaries SAC (UK0030076)	Alde-Ore & Butley Estuaries SAC 1 comprises the estuaries of the Rivers Alde, Butley and Ore (1632.72 ha), and adjoins the Orfordness - Shingle Street SAC. The two SACs combined cover approximately the same area as the Alde-Ore Estuary Ramsar. The qualifying interest features are: 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	835m west	Habitats Regulations, NPPF para 188, Suffolk Coastal LP Policy SCLP10.1:	
Orfordness-Havergate National Nature Reserve (1006116)	Orfordness-Havergate NNR (903.81 ha) comprises all of Orfordness spit, with the same boundaries as Orfordness - Shingle Street SAC but excluding the radio transmitter land, plus Havergate Island which is part of the Alde-Ore & Butley	0m, c.50% overlap as part of the PCS is within the radio transmitter land.	National Parks & Access to the Countryside Act 1949, as amended	

Site Name (Code)	Brief Description	Distance from PCS	Legal & Policy Protection	Evaluation
	Estuaries SAC. The interest features are the shingle spit, rare and scarce invertebrates - particularly beetles and spiders - and breeding birds including terns and avocets.			
Alde-Ore Estuary SSSI (1001866)	The Alde-Ore Estuary SSSI 2534.03 ha has the same boundary as the Ramsar Site. The interests features of the SSSI include the shingle spit, the plant species and communities of the saltmarsh and shingle, breeding, wintering and migratory birds, and invertebrates including the rare anthozoan *Nematostella vectensi* and several rare species of spider.	0m, 100% overlap	WCA, NPPF para 186b, Suffolk Coastal LP Policy SCLP10.1	

3.2 HABITATS

3.2.1 As shown on Drawing 3 and commensurate with the designations listed in Table 3.1, the area in the PCS and much of the surrounding area are mapped as priority habitats. These include Coastal Vegetated Shingle, Saline Lagoon and Saltmarsh. The legal and policy protection for these habitats and the ecological value is primarily encapsulated by their inclusion in the designated sites, although priority habitats also have some legal and policy protection in their own right (s.40 NERC Act, NPPF para 185b, Suffolk Coastal LP Policy SCLP10.1).

3.2.2 The habitats present along the fence line and within the PCS are described below and shown on Drawing 4.

T2G5 SALINE LAGOONS (H1150)

3.2.3 There are a number of saline lagoons present within the PCS which vary in size. This habitat is synonymous with the NERC Act s.41 priority habitat type 'Saline Lagoons' and Habitats Directive Annex I type '1150 Coastal lagoons* (Priority feature)'. The definition of the Annex I habitat type encompasses all types of shallow, salt-water lagoons, with or without vegetation (EC, 2013).

3.2.4 Those within the PCS are apparently percolation lagoons, comprised of sea water which has seeped under the shingle spit. The benthic substrate is shingle, which is gently sloping, and the water is estimated to be less than 0.5m deep at the deepest. The marginal vegetation comprises a glasswort *Salicornia* sp and annual sea blite *Suaeda maritima*, which gives way to open water where it is deeper. Sea rush *Juncus maritimus* is present in patches around the margins. See Figure 3.1.

Figure 3.1: T2g5 Saline Lagoons (H1150)

S3B5 PERENNIAL VEGETATION ON COASTAL SHINGLE (H1220)

3.2.5 The predominant habitat with the PCS is Perennial vegetation on coastal shingle. This habitat is synonymous with the NERC Act s.41 priority habitat type 'Coastal Vegetated Shingle' and the Annex I habitat 1220 'Perennial vegetation of stony banks'. The definition of this Annex I habitat type encompasses all types of perennial vegetation; the unifying factor is that the vegetation occurs on coastal shingle (EC, 2013).

3.2.6 The vegetation within the PCS is all on coastal shingle. The vegetation is primarily perennial grasses, although the structure and composition of the vegetation varies. Three distinct types were recognisable which following the classification of Sneddon and Randall (1993) as far as possible are described below. In addition, there were occasional patches of short vegetation, apparently the result of grazing.

3.2.7 Importantly, the shingle within the PCS is mostly level, with shallow hollows supporting the saline lagoons (described above) and artificial banks along the ditches (described below); it does not contain an obvious sequence of wave-formed ridges. These ridges, when vegetated, are the most important and delicate variation of 'Perennial vegetation on coastal shingle'. The ridges have apparently been lost from this part of Orford Ness due to past human activity (Warrington, Lohoar, & Mason, Orford Ness, a place of conflict and conservation. , 2013)

SH71 *ARRHENATHERUM ELATIUS* GRASSLAND COMMUNITY.

3.2.8 The SH71 False oat-grass Arrhenatherum elatius grassland community is found in the east of the PCS along and in proximity to the lower slopes of the main shingle embankment. The plant species recorded here included False oat-grass Arrhenatherum elatius, Red Fescue Festuca rubra, Common Mouse-ear Cerastium fontanum, Ragwort Jacobea vulgaris, Weld Reseda luteola, Sheep's Sorrel Rumex acetosella, a clover Trifolium sp., and Yellow Horned Poppy Glaucium flavum. Crustose, Fruticose and Cladoniform lichens were also present. This community was prevalent along the eastern alignment of the proposed fence, and the eastern part of the PCS. There is a defunct fence running north-south through this area with just the upright fence posts remaining, see Figure 3.2.

Figure 3.2: SH71 *Arrhenatherum elatius* grassland community

SH78 *ELYMUS ATHERICUS* GRASSLAND COMMUNITY.

3.2.9 The SH78 sea couch *Elymus athericus* (syn *E pungens* and *E. pycnanthus*) grassland community is the dominant community along the fence line and within the PCS. Sea couch *Elymus athericus* is the dominant species, with Common Bent *Agrostis capillaris*, Yorkshire-fog *Holcus lanatus*, Cock's-foot *Dactylis glomerata,* Red Fescue, Common Mouse-ear, Ragwort, Sheep's Sorrel, Spear Thistle *Cirsium vulgare*, a geranium *Geranium* sp., a bitter-cress *Cardamine* sp., Teasel *Dipsacus fullonum* and bramble *Rubus fruticosus.* Sea couch is a coarse and tall grass, and the sward is generally thick with occasional thinner patches where the other species are more prevalent. There are old railway sleepers amongst the vegetation which support lichens and mosses. This community was prevalent along the northern and southern alignments of the proposed fence, and the majority of the PCS outside the saline lagoons - see Figure 3.3**.**

Figure 3.3: SH78 Elymus athericus grassland community

OPEN SHINGLE COMMUNITY

3.2.10 Alongside and amongst the SH78 community, there are also more open areas which have a much-reduced abundance of Sea Couch, or it is absent. These support low growing herbs, lichens and mosses amongst bare shingle. Plant species present include Common Mouse-ear, a geranium, Common Cats-ear *Hypochaeris radicata*, Sheep's Sorrel, Ragwort and a vetch *Vicia* sp.. In some areas Sea-purslane *Atriplex portulacoides* is abundant and a species of stonecrop (*Sedum* sp.) is occasional. Crustose, Fruticose, Foliose and Cladoniform lichens and Common Puffball fungus *Lycoperdon perlatum* are also present. This community is present along ditch banks in the south-western alignment of the proposed fence and in patches elsewhere. See Figure 3.4.

Figure 3.4: Open shingle community on ditch banks

3.2.11 Areas of bare shingle with patchy vegetation are also prevalent in the eastern part of the PCS. Species here include Sea Couch, False-oat grass, Common bent, Yellow Horned Poppy, Sea Beet *Beta vulgaris* subsp. *maritma.* Crustose and Fruticose lichens and mosses are also present, growing on the shingle.

R1 DITCHES

3.2.12 The PCS is divided into two parts by a ditch running from the northeast to the southwest. Further ditches lie outside the PCS to the south, west and north. All ditches were similar; apparently brackish, c1m to 2.5m wide and up to c1m deep. There was no visible vegetation within the ditches (in January). See Figure 3.5.

Figure 3.5: R1 Ditch

3.3 SPECIES

PLANTS

3.3.1 The plant species recorded during the survey are all common along the coast and none of those recorded were listed on the Ramsar citation or the SSSI citation as rare or local species. As the survey was undertaken in January, when many plants are not in evidence, a review of their ecology and potential to be present is provided in Table 3.2.

Table 3.2 Plant Species of Special Interest

Scientific Name	Common Name	Habitat (taken from Plant Atlas 2020 (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023))	Review	Ramsar feature	SSSI feature
Althaea officinalis	Marsh mallow	*A perennial herb of coastal habitats, growing on the banks of ditches containing brackish water, in brackish pastures, and in the transition zone between the upper saltmarsh and freshwater habitats.*	Suitable habitat may be present along the brackish ditches within the PCS. This species may have been detectable in January but was not recorded.	P	-
Frankania laevis	Sea heath	*A mat-forming perennial herb of saltmarshes and saltmarsh-sand dune transitions, especially amongst Suaeda vera Shrubby Sea-blite where firm sand or silt overlies coarser-grained material; also rarely on shingle beaches and sea-cliffs.*	The habitat in the PCS is not the typical habitat of this species and it is therefore likely to be absent.	P	-
Lathyrus japonicus	Sea pea	*A long-lived perennial herb, forming large and conspicuous patches on shingle beaches, or rarely, in smaller quantities on blown sand.*	The grassland with the PCS is probably too dense for this species and none was found in the more open shingle areas during the survey.	P	P

Scientific Name	Common Name	**Habitat (taken from Plant Atlas 2020** (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023)**)**	Review	Ramsar feature	SSSI feature
Lepidum latifolium	Dittander	*A rhizomatous, patch-forming perennial herb, restricted as a native to coastal creek-sides, coastal ditches, sea-walls, open brackish grassland and the upper fringes of estuarine saltmarshes.*	The ditches within the PCS have the potential to support this species.	P	-
Medicago minima	Bur Meddick	*A winter-annual herb of dry, open, well-drained, sandy or gravelly places, in short open turf and in disturbed ground; also occasionally found as a casual,*	The short-grazed vegetation which is infrequent within the PCS has the potential to support this species.	P	P
Parapholis incurva	Curved Hard-grass	*An annual of bare places by the sea, including gravelly mud banks, shingle ridges, rock ledges and cliff-tops, and the uppermost parts of saltmarshes; also in artificial habitats such as sea-walls and wooden mooring stays.*	The open shingle community within the PCS has the potential to support this species.	P	-

Scientific Name	Common Name	Habitat (taken from Plant Atlas 2020 (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023))	Review	Ramsar feature	SSSI feature
Puccinellia fasciuculata	Borrer's saltmarsh grass	*A tufted short-lived perennial grass of bare places by the sea, in grazing marshes around cattle-poached pools and depressions, on earthen sea-walls, vehicle tracks and the mud dredged from ditches.*	The habitat in the PCS is not the typical habitat of this species and it is therefore likely to be absent.	P	-
Ruppia cirrhosa	Spiral tasselweed	*A perennial aquatic which occurs in similar habitats to R. maritima, including coastal lakes, tidal inlets, creeks and brackish ditches. It usually grows in deeper water than that species and tolerates more saline conditions, even growing with Zostera species.*	The ditches within the PCS have the potential to support this species.	P	-
Sarcocornia perennis	Perennial glasswort	*A woody perennial subshrub of saltmarshes, especially in bare or sparsely vegetated areas on firm, muddy sand and gravel. S. perennis occurs on eroding lower parts of saltmarshes, at higher elevations on saltmarsh drift-lines and on shell and shingle banks; sometimes also*	The shingle within the PCS has the potential to support this species.	P	-

Scientific Name	Common Name	Habitat (taken from Plant Atlas 2020 (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023))	Review	Ramsar feature	SSSI feature
		on bare ground behind sea-walls.			
Sonchus palustris	Marsh Sowthistle	*A perennial herb of tall vegetation beside rivers on damp peaty or silty soils rich in nitrogen. It is also moderately tolerant of saline conditions, and can grow near tidal river mouths.*	The habitat in the PCS is not suitable for this species.	P	-
Trifolium suffocatum	Suffocated clover	*A winter-annual herb of thin, dry soils on rocky coasts or on acidic compacted sand and shingle, either in open turf or on bare ground, and often part of a species-rich mosaic of annuals or bulbous plants. It occasionally grows on moister soils, but only in situations that are baked dry in summer.*	A small clover without flowers was found within the PCS which could have been this species. However, the vegetation within the PCS is mostly too dense for this species except in small patches which apparently been grazed.	P	P
Trifolium glomeratum	Clustered Clover	*A winter-annual herb of short, open communities on light, drought-prone often somewhat acidic sandy or stony soils near the coast. Habitats include*	The habitat in the PCS is not the typical habitat of this species and it is therefore likely to be absent.	-	P

Scientific Name	Common Name	Habitat (taken from Plant Atlas 2020 (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023))	Review	Ramsar feature	SSSI feature
		pathside banks, seafront lawns and cliff-slopes….			
Trifolium striatum	Knotted Clover	*A winter-annual herb of short, open communities around rock outcrops and on thin, relatively infertile drought-prone soils. Habitats include well-drained pastures, grassy banks and road verges.*	The habitat in the PCS is not the typical habitat of this species and it is therefore likely to be absent.	-	P
Trifolium scabrum	Rough Clover	*A winter-annual herb of thin, infertile, drought-prone soils over limestone, sand and gravel; by the sea also in summer-parched cliff-top grasslands. It grows in similar habitats to T. striatum, and frequently grows with it, but tends to occupy rockier, drier and more strongly leached (acidic) microsites.*	A small clover without flowers was found within the PCS which could have been this species. However, the vegetation within the PCS is mostly too dense for this species except in small patches which apparently been grazed.	-	P
Vicia lutea	Yellow-vetch	*An annual herb of a variety of coastal habitats where it is presumed to be native, including scrubby grassland and cliffs, and on open yet consolidated shingle. In*	The habitat with the PCS is apparently suitable for this species however it is unlikely	P	-

Scientific Name	Common Name	Habitat (taken from Plant Atlas 2020 (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023))	Review	Ramsar feature	SSSI feature
		southern Scotland it is confined to sheltered sea-cliffs.	that it would be detected in January.		
Zostera angustifolia	Narrow-leaved Eelgrass	*Although a coastal species, this rhizomatous perennial is found at higher levels of the shore than Z. marina. It grows in the inter-tidal zone in sheltered estuaries, bays and harbours, where it is found on mixed substrates of sand and mud. Plants are often concentrated in pools or runnels on the shore.*	The PCS does not include intertidal habitats and it is therefore unsuitable for this species.	P	P

INVERTEBRATES

3.3.2 An assessment of the potential for invertebrate species listed as special interest on the Ramsar and SSSI citation is provided in Table 3.3.

Table 3.3: Invertebrate Species of Special Interest

Scientific Name	Common Name	Habitat	Review	Ramsar	SSSI
Malacosoma castrensis	Ground Lackey Moth	Feeds on a range of saltmarsh plants such as sea wormwood *Artemisia maritima* and sea-lavender *Limonium vulgare*).	The habitat with the PCS is apparently **not** suitable for this species.	✓	-
Campsicnemus magius	Fancy-legged fly	Occurs on bare mud in coastal levels and upper saltmarsh where there is an intermediate level of salinity and does not normally occur on the tidal parts of a saltmarsh.	The habitat with the PCS is apparently **not** suitable for this species.	✓	-
Cheilosia velutina	A hoverfly	Recent records are from the chalk pits and adjacent areas.	The habitat with the PCS is apparently **not** suitable for this species.	✓	-
Empis prodromus	A species of dagger-fly	Associated with dry sandy heathlands with trees. Typically, the Brecklands in East Anglia.	The habitat with the PCS is apparently **not** suitable for this species.	✓	-
Dixella attica	A species of midge	Unknown	Unknown	✓	-
Hylaeus euryscapu syn Hylaeus annularis	Shingle Yellow-face Bee	Restricted to coastal shingle in south and south-eastern England where it nests in hollow plant stems and forages on Sea Kale, Sea Spurge, umbellifers, ragworts, hawkbits, and bramble.	Habitat with the PCS may be suitable for this species.	✓	-

Scientific Name	Common Name	Habitat	Review	Ramsar	SSSI
Pseudamnicola confusa	A snail	Freshwater	The habitat with the PCS is apparently **not** suitable for this species.	✓	-
Nematolstella vectensis	Starlet sea anemone	Lives in isolated or semi-isolated brackish pools in saltmarsh and lagoons, in ditches and on mudflats in saltmarshes and shallow estuaries at or above high water, typically in mud, muddy sand and muddy shingle but is also found on vegetation	The saline lagoons within the PCS may be suitable for this species.	✓	✓
Gammarus insnensibili	Lagoon sand shrimp	limited to sheltered, shallow, brackish water habitats with a variety of sediments ranging from organic muds to shingle with various admixtures of sand and silt-clay. Gammarus insensibilis appears to be associated with the alga Chaetomorpha linum, which may form extensive floating mats	The saline lagoons within the PCS may be suitable for this species.	✓	

Scientific Name	Common Name	Habitat	Review	Ramsar	SSSI
Euophrys browningi syn, Pseudeuophrys obsoleta	A jumping spider	Described by JNCC as Nationally Scarce and is a Section 41 species. Confined to a few shingle beaches in eastern and south-eastern England where it can be found in tide litter and inside empty whelk shells.	The habitat with the PCS is apparently **not** suitable for this species.	✓	✓
Baryphyma duffeyi syn. *Praestigia duffeyi*.	Duffy's Bell-headed Spider	Described by JNCC as Endangered and is a Section 41 species. Known in the UK only from the coasts of Suffolk and Essex and Kent where it can be found in tidal litter or on mud beneath vegetation in saltmarshes and brackish marshes. The only recent records are from Orford Ness. Development and habitat degradation may have adversely affected previously known sites.	The habitat with the PCS is apparently **not** suitable for this species.	✓	✓
Haplodrassus minor	A spider	Among tide litter and sparse vegetation and shingle on the seashore.	The vegetation with the western PCS is probably too dense for this species however habitat suitable is	✓	✓

Scientific Name	Common Name	Habitat	Review	Ramsar	SSSI
			suitable in the eastern part.		
Trichoncus affinis	A spider	Among the roots of sparse vegetation on shingle,	The vegetation with the western PCS is probably too dense for this species however habitat suitable is suitable in the eastern part.	✓	✓

AMPHIBIANS

3.3.3 The waterbodies within the PCS are saline and therefore not suitable for amphibians.

REPTILES

3.3.4 The habitat within the PCS is superficially suitable for all four common species of reptile and common lizard and grass snake have been recorded here in the past. This habitat includes the old railway sleepers which may act as a basking site and hibernacula. These species are all protected from killing/injury under the WCA, are priority species and receive policy protection Suffolk Coastal Local Plan Policy SCLP10.1:

BIRDS

3.3.5 During the survey relatively few bird species were seen using the PCS on the day of the survey; grey heron, little egret, redshank and marsh harrier. A review of the potential of the PCS to support bird species that are of special interest is provided in Table 3.4.

Table 3.4: Bird Species of Special Interest

Scientific Name	Common Name	Habitat taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature	SSSI feature
Birds - Breeding						
Larus fuscus	Lesser black-backed gull	*Most of the Orford Ness gulls currently breed in Lantern Marshes, an area of saltmarsh towards the north of the spit, dominated by the tall grass Elytrigia atherica. The colony is on small islands within a network of ditches and creeks, which are each approximately 2-3 m wide…. Although gulls benefit from the shelter provided by some vegetation, gulls avoid nesting in very dense vegetation*	The PCS is shingle rather than salt marsh but large areas are dominated by dense *Elytrigia atherica* It is divided by ditches but there is access on land to all areas. LBBG does not breed here currently.	✓	✓	-
Recurvirostra avosetta	Avocet	*…breeds in flat open areas with islands, ridges, spits or margins of bare sand, clay or mud and sparse short vegetation including coastal lagoons….. inhabits coastal and inland saline lakes and mudflats lagoons, pools, saltpans…*	The PCS includes saline lagoons which are potentially suitable nesting and foraging habitat for this species although there was no evidence of either and this species is not known to breed here.	✓	✓	✓
Sternula albifrons	Little tern	*..breeds on barren or sparsely vegetated beaches, islands and spits of sand, shingle, shell fragments, pebbles, rocks or coral fragments on seashores or in estuaries….fishes in very shallow water only a few*	The PCS does not include suitable nesting habitat, but it does include brackish lagoons and ditches, the latter apparently supports	✓	✓	-

Scientific Name	Common Name	Habitat taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature	SSSI feature
		centimetres deep, often over the advancing tideline or in brackish lagoons and saltmarsh creeks	fish as evidenced by a hunting common seal.			
Thalasseus sandvicensis	Sandwich tern	*forms colonies on sandy islands, rocky calcareous islets, sand-spits, sand-dunes, shingle beaches and extensive deltas* (BirdLife International, 2024)	The PCS does not include suitable nesting or foraging habitat for Sandwich Tern.	✓	✓	-
Circus aeruginosus	Marsh harrier	*Nests are normally found in freshwater or brackish reed beds, in other wetlands with tall emergent vegetation and few or no trees, or in tall crops adjacent to a wetland* (Hardey, et al., 2013) *….inhabits extensive areas of dense marsh vegetation, in fresh or brackish water, generally in lowlands*	One or two Marsh Harrier were present during the survey. The habitat within the PCS does not include reed bed and is therefore not optimal nesting habitat for this species, it is suitable hunting habitat for this species.	✓	✓	-
Bird - Non-breeding						
Cygnus columbianus	Bewick's swan	*brackish and freshwater marshes, rivers, lakes, ponds and shallow tidal estuarine areas with adjacent grasslands, flooded pastures or agricultural arable fields*	The PCS mainly comprises dense perennial grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.	-	-	✓

Scientific Name	Common Name	Habitat taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature	SSSI feature
Recurvirostra avosetta	Avocet	*inhabits coastal and inland saline lakes and mudflats lagoons, pools, saltpans…*	The saline lagoons within the PCS may provide suitable foraging habitat for this species although none were present during the survey. This species was observed in the Ore Estuary.	✓	✓	✓
Calidris pugnax	Ruff	*muddy margins of brackish, saline and alkaline lakes, ponds, pools, rivers, marshes and food-plains, as well as freshly mown or grazed short-sward and wheat…fields, usually roosting at night in the shallow waters of lake shores*	The PCS mainly comprises dense perennial grasses which is likely to deter this species, while the saline lagoons may provide suitable foraging habitat for this species.	-	✓	-
Tringa totanus	Redshank	*largely coastal occupying rocky, muddy and sandy beaches, saltmarshes, tidal mudflats, saline and freshwater coastal lagoons, tidal estuaries*	One or two were observed during the survey making use of ditches and saline lagoons for foraging; these habitats within the PCS is suitable foraging habitat for this species while the perennial grass vegetation on shingle is unsuitable.	✓	✓	✓
Limosa limosa islandica	Black-tailed godwit	*sheltered estuaries and lagoons with large intertidal mudflats, sandy beaches, salt-marshes and salt-flats*	More likely to be found foraging in the soft sediments of the estuary	✓	-	-

Scientific Name	Common Name	Habitat taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature	SSSI feature
			than among the saline lagoons with shingle substrate found in the PCS. The tall perennial grass vegetation on the shingle is not suitable habitat for this species.			
Taodorna tadorna	Shelduck	*preference for saline habitats and frequents mudflats and muddy or sandy estuaries in coastal regions…*	More likely to be found in the estuary than among the shingle found in the PCS. The tall perennial grass vegetation on the shingle is not suitable habitat for this species	✓	-	✓
Anas clypeata	Shoveler	*permanent shallow freshwater wetland …. coastal brackish lagoons, tidal mudflats, estuaries, coastal shorelines, fresh and brackish estuarine marshes, inland seas and brackish or saline inland waters,*	The saline lagoons within the PCS are probably too shallow to provide suitable foraging habitat for this species. The tall perennial grass vegetation on the shingle is not suitable habitat for this species.	✓	-	-
Tringa erythropus	Spotted redshank	*a variety of freshwater and brackish wetlands …brackish lagoons, saltmarshes, saltpans, sheltered muddy coastal shores and mudflats …*	The saline lagoons within the PCS may provide suitable foraging habitat for this species although none were present during the survey. The tall perennial	✓	-	-

Scientific Name	Common Name	Habitat taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature	SSSI feature
			grass vegetation on the shingle is not suitable habitat for this species			
Anas crecca	Teal	*flooded gravel pits, reservoirs and floodplain meadows*	The PCS mainly comprises dense perennial grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.	✓	-	✓
Anser albifrons albifrons	White-fronted goose	*in open country on improved grassland, stubble fields … wet meadows… in brackish and freshwater marshy habitats*	The PCS mainly comprises dense perennial grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.	✓	-	-
Anas penelope	Wigeon	*…coastal salt-marshes, freshwater, brackish and saline lagoons, flooded grasslands, estuaries, intertidal mudflats, and other sheltered marine habitats*	The PCS mainly comprises dense perennial grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.	✓		✓

MAMMALS

3.3.6 Three species of mammal were observed during the survey; Common Seal *Phoca vitulina* Brown Hare *Lepus europaeus* and Chinese Water Deer *Hydropotes inermis* and there was some evidence of European Rabbit Oryctolagus cuniculus.

3.3.7 A Common Seal was observed hunting in the ditch which bisects the PCS and other individuals were observed on the shingle bank and beach to the east of the PCS.

3.3.8 Brown Hare and Chinese Water Deer were observed on several occasions within and around the PCS. Brown Hare, Chinese Water Deer and European Rabbit are not native species in Britain. Despite this, the long-established Brown Hare is a priority species in England.

3.3.9 These species, and Rabbit, graze the vegetation with the PCS with limited but some effect of creating open areas of shorter vegetation see Figure 3.6. The grassland within the existing compensation site was much denser than immediately outside the fence surrounding it, providing evidence of the effects of grazing, see Figure 3.7.

Figure 3.6: Short vegetation, apparently grazed.

Figure 3.7: Effects of excluding Grazing.

3.3.10 With the existing predator control fence in the foreground, exclusion area to left, area open to grazing animals on the right, and showing variation in vegetation height and structure between these two areas.

SUMMARY OF IMPORTANT ECOLOGICAL FEATURES

3.3.11 The Important Ecological Features present or potential present in and around the PCS which could be affected by the proposed compensation are listed in Table 3.5.

Table 3.5: Summary of Important Ecological Features

	Ecological Feature	Legal and Policy Protection	Scale at which Feature is Important
1.	Designated Sites, encompassing:		
	> Alde-Ore Estuary Ramsar (UK11002)	Ramsar Convention, NPPF para 187, Suffolk Coastal LP Policy SCLP10.1:	International
	> Alde-Ore Estuary SPA (UK9009112)	Habitats Regulations, NPPF para 188, Suffolk Coastal LP Policy SCLP10.1:	International
	> Orfordness - Shingle Street SAC (UK0014780)	Habitats Regulations, NPPF para 188, Suffolk Coastal LP Policy SCLP10.1:	International
	> Alde-Ore & Butley Estuaries SAC (UK0030076)	Habitats Regulations, NPPF para 188, Suffolk Coastal LP Policy SCLP10.1:	International

	Ecological Feature	Legal and Policy Protection	Scale at which Feature is Important
	> Orfordness-Havergate National Nature Reserve (1006116)	National Parks & Access to the Countryside Act 1949, as amended	National
	> Alde-Ore Estuary SSSI (1001866)	WCA, NPPF para 186b, Suffolk Coastal LP Policy SCLP10.1	National
2.	T2g5 Saline Lagoons (H1150)	Qualifying Interest of Orfordness - Shingle Street SAC, Annex I of Habitats Directive, s40 NERC Act, NPPF para 185b, Suffolk Coastal LP Policy SCLP10.	International, through inclusion in designated sites.
3.	S3b5 Perennial Vegetation on Coastal Shingle (H1220)	Qualifying Interest of Orfordness - Shingle Street SAC, Annex I of Habitats Directive, s40 NERC Act, NPPF para 185b, Suffolk Coastal LP Policy SCLP10.	International, through inclusion in designated sites.
4.	R1 Ditches	Potentially supporting qualifying interest of Ramsar	International, through inclusion in designated sites.
5.	Scare/Uncommon plant species potentially occurring within the PCS, including: Marsh Mallow, Dittander, Bur Meddick, Curved hard-grass, Spiral Tasselweed, Perennial glasswort, Suffocated clover, Rough Clover, Yellow-vetch.	Ramsar Convention, NPPF para 187, Suffolk Coastal LP Policy SCLP10.1. (all species listed expect Rough Clover). Or WCA, NPPF para 186b, Suffolk Coastal LP Policy SCLP10.1. (Rough Clover)	International, through inclusion in designated sites.
6.	Scare/Uncommon invertebrate species potentially occurring within the PCS, including, Lagoon sand shrimp, *Haplodrassus minor* and *Trichoncus affinis*	Ramsar Convention, NPPF para 187, Suffolk Coastal LP Policy SCLP10.1. (all species listed). and WCA, NPPF para 186b, Suffolk Coastal LP Policy SCLP10.1 (Starlet Sea Anemone, *Haplodrassus minor* and *Trichoncus affinis*)	International, through inclusion in designated sites.
7.	Common Reptiles, including Common Lizard and Grass Snake	WCA Sch. 5., NPPF para 185b, Suffolk Coastal LP Policy SCLP10.1	Up to County
8.	Breeding birds that are the special interest of Alde-Ore Estuary and may	Ramsar Convention, Habitats Regulations, NPPF para 187	International, National

	Ecological Feature	Legal and Policy Protection	Scale at which Feature is Important
	use the PCS, including Avocet, Little Tern and Marsh Harrier	and 188, Suffolk Coastal LP Policy SCLP10.1:	
9.	Wintering birds that are the special interest of Alde-Ore Estuary and may use the PCS including Avocet, Ruff. Redshank and Spotted Redshank.	Ramsar Convention, Habitats Regulations, NPPF para 187 and 188, Suffolk Coastal LP Policy SCLP10.1:	International, National
10.	Brown Hare	NPPF para 185b, Suffolk Coastal LP Policy SCLP10.1	Local
11.	Biodiversity of the PCS	EIA Regulations 2017, NERC Act 2003 s 40, Environment Act 2021 Pt 6, NPPF para 180 d, 185. 186 a, Suffolk Coastal LP Policy SCLP10.1	International

4 FUTURE BASELINE

4.1.1 In the absence of the fence, the habitats, flora and fauna within the PCS would be expected to remain similar to now.

5 DETAILED PROJECT DESCRIPTION

5.1.1 An area of approximately 8.72 hectares will be enclosed with a fence of up to approximately 1.26 km in length. The fence is designed to deter foxes and other mammalian predators and therefore create a predator free area within which the birds can breed.

5.2 DESIGN

5.2.1 The installed fence is planned to be 1.8m-2m above ground level and comprised of mesh fencing supported by steel posts. It will be part buried in the ground, extending vertically downwards by 150mm and then horizontally to form a skirt. The top of the fence will be angled at 45^0 away from the enclosure interior. The mesh will be support on steel posts and inserted into the ground. The design of the fence will be in accordance with RSPB guidance on mammal exclusion fencing (White and Hirons 2019) and is subject to approval by the Secretary of State as part of the LBBG Implementation and Monitoring Plan. Access gates will be installed in the fence to allow for management of the vegetation within the exclusion area.

5.3 INSTALLATION

5.3.1 The fencing materials and plant would be transported to the location of the proposed fencing using standard low-loaders along existing trackways as far as possible. These materials are planned to be delivered by vessel from Orford quay to the boat landing across the Ore Estuary.

5.3.2 The proposed installation would involve, an excavator which would scrape back the top 50-150mm of vegetation and shingle along the alignment of the fencing to create a shallow trench up to 1,000mm wide. A dump truck may also be required to assist with earth moving.

5.3.3 Along the side of the trench closest to the enclosure, the steel fence posts would be inserted into the ground at approximately 3m intervals using a specialised tool attached to the bucket of the excavator. The tool is placed on top of each post and the bucket would be slowly lowered pushing the post into the ground to the required depth. Using this method means that the posts will not be hammered into the ground and there would be no post hole excavations or use of concrete.

5.3.4 The mesh fencing would then be rolled out and clipped to each fence post with the lower portion laid into the trench and pegged into place to create the skirt. The scrapped back shingle and prices of vegetation will then be pushed back into place, covering the skirt.

5.3.5 The installation of the fencing would take place outside the bird nesting period (not within April to August, inclusive). The works to install the fence are expected to take two to three weeks with approximately six personnel on site undertaking the fence installation. An existing area of hard standing is present adjacent to the proposed fence alignment which may be used for a temporary laydown and placing temporary welfare for the duration of the fence installation works, alternatively a temporary laydown area may be formed elsewhere within the PCS. The temporary laydown and welfare unit will be removed after completion of the construction phase.

5.4 MONITORING, MANAGEMENT AND MAINTENANCE

5.4.1 The fence will be maintained for the lifetime of wind farm (assumed to be 40 years). Inspections, routine maintenance, and repair of the fence will be conducted as required and as set out the in the LBBG Implementation and Monitoring Plan (LIMP) (Volume 5, Report 5.6).

5.4.2 Habitat management will be undertaken. as required within the enclosure. This will comprise cutting vegetation with a strimmer and removing the arisings to create a mosaic of short and long sward heights, to create optimum nesting habitat for LBBG. It is likely to take up to ten days per year, depending on the quantity of vegetation to be removed. Further details are provided in the LIMP.

5.5 DECOMMISSIONING

5.5.1 At the end of the operational lifetime of the wind farm, the fencing will either be removed (with approval from the Secretary of State) or maintained either by the Applicant or a third party.

6 ASSESSMENT OF EFFECTS ON DESIGNATED SITES

6.1.1 The assessment of effects on the Ramsar and European sites (including the Alde-Ore Estuary Ramsar, Alde-Ore Estuary SPA, Orfordness - Shingle Street SAC and Alde-Ore & Butley Estuaries SAC) are set out in the accompanying Habitats Regulations Assessment, Volume 5, Report 4: RIAA). This concludes that there will be no adverse effects on the integrity of these, or any other sites, arising from the PCS alone and in combination with other Plans and Projects, when taking into account the proposed mitigation. Therefore, in EIA terms, there will be no significant effects on these designated sites.

6.1.2 The protection for the NNR essentially falls under its designation as a SSSI. The individual features of the SSSI are assessed in the Section 7 and Section 11 where an overall conclusion on the effect of the fence line on the integrity of the SSSI is provided.

7 ASSESSMENT OF EFFECTS ON OTHER FEATURES

7.1 INSTALLATION AND DECOMMISSIONING

HABITAT DAMAGE

S3B5 PERENNIAL VEGETATION ON COASTAL SHINGLE (H1220)

7.1.1 The installation of the fence will result in disturbance and then reinstatement of 1m x 1.26 km of S3b5 Perennial vegetation on coastal shingle (H1220), giving a total 0.13ha (of 520ha at Orford Ness). This comprises:

- SH71 – 690m x 1m
- SH78 – 373m x 1m
- Open Shingle – 196m x 1m

7.1.2 The alignment of the fence on the northwestern, western and southern boundaries is alongside ditches where it appears that material excavated from the ditch was placed. The alignment along the eastern boundary is adjacent to an old fence line (now just wooden posts in concrete footings). These areas have therefore been disturbed in the past[1] and have recovered to support the shingle communities described above. The northeastern boundary crosses an area of open shingle which is flat and may also have been disturbed by past human activity.

7.1.3 Importantly, the fence would not cross natural shingle ridges (as these have already been lost from the PCS location) and the perennial grass vegetation along the fence line would be expected to recover quickly, as it has along the fence line of Norfolk Projects enclosure (see Figure 3.7). However, lichens would take longer to re-establish their current extent on the re-disturbed shingle.

T2G5 SALINE LAGOONS (H1150) LAGOONS

7.1.4 T2g5 Saline Lagoons (H1150) lagoons are not along the fence line, access tracks or within temporary works areas and therefore will not be damaged during the installation of the fence.

R1 DITCHES

7.1.5 The fence line may cross the ditches within the PCS. A separate hydrology assessment has determined that this has a minor flood risk, should debris become trapped in the fence.

SCARCE/UNCOMMON PLANTS

7.1.6 There were no uncommon plants recorded along the fence line during the survey. However, the survey was undertaken in January and so the presence of a few of these species (such as Bur Meddick, Curved hard-grass, Suffocated Clover, Rough Clover, Yellow-vetch) cannot be excluded, see Table 3.2. These are all annuals and therefore less vulnerable than perennials to temporary disturbance of the shingle through fence installation in the location of the PCS, especially after setting seed.

[1] The southern ditch is evident on maps dating from 1881, while the western (and central) ditch appears to date from the construction of the Cobra Mist AN/FPS-95 antenna in the last half of the1960s. The old fence line was probably installed at the same time; it is visible on aerial imagery from 2000 but not visible on aerial imagery from 1945.

SCARCE/UNCOMMON INVERTEBRATES

7.1.7 There is suitable habitat for uncommon invertebrates along the fence line including the two spiders *Haplodrassus minor* and *Trichoncus affinis*. However, given the localised and temporary nature if the works, populations of invertebrates are unlikely to be affected.

COMMON REPTILES

7.1.8 There is suitable habitat for common reptiles along the fence line however given the localised and temporary nature if the works, populations of reptiles are unlikely to be affected by the installation of the fence. However, removal or moving of old railway sleepers could negatively affect reptile populations if these are used as refuges.

BIRDS

7.1.9 Other than Marsh Harrier, the habitat along the fence line is not suitable for the special interest birds. The area affected by the fence line installation is a very small fraction of a Marsh Harrier home range and the temporary disturbance to this area could not affect the Marsh Harrier population.

BROWN HARE

7.1.10 The habitat along the fence line is suitable for Brown Hare but again the area of habitat is a very small part of the range of the Brown Hare and the population could not be affected.

DISTURBANCE

WINTERING BIRDS

7.1.11 The installation of the fence will involve the presence of workers and plant for six weeks during the autumn / winter period. The workforce will disturb birds during the works; Redshank (two or three), Grey Heron (one), Little Egret (one) were all disturbed during the survey work in January. Marsh Harrier was also observed however this species did not appear to respond to our presence. A similar level of disturbance would be expected during each day of fence installation however this is unlikely to result in significant disturbance for any of these species[2] (or any other bird species) because the disturbance will be localised and of short duration.

MAMMALS

7.1.12 Harbour Seal (one), Brown Hare (three to five) and Chinese Water Deer (three to five) were all disturbed during the winter survey. As for birds, the installation is unlikely to result in significant disturbance for any of these species (or any other mammal species) because the disturbance will be localised and of short duration.

[2] Defined as disturbance which will cause impacts on populations of a species through either (i) changed local distribution on a continuing basis; and/or (ii) changed local abundance on a sustained basis; and/or (iii) the reduction of ability of any significant group of birds to survive, breed, or rear their young.

OTHERS

7.1.13 The other important ecological features present (Saline Lagoons, Perennial Vegetation on Coastal Shingle, Ditches, Scare/Uncommon plant species, Scare/Uncommon invertebrates, and Common Reptiles) are not sensitive to this level of disturbance from human activity.

INVASIVE SPECIES

7.1.14 There is a low risk that machinery and materials brought onto the PCS for the works is contaminated with invasive non-native species which then become established and spread, with negative effects on Orford Ness, especially its flora including scarce/uncommon plant species.

7.2 OPERATION

REMOVAL OF GRAZING

S3B5 PERENNIAL VEGETATION ON COASTAL SHINGLE (H1220)

7.2.1 The enclosure will exclude two or three species of gazing animals as well as the intended predator (although Chinese Water Deer may fit into both categories as there is evidence that this species eats the eggs of ground nesting birds. The grazing animals appear to have a moderate effect on the vegetation, creating variability in sward height and species composition. Removal of grazing may promote a denser sward of tall perennial grasses at the expense of more open areas and associated flora and lichens, with the open areas being of greater conservation importance.

T2G5 SALINE LAGOONS (H1150) & R6 DITCHES

7.2.2 The vegetation within the saline lagoons does not appear to be grazed or dependent on grazing to maintain its community structure and composition, while the ditches generally lack vegetation.

SCARCE/UNCOMMON PLANTS

7.2.3 The scarce and uncommon plants are smaller species which may benefit from light grazing; removal of grazing could result in a decline of these species if present, e.g. the small clovers.

SCARCE/UNCOMMON INVERTEBRATES

7.2.4 The spiders *Haplodrassus minor* and *Trichoncus affinis*, if present, may be affected by cessation of grazing as these prefer open habitats. The species associated with lagoons would not be affected, however.

REPTILES

7.2.5 Removing grazing from with the PCS could reduce its suitability for reptiles by removing basking sites and refuges/hibernation sites.

BIRDS

7.2.6 Other the Marsh Harrier, the grassland areas are not favourable to the bird species that are of special interest and therefore these species are unlikely to be affected by the removal of grazing; the saline water apparently keeps areas in and around the lagoons clear of dense perennial vegetation without the need for grazing. Marsh Harrier hunts over dense vegetation and therefore it is also unlikely to be affected.

MAMMALS

7.2.7 See ‘Exclusion’ below.

INCREASE IN NUTRIENTS

S3B5 PERENNIAL VEGETATION ON COASTAL SHINGLE (H1220)

7.2.8 The introduction of breeding gulls into the PCS will increase nutrients within the shingle due to bird droppings; this may favour coarse grasses at the expense of smaller flowering plants and therefore change the vegetation community composition or relative abundance. Although there was historically 25,000 LBBG nesting on Orford Ness, this was in a different location.

T2G5 SALINE LAGOONS (H1150) LAGOONS

7.2.9 Similarly, the introduction of breeding gulls into the PCS will increase nutrients within the saline lagoons and potentially lead to changes in the plant and animal communities present.

OTHERS

7.2.10 Any change in vegetation structure and composition arising from increased nutrients, may affect the other ecological features with some potentially benefitting and others potentially declining, such as scarce/uncommon plants and invertebrates.

CHANGES IN HYDROLOGY

7.2.11 The proposed fencing will not change the flow of water across the Site and is not predicted to increase the risk of flooding over the development lifetime, as there will be no increase in surface water runoff (see Volume 6, Part 8, Annex 1.1: Flood Risk Assessment); there should be no indirect effects on ecological features as a result of changes in hydrology.

EXCLUSION

MAMMALS

7.2.12 The grazing animals will lose access to 8.72ha of currently accessible land. Of the species recorded only the Brown Hare is of conservation concern, the PCS is enough to support 1 Hare (Warrington & Cormack, 2006) and therefore could reduce the Orford Ness population by that amount (of about 50 to 100 Hare in total, with numbers fluctuating annually).

7.2.13 The fence line may cross the ditches within the PCS and therefore the ability of common seals to access these will be impaired. However, this is unlikely to have any effect on the seal population.

OTHERS

7.2.14 The fence would not exclude any of the other features identified.

8 ASSESSMENT OF EFFECTS ON BIODIVERSITY

8.1.1 As set out above, there is a risk that the biodiversity within the PCS is reduced as a result of excluding grazing animals and increases in nutrients derived from nesting gulls (which unlike the grazing animals import nutrients from elsewhere into Orford Ness through foraging). Both factors tend to favour uniform coarse grasses in terrestrial habitats at the expense of other flora, and the latter could reduce biodiversity in the saline lagoons through a reduction in water quality.

9 CUMULATIVE EFFECTS

9.1.1 The Norfolk Projects compensation area is an existing area enclosed by predator control fencing at Orford Ness. This has the potential to give rise to the same effects during operation as the PCS, namely changes in the vegetation and ecology of the enclosed areas through cessation of grazing and increase in nutrients. It is understood that, after one breeding season, gulls have not bred within the Norfolk Projects compensation area and therefore not resulted in nutrient increases. The changes in the vegetation through excluding grazing animals are evident at the Norfolk Projects compensation area, despite the commitment to manage the vegetation therein.

9.1.2 The addition of the PCS would increase the area of Orford Ness with reduced grazing intensity (and potentially) increases in nutrients with possible negative effects on the flora, unless managed.

9.1.3 Both the Norfolk Projects compensation area and the PCS will require maintenance and management, and therefore will result in cumulative increase in people present on Orford Ness. The presence for both will be of short duration and therefore unlikely to result in significant disturbance.

9.1.4 No other projects have been identified which could affect the same ecological features as the PCS.

10 MITIGATION MEASURES

10.1 INSTALLATION AND DECOMMISSIONING

HABITAT DAMAGE

10.1.1 The ground disturbance will be the minimum necessary for the installation of fence to minimise damage to the shingle habitat. The few areas which are more open and richer in flora and lichens will receive particular care to limit disturbance to the minimum. Where possible stones supporting lichens will be placed to one side and then replaced near to their original location in an upright position once the fence has been installed. The vegetation will then be allowed to naturally regenerate with the disturbed area, without any intervention (seeding, topsoil, fertilizer, etc).

DISTURBANCE

10.1.2 The installation of the fencing will take place outside the bird nesting period (not between April and August) The works are expected to take less than four weeks and with three gangs (three teams of two) working at any one time.

INVASIVE SPECIES

10.1.3 All machinery, materials and equipment to be brought onto site will be clean and checked for the presence of INNS and mud (which could contain INNS).

10.2 OPERATION

REMOVAL OF GRAZING

10.2.1 To create or maintain open areas, patches of Sea Couch will be cut and outside the breeding season for LBBG. These measures have a dual purpose, firstly to create open areas suitable for nesting LBBG and secondly to minimise negative changes in the vegetation from the removal of grazing. The details will be set out in a final LIMP for the PCS.

INCREASE IN NUTRIENTS

10.2.2 In the event that a gull colony is established within the PCS, and increased nutrients are noted to be affecting features within the site, consideration may be given to removing cut vegetation from the PCS and the designated site, which would therefore help reduce the potential additional nutrients arising from nesting LBBG. The balance of nutrients will be determined by the numbers of nesting birds and the effect of excluding grazers, which is as yet unknown, however it will be no more than would occur with the restoration of the LBBG population in accordance with the site's conservation objectives. The details of habitat management will be set out in the final LIMP for the PCS.

CHANGES IN HYDROLOGY

10.2.3 The fence line will not result in change in hydrology and therefore no mitigation is required.

11 RESIDUAL EFFECTS

11.1.1 An assessment of the residual effects of the PCS on the Important Ecological Features is present in Table 11.1.

11.1.2 With the mitigation proposed, principally within the LIMP until the fence is removed, the PCS would not have an adverse effect on the integrity of the Alde-Ore Estuary SSSI either individually or in combination with other developments.

Table 11.1 Summary of Likely Significant Effects

	Ecological Feature	Potential Significant Negative Effects	Mitigation	Significant Residual Negative Effects
1.	Designated Sites, encompassing:			
	> Alde-Ore Estuary Ramsar (UK11002)	See Plants, Invertebrates, Breeding Birds, Wintering Birds below.	See Plants, Invertebrates, Breeding Birds, Wintering Birds below.	None, but dependent on successful and ongoing implementation of the LIMP
	> Alde-Ore Estuary SPA (UK9009112)	None identified	-	-
	> Orfordness - Shingle Street SAC (UK0014780)	See T2g5 Saline Lagoons (H1150) and S3b5 Perennial Vegetation on Coastal Shingle (H1220)	See T2g5 Saline Lagoons (H1150) and S3b5 Perennial Vegetation on Coastal Shingle (H1220)	None, but dependent on successful and ongoing implementation of the LIMP.
	> Alde-Ore & Butley Estuaries SAC (UK0030076)	None identified	-	-
	> Orfordness-Havergate National Nature Reserve (1006116)	See Plants, Invertebrates, Breeding Birds, Wintering Birds below.	See Plants, Invertebrates, Breeding Birds, Wintering Birds below.	None, but dependent on successful and ongoing implementation of the LIMP.
	> Alde-Ore Estuary SSSI (1001866)	See Plants, Invertebrates, Breeding Birds, Wintering Birds below.	See Plants, Invertebrates, Breeding Birds, Wintering Birds below.	None, but dependent on successful and ongoing implementation of the LIMP.

	Ecological Feature	Potential Significant Negative Effects	Mitigation	Significant Residual Negative Effects
2.	T2g5 Saline Lagoons (H1150)	Declining habitat quality due to increase in nutrients.	Removal of cut vegetation to deplete nutrients (if required).	None, but dependent on successful and ongoing implementation of the LIMP.
3.	S3b5 Perennial Vegetation on Coastal Shingle (H1220)	Damage during fence installation. Introduction of Invasive Non-native Species. Negative changes in vegetation due to removal of grazing. Negative changes in vegetation due to increase in nutrients.	Minimise disturbance of shingle, use of existing access tracks and hard standing. Ensure all equipment brought onto site is clean and checked. Replacement of lichens following fence installation. Vegetation management to create open areas in winter. Removal of cut vegetation to deplete nutrients (if required).	None, but dependent on successful and ongoing implementation of the LIMP.
4.	R1 Ditches	Introduction of Invasive Non-native Species.	Ensure all equipment brought onto site is clean and checked.	None.
5.	Scare/Uncommon plant species potentially occurring within the PCS, including: Marsh Mallow, Dittander, Bur Meddick, Curved hard-grass, Spiral Tasselweed, Perennial glasswort,	Damage during fence installation. Introduction of Invasive Non-native Species. Negative changes in vegetation due to removal of grazing.	Minimise disturbance of shingle, use of existing access tracks and hard standing. Ensure all equipment brought onto site is clean and checked.	None, but dependent on successful and ongoing implementation of the LIMP.

	Ecological Feature	Potential Significant Negative Effects	Mitigation	Significant Residual Negative Effects
	Suffocated clover, Rough Clover, Yellow-vetch	Negative changes in vegetation due to increase in nutrients	Vegetation management to create open areas in winter. Removal of cut vegetation to deplete nutrients (if required).	
6.	Scare/Uncommon invertebrate species potentially occurring within the PCS, including, Lagoon sand shrimp, *Haplodrassus minor* and *Trichoncus affinis*	Negative changes due to changes in vegetation due to removal of grazing. Negative changes in vegetation due to increase in nutrients.	Vegetation management to create open areas in winter. Removal of cut vegetation to deplete nutrients (if required).	None, but dependent on successful and ongoing implementation of the LIMP.
7.	Common Reptiles, including Common Lizard and Grass Snake	Negative changes due to changes in vegetation due to removal of grazing. Negative changes in vegetation due to increase in nutrients.	Vegetation management to create open areas in winter. Removal of cut vegetation to deplete nutrients (if required).	None, but dependent on successful and ongoing implementation of the LIMP.
8.	Breeding birds that are the special interest of Alde-Ore Estuary and may use the PCS, including Avocet, Little Tern and Marsh Harrier	None identified.	-	-
9.	Wintering birds that are the special interest of Alde-Ore Estuary and may use the PCS including Avocet, Ruff. Redshank	None identified.	-	-

	Ecological Feature	Potential Significant Negative Effects	Mitigation	Significant Residual Negative Effects
	and Spotted Redshank.			
10.	Brown Hare	Loss of access to habitat and population decline by 1 Hare.	Allowing grazing in winter.	Loss of grazing in summer may still result a slight population decline.
11.	Biodiversity of the PCS			

642000 643000 644000 645000 646000

252000 251000 250000 249000

N

LEGEND

Lesser Black-backed Gull (LBBG) Compensation Area

0 250 500

Metres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

SITE LOCATION

VER	DATE	REMARKS	Drawn	Checked
1	02/02/2024	For Submission	DB	JRS

DRAWING NUMBER: 1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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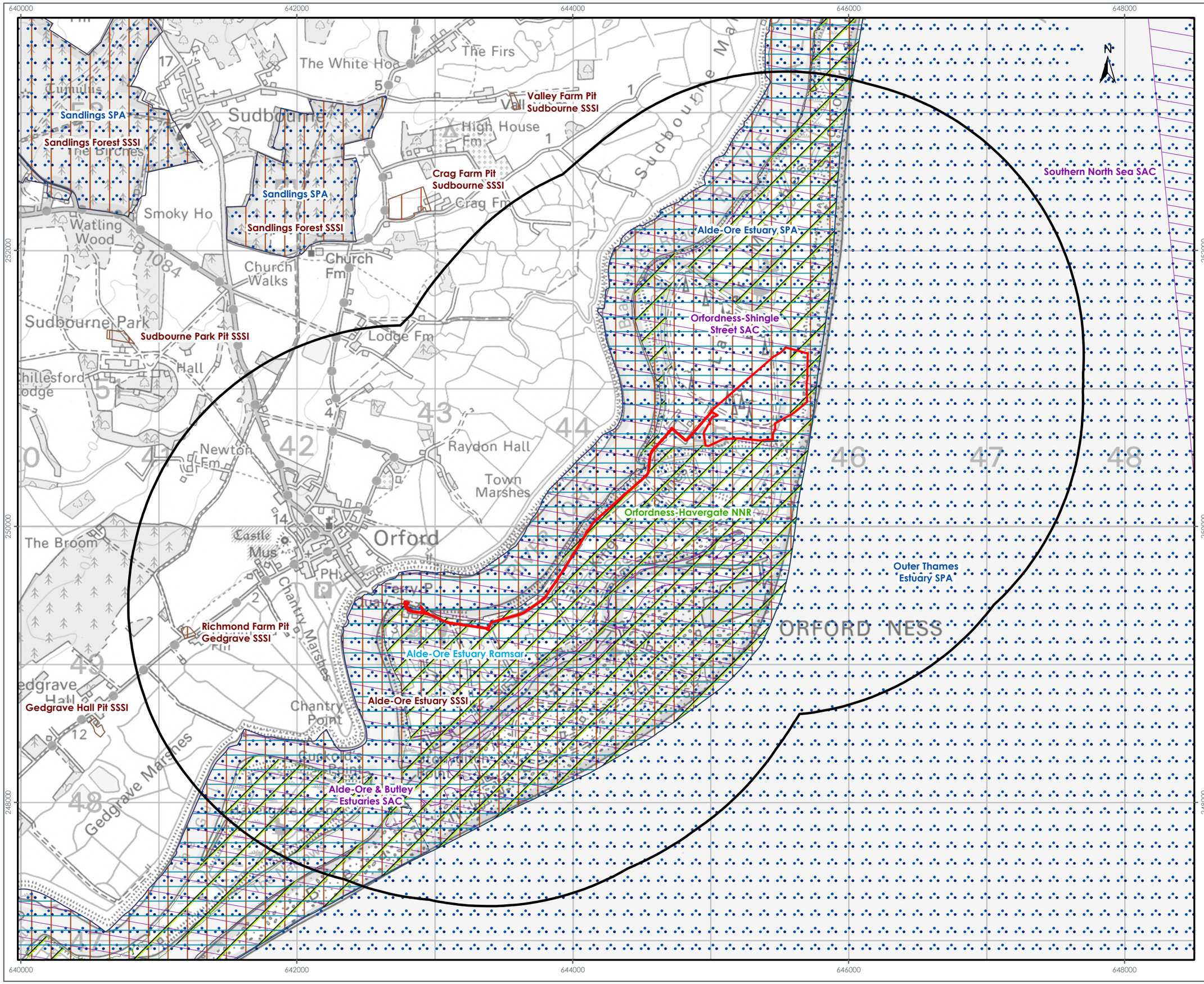
FIVE ESTUARIES OFFSHORE WIND FARM



LEGEND

- Lesser Black-backed Gull (LBBG) Compensation Area
- Lesser Black-backed Gull (LBBG) Compensation Area 2 km Buffer
- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)

0 0.5 1
Kilometres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
STATUTORY DESIGNATED SITES

VER	DATE	REMARKS	Drawn	Checked
1	02/02/2024	For Submission	DB	JRS

DRAWING NUMBER: 2

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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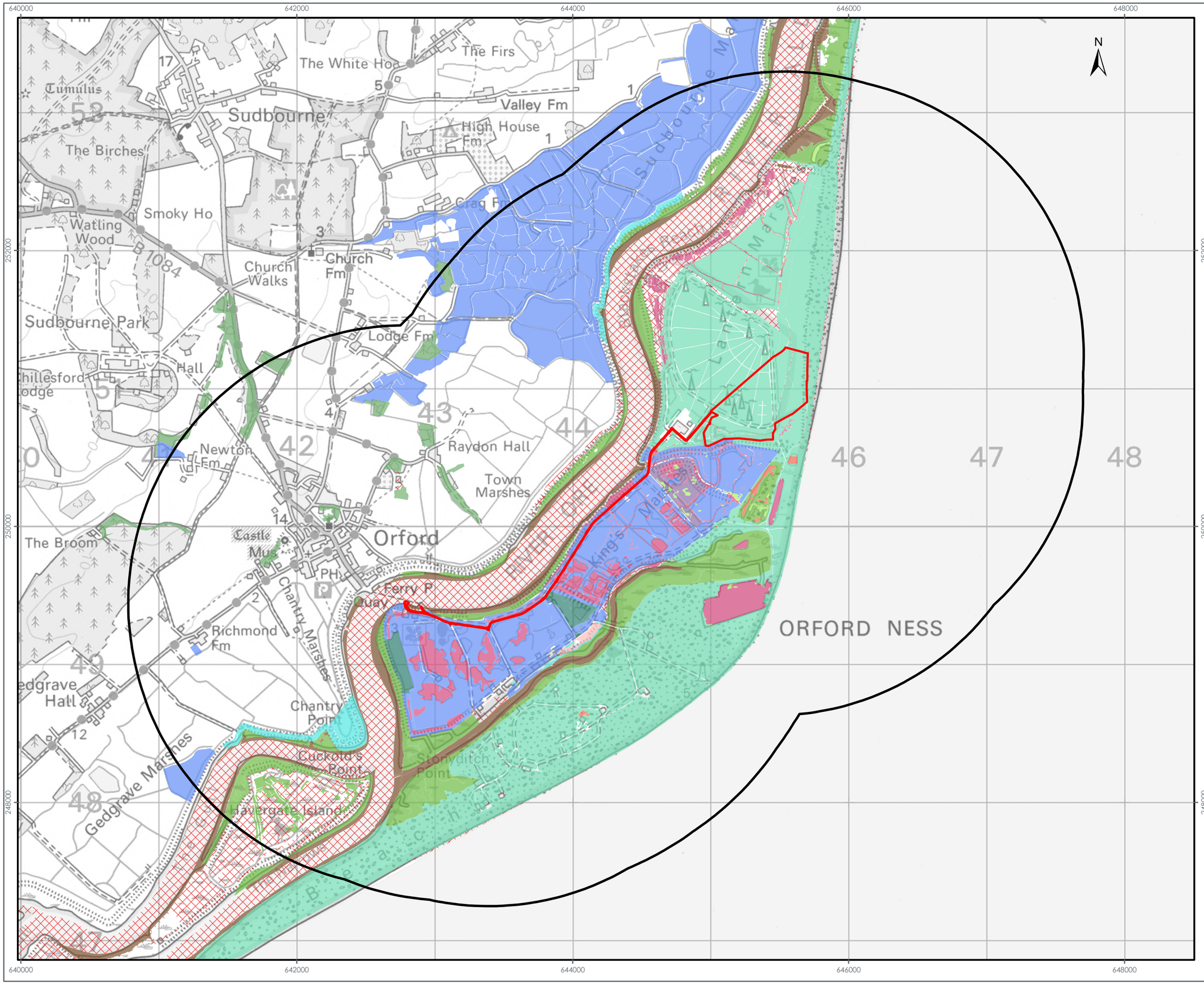
FIVE ESTUARIES
OFFSHORE WIND FARM



LEGEND

- Lesser Black-backed Gull (LBBG) Compensation Area
- Lesser Black-backed Gull (LBBG) Compensation Area 2 km Buffer

Priority Habitat Inventory

- Coastal and Floodplain Grazing Marsh
- Coastal Saltmarsh
- Coastal and Floodplain Grazing Marsh / Coastal Saltmarsh
- Coastal Saltmarsh / Saline Lagoon
- Coastal Vegetated Shingle
- Coastal Vegetated Shingle / Saline Lagoon
- Deciduous Woodland
- Good Quality Semi Improved Grassland
- Lowland Dry Acid Grassland
- Mudflat
- Reedbed
- Saline Lagoon
- No Main Habitat but Additional Habitats Present

0 0.5 1
Kilometres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
PRIORITY / ANNEX I HABITATS

VER	DATE	REMARKS	Drawn	Checked
1	02/02/2024	For Submission	DB	JRS

DRAWING NUMBER: 3

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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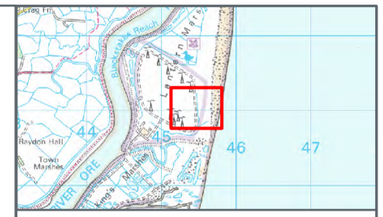
FIVE ESTUARIES
OFFSHORE WIND FARM

645200
645400
645600
645800
251200
251000
250800

N

s3b5 1220
r1 191
t2g5 1150
t2g5 1150
t2g5 1150
t2g5 1150
t2g5 1150
r1 191
r1 191



LEGEND

- Lesser Black-backed Gull (LBBG) Compensation Area
- Proposed Fence Line

UK Habitat Classification

Watercourse

- r1 - Standing Open Water and Canal

Marine Inlets and Transitional Waters - Littoral Sediment

- t2g5 - Saline Lagoon (H1150)

Sparsely Vegetated Land - Supralittoral Sediment

- s3b5 - Perennial Vegetation on Coastal Shingle (H1220)

Secondary Codes:
191 - Ditch
1150 - Coastal Lagoon
1220 - Perennial Vegetation on Stony Bank

0 50 100
Metres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

VE2 UK HABITAT CLASSIFICATION

VER	DATE	REMARKS	Drawn	Checked
1	02/02/2024	For Submission	DB	JRS

DRAWING NUMBER: 4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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FIVE ESTUARIES
OFFSHORE WIND FARM

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FIVE ESTUARIES
OFFSHORE WIND FARM

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