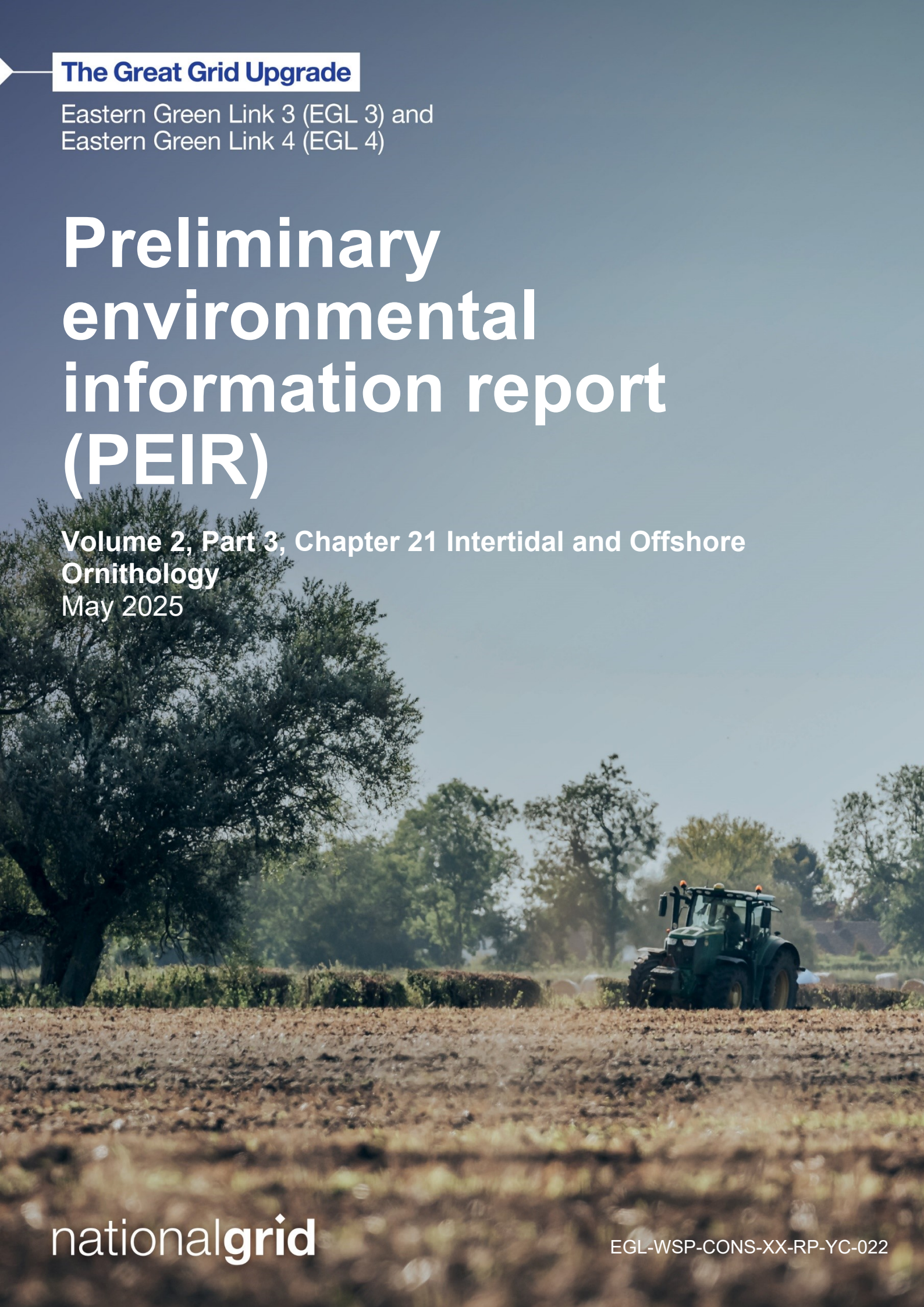
The Great Grid Upgrade

Eastern Green Link 3 (EGL 3) and
Eastern Green Link 4 (EGL 4)

Preliminary environmental information report (PEIR)

Volume 2, Part 3, Chapter 21 Intertidal and Offshore Ornithology

May 2025



nationalgrid

EGL-WSP-CONS-XX-RP-YC-022

Contents

21. Intertidal and Offshore Ornithology

nationalgrid

21. Intertidal and Offshore Ornithology

21.1 Introduction

21.1.1 This chapter presents the preliminary findings of the Environmental Impact Assessment (EIA) undertaken to date for the offshore elements of the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) schemes in English waters (the English Offshore Scheme) seaward of Mean High Water Springs (MHWS) with respect to intertidal and offshore ornithology. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the description of the English Offshore Scheme provided in **Volume 1, Part 1, Chapter 4: Description of the Projects.**

21.1.2 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, environmental measures, and the preliminary intertidal and offshore ornithology effects that could result from the English Offshore Scheme during the construction, operation (and maintenance) and decommissioning phases. Specifically, it relates to the marine environment seaward of MHWS including the intertidal zone between MHWS and Mean Low Water Springs (MLWS).

21.1.3 This chapter should be read in conjunction with:

- **Volume 1, Part 2, Chapter 6: Biodiversity** - which identifies the potential impacts on onshore ecology and receptors which might be using the intertidal area;
- **Volume 1, Part 3, Chapter 17: Designated Sites** (due to the identification and assessment of sites designated for the protection of intertidal and/or offshore ornithological receptors that have the potential to be affected by the English Offshore Scheme).
- **Volume 1, Part 3, Chapter 19: Intertidal and Subtidal Benthic Ecology** (due to the close association between some habitats, flora and fauna, and the availability of prey species for intertidal and/or offshore ornithological receptors); and
- **Volume 1, Part 3, Chapter 20: Fish and Shellfish Ecology** (due to the importance of fish and shellfish as prey species for intertidal and/or offshore ornithological receptors and the potential for fish and shellfish to be affected by the English Offshore Scheme).

21.1.4 This chapter is supported by the following figures:

- **Volume 3, Part 3, Figure 21-1: Ornithology Study Area**
- **Volume 3, Part 3, Figure 21-2: Designated Sites**
- **Volume 3, Part 3, Figure 21-3: Offshore common scoter density distribution in relation to the draft Order Limits**
- **Volume 3, Part 3, Figure 21-4: Offshore red-throated diver density distribution in relation to the draft Order Limits**
- **Volume 3, Part 3, Figure 21-5: Offshore little gull density distribution in relation to the draft Order Limits**

- **Volume 3, Part 3, Figure 21-6: Cable and pipeline crossings within the Greater Wash SPA**
- This chapter is supported by the following appendices:
- **Volume 2, Part 3, Appendix 3.21.A: Supporting information intertidal and offshore ornithology**
- **EGL 3 and EGL 4 Draft HRA Report (May 2025, document reference EGL-WSP-CONS-XX-RP-Y-001)**
- **Volume 2, Part 1, Appendix 1.5.C: Outline Construction Environmental Management Plan;**
- **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context;**
- **Volume 2, Part 1, Appendix 1.2.B: Marine Plan Assessment**
- **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**.

21.1.5 As set out in **Volume 1, Part 1, Chapter 1: Introduction,** cable installation and some associated activities beyond 12 nautical miles (NM) are exempt under the Marine and Coastal Access Act (MCAA) as well as repair of the installed cable. This chapter presents a preliminary assessment of the cable route from MHWS at the Anderby Creek Landfall to the border with Scottish adjacent waters. This is to provide a holistic view of the English Offshore Scheme and any associated impacts, however, consent is not being sought for the exempt cable (either installation or repair) and only cable protection and dredging for sandwave levelling will be included in the deemed Marine Licences (dML) beyond 12 NM.

Limitations

21.1.6 The information provided in this Preliminary Environmental Impact Report (PEIR) is preliminary, and the final assessment of potential significant effects will be reported in the Environmental Statement (ES). The PEIR has been produced to fulfil the Applicant's consultation duties in accordance with Section 42 of the Planning Act 2008 (PA2008) and enable consultees to develop an informed view of the preliminary potential significant effects of the English Offshore Scheme.

21.1.7 This PEIR has been collated based on a range of publicly available data and information. The data has not been supplemented by additional project specific offshore ornithological surveys as the publicly available information collated as part of the desktop review was considered sufficient for the nature of the English Offshore Scheme. During a meeting with Natural England on 03 March 2025, the Applicant confirmed that no offshore aerial ornithology surveys would be undertaken to support this PEIR chapter.

21.1.8 It is assumed that the data collated is accurate. The publicly available data includes additional information acquired as part of the stakeholder engagement process. It should be noted that the survey data currently available for the Greater Wash Special Protection Area (SPA) was published in 2016 (Lawson *et al.,* 2015, REF 21.1). A more recent survey was commissioned by Natural England and carried out over the winter of 2022/23. Preliminary data from the 2022/23 survey has been viewed by the Applicant, a full analysis of this will be provided as part of the ES. This PEIR chapter has therefore been informed by the 2016 survey data. Whilst some data sets are limited as they provide a short 'snapshot' of the populations present within the Greater Wash SPA during one day in one particular season, the Applicant has also made use of available

data from offshore wind farm projects in the area of the English Offshore Scheme, as well as information from the Joint Nature Conservation Committee (JNCC, 2016, REF 21.2) which was used to inform the designation of the Greater Wash SPA (Lawson *et al.,* 2015, REF 21.1). Whilst the Applicant recognises that the use of data from offshore wind projects will not provide a full 'picture' of seasonal and annual variation in species distribution and density, it will assist in the identification of trends, for example certain hotspots for red-throated diver (*Gavia stellata*).

21.1.9 The assessment has been undertaken based on the description of the Offshore Scheme presented in **Volume 1, Part 1, Chapter 4: Description of the Projects.** To allow flexibility due to changing seabed conditions or features, it is assumed that the English Offshore Scheme could be installed anywhere within the draft Order Limits. Whilst indicative locations have been provided for external cable protection, it is also assumed that remedial external cable protection could be used at any point along the English Offshore Scheme and therefore anywhere within the draft Order Limits.

21.1.10 A precautionary approach has been taken based on experience of similar linear projects and professional judgement, to inform the scope of the assessment.

Preliminary significance conclusions

21.1.11 All effects in relation to intertidal and offshore ornithology have been assessed as not significant. Further details of the methodology behind the assessment, and a detailed narrative of the assessment itself are provided within the sections below.

21.2 Relevant technical guidance

21.2.1 The legislation and planning policy which has informed the assessment of effects with respect to intertidal and offshore ornithology is provided within **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context and Volume 2, Part 1, Appendix 1.2.B: Marine Plan Assessment**. Further information on policies relevant to the English Offshore Scheme is provided in **Chapter 2: Regulatory and Policy Overview.** Relevant technical guidance, specific to intertidal and offshore ornithology, that has informed this PEIR and will subsequently inform the assessment within the ES is summarised below.

Technical guidance

21.2.2 A summary of the technical guidance for intertidal and offshore ornithology is given in **Table 21-1.**

Table 21-1 – Technical guidance relevant to the intertidal and offshore ornithology assessment

Technical guidance document	Context
Natural England Conservation Advice for Marine Protected Areas (Natural England, 2013, REF 21.3)	Provides conservation advice for Marine Protected Areas within England's territorial waters.
Joint Nature Conservation Committee (JNCC) Conservation Advice for Marine Protected Areas (JNCC, 2019, REF 21.4)	Provides conservation advice for Marine Protected Areas up to England's Exclusive Economic Zone Limit.

Technical guidance document	Context
Joint Statutory Nature Conservation Bodies (SNCBs) Interim Displacement Advice Note (MIG-Birds, 2017, REF 21.5)	Group for ornithology (MIG-Birds) with contributions from Joint Nature Conservation Committee, Natural England, Natural Resources Wales, Northern Ireland Environment Agency and Scottish Natural Heritage. Although prepared to advise on how offshore wind development should present information on the extent and potential consequences of seabird displacement, certain aspects can be applied to vessel disturbance.
Joint Statutory Nature Conservation Bodies (SNCBs) interim advice on the treatment of displacement for red-throated diver (MIG-Birds, 2022, REF 21.6)	Provides updated advice on treatment of displacement of red-throated diver in relation to offshore wind development and supersedes the 2017 advice note. Recommends a displacement buffer of at least 10 km for impact assessment where an offshore wind farm is within 10 km of a SPA designated for non-breeding red-throated diver, and 4 km for vessel disturbance.
Natural England's Best Practice Protocol for Vessels in Red-throated Diver SPAs (Natural England, 2025, REF 21.7)	Natural England has developed text for licence conditions of vessel management plans for proposals where a Red-throated diver Best Practice Protocol is required. The Protocol is to be adopted where there is a need to minimise risk from vessel disturbance from activities like cable installation or where construction, operation and maintenance vessels will transit through a site designated for this species.
Natural England offshore wind cabling: ten years experience and recommendations (Natural England, 2018, REF 21.8)	Provides evidence for Natural England's advice on impact assessments for cable projects and their advice for routeing and mitigation.
Natural England and Joint Nature Conservation Committee (JNCC) guidance on key sensitivities of habitats and Marine Protected Areas in English waters to aggregate extraction (Atterbury *et al.,* 2021, REF 21.9)	Provides advice on marine bird sensitivities to impacts such as visual disturbance, above water noise and changes in suspended solids (water clarity).

21.3 Consultation and engagement

Overview

21.3.1 The assessment has been informed by non-statutory consultation responses relevant to the intertidal area and ongoing stakeholder engagement. An overview of the approach

to consultation is provided in **Section 5.9** of **Chapter 5: PEIR Approach and Methodology**.

Scoping Opinion

21.3.2 A Scoping Opinion was adopted by the Secretary of State, and issued by the Planning Inspectorate, on 05 September 2024. A summary of the relevant responses received in the Scoping Opinion in relation to intertidal and offshore ornithology and confirmation of how these have been addressed within the assessment to date is presented in **Table 21-2.**

21.3.3 Potential impacts that have been scoped 'in' to this assessment are summarised in **Table 21-12**.

21.3.4 The information provided in the PEIR is preliminary and all comments will be addressed in full within the ES.

Table 21-2 – Summary of EIA Scoping Opinion responses for intertidal and offshore ornithology

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate	ID 5.4.1: Inspector agreed with Applicant's proposal to scope out "Temporary increase and deposition of suspended sediments" for the receptor "sea ducks, geese and swans" during all phases.	Receptor and impact pathway remains scoped out in the PEIR .
	ID 5.4.2: Inspector agreed with Applicant's proposal to scope out "Temporary increase and deposition of suspended sediments" for the receptor "Harriers and Waders" during all phases.	Receptor and impact pathway remains scoped out in preliminary environmental assessment.
	ID 5.4.3: Inspector agreed with Applicant's proposal to scope out "Changes in distribution of prey species" during pre-sweeping of sand waves and cable burial and trenching, for the receptor "all species" during all phases.	Receptor and impact pathway remains scoped out in preliminary environmental assessment.
	ID 5.4.4: Inspector agreed with Applicant's proposal to scope out "Changes in distribution of prey species during deposit of cable protection" for the receptor "all species" during decommissioning.	Receptor and impact pathway remains scoped out in preliminary environmental assessment.

Consultee	Consideration	How addressed in this PEIR
	ID 5.4.5: Inspector agreed with Applicant's proposal to scope out "Visual/physical disturbance or displacement" on the receptor "terns, gulls, kittiwakes and gannets" during all phases.	Receptor and impact pathway remains scoped out in preliminary environmental assessment.
	ID 5.4.6: Inspector agreed with Applicant's proposal to scope out "Accidental spills (Hydrocarbon and Polycyclic aromatic Hydrocarbons (PAH) contamination)" on the receptor "all species" during all phases.	Receptor and impact pathway remains scoped out in preliminary environmental assessment.
	ID 5.4.7: Inspector recommended that the Applicant should seek agreement from relevant conservation bodies with regards to not completing offshore specific bird surveys.	During a meeting with Natural England on 03 March 2025, the Applicant confirmed that no offshore aerial ornithology surveys would be undertaken to support this PEIR chapter.
Marine Management Organisation (MMO)	The Marine Management Organisation (MMO) advises that the number and duration of vessels to be used throughout the works are clearly presented. This includes any surveys pre- and post-construction. The time vessels will spend inside the Greater Wash SPA and a 2.5 km buffer around the SPA should also be clearly presented.	The number of vessels expected to be required for pre-installation and construction works is set out in **Section 21.8.** A preliminary vessel disturbance assessment has been carried out which has determined that the English Offshore Scheme will not exceed the thresholds for significant visual or physical disturbance to intertidal and offshore ornithology receptors as a result of vessel movements. A full vessel disturbance assessment will be carried out and presented in the ES, following the guidance provided by the Joint Nature Conservation Committee (JNCC) in the EGL 3 Marine Management Organisation (MMO) Non-Statutory Consultation Response received in May 2024. It
Marine Management Organisation (MMO)	The Marine Management Organisation (MMO), in consultation with Joint Nature Conservation Committee (JNCC), advised that works occurring within or around the Greater Wash SPA are carried out outside of the wintering period for common scoter and red-throated diver which are present in the Greater Wash SPA between September and	

Consultee	Consideration	How addressed in this PEIR
	April (inclusive). If this is not possible then a vessel disturbance assessment should be carried out.	should be noted that only vessel movements within the draft Order Limits will be assessed as transit between port and the area of works is not subject to marine licensing requirements.

Technical engagement

21.3.5 Technical engagement with consultees in relation to intertidal and offshore ornithology is ongoing. A summary of the technical engagement undertaken to date February 2025 is outlined in **Table 21-3.** It should be noted that the Applicant has held regular meetings with stakeholders, including Natural England, the Marine Management Organisation (MMO) and the Joint Nature Conservation Committee (JNCC) to discuss offshore and onshore aspects of the EGL 3 Project and the EGL 4 Project. However, only those meetings of relevance to intertidal and offshore ornithology within the English Offshore Scheme have been included in **Table 21-3.**

Table 21-3 – Technical engagement on the environmental aspect assessment

Consultee	Consideration	How addressed in this PEIR
Natural England Joint Nature Conservation Committee (JNCC)	Introductory meeting held via MS Teams on 26 April 2023. Natural England requested that activities within the Greater Wash SPA be clearly outlined in the consent applications and that vessel movements should be logged.	**Volume 1, Part 1, Chapter 4: Description of the Projects, Section 4.5: Construction** describes the activities to be undertaken. A preliminary vessel disturbance assessment has been provided in **Sections 21.13** and **21.14** of this chapter, and a final assessment will be carried out for the ES.
Natural England	First monthly call held via MS Teams on 18 September 2024. Discussed use of environmental survey results to date to inform micro-routeing. Natural England advised the use of a precautionary approach and the mitigation hierarchy during assessment and discussion of approach in expert topic groups.	Assessments have informed the final route design. Precautionary approach and the mitigation hierarchy have been used throughout the process.
Marine Management Organisation (MMO)	Project update meeting held via MS Teams on 07 February 2025. Highlighted presence of	Red-throated diver presence in the Greater Wash SPA is

Consultee	Consideration	How addressed in this PEIR
	red-throated diver in the Greater Wash SPA. The Applicant confirmed that this will be discussed with Natural England following their scoping response.	discussed in **Section 21.5** of this PEIR chapter.
Joint Nature Conservation Committee (JNCC)	Project update meeting held via MS Teams on 10 February 2025. Highlighted presence of red-throated diver in the Greater Wash SPA. The Applicant confirmed that this will be discussed with Natural England following their scoping response.	Red-throated diver presence in the Greater Wash SPA is discussed in **Section 21.5** of this PEIR chapter.
Natural England	Ornithology meeting held via MS Teams on 13 February 2025. Natural England content with proposed onshore survey methods. Applicant to provide a simple overview of ornithology data available across the English Offshore Scheme.	Whilst this meeting primarily discussed onshore ornithology it touched upon the vantage point surveys and method to be undertaken at the Anderby Creek Landfall which is relevant for the English Offshore Scheme. This has been addressed within this chapter in **Table 21-4,** listing out all publicly available data used to inform the baseline.
Natural England	Monthly update meeting held via MS Teams on 03 March 2025. The Applicant confirmed that no offshore aerial ornithology surveys would be undertaken. No opposition was raised to this approach. The Applicant requested sight of the 2022/23 aerial survey data which was commissioned by Natural England.	This PEIR chapter has made use of the Lawson *et al.* (2015, REF 21.1) aerial survey data. Whilst the Applicant has viewed the 2022/23 survey data, it was available as the preliminary assessments were completed. A detailed review will be undertaken to inform the ES to ensure that sufficient time is taken to complete a robust assessment.
Natural England	Monthly update meeting held via MS Teams on 07 April 2025. The Applicant presented the preliminary findings of the assessments presented in this PEIR chapter with a focus on	A preliminary vessel disturbance assessment has been provided in **Sections 21.13**and **21.14** of this chapter, and a final assessment will be carried out

Consultee	Consideration	How addressed in this PEIR
	the Greater Wash SPA, noting that the 2022 / 23 aerial survey data was not available to inform the PEIR but would be used for the ES. Natural England noted that: an additional aerial data set covering the period 2021 / 22 may also be available on request for the Greater Wash SPA; hot spots for red-throated diver and common scoter have been identified closer to the Anderby Creek Landfall in the more recent aerial data; it would be useful to present the number of birds affected as a percentage of the population alongside the percentage of the Greater Wash SPA area affected; and reiterated that Natural England would still seek seasonal restrictions on vessel movements.	for the ES. The number of birds affected as a percentage of the population has been calculated based on the Lawson *et al.* (2015, REF 21.1) aerial survey data. Whilst the Applicant has viewed the 2022 / 23 survey data, a detailed review will be undertaken to inform the ES to complete a robust assessment. The 2021 / 22 aerial data set will be requested from Natural England to inform the ES.

21.4 Data gathering methodology

21.4.1 This PEIR has been collated based on a range of publicly available data and information. It is assumed that the data collated is accurate. The data has been supplemented with additional information acquired as part of the Stakeholder engagement process. The sources of data used are noted in **Table 21-4.**

Study area

21.4.2 The English Offshore Scheme will route from Anderby Creek across the Southern and Central North Sea to the boundary between the English and Scottish Exclusive Economic Zones (EEZ). The draft Order Limits for the English Offshore Scheme is illustrated in **Volume 3, Part 3, Figure 21-1 Ornithology Study Area**.

21.4.3 The study area used in the intertidal and offshore ornithology assessment was defined with reference to the maximum likely Zone of Influence (ZoI) over which the English Offshore Scheme may incur potential significant effects (noting the ZoI may vary by species or phase of development), with consideration of the need to gather sufficient data to account for worst case scenarios for the impact assessment. It takes into consideration:

- Seabird foraging ranges (Thaxter *et al*., 2012, REF 21.10); Woodward *et al.,* 2019, REF 21.11).

- Recent recommendations from Statutory Nature Conservation Bodies SNCBsregarding maximum disturbance/displacement ranges for sensitive bird species (MIG-Birds, 2022, REF 21.6).
- Maximum tidal excursion to encompass the potential impact pathway from increased sediment concentrations, which could affect a bird's ability to seek prey.

21.4.4 The defined ZoI are feature-specific, this can be for functional groups or individual species where relevant. It should be noted that the ZoI can change depending on the stage the English Offshore Scheme is in e.g., it may be larger during construction for a certain receptor than it is during operation. The ZoI can also vary depending on the individual sensitivities of different bird species within the same ornithological group. In this case, the largest ZoI for that functional group has been considered.

21.4.5 The study area for intertidal and offshore ornithology includes the draft Order Limits to MHWS plus an additional 15 km buffer either side and is illustrated in **Volume 3, Part 3, Figure 21-1 Ornithology Study Area**. This is a precautionary maximum ZoI that encompasses the worst-case scenario of potential impact pathways from increased suspended sediment concentrations. It is based on the conclusions of **Volume 1, Part 3, Chapter 18: Coastal and Marine Physical Processes**. According to advice from Statutory Nature Conservation Bodies SNCBs, a maximum buffer of 10 km should be applied to consider disturbance effects on red-throated diver (*Gavia stellata*) and a buffer of at least 4 km should be applied for other diving birds (MIG-Birds, 2022, REF 21.6). The 15 km buffer used to define the study area is therefore sufficiently precautionary to cover the potential effects of displacement as well as potential effects resulting from increases in turbidity.

Tidal River Works

21.4.6 In addition to the English Offshore Scheme works are proposed within a tidal river. The works consist of the following:

- Tidal river crossings of the River Nene and the River Welland by Horizontal Directional Drilling (HDD) or trenchless solution beneath the bed of the rivers
- Option for the construction of a Temporary Quay on the River Nene.

21.4.7 In respect to the Tidal River Crossings and in accordance with Article 35 of the 2011 Exempted Activities Order these activities are considered a 'bored tunnel' and exempt from needing a Marine Licence. As works will be carried out wholly under the seabed there will be no interaction with and no potential for significant adverse effects on the marine environment. Therefore, these works will not be included in the dMLs. Impacts relating to the drill entry and exit above MHWS are assessed in relevant chapters of the English Onshore Scheme in **Volume 1, Part 2 English Onshore Scheme**.

21.4.8 The River Nene Temporary Quay is an option being explored within the Projects' design for delivery of components for the English Onshore Scheme. At this stage feasibility of the temporary quay is still being explored, and insufficient information is available to complete a preliminary assessment. If this option is taken forward, the ES will include a full assessment of effects of the temporary quay. **Section 21.16** outlines the further work that will be undertaken to inform the assessment.

Publicly available data

21.4.9 Desk-based reviews of publicly available data sources (literature and GIS mapping files) have been used to describe the baseline environment. A summary of the organisations that have supplied data, and the source and nature of that data is outlined in **Table 21-4**

Table 21-4 – Data sources used to inform the intertidal and offshore ornithology assessment

Organisation	Data source	Data provided
NIRAS on behalf of The Crown Estate (TCE)	Woodward *et al.* (2019, REF 21.11)	Seabird foraging ranges
British Trust for Ornithology (BTO)	Thaxter *et al*. (2012, REF 21.10)	Seabird foraging ranges
British Trust for Ornithology (BTO) Non-Estuarine Waterbird Surveys (NEWS)	Wetland Bird Survey Data – Results of the third Non-Estuarine Waterbird Survey, including Population Estimates for Key Waterbird Species (Austin *et al.,* 2017, REF 21.12)	Waterbird Populations: Numbers and Trends by Count Sector
British Trust for Ornithology (BTO) Wetland Bird Survey (WebS)	Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme (Woodward *et al.,* 2024, REF 21.13)	Annual survey reports of wetland waterbirds Sector: Anderby Location Code: 35S01 Habitat: goose and swan 'fields'
Joint Nature Conservation Committee (JNCC)	(Lawson *et al.,* 2015, REF 21.1)	Description and presentation of aerial survey data collected over five winter seasons between 2002 and 2008 providing information on the density distribution of protected bird species within the Greater Wash SPA.
Natural England and Joint Nature Conservation Committee (JNCC)	Departmental Brief: Greater Wash potential Special Protection Area (Natural England and JNCC, 2016, REF 21.14)	Description of Greater Wash SPA including species density data presented by Lawson *et al., (*2015)., REF 21.1)
Environmental Statements from Offshore Wind Farm (OWF) Developments. From Planning Inspectorate Public Register	• Outer Dowsing Offshore Wind Environmental Statement Chapter 12: Offshore and Intertidal Ornithology (Outer Dowsing Offshore Wind (2024, REF 21.15)	Offshore wind farms collect two years of aerial and boat-based data for marine birds within array sites to inform Development Consent applications. The following OWFs lie within the wider

Organisation	Data source	Data provided
	• Hornsea 4 Offshore Wind Farm Environmental Statement, Volume A2, Chapter 5: Offshore and Intertidal Ornithology (APEM, 2021, REF 21.16) • Hornsea Offshore Wind Farm Project One Environmental Statement, Volume 5, Chapter 5.5.1 Ornithology Technical Report (RPS 2013, REF 21.17) • Hornsea 3 Offshore Wind Farm Environmental Statement, Volume 2, Chapter 5, Offshore Ornithology (NIRAS Consulting Ltd., 2018, REF 21.18)	region around the draft Order Limits and data from the consent applications has been analysed to inform the baseline description.
International Convention for the Conservation of Nature (IUCN)	The IUCN Red List of Threatened Species (https://www.iucnredlist.org)	Extinction risk status of protected species.
Natural England	Conservation Advice for Marine Protected Areas (Natural England, 2013, REF 21.19)	Includes summaries of site characteristics and designated features. Provides the conservation objectives for the site and expands them to give detail on ecological attributes. Advice on operations and seasonality information provides guidance on Project activities and timings.
National Bird Atlas	Balmer *et al.,* (2013, REF 21.20)	Results of the five years of breeding season and wintering surveys across the UK at a 10 km resolution
Department for Business, Energy & Industrial Strategy	Offshore Energy Strategic Environmental Assessment (SEA) 4 (BEIS, 2022, REF 21.21)	Literature review of knowledge of marine bird baseline

Survey work

21.4.10 Due to the temporary and transient nature of construction, offshore site-specific bird surveys are not considered necessary for the English Offshore Scheme, which is

consistent with the approach taken by other subsea electricity interconnectors installed in UK waters, for example Viking Link (National Grid Viking Link Ltd. and Energinet.dk (2017), REF 21.22) and GridLink (GridLink Interconnector Ltd (2020), REF 21.23). A number of bird surveys have been conducted for the English Onshore Scheme which include a single coastal vantage point survey at Anderby Creek Landfall. These were designed to incorporate the draft Order Limits and a potential ZoI for wintering, breeding, passage and intertidal bird surveys; these commenced in September 2024 and are ongoing. These included walked transect surveys timed to cover high and low tide survey periods, the data from which will be used to inform the ES.

21.5 Overall baseline

21.5.1 Intertidal and offshore ornithology refers to the diversity, abundance and function of bird species present in the study area up to MHWS, at all life stages including feeding, breeding, overwintering and migrating. Marine birds are highly mobile but can be constrained during certain times of the year by factors such as their need to return to a colony to feed and care for chicks, or when they are flightless during a post-breeding moult. Species can also be restricted by their foraging strategy, the availability of prey species and their sensitivity to human activities such as vessel traffic (Atterbury *et al*., 2021)(REF 21.9).

21.5.2 The Anderby Creek Landfall and first 66.4 km of the English Offshore Scheme draft Order Limits are within the Greater Wash SPA. Offshore, the draft Order Limits lie within a shallow area of low salinity which is of importance for a number of bird species, in particular divers, gulls, seaduck and terns ((BEIS, 2022, REF 21.21); JNCC, 1995, REF 21.24)). In the wider region, there are several offshore designated sites that include a variety of marine habitats of importance for breeding and non-breeding birds, including extensive intertidal mudflats and sandflats, subtidal sandbanks and biogenic reef. The area off the Lincolnshire coastline is characterised by extensive sandbank features present at depths of less than 25 m, many of which are protected for their importance in providing habitat and affecting water and sediment dynamics (BEIS, 2022, REF 21.21).

Current baseline

21.5.3 The intertidal ecology baseline is described in **Volume 1, Part 3, Chapter 19: Intertidal and Subtidal Benthic Ecology** and can be summarised as follows: The landfall lies at Anderby Creek where the foreshore sediments are composed of a diverse range of habitats, including sand dunes with marram grass (N1) in the supralittoral zone, coarse sediment, and a strand line of shell debris and washed-up fauna (MA521). The upper eulittoral consists of coarse sand (MA5231) with finer mobile sand patches (MA523). A tidal stream marks the transition to the lower eulittoral, which contains finer sand and occasional puddles. Sand mason (*Lanice conchilega*) habitats were observed at low tide, along with crabs, large whelks, bivalves and polychaetes.

21.5.4 The Anderby Creek Landfall lies within The Wetland Bird Survey (WeBS) site Anderby (Location Code 35S01). The site is set back from the MHWS mark in the adjacent fields with the habitat noted as goose and swan ‘fields’. **Volume 2, Part 3, Appendix 3.21.A Supporting Information: Intertidal and Offshore Ornithology** presents the annual peak counts data for the last 10 years as published in the 2022/2023 WeBS report. The average number of birds using the site has increased over the last five years with the average total 5-year count being 534 individuals. 2022/2023 saw a five-year high with numbers reaching 937. Forty-seven different species have been recorded in the last 10

years using the site, although 17 species have only been identified in one or two years in low numbers. The most prevalent functional group are species 'seaducks, swans and geese' (18 species) with 'waders' (15 species) also highly represented. Six species of gull and three species of 'divers, grebes and mergansers' have been noted. The remainder are either terrestrial birds or species that prefer terrestrial waterbodies such as rivers, lakes and ponds.

21.5.5 The top five abundant species over the last five years are (in order of abundance) wigeon (*Anas penelope*), black-headed gull (*Chroicocephalus ridibundus*), lapwing (*Vanellus Vanellus*), curlew (*Numenius arquata*) and teal (*Anas crecca*). Of the marine birds present black-headed gull and herring gull (*Larus argentatus*) are the most numerous.

21.5.6 Whilst the Anderby Creek Landfall vantage point surveys are ongoing, preliminary results at Anderby Creek recorded red-throated diver and common scoter (*Melanitta negra*) on only two surveys to date. A peak count of two red-throated diver in September 2024 and a peak count of 25 common scoter were recorded in January 2025 within the first few hundred metres out to sea.

Marine Birds

21.5.7 The Offshore Energy Strategic Environmental Assessment (OESEA) 4 (BEIS, 2022, REF 21.21) provides an overview of the UK's baseline environment to support discussions on the potential development of renewable energy and oil and gas extraction. It describes the UK's bird fauna as "western Palaearctic," indicating that most species are distributed across western Europe and extend into parts of western Asia and northern Africa.

21.5.8 Digital aerial bird surveys from offshore wind farms in the study area (Outer Dowsing, Hornsea 3 and 4) consistently identified a number of marine birds as present in the study area, which are included below.

21.5.9 For the purpose of this preliminary environmental assessment, marine bird species have been described based on their functional groups (based on Atterbury *et al*., 2021, REF 21.9).

Divers, grebes and mergansers

21.5.10 This functional group is highly sensitive to noise and visual disturbances, such as those caused by vessel traffic (Fliessbach *et al*., 2019, REF 21.25), cited in Atterbury *et al*., 2021, REF 21.9). Some species, including red-throated divers, may not quickly resettle after being flushed, effectively losing the vessel transit route and a buffer zone of several kilometres as habitat (Mendel *et al*., 2019, REF 21.26), cited in Atterbury *et al*., 2021, REF 21.9). Additionally, these birds are thought to be sensitive to underwater noise and may be affected by increased suspended sediment when foraging in the water column.

21.5.11 These species typically gather in coastal waters, including bays and estuaries, often forming large aggregations in some areas during winter. During the breeding season, their foraging activity is generally confined to restricted ranges near breeding sites. Post-breeding, many species undergo a flightless moulting period, during which they may be especially vulnerable to anthropogenic impacts. While primarily considered water column feeders, some evidence suggests that certain species may also feed on benthic prey (Duckworth *et al*., 2020, REF 21.27), cited in Atterbury *et al*., 2021, REF 21.9).

21.5.12 Joint Nature Conservation Committee (JNCC) and Wildfowl and Wetlands Trust (WWT) undertook aerial bird surveys of the Greater Wash SPA between 2003 and 2007 and recorded the following species from this functional group (Wilson *et al*., 2009, REF 21.28)

- Great crested grebe (*Podiceps cristatus*)
- Great northern diver (*Gavia immer*)
- Red-throated diver (*Gavia stellata*)

21.5.13 Digital aerial bird surveys in the vicinity of the Greater Wash SPA carried out by various OWF projects (Hornsea One, Race Bank, Dudgeon & Sheringham Shoal OWF Extensions) identified the following species from this functional group (21. RPS, 2013, REF 21.29); The Crown Estate, 2021; REF 21.30; Equinor, 2021, REF 21.31) respectively):

- Black-throated diver (*Gavia arctica*)
- Great crested grebe
- Great northern diver
- Red-necked grebe (*Podiceps grisegena)*
- Red-throated diver
- Cormorant (*Phalacrocoracidae*)
- Shag (*Phalacrocorax aristotelis*)
- Slavonian grebe (*Podiceps auritus*)
- Red-breasted merganser (*Mergus serrator*)

Seaducks, geese and swans

This functional group includes species that breed, migrate through, and/or winter in UK waters, utilising a range of inshore and offshore habitats. They exhibit diverse feeding strategies, including benthic, surface, and grazing feeding. Diving sea ducks such as eiders and scoters are specialists in foraging shellfish and crustaceans, while generalists like long-tailed ducks, goldeneye, and scaup have a varied diet comprising aquatic plants, polychaetes, amphipods, aquatic insects, and small fish. Other ducks, swans, and geese in this group are surface feeders, targeting prey on the surface of intertidal habitats, such as small gastropod molluscs, or grazing on saltmarsh and coastal grazing marsh vegetation.

Most species in this group are sensitive to visual and noise disturbances caused by vessel traffic (Fliessbach *et al*., 2019, REF 21.25), cited in Atterbury *et al*., 2021, REF 21. 9). Studies on disturbance effects, including research on common scoters, have shown that some species may not resettle after being flushed (Schwemmer *et al*., 2011, REF 21.32); Fliessbach *et al*., 2019 (21.25), both cited in Atterbury *et al*., 2021, REF 21.9)). However, for many species, it remains unclear whether or how quickly they recover and return to areas after vessel activity. While their sensitivity to underwater noise is unknown, benthic-feeding species may be affected by activities that disturb seabed habitats, potentially reducing the availability of their prey.

Joint Nature Conservation Committee (JNCC) and Wildfowl and Wetlands Trust (WWT) undertook aerial bird surveys of the Greater Wash SPA between 2003 and 2007 and recorded the following species from this functional group (Wilson *et al*., 2009, REF 21.28):

- Common scoter (*Melanitta nigra*)

21.5.14 Digital aerial bird surveys in the vicinity of the Greater Wash SPA carried out by OWF projects (Hornsea One, Race Bank) identified the following species from this functional group (RPS, 2013, REF 21.29); The Crown Estate, 2021, REF 21.30) respectively) in the region.

- Common scoter
- Eider (Somateria mollissima)
- Goldeneye (Bucephala clangula)

Auks

21.5.15 Four auk species commonly inhabit UK waters: the Atlantic puffin (*Fratercula arctica*), black guillemot (*Ceppus grille*), common guillemot (*Uria aalge*), and razorbill (*Alca torda*). These birds aggregate in both inshore and offshore waters year-round. During the breeding season, they form large colonies, and disturbances within key foraging areas near these colonies can affect their ability to raise chicks successfully. After fledging, both adults and chicks experience flightless moulting periods. For adults this can last several months, and for chicks it can continue for several weeks. These flightless moulting periods make both adults and chicks particularly vulnerable to anthropogenic impacts such as noise and visual disturbance. Auks are water-column feeders, primarily preying on pelagic and demersal fish.

21.5.16 Auks are sensitive to noise and visual disturbances, with vessel movements through critical foraging areas or aggregations of birds causing disruption. While studies on related species, such as African penguins (*Spheniscus demersus*), suggest that underwater anthropogenic noise can alter foraging behaviour (Pichegru *et al*., 2017,, REF 21.33) cited in Atterbury *et al*., 2021)(REF 21.9), the sensitivity of auks to such impacts remains uncertain. Feeding in the water column also makes auks susceptible to changes in water turbidity caused by increased suspended sediments, which can hinder their ability to locate prey. Additionally, disturbances to or the loss of seabed habitats may reduce the availability of suitable prey, such as sandeel (*Ammodytidae spp.*).

21.5.17 Joint Nature Conservation Committee (JNCC) and Wildfowl and Wetlands Trust (WWT, Wilson *et al*., 2009, REF 21.28) undertook aerial bird surveys of the Greater Wash SPA between 2003 and 2007 and did not record any auk species of interest during this time.

21.5.18 Digital aerial bird surveys in the vicinity of the Greater Wash SPA carried out by OWF projects (Hornsea One, Race Bank, Dudgeon & Sheringham Shoal OWF Extensions) identified the following species from this functional group (RPS, 2013;(REF 21.29) The Crown Estate, 2021;, REF 21.30) Equinor, 2021, REF 21.31) respectively) in the region.

- Common guillemot
- Little auk (*Alle alle*)
- Atlantic puffin
- Razorbill

Terns, gulls, kittiwakes and gannets

21.5.19 This group includes terns, gulls, kittiwakes, petrels, and gannets, which aggregate in both inshore and offshore waters around the UK. Terns are typically present during spring and autumn migrations and the breeding season, while other species may be found in UK waters year-round. During the breeding season, these birds often form colonies, and sources of anthropogenic disturbance within key foraging areas near these colonies can impact their ability to raise chicks successfully. With the exception of gannets, which are plunge divers, the species in this group are surface feeders, with some also foraging in exposed tidal areas. Their diet includes a variety of marine prey, such as fish, squid, crustaceans, jellyfish, and offal.

21.5.20 This functional group has low to moderate sensitivity to noise and visual disturbances, though some species may be attracted to vessels, possibly due to the availability of fishery discards or offal. Their sensitivity to underwater noise remains unknown. As

surface feeders, most species in this group may be affected by increased suspended solids in the water, which could impair their ability to forage successfully for prey (van Kruchten & van der Hammen 2011, REF 21.34; Cook & Burton 2010, REF 21.35) both cited in Atterbury *et al*., (2021, REF 21.9).

21.5.21 Joint Nature Conservation Committee (JNCC) and Wildfowl and Wetlands Trust (WWT) undertook aerial bird surveys of the Greater Wash SPA between 2003 and 2007 and recorded the following species from this functional group (Wilson *et al*., 2009, REF 21.28):

- Little gull (*Hydrocoloeus minutus*)

21.5.22 Digital aerial bird surveys in the vicinity of the Greater Wash SPA carried out by various wind farm projects (Hornsea One, Race Bank, Dudgeon & Sheringham Shoal OWF Extensions) identified the following species from this functional group, noting that some species were identified in relatively low numbers (e.g., black-headed gull, herring gull) whilst others were more abundant (e.g., gannet, kittiwake, RPS, 2013;, REF 21.29) The Crown Estate, 2021;, REF 21.30) Equinor, 2021, REF 21.31) respectively):

- Arctic tern (*Sterna paradisaea*)
- Balearic shearwater (*Puffinus mauretanicus*)
- Black-headed gull (*Chroicocephalus ridibundus*)
- Black tern (*Chlidonias niger*)
- Common gull (*Larus canus*)
- Cory's shearwater (*Calonectris borealis*)
- Fulmar (*Fulmarus glacialis*)
- Gannet (*Morus bassanus*)
- Great black-backed gull (*Larus marinus*)
- Great skua (*Stercorarius skua*)
- Herring gull (*Larus argentatus*)
- Kittiwake (*Rissa tridactyla*)
- Leach's petrel (*Hydrobates leucorhous*)
- Lesser black-backed gull (*Larus fuscus*)
- Little gull
- Little tern (*Sternula albifrons*)
- Long-tailed skua (*Stercorarius longicaudus*)
- Manx shearwater (*Puffinus puffinus*)
- Pomarine skua (*Stercorarius pomarinus)*
- Sabine's gull (*Xema sabini*)
- Sandwich tern (*Thalasseus sandvicensis*)
- Sooty shearwater (Ardenna grisea)
- Storm petrel (*Hydrobates pelagicus*)
- Yellow-legged gull (*Larus michahellis*)

Waders and harriers

21.5.23 This functional group includes waders that breed, migrate, and winter along the UK coast. Wader species employ various foraging strategies but are all surface or near-surface feeders. They utilise open coasts, mudflats, sandflats, saltmarshes, saline lagoons, rocky coasts and nearby grazing marshes and arable lands for feeding and

roosting. While some species, like the oystercatcher (*Haematopus ostralegus*), are more dependent on localised food resources such as cockle and mussel beds, others are more generalist in their diet. Certain waders have specific breeding habitat preferences – avocets (*Recurvirostra avosetta*) favour saline lagoons, saltpans, and scrapes, while ringed plovers (*Charadrius hiaticula*) prefer sand, shingle, and saltmarsh edges - though some species use a broader range of coastal and adjacent habitats. This group also includes marsh and hen harriers (*Circus aeruginosus* and *Circus cyaneus*), both of which make extensive use of intertidal habitats for foraging and roosting during the winter. Marsh harriers also breed in coastal habitats, particularly saline reedbeds, during the breeding season.

21.5.24 These species are sensitive to visual and noise disturbances from vessel traffic. Waders and other species using intertidal habitats are particularly vulnerable to disturbances caused by people and machinery operating within or near their habitats. Generally, shipping poses a lower risk to these habitats except where shallow-draft vessels are employed. Activities that disturb intertidal habitats or prey species can reduce the availability of suitable prey, potentially impacting these species' feeding opportunities.

21.5.25 Fifteen species of waders have been identified at the Anderby Creek Landfall. In addition, digital aerial bird surveys in the vicinity of the Greater Wash SPA carried out by various wind farm projects (Hornsea One, Race Bank, Dudgeon & Sheringham Shoal OWF Extensions) identified the following species from this functional group (RPS, 2013, REF 21.29) The Crown Estate, 2021, REF 21.30) Equinor, 2021, REF 21.31) respectively.

- Bar-tailed godwit (*Limosa lapponica*)
- Dunlin (*Calidris alpina*)
- Grey phalarope (*Phalaropus fulicarius*)
- Knot (*Calidris canutus*)
- Lapwing (*Vanellus vanellus*)
- Oystercatcher
- Whimbrel (*Numenius phaeopus*)

Designated sites

21.5.26 There are several designated sites located within the study area relevant to the intertidal and offshore ornithology assessment. The ecological features of those which are relevant to the English Offshore Scheme are summarised below, and the sites are illustrated in **Volume 3, Part 3, Figure 21-2: Designated Sites**. The sites include:

- The Greater Wash SPA
- Humber Estuary SPA
- Humber Estuary Ramsar
- Saltfleetby – Theddlethorpe Dunes Site of Special Scientific Interest (SSSI)
- Lincolnshire Coronation Coast National Nature Reserve (NNR)

21.5.27 **EGL 3 and EGL 4 Draft HRA Report (May 2025, document reference EGL-WSP-CONS-XX-RP-Y-001)** also considered the sites listed in **Table 21-5** to be relevant based on the foraging ranges of their designated species. Please note that the following table only lists the designated species considered relevant by the Habitat Regulation Assessment (HRA) Screening.

Table 21-5 - Additional sites to be considered based on HRA Screening

Designated site	Distance from draft Order Limits	Relevant Designated Species * Seabird assemblage feature
Outer Firth of Forth and St Andrews Bay Complex SPA [UK9020316]	18.3 km	Breeding Arctic tern Razorbill Atlantic puffin* Common guillemot*
Flamborough and Filey Coast SPA [UK9006101]	20.9 km	Breeding Guillemot Razorbill Atlantic puffin* Great cormorant*
Northumberland Marine SPA [UK9020325]	23.4 km	Breeding Arctic tern Common guillemot Atlantic puffin Sandwich tern Great cormorant* Razorbill*
St Abb's Head to Fast Castle SPA [UK9004271]	27.7 km	Breeding Razorbill* Common guillemot*
Lindisfarne SPA [UK9006011]	28.2 km	Non-breeding Long-tailed duck
Farne Islands SPA [UK9006021]	30.7 km	Breeding Sandwich tern Common guillemot Atlantic puffin*
Forth Islands SPA [UK9004171]	58.3 km	Breeding Atlantic puffin Razorbill* Common guillemot*

21.5.28 No relevant transboundary European sites have been identified.

The Greater Wash SPA

21.5.29 The draft Order Limits overlap the Greater Wash SPA for 66.4 km from the Anderby Creek Landfall seaward. The EGL 3 Project crosses the Greater Wash SPA for 36.3 km, and the EGL 4 Project crosses the Greater Wash SPA for 30.1 km.

21.5.30 The Greater Wash SPA covers an area of 3,536 km^2 stretching from Bridlington Bay, Yorkshire along the east coast of England to the existing northern boundary of the Outer Thames Estuary SPA off the Suffolk coast (Natural England and JNCC, 2018), REF 21.36). It encompasses a variety of different habitats, including coarse sediments, sand, mud and mixed sediments in the north; subtidal sandbanks in the mouth of the Humber Estuary; extensive areas of subtidal sandbanks offshore from coast of Norfolk; mosaic of sand and mixed sediments, muddy sands, coarse sediments and occasionally Annex I reef inshore off Norfolk; the coast off Suffolk is largely soft sediment (Natural England and JNCC, 2018). The majority of the site is below 30 m in water depth, with a single deep channel of 90 m water depth on the approach to the Wash (Natural England and JNCC, 2016), REF 21.37).

21.5.31 The Greater Wash SPA is designated for nationally important numbers of non-breeding red-throated diver, common scoter and little gull; and nationally important numbers of breeding common tern (*Sterna hirundo*), little tern and Sandwich tern. The site encompasses important habitat for its non-breeding bird features in the form of shallow sandbanks and sandy substrates. Breeding species of tern forage within the Greater Wash SPA during the breeding season (Natural England and JNCC, 2016), REF 21.37). The boundary of the Greater Wash SPA was initially defined as a composite boundary, encompassing the extents of important offshore areas identified for each of its species of interest. Seaward, it includes areas of high density of red-throated divers and areas used for foraging by common, little and Sandwich tern off the north Norfolk Coast (Natural England and JNCC, 2016, REF 21.37).

21.5.32 The population within the Greater Wash SPA (on a seasonal basis) for each species and the percentage of the GB population this represents is presented in **Table 21-6.** The seasonality of the birds for which the site is designated is presented in **Table 21-7.**

21.5.33 The current condition status for all qualifying features of the site is ‘maintain’ or ‘restore’ (JNCC, 2020)., REF 21.38)

Table 21-6 - Protected features, the percentage population of each within Great Britain (JNCC, 2020).

Protected Feature	Count (period)	% GB Population
Red-throated diver (non-breeding season)	1,511 mean of peak (2002/03, 2005/06)	8.9
Little gull (non-breeding season)	1,303 mean of peak (2004/05, 2005/06)	No estimate
Common scoter (non-breeding season)	3,463 mean of peak (2002/03, 2007/08)	0.6
Sandwich tern (breeding season)	3,852 pairs (5 year mean of peak 2010-2014)	35
Little tern (breeding season)	798 pairs (5 year mean of peak 2009-2013	42
Common tern (breeding season)	510 breeding pairs (5 year mean of peak 2010-2014)	5.1

Table 21-7 - Species seasonality for the Greater Wash SPA (Natural England, 2023)

Designated Species	Functional Group	Sensitivity	Seasonality J	F	M	A	M	J	J	A	S	O	N	D
Common scoter	SGS	Non-breeding												
Little gull	TGK	Non-breeding												
Red-throated diver	DGM	Non-breeding												
Common tern	TGK	Breeding												
Little tern	TGK	Breeding												
Sandwich tern	TGK	Breeding												
Key:	DGM	Divers, grebes and mergansers												
	SGS	Seaducks, geese and swans												
	TGK	Terns, gulls and kittiwake												

Source Natural England (2023, REF 21.39)

21.5.34 The Joint Nature Conservation Committee (JNCC) and Natural England (2016, REF 21.37) Departmental Brief for the Greater Wash SPA includes figures showing mean density and distribution of the protected species within the site. These figures present data from winter aerial surveys in 2002/03, 2004/05, 2005/06, 2007/08 reported in Lawson *et al*. (2015, REF 21.1, in JNCC and Natural England, 2016, REF 21.37) and nesting bird count data from the seabird monitoring programme and site managers. It should be noted that digital aerial surveys were conducted in winter 2021/2022 and 2022/2023 which have not been fully analysed at the time of writing this preliminary environmental assessment. It is possible that common scoter and red-throated diver distributions have changed since the Greater Wash SPA was designated.

21.5.35 **Volume 3, Part 3, Figure 21-3: Offshore Common Scoter Density Distribution in relation to the draft Order Limits**, illustrates common scoter distribution in relation to the draft Order Limits. Common scoter use of the Greater Wash SPA is focused around the mouth of The Wash and to the north of the Norfolk coastline. Whilst densities around Skegness are relatively high at 7.23 – 10.51 birds per km^2 (peak values within the site are 40.73 – 56.58 birds per km^2), off the Anderby Creek Landfall densities are <10 bird per km^2 indicating that the draft Order Limits are unlikely to be preferred foraging grounds for common scoter. It should be noted that there considerable variability in the numbers of common scoter was recorded during the aerial surveys which informed the density estimates.

21.5.36 Red-throated diver use of the Greater Wash SPA focuses on the area around the mouth of The Wash and along the coastlines of Lincolnshire and Norfolk out to the 12 NM limit. As illustrated in **Volume 3, Part 3, Figure 21-4: Offshore Red-throated Diver Density Distribution** , the highest densities are observed approximately 3 km off the northeast Norfolk coast, with other high-density areas also occurring up to 15 km from the coast

around the mouth of The Wash. Densities within the draft Order Limits are mostly between 0.39 and 0.51 birds per km^2, with areas closer to the Anderby Creek Landfall recording densities of 0.19 to 0.28 birds per km^2. Densities within draft Order Limits are consistently below 1 bird per km^2, reflecting infrequent use by red-throated diver.

21.5.37 Little gull are predominantly marine, using inshore and offshore areas, and tend to be thinly distributed rather than forming persistent or regularly occurring aggregations. Survey data from five winter seasons was combined to provide count numbers across the Greater Wash SPA. As illustrated in **Volume 3, Part 3, Figure 21-5: Offshore little gull density distribution in relation to the draft Order Limits,** little gull appear to fan out from The Wash and largely avoid the shallow coastal waters along the Lincolnshire coastline. It is more likely that they will be present in the draft Order Limits outside of the Greater Wash SPA, past the 12 NM limit, than in inshore waters close to the Anderby Creek Landfall.

21.5.38 Common tern usage of the Greater Wash SPA is limited to within 30 km of their nesting grounds (Woodward *et al.,* 2019, REF 21.11). The highest densities of >37 bird per km^2 is concentrated to within a few kilometres of the north Norfolk coast. Densities of up to 0.94 bird per km^2 reach out to around 20 km from the coast, in line with their predicted mean-max foraging range of 18 km (Woodward *et al.,* 2019, REF 21.11). The draft Order Limits and Anderby Creek Landfall do not fall within areas of predicted usage for common tern within the Greater Wash SPA, with the maximum density being 0.13 birds per km^2.

21.5.39 Little tern have the most restricted foraging ranges of all the qualifying species within the Greater Wash SPA. Their main nesting grounds are located around the Spurn Head NNR which lies approximately 20 km northeast of the draft Order Limits and along the north Norfolk coast from Scolt Head to Blakeney Point. As little tern has a maximum foraging range of 5 km, their predicted areas of usage will not overlap with the draft Order Limits (Woodward *et al*., 2019, REF 21.11).

21.5.40 Sandwich tern use of the Greater Wash SPA is focused around their nesting grounds at Scolt Head and Blakeney Point on the north Norfolk coast. Scolt Head lies approximately 35 km south of the draft Order Limits, while Blakeney Point lies further south still at around 52 km from the draft Order Limits. Although Sandwich tern has a maximum foraging range of 80 km (Woodward *et al.,* 2019, REF 21.11), their predicted usage is generally limited to within 30 km of the coastline from their nesting grounds. The maximum average usage of Sandwich tern over the draft Order Limits is 0 – 0.1 birds per km^2 reflecting the unlikely use of this area by nesting terns.

Humber Estuary SPA

21.5.41 The draft Order Limits lie 6.8 km to the south of the Humber Estuary SPA at its closest point.

21.5.42 On the east coast of England, the River Humber separates the counties of Yorkshire and Lincolnshire. The Humber Estuary is a designated SPA that extends from the mouth of the River Humber to the limit of saline intrusion on the River Ouse and to a point approximately 2 km south of Trent Falls on the River Trent (Natural England, 2019, REF 21.40). It covers an area of 376.3 km^2.

21.5.43 The Humber Estuary is a vast macro-tidal coastal plain estuary characterised by high levels of suspended sediment, which sustain a dynamic system of intertidal and subtidal mudflats, sandflats, saltmarshes, and reedbeds. This diverse range of habitats supports various wintering, migratory, and breeding bird species. Birds are widely distributed

across the site, although high tide roosting sites are limited due to the in combination impacts of historical land reclamation, coastal squeeze, and shortage of grazing marsh and grassland. There are a number of managed realignment sites being developed to enhance the variety of habitats available to bird populations. Additionally, nearby inland terrestrial areas are extensively utilised as high tide roosts and serve as supplementary habitats for some bird species within the Humber Estuary SPA (Natural England, 2019, REF 21.40).

21.5.44 The Humber Estuary SPA is designated for the protection of a number of internationally important populations of birds. The qualifying species for which the site is designated are outlined in **Table 21-8** along with their seasonal presence within the Humber Estuary SPA. These include mainly wading species which use the extensive intertidal and subtidal mudflats and sandflats for feeding.

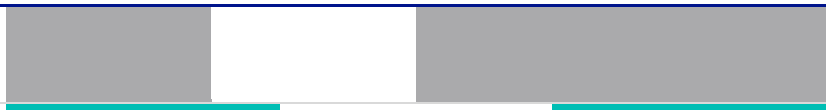
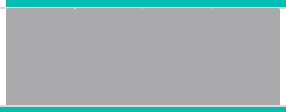
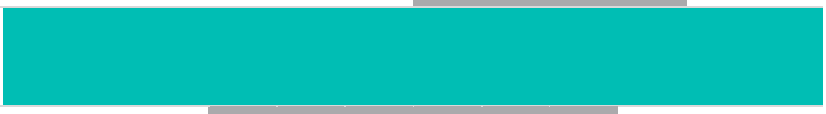
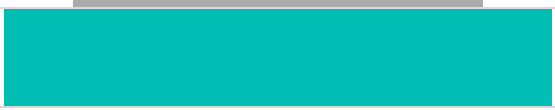
21.5.45 Of the designated species, little tern are most likely to be foraging within the study area and draft Order Limits. Little tern are present during the breeding season from April to September (Natural England, 2019, REF 21.40). Between 1% and 2% of the UK's breeding population of little tern has been present within the boundaries of the Humber Estuary SPA since the early 1990s. Colonies are located around the Humber Estuary as Easington Lagoons, Donna Nook and Tetney Marshes.

21.5.46 During the breeding season little tern forage in the water column for small fish, crustaceans and other invertebrates, largely within the open coastline around Easington and the outer estuary of the Wash (Natural England, 2019), REF 21.40). Foraging generally takes place within 5 km of the breeding site, but this value has a moderate degree of uncertainty (Woodward *et al.*, 2019, REF 21.13).

21.5.47 The Anderby Creek Landfall is approximately 10 km to the south of the known breeding locations for little tern within the Humber Estuary SPA. The draft Order Limits lie approximately 7 km from Donna Nook at its closest point and therefore are not within the foraging range for little tern.

Table 21-8 - Species seasonality for the Humber Estuary SPA (Natural England, 2017)

Designated Species	Functional Group	Sensitivity	Seasonality											
			J	F	M	A	M	J	J	A	S	O	N	D
Avocet	WH	Non-breeding and breeding												
Bar-tailed godwit	WH	Non-breeding												
Bittern	WH	Non-breeding and breeding												
Black-tailed godwit	WH	Non-breeding												
Dunlin	WH	Non-breeding												

Designated Species	Functional Group	Sensitivity	Seasonality J F M A M J J A S O N D
Golden plover	WH	Non-breeding	
Hen harrier	WH	Non-breeding	
Knot	WH	Non-breeding	
Redshank	WH	Non-breeding	
Ruff	WH	Non-breeding	
Shelduck	SGS	Non-breeding	
Little tern	TGK	Breeding	
Marsh harrier	WH	Breeding	
Key:	SGS	Seaducks, geese and swans	
	TGK	Terns, gulls and kittiwake	
	WH	Waders and harriers	

Source Natural England (2017, REF 21.41)

Saltfleetby – Theddlethorpe Dunes SSSI

21.5.48 The Saltfleetby - Theddlethorpe Dunes SSSI supports nationally important habitats such as flats, dunes, salt and freshwater marsh which in turn support nationally outstanding breeding bird assemblages. Yellow wagtails breed on the saltmarsh and there was once a small colony of little tern that bred on the shingle bank within the site (Natural England, 1981, REF 21.41).

21.5.49 The Saltfleetby – Theddlethorpe Dunes SSSI lies approximately 10 km north of the Anderby Creek Landfall and 8 km at the closest point from the draft Order Limits.

21.5.50 This site overlaps the Lincolnshire Coronation Coast NNR, previously the Saltfleetby – Theddlethorpe Dunes NNR, which is designated for the SSSI bird species outlined below and the SPA bird species of the Humber Estuary SPA discussed above. The seasonality of the qualifying bird species of the Saltfleetby – Theddlethorpe Dunes SSSI are outlined in **Table 21-9.**

21.5.51 All bird species which are qualifying features of the Saltfleetby – Theddlethorpe Dunes SSSI are in a favourable condition (Natural England, 2010, REF 21.42).

Table 21-9 - Species seasonality for the Saltfleetby – Theddlethorpe Dunes SSSI (Natural England, 2017)

Designated Species	Functional Group	Sensitivity	Seasonality
			J F M A M J J A S O N D
Brent goose (dark-bellied, REF 21.43)	SGS	Non-breeding	
Dunlin	WH	Non-breeding	
Knot	WH	Non-breeding	
Redshank	WH	Non-breeding	
Sanderling, REF 21.44)	WH	Non-breeding	
Wigeon, REF 21.45)	SGS	Non-breeding	
Little tern	TGK	Breeding	
Key:	SGS	Seaducks, geese and swans	
	TGK	Terns, gulls and kittiwake	
	WH	Waders and harriers	

Source Natural England (2024, REF 21.42)

Lincolnshire Coronation Coast NNR

21.5.52 This site was recently declared by Natural England and encompasses the previously designated Donna Nook NNR, Saltfleetby - Theddlethorpe Dunes NNR and the Saltfleetby/Theddlethorpe Nature Reserve in addition to a 100.3 hectare extension inland of the Saltfleetby - Theddlethorpe Dunes NNR (Natural England, 2023, REF 21.46). Details on the designated features are not currently available on the Natural England Designated Sites viewer but are expected to include the SPA and SSSI birds that are protected within the Saltfleetby-Theddlethorpe Dunes SSSI and the Humber Estuary SPA which it overlaps.

Humber Estuary Ramsar

21.5.53 The Humber Estuary, the largest macro-tidal estuary on the British North Sea coast, covers a catchment of 24,240 km² and delivers the largest freshwater input from Britain into the North Sea. It has the UK's second-highest tidal range (up to 7.4 m), exposing extensive mud and sand flats at low tide. Key habitats include estuarine waters, intertidal flats, saltmarshes, reedbeds, dunes, brackish lagoons, and saline gradients from tidal rivers to the open coast. The estuary supports diverse vegetation, from lower saltmarsh cordgrass and glasswort to upper marsh dominated by sea couch and reedbeds. It hosts internationally significant winter waterfowl populations, nationally

important breeding birds, and the UK's second-largest grey seal colony at Donna Nook. Additionally, the dune slacks within the Saltfleetby-Theddlethorpe Dunes SSSI are the most northeasterly breeding site in England for the natterjack toad (*Bufo calamita*). This dynamic system exemplifies a near-natural estuary shaped by accretion and erosion processes (JNCC, 2007, REF 21.47).

21.5.54 This site is legally underpinned by the Saltfleetby–Theddlethorpe Dunes SSSI, for which the features of the Ramsar site relevant to the English Offshore Scheme are determined. These are: dunlin, knot and redshank (Natural England, 2024, REF 21.48).

Future baseline

21.5.55 This section summarises the predicted changes in the absence of the English Offshore Scheme over the next 10 – 40 years.

21.5.56 The ornithology population in the North Sea has a number of impacts acting upon it at present, including changes in prey availability due to climate change, alterations in commercial fisheries and cumulative disturbance and displacement from offshore developments and activities in the oil and gas and renewable sectors (Dias *et al*., 2019;, REF 21. 49), REFOSPAR, 2023, REF 21.50)). In addition, some populations are still recovering from the 2022 outbreak of Highly Pathogenic Avian Influenza (HPAI, Avian Influenza) so future monitoring may reveal new population trends in the North Sea (Macgregor *et al.,* 2024, REF 21.51).

21.5.57 Breeding populations of marine bird species in the North Sea are closely monitored as part of the Seabird Monitoring Programme (SMP, Harris *et al.,* 2024, REF 21.52) which is funded jointly by the British Trust for Ornithology (BTO) and Joint Nature Conservation Committee (JNCC), in association with the Royal Society for the Protection of Birds (RSPB). The latest annual report from the SMP, published in 2024, provides a detailed analysis of bird survey data from 2021, 2022 and 2023 and considers historic data dating back to 1986, concluding a general declining trend in English seabird populations (Harris *et al.,* 2024;, REF 21.52) MacDonald *et al*., 2015, REF 21.53).

21.5.58 The most likely pressure on the future baseline for intertidal and offshore ornithology will be climate change. This will both be through indirect impacts such as changes in prey abundance or frequency of extreme weather events, and directly through mortality (Burton *et al*., 2023, REF 21.54); Capuzzo *et al*., 2018, REF 21.55).

21.5.59 Additionally, fisheries management will play a large role in maintaining or decreasing the future populations of seabirds along the UK coast, including within the study area. This is especially true of the North Sea, where recent management changes of commercial fisheries included the closing of the sandeel fishing grounds throughout the North Sea (RSPB, 2024, REF 21.56); Defra, 2024, REF 21.57). This will relieve pressure on bird species that rely on sandeel as a main source of food, with the intention of increasing prey availability by reducing competition with fishing vessels.

21.6 Environmental measures

21.6.1 As set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, the environmental measures are characterised as design measures or control and management measures. A range of environmental measures would be implemented as part of the English Offshore Scheme and will be secured in the DCO as relevant. **Table**

21-10 outlines how these design and control measures will influence the intertidal and offshore ornithology assessment.

21.6.2 Several management plans will be provided as Outline Management Plans with the Development Consent Order (DCO) application to support the dMLs. These will include an Outline Construction Environmental Management Plan (CEMP) and Outline Marine Pollution Contingency Plan (MPCP). These documents will outline measures to be implemented to comply with legislation (e.g., in relation to the prevention of oil and chemical spills) during all phases of the English Offshore Scheme. Final management plans will be submitted in accordance with the dMLs to discharge the licence conditions. An Outline CEMP can be found in **Volume 2, Part 1, Appendix 1.5.C Offshore Construction Environmental Management Plan (CEMP)**. In addition, design measures identified through the EIA process have been applied to avoid or reduce potential significant effects." Design measures included that are relevant to intertidal and offshore ornithology receptors are included in **Table 21-10** below and are also included in **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**.

Table 21-10 – Summary of the environmental measures

Receptor	Potential changes and effects	Embedded measures
Waders	Visual and physical disturbance or displacement	Intertidal zone would be crossed by horizontal directional drill to avoid disturbance to surface sediments and habitats.
Divers and seaducks	Visual and physical disturbance or displacement	Existing shipping lanes would be utilised for vessel transiting routes to avoid additional disturbance, where practicable.
Divers	Visual and physical disturbance or displacement	Vessel operators would be made aware of the importance and sensitivity of the species to disturbance. Vessels will avoid rafting birds and areas with high densities of birds, where practicable.
All species	Visual and physical disturbance or displacement	Artificial lighting on vessels would be directional and only used when necessary, noting that health and safety requirements will need to be met for safe working practices.
All species	Changes in distribution of prey species	The intention is to bury the cables in the seabed, except in areas where trenching is not possible e.g. where ground conditions do not allow burial or at infrastructure crossings.
All species	Changes in distribution of prey species	Cable protection would only be installed where considered necessary for the safe operation of the English Offshore Scheme. This includes the repair of cables due to accidental damage, where depth of lowering is not achieved and at infrastructure crossings.

Receptor	Potential changes and effects	Embedded measures
All species	Changes in distribution of prey species	Where possible, cable protection materials would be selected to match the environment (e.g., when cables are installed in areas of cobbles or other natural rock features, rock of similar diameter and material as the receiving environment should be used as an alternative to the current normal approach of using terrestrially sourced granite)

21.7 Scope of the assessment

21.7.1 The spatial scope of the assessment of intertidal and offshore ornithology covers the area of the English Offshore Scheme contained within the draft Order Limits, together with the study area described in **Section 21.4** and illustrated in **Volume 3, Part 3, Figure 21-1 Ornithology Study Area.**

Temporal scope

21.7.2 The temporal scope of the assessment of intertidal and offshore ornithology is consistent with the period over which the English Offshore Scheme would be carried out. It assumes that the construction programme for the English Offshore Scheme would be expected to take approximately 55 months, commencing in 2028/2029 for both the EGL 3 Project and the EGL 4 Project. Operation would commence in 2034, with periodic maintenance required during the operational phase of the English Offshore Scheme. It is assumed that maintenance and repair activities could take place at any time during the life span of the English Offshore Scheme.

21.7.3 The English Offshore Scheme is expected to have a life span of more than 40 years. If decommissioning is required at the end of its life span, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration of two years. Acknowledging the complexities of completing a detailed assessment for decommissioning works up to 40 years in the future, based on the information available, the Projects have concluded that impacts from decommissioning would be no greater than those during the construction phase. Furthermore, should decommissioning take place it is expected that an assessment in accordance with the legislation and guidance at the time of decommissioning would be undertaken.

Identification of receptors

21.7.4 The principal intertidal and offshore ornithology receptors that have been identified as being potentially subject to significant effects are summarised in **Table 21-11.**

Table 21-11 - Intertidal and offshore ornithology receptors subject to potential effects

Receptor	Reason for consideration
Divers, grebes and mergansers (in particular red-throated diver)	Statutory Nature Conservation Bodies (SNCBs) have highlighted increasing concern over the disturbance of red-throated diver due to anthropogenic activities, particularly in the Greater Wash area.

Receptor	Reason for consideration
	This species is recognised as being highly sensitive to noise and visual disturbance and once flushed, they may not rapidly resettle (Atterbury *et al*., 2021)., REF 21.9)
Seaducks, geese and swans	Species of this functional group are known to be sensitive to noise and visual disturbance (Atterbury *et al*., 2021, REF 21.9). Common scoter are also a protected feature of the Greater Wash SPA. This species is most sensitive when overwintering, with the largest aggregations of birds recorded between December and January (inclusive) within the site.
Terns, gulls, kittiwakes and gannets	Species in this functional group are protected features of several relevant designated sites. As they plunge dive for food they are sensitive to changes in water clarity e.g., as a result of changes in suspended sediments.
Waders	These species are considered to be sensitive to noise and visual disturbance (Atterbury *et al*., 2021, REF 21.9). Although they are largely present within the intertidal areas rather than offshore, there is the potential for them to be disturbed by the English Onshore Scheme as well as the English Offshore Scheme.
Auks	Auks are sensitive to noise and visual disturbances (Atterbury *et al.,* 2021, REF 21.9), with vessel movements through critical foraging areas or aggregations of birds potentially causing disruption. They are also sensitive to changes in water turbidity and prey distribution.
European sites including Greater Wash SPA, Humber Estuary SPA & Ramsar, and sites listed in **Table 21-5**	These sites of international importance have been identified as having designated bird species that may forage within the English Offshore Scheme and are therefore considered relevant.
Nationally designated sites including Saltfleetby – Theddlethorpe Dunes SSSI, Lincolnshire Coronation Coast NNR,	These sites of national importance have been identified as having designated bird species that may forage within the English Offshore Scheme and are therefore considered relevant.

Potential effects considered within this assessment

21.7.5 The effects on intertidal and offshore ornithology receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 21-12**. All likely significant effects identified are relevant for each of the three phases of the English Offshore Scheme: construction, operation (including repair and maintenance) and decommissioning.

Table 21-12 - Intertidal and offshore ornithology receptors scoped in for further assessment

Receptor	Likely significant effects
Divers, grebes and mergansers Terns, gulls, kittiwakes and gannets Auks Greater Wash SPA Humber Estuary SPA	**Temporary increase and deposition of suspended sediments** from activities such as pre-sweeping of sand-waves, cable burial and trenching, cable repair and cable removal during construction, operation and decommissioning.
Divers, grebes and mergansers Seaducks, geese and swans Terns, gulls, kittiwakes and gannets Waders Auks Greater Wash SPA Humber Estuary SPA	**Changes in distribution of prey species** as an indirect result of permanent habitat loss from the deposit of external cable protection during construction and operation.
Divers, grebes and mergansers Seaducks, geese and swans Waders Auks Greater Wash SPA Humber Estuary SPA	**Visual and physical disturbance or displacement** due to the presence of project vessels and equipment during construction, operation and decommissioning.

21.7.6 The receptors/effects detailed in **Table 21-13** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 21-13 - Summary of effects scoped out of the intertidal and offshore ornithology assessment

Receptors/potential effects	Justification
Temporary increase and deposition of suspended sediments Seaducks, geese and swans Waders and harriers	The Scoping Report proposed scoping the functional group seaducks, geese and swans out of the assessment based on the availability of alternative feeding grounds and the temporary nature of the potential effect. Waders and harriers do not dive for food and are therefore very unlikely to be adversely affected by a decrease in water clarity. These justifications applied to all phases of the English Offshore Scheme. The Planning Inspectorate agreed with this conclusion.
Changes in distribution of prey species as an indirect result of	The Scoping Report proposed scoping this impact pathway out for all Phases of the English Offshore Scheme due to the temporary

Receptors/potential effects	Justification
temporary habitat loss from activities such as pre-sweeping of sand waves, cable burial and trenching, cable repair and cable removal All species	and transient nature of the potential effect and the alternative foraging areas that are available. The Planning Inspectorate agreed with this conclusion.
Changes in distribution of prey species as an indirect result of permanent habitat loss from the deposit of external cable protection. All species	Scoped out for decommissioning as no further cable protection would be deposited during decommissioning.
Visual/physical disturbance Terns, gulls, kittiwakes and gannets	These species are considered to be low to moderately sensitive to noise and visual disturbance (Atterbury *et al*., 2021). It is not considered that the presence of vessels associated with the English Offshore Scheme are likely to have a significant impact on this group. The Planning Inspectorate agreed with the conclusion to scope out visual disturbance to terns gulls, kittiwakes and gannets.
Accidental spills (Hydrocarbon & PAH contamination) All species	Vessels and contractors associated with the English Offshore Scheme will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 which relates to pollution from oil from equipment, fuel tanks etc and release of sewage (black and grey water). It is a legal requirement that all vessels carry a Shipboard Oil Pollution Emergency Plan (SOPEP). Compliance with Regulations will be sufficient to minimise the risk to the environment. The Planning Inspectorate agreed with scoping out this impact pathway.

21.8 Key parameters for assessment

Realistic worst-case design scenario

21.8.1 The assessment has followed the Rochdale Envelope approach as outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects** and **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology.** The assessment of effects has been based on the description of the English Offshore Scheme and parameters outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects**. However, where there is uncertainty regarding a particular design parameter, the realistic worst-case design parameters are provided below with regards to intertidal and offshore ornithology along with the reasons why these parameters are considered worst-case and do not exceed those set out in **Volume 1, Part 1, Chapter 4: Description of Projects**. The preliminary assessment

for intertidal and offshore ornithology has been undertaken on this basis. Effects of greater adverse significance are not likely to arise should any other development scenario, based on details within the Rochdale Envelope (e.g., different infrastructure layout within the draft Order Limits), to that assessed here be taken forward in the final design scheme.

21.8.2 In relation to intertidal and offshore ornithology the following assumptions presented in **Table 21-14** and **Table 21-15** are made regarding the English Offshore Scheme design parameters in order to ensure a realistic worst-case assessment has been undertaken.

Table 21-14 - EGL 3 Project worst-case assumptions

Impact Pathway	Construction	Operation	Decommissioning	Most sensitive location or scenario
Temporary habitat loss/ seabed disturbance	13.20 km^2	To be confirmed	Similar footprint as is disturbed during construction and operation combined.	Herring or sandeel habitat
Permanent habitat loss	0.915 km^2	To be confirmed	No new deposits but assumes cable protection remains in place.	Herring or sandeel habitat
Temporary increase and deposition of suspended sediments	**Volume 1, Part 3, Chapter 18 Coastal and Marine Physical Processes** concluded that the majority of suspended sediment will settle within 700 m of the cable trench during trenching and very fine sands (<63 µm) may travel as far as 17.5 km dependant on the peak flow speed. However, sediment deposition beyond 700 m will be <2 mm. Material discharged from the trailing suction hopper dredger will settle within 3.15 km of the disposal location.			Herring habitat
Visual and/or physical disturbance due to the presence of EGL 3 Project vessels and equipment	The number of vessels engaged in construction, operation and decommissioning will vary over the duration of the phase. A peak of up to 7 vessels would be present within the Greater Wash SPA during the landfall enabling works.			Red-throated diver

Table 21-15 - EGL 4 Project worst-case assumptions

Impact Pathway	Construction	Operation	Decommissioning	Most sensitive location or scenario
Temporary habitat loss/ seabed disturbance	12.75 km^2	To be confirmed	Similar footprint as is disturbed during construction and operation combined.	Herring or sandeel (prey) habitat
Permanent habitat loss	1.135 km^2	To be confirmed	No new deposits but assumes cable protection remains in place.	Herring or sandeel habitat
Temporary increase and deposition of suspended sediments	**Volume 1, Part 3, Chapter 18 Coastal and Marine Physical Processes** concluded that the majority of suspended sediment will settle within 700 m of the cable trench during trenching and very fine sands (<63 µm) may travel as far as 17.5 km dependant on the peak flow speed. However, sediment deposition beyond 700 m will be <2 mm. Material discharged from the trailing suction hopper dredger will settle within 3.15 km of the disposal location.			Herring habitat
Visual and/or physical disturbance due to the presence of EGL 4 Project vessels and equipment	The number of vessels engaged in construction, operation and decommissioning will vary over the duration of the phase. A peak of up to 7 vessels would be present within the Greater Wash SPA during the landfall enabling works.			Red-throated diver

Consideration of construction scenarios

21.8.3 As detailed in **Volume 1, Part 1, Chapter 4: Description of the Projects**, the timing of construction activities set out within this PEIR is indicative. To allow for any unexpected circumstances and a realistic worst-case assessment, the impact assessment for the English Offshore Scheme considers the following construction scenario to ensure the worst-case scenario for intertidal and offshore ornithology can be identified and assessed:

- The EGL 3 Project and the EGL 4 Project are constructed sequentially, and construction activities do not overlap. This would extend the period over which intertidal and offshore ornithology receptors would be subject to effects.

21.9 Assessment methodology

Overview

21.9.1 The generic project-wide approach to the assessment methodology is set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, and specifically in **Sections 5.4** to **5.6**. However, whilst this has informed the approach that has been used in this intertidal and offshore ornithology assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this intertidal and offshore ornithology assessment. Details are provided below.

21.9.2 The criteria for characterising the value and sensitivity and magnitude for intertidal and offshore ornithology are outlined in **Table 21-16** and **Table 21-17**. The significance matrix is as per **Table 21-18.**

21.9.3 The assessment of sensitivity will be made with consideration of the rarity and importance of the receptor but will primarily focus on the vulnerability of the receptor to an impact and its ability to recover and adapt. Vulnerability can differ between different functional groups of marine birds and will also vary depending on the impact pathway and season. For example, certain species of diver (e.g., red-throated diver) and seaduck (e.g., common scoter) are more sensitive to visual disturbance than terns and gulls, whilst sensitivity to temporary changes in suspended sediment concentrations typically only affects species which plunge dive for prey (e.g., red-throated diver, tern species), with species such as waders not considered sensitive.

21.9.4 It should be noted though, that a species may be of international importance (e.g., a designated feature of an SPA) and initially categorised as 'highly' sensitive according to **Table 21-16**. However, if baseline studies and species characteristics show that the species is only rarely or occasionally present in the draft Order Limits, or if it is not sensitive to the impact pathway, professional judgment may justify lowering its sensitivity category. Where such assessments have been made, justification has been provided.

21.9.5 The assessment of magnitude will be made with consideration of the extent of the area impacted, the duration and frequency of the impact and the scale of the change i.e., whether it has an effect at an individual or population level. When determining the magnitude of impacts the life history and ecology of the receptors is important. Factors such as seasonality of presence or whether specific areas are required for foraging and loafing which the species may be unwilling or unable to move away from are considered.

21.9.6 The ecological impact assessment will use available evidence, professional judgement and knowledge of bird ecology and behaviour to determine the level of impact.

Table 21-16 - Criteria for characterising the sensitivity of receptors

Sensitivity	Description of criteria
High	Receptor is of very high or high importance and rarity, international or national scale (i.e., a designated feature of an SPA, Ramsar or Marine Conservation Zone (MCZ)). Receptor has low tolerance to change i.e., recovery will take longer than 10 years following the cessation of activity or will not occur.

Sensitivity	Description of criteria
	The licensable activity is taking place during a sensitive season.
Medium	Receptor is of medium importance and rarity, regional scale (i.e., a designated feature of a SSSI or NNR). Receptor has intermediate tolerance to change i.e., recovery to pre-impact conditions is possible between 5 and 10 years.
Low	Receptor is of low importance and rarity, local scale. Receptor has high tolerance to change with recovery to pre-impact conditions between 1 and 5 years.
Negligible	Receptor is common or widespread. The receptor is tolerant to change with no effect on its character. Recovery expected to be relatively rapid, i.e., less than approximately six months following cessation of activity.

Table 21-17 - Criteria for characterising the magnitude of an impact

Magnitude	Description of criteria
High	Major disturbance over multiple seasons such that population can no longer use key nesting/foraging/loafing grounds and recruitment declines above that which would be expected from natural fluctuations. A change in the size or extent of distribution of the population that is the interest feature of a specific designated site such that the viability of the population and/or the integrity of the designated site is predicted to be irreversibly altered in the short-to-long term. Recovery from that change would be predicted to be achieved in the long-term (i.e., more than five years) through to permanent duration following cessation of the development activity.
Medium	Significant disturbance over the whole season for a sensitive species such that they are displaced from preferred nesting/foraging/loafing areas, with limited alternatives. A change in the size or extent of distribution of the population that is the interest feature of a specific designated site that is expected to occur in the short and long-term, but which is not expected to alter the long-term viability of the population and/or the integrity of the designated site. Recovery from that change predicted to be achieved in the medium-term (i.e., no more than five years) following cessation of the development activity.
Low	Disturbance is temporary (less than a season), site specific and/or a minor shift away from the baseline condition such as that experienced under natural conditions. Impacts limited to within the project's footprint. Negligible contribution to cumulative effects.

Magnitude	Description of criteria
	A change in the size or extent of distribution of the population that is the interest feature of a specific designated site that is expected to occur at a sufficiently small scale or of a short duration such that no long-term harm to the viability of the population or the integrity of the designated site is expected. Recovery from that change is predicted to be achieved in the short-term (i.e., no more than one year) following cessation of the development activity.
Negligible	Very little or no detectable change from baseline conditions. Disturbance is within the range of natural variability. Impacts predicted to be brief (one to two days) or for a short period but outside of the key season (up to 3 months). No contribution to cumulative effects. Any change is predicted to be reversible and recovery from any change is predicted to be rapid (i.e., no more than approximately 6 months) following cessation of the development activity.

Table 21-18 - Significance Matrix

		Sensitivity			
		High	**Medium**	**Low**	**Negligible**
Negative magnitude	**High**	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible
Beneficial magnitude	**Negligible**	Minor	Minor	Negligible	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Medium	Major	Moderate	Minor	Negligible
	High	Major	Major	Moderate	Minor

Preliminary Assessment of Cumulative Effects

21.9.7 At the current stage of the English Offshore Scheme (PEIR stage), design information for the Projects is insufficient to allow for a robust cumulative assessment to be undertaken. Furthermore, given the current position in relation to baseline data collection, with much of the environmental surveys still to be undertaken during 2025, the baseline identified at this PEIR stage cannot be taken as a complete picture of the potential presence and significance of sensitive receptors. Therefore, a cumulative assessment has not been undertaken at this stage; however, **Volume 1, Part 4, Chapter 28: Cumulative Effects Assessment,** presents the long and short lists of 'other developments' which will be considered at the ES stage, and the methodology

which allowed for the identification of these other developments, to allow consultation bodies to form a view and provide comment on the other developments included. The long-list will be reviewed and if necessary, updated, in the lead up to the ES, as the design of the English Offshore Scheme further evolves and in response to any comments raised at statutory consultation."

21.10 Preliminary assessment of temporary increase and deposition of suspended sediments – All Phases

21.10.1 This impact relates to changes in water clarity (or turbidity) due to changes in suspended sediment concentrations (SSC). Sediment suspension is caused by activities that penetrate the seabed or that abrade surface layers. This would include construction activities such as seabed preparation works (including pre-sweeping of sand waves) and cable burial; repair and maintenance works such as cable repair and burial and placement of remedial cable protection; and during decommissioning cable removal. The SSCs at a particular location depend on the activity, hydrological conditions and the sediment particle size distribution.

21.10.2 Pre-sweeping of sandwaves will be required within the Greater Wash SPA as part of seabed preparation for the EGL 3 Project for approximately 3.8 km. It will not be required for the EGL 4 Project. Although several activities will create minor elevations in suspended sediment concentrations, cable burial and pre-sweeping of sandwaves will cause the largest temporary sediment plume. As the EGL 3 and the EGL 4 Project intersect the Greater Wash SPA (which covers an area of 3,535.7 km^2) for approximately 36.3 km and 30.1 km respectively, there may be a direct impact on species within the Greater Wash SPA. **Volume 1, Part 3, Chapter 18: Coastal and Marine Physical Processes** estimates that suspended concentrations will exceed 10 mg/l up to 8 km from the cable trench during spring tides (for pre-sweeping the distance is lower), but that beyond the draft Order Limits this will be of short duration. Therefore, SSCs beyond 8 km from the source of the disturbance will be very low.

21.10.3 Certain diving species (such as terns, little gull, red-throated diver, common scoter) are sensitive to changes in water clarity. These species are generally visual foraging birds, which depend on clear water to identify and catch potential prey (van Kruchten and van der Hammen., 2011, REF 21.34). The preliminary assessment below considers the significance of the impact on the key functional groups likely to be affected. Assessment for the following receptors has been provided:

- Greater Wash SPA
- Divers, grebes and merganser
- Terns, gulls, kittiwakes and gannets
- Auks

Greater Wash SPA

21.10.4 The draft Order Limits overlap the Greater Wash SPA for 66.4 km from the Anderby Creek Landfall seaward. The EGL 3 Project crosses the Greater Wash SPA for 36.3 km, and the EGL 4 Project crosses the Greater Wash SPA for 30.1 km. Assuming that a worst-case area 8 km in radius from each trench would be affected by a temporary increase in SSCs <10 mg/l, it has been calculated that 132.8 km^2 of the Greater Wash SPA would be affected (3.8% of the 3,535.7 km^2 site).

21.10.5 Little gull and common, little and Sandwich tern fall within the functional group 'terns, gulls, kittiwakes and gannets'. Cook and Burton (2010, REF 21.54) assess little tern to be highly vulnerable to changes in turbidity as vision plays an important role in the species' foraging capability. A report by Brenninkmeijer *et al.* (2002) , REF 21.58) states that the food intake rate for little tern and Sandwich tern was lower in the most turbid waters compared to clearer waters at their study site in West Africa. Whilst they have a high sensitivity to the impact, the baseline established that the draft Order Limits are not a preferred foraging area for the designated species within the Greater Wash SPA as summarised below:

- Little gull largely avoid the shallow coastal waters along the Lincolnshire coastline.
- Common tern use of the Greater Wash SPA is limited to within 30 km of their nesting grounds with maximum densities within the draft Order Limits being 0.13 birds per km^2 (compared to densities of >37 birds per km^2 within a few kilometres of the colonies on the north Norfolk coastline).
- Little tern have a foraging range of 5 km and the draft Order Limits are >5 km from the Spurn Head colony.
- Sandwich tern usage of the Greater Wash SPA is generally limited to within 30 km of their nesting grounds on the north Norfolk coast. Predicted densities within the draft Order Limits are <0.1 bird per km^2.

21.10.6 As the baseline assessment indicates that the gull and tern receptors already prefer alternative foraging areas within the Greater Wash SPA, and that their use of the draft Order Limits within the Greater Wash SPA is marginal, the **sensitivity** of the **gull and tern receptors** has been assessed as **low.**

21.10.7 Similarly to the tern and gull species, the red-throated diver and common scoter features of the Greater Wash SPA are also thought to be sensitive to temporary changes in SSCs. Natural England's Advice on Operations (Natural England, 2024) , REF 21.59) gives a sensitivity score of 'medium' (although note that Natural England state within their advice note that the confidence level of this assessment is low); although there is the potential for red-throated divers to be impacted by change in water clarity there is limited specific information available. The baseline established that the draft Order Limits within the Greater Wash SPA are:

- Not a preferred foraging area for common scoter. Common scoter distribution is focused around the mouth of The Wash and to the north of the Norfolk coastline.
- Not a preferred foraging area for red-throated diver. Densities within the draft Order Limits are <0.51 birds per km^2 in comparison to hot spots around the mouth of The Wash and along the coastline of Norfolk where densities reach 1.3 – 3.38 birds per km^2.

21.10.8 As the baseline indicates that the common scoter and red-throated diver features already prefer alternative foraging areas within the Greater Wash SPA and their use of the draft Order Limits within the Greater Wash SPA is low, the **sensitivity** of the **common scoter and red-throated diver** has been assessed as **low.**

21.10.9 The **magnitude** of the impact for all Greater Wash SPA features has been assessed as **negligible.** Natural England's benchmark for the impact is "a change in one Water Framework Directive (WFD) ecological status class for one year within the site." A temporary increase in suspended sediments could occur on multiple occasions during construction, operation and decommissioning. However, on each occasion, the change

will be for a short period (days rather than weeks), with SSCs rapidly reducing once the activity ceases. The impact benchmark would not be reached.

21.10.10 In conclusion, for all phases, the effect of temporary increase and deposition of suspended sediment has been assessed as **Negligible** and **Not Significant**.

Divers, grebes and mergansers

21.10.11 Divers, grebes and mergansers are thought to be sensitive to temporary changes in SSCs due to their reliance on underwater visibility for foraging, but there is little evidence to determine whether the sensitivity is high or low in the specific area of the draft Order Limits. Cook and Burton (2010, REF 21.54, in Natural England site advice) note that they are more sensitive than auks and gannets. Price and Thompson (2006, REF 21.60) observed Great northern diver (common loon) *Gavia immer* along a Maryland estuary in North America. They concluded that loon dove for longer periods in areas with higher water clarity, but no relationship was identified between water clarity and distribution of wintering loon. Natural England's Advice on Operations for English SPAs designated for diving species indicates that Slavonian grebe (*Podiceps auritus*) and black-throated diver (*Gavia arctica*) are of medium sensitivity to changes in SSCs, and that great northern diver (*Gavia immer*) are of low sensitivity. All assessments have been given a low confidence level by Natural England (Natural England, 2024, REF 21.61); (Natural England, 2024, REF 21.62)

21.10.12 Species from the group known to be present within the region and that could therefore be found within the draft Order Limits and ZoI include red-throated, black throated and great northern diver, shag, cormorant, and Slavonian, red-necked and great crested grebe. Species generally forage in shallow waters over sandy or muddy seabeds or in rocky areas. The foraging ranges are between approximately 9 and 33 km from the coastline (NatureScot, 2023) , REF 21.63) using (Woodward *et al.,* 2019, REF 21.11) suggesting that for the majority of the draft Order Limits they are unlikely to be present. The English Offshore Scheme is largely sited offshore >35 km from the coastline; only short sections of the EGL 3 Offshore Scheme namely KP 0 - KP 54 and KP142 and KP171, and EGL 4 Offshore Scheme KP 0 – KP55, KP 132 – KP167 and KP 414 – KP422 are within the foraging range. The area of the draft Order Limits within the foraging range is approximately 154 km^2, equivalent to 24% of the overall draft Order Limits.

21.10.13 As the baseline indicates only a small area of the draft Order Limits is likely to be suitable foraging grounds for divers and grebes (noting mergansers have not been noted as present within the region), and that there are alternative suitable foraging grounds in the region, the **sensitivity** of the group has been assessed as **low**.

21.10.14 The **magnitude** of the impact for divers, grebes and mergansers has been assessed as **negligible.** Natural England's benchmark for the impact based on their Advice on Operations for the Greater Wash SPA, Exe Estuary SPA and Falmouth Bay to St Austell SPA is "a change in one WFD ecological status class for one year within the site." A temporary increase in suspended sediments could occur on multiple occasions during construction, operation and decommissioning. However, on each occasion, the change will be for a short period (days rather than weeks), with SSCs rapidly reducing once the activity ceases. The impact benchmark would not be reached.

21.10.15 In conclusion, for all phases, the **significance** of the effect of temporary increase and deposition of suspended sediment on divers, grebes and mergansers has been assessed as **Negligible** and **Not Significant**.

Terns, gulls, kittiwakes and gannets

21.10.16 Twenty-four different species have been identified within the region that fall within this group. However, the sensitivity to the impact of temporary changes in suspended sediments (change in water clarity) varies between species. Natural England's Advice on Operations classify tern species as having a high sensitivity to a change in water clarity, kittiwake as medium sensitivity and gannet as low sensitivity. Sensitivity within gull species varies depending on their feeding habitats with little gull exhibiting high sensitivity. Foraging distances range from 5 – 35 km for tern species and 509 km for gannet, 300 km for kittiwake and from 18.5 – 236 km for gull species. This suggests that different areas of the draft Order Limits will be used by different species depending on their foraging range and the distance of the draft Order Limits from the coastline. The higher sensitivity species (e.g., tern and little gull) are features of the SPAs within the region. The assessment for the Greater Wash SPA (above) concluded that the sensitivity was low due to the baseline review indicating that the draft Order Limits are not a preferred foraging area for the designated species. As gannet also have a low sensitivity, the sensitivity for this group is therefore based on kittiwake which are likely to be present further offshore. The **sensitivity** has therefore been assessed as **medium** for this group.

21.10.17 The **magnitude** of the impact for terns, gulls, kittiwake and gannets has been assessed as **negligible.** Natural England's benchmark for the impact based on their Advice on Operations for the Greater Wash SPA is "a change in one WFD ecological status class for one year within the site." A temporary increase in suspended sediments could occur on multiple occasions during construction, operation and decommissioning. However, on each occasion, the change will be for a short period (days rather than weeks), with SSCs rapidly reducing once the activity ceases. The impact benchmark would not be reached.

21.10.18 In conclusion, for all phases, the Significance of the effect of temporary increase and deposition of suspended sediment has been assessed as **Minor** and **Not Significant**.

Auks

21.10.19 Common guillemot, Atlantic puffin and razorbill have been identified as designated species of six of the relevant SPAs for consideration by the preliminary environmental assessment. Although the English Offshore Scheme does not overlap with these SPAs, the draft Order Limits is within the foraging range of these species, and they are therefore likely to be present. Natural England's Advice on Operations classify guillemot, razorbill and puffin as having medium sensitivity to a change in water clarity, noting that they are not as sensitive as divers, but more sensitive than gannet. The **sensitivity** has therefore been assessed as **medium** for this group.

21.10.20 Natural England's benchmark for the impact is "a change in one WFD ecological status class for one year within the site." A temporary increase in suspended sediments could occur on multiple occasions during construction, operation and decommissioning. However, on each occasion, the change will be for a short period (days rather than weeks), with SSCs rapidly reducing once the activity ceases. The impact benchmark would not be reached. The **magnitude** of the impact has been assessed as **negligible.**

21.10.21 In conclusion, for all phases, the Significance of the effect of temporary increase and deposition of suspended sediment has been assessed as **Minor** and **Not Significant**.

21.11 Preliminary assessment of changes in distribution of prey species – Construction

21.11.1 This preliminary assessment focuses on changes in distribution of prey species as an indirect result of permanent habitat loss from the deposit of external cable protection during construction. **Section 21.12** below focuses on the same impact pathway during operation. All other aspects of the English Offshore Scheme, and the decommissioning phase have been scoped out of the assessment, as agreed with The Planning Inspectorate. The preliminary environmental assessment focuses on the receptors 'All Species' and the 'Greater Wash SPA'.

21.11.2 Marine birds feed on a variety of prey species and can travel great distances to forage. Conversely, they may also have specific habitat preferences which limit their foraging ranges. Seabirds such as gannets and auks typically forage further offshore, feeding on plankton and fish that live within the water column, whereas gulls and terns tend to remain closer to shore (Cefas, 2018, REF 21.64). Divers, mergansers and grebes feed on small fish in shallow inshore waters, and some diving ducks and gulls forage for benthic invertebrates such as bivalves (Cefas, 2018, REF 21.64). Fish species such as Atlantic herring (*Clupea harangus*) and sandeel (*Ammodytes spp.*) are known to be of particular importance as a prey species for a variety of marine fauna, including seabirds. Sandeel in particular are widely recognised as a critical food source for many seabirds, fish and marine mammals (Frederiksen *et al.,* 2006, REF 21.65); (Wanless *et al.,* 2008, REF 21.66); (Reach *et al.,* 2024, REF 21.67) and have been identified as the most important forage fish in the North Sea.

21.11.3 Activities that lead to temporary or permanent habitat loss affect seabed habitats which in turn could affect the availability or distribution of prey. Significant or widespread disturbance of the seabed during the spawning season for species with a demersal life stage (such as sandeel and herring) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species for bird species in subsequent years.

21.11.4 Other impacts on prey species such as underwater noise, temporary increase and deposition of suspended sediments and sediment heat changes could also combine with temporary and permanent habitat loss to lead to a change in prey availability.

21.11.5 If fish species are avoiding an area, then birds may potentially be required to travel greater distances to locate prey, with an associated energetic cost. For example, loss of a preferred prey close to breeding colonies would increase the amount of time birds are at sea foraging or lead to lower food availability for chick survival. The maintenance of supporting habitats and processes to ensure the provision of prey species for birds is therefore a key consideration in maintaining the favourable conservation status of the individual species.

21.11.6 The impact pathway assessed focuses on the permanent change of one marine habitat type to another marine habitat type, through the change in substratum, including to artificial material (e.g., concrete) because of the deposition of external cable protection. External cable protection would be used in the construction of infrastructure crossings and for burial remediation where full cable burial into sediment has not been achieved. Whilst most external cable protection would be installed during construction, it would also be required during the operational phase, either for the maintenance of infrastructure crossings or for remedial burial e.g., associated with a cable repair, or if the cables become exposed. Once deposited it is assumed, for the purposes of worst-case assessment, that the external cable protection would not be removed.

Greater Wash SPA

21.11.7 The maximum permanent seabed footprint from infrastructure crossings (EGL 3 Project and EGL 4 Project combined) within the Greater Wash SPA (0.013 km^2) is equivalent to 0.0004% of the area of the Greater Wash SPA. It is currently unknown if remedial cable protection would be required within the Greater Wash SPA. Further engineering studies would be completed and this assessment updated to include this information for the ES.

21.11.8 The assessment approach suggests that as a designated feature of an SPA, the designated features should be considered highly sensitive. However, professional judgement has led to the assessment that the **sensitivity** of the designated species is **low**. The baseline assessment established that the draft Order Limits are not a preferred foraging area for five of the six designated species within the Greater Wash SPA as summarised below:

- Little gull largely avoid the shallow coastal waters along the Lincolnshire coastline.
- Common tern use of the Greater Wash SPA is limited to within 30 km of their nesting grounds with maximum densities within the draft Order Limits being 0.13 birds per km^2 (compared to densities of >37 birds per km^2 within a few kilometres of the colonies on the north Norfolk coastline).
- Little tern have a foraging range of 5 km and the draft Order Limits are >5 km from the Spurn Head colony.
- Sandwich tern usage of the Greater Wash SPA is generally limited to within 30 km of their nesting grounds on the north Norfolk coast. Predicted densities within the draft Order Limits are <0.1 bird per km^2.
- The draft Order Limits are not a preferred foraging area for common scoter. Common scoter distribution is focused around the mouth of The Wash and to the north of the Norfolk coastline.

21.11.9 Whilst the baseline indicates that the use of the draft Order Limits by red-throated diver is also marginal (densities within the draft Order Limits are <0.5 birds per km^2 in comparison to hot spots around the mouth of The Wash and along the coastline of Norfolk of 1.3 – 3.38 birds per km^2) it is possible that they could use the draft Order Limits for foraging. The assessment therefore focuses on the magnitude of the impact on red-throated diver as they are relatively more sensitive than the other designated species although their sensitivity to the impact has still been assessed as low.

21.11.10 The locations of infrastructure crossings within the Greater Wash SPA are shown in **Volume 3, Part 3, Figure 21-6: Cable and pipeline crossings within the Greater Wash SPA**.

21.11.11 The magnitude of the impact has been assessed as **low**. The infrastructure crossings lie in European Nature Information System (EUNIS) habitat A5.14 circalittoral coarse sand. The habitat is described by the European Environment Agency (EEA) as "*Tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15-20 m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. This habitat, as with shallower coarse sediments, may be characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g., Neopentadactyla) may also be prevalent in these areas along with the lancelet Branchiostoma lanceolatum*." (EEA, 2019, REF 21.68).

21.11.12 JNCC (2024, REF 21.69) lists the top five characterising species of EUNIS habitat A5.14 as the gravel sea cucumber *Neopentadactyla mixta*, the polychaete

Protodorvillea kefersteini, ribbon worms *Nemertea*, the common starfish *Asterias rubens* and the tube worm *Spirobranchus triqueter*. EUNIS habitat A5.14 covers 1,721 km^2 of the Greater Wash SPA, approximately 48.7% of the site. The localised habitat loss associated with the English Offshore Scheme infrastructure crossings would represent a maximum of 0.0007% of the habitat within the site.

21.11.13 Comparison of the red-throated diver distribution maps against the EUNIS habitats within the Greater Wash SPA identified that the highest densities of red-throated diver are distributed primarily across EUNIS habitats A5.44 circalittoral mixed sediments, A5.25 circalittoral fine sand or A5.26 circalittoral muddy sand, A5.23 sublittoral sediment or A5.24 infralittoral muddy sands with some areas of EUNIS habitats A5.611 *Sabellaria spinulosa* on stable circalittoral mixed sediment, A5.61 sublittoral polychaete worm reefs on sediment, A5.6 sublittoral biogenic reefs and A5.45 deep circalittoral mixed sediments present. This suggests that the localised loss of habitat is not within the key supporting habitats for red-throated diver.

21.11.14 The permanent habitat loss associated with the infrastructure crossings for the English Offshore Scheme is not within an area of high density use by red-throated diver, is within a habitat type that is common across the site (representing 48.7% of the Greater Wash SPA) and is not a key habitat type that is used by red-throated diver. With respect to the conservation objectives for the Greater Wash SPA, there will be no significant reduction in extent and distribution of the habitat for the species; there will be no effect on the structure and function of the habitat and there will be no impact on the distribution of red-throated diver.

21.11.15 In conclusion, the Significance of the effect has been assessed as **Minor** and **Not Significant** for all designated species.

All Species

21.11.16 The maximum permanent seabed footprint from all infrastructure crossings (including within the Greater Wash SPA) and remedial cable protection would be 0.92 km^2 within the EGL 3 English Offshore Scheme and 1.14 km^2 within the EGL 4 English Offshore Scheme.

21.11.17 With regards to fish and shellfish prey, **Volume 1, Part 3**, **Chapter 20: Fish and Shellfish** considered a number of impact pathways during construction on marine species including herring, sandeel and shellfish. The impact pathways considered as part of the preliminary assessment include:

- Temporary habitat loss **(Section 20.10)**
- Permanent habitat loss **(Section 20.11)**
- Increased SSCs **(Section 20.12 and Section 20.13)**
- Underwater noise changes **(Section 20.14)**
- Electromagnetic changes and barrier to species movement **(Section 20.15)**
- Temperature increase **(Section 20.16)**

21.11.18 Herring, sandeel and shellfish were identified as having a value and sensitivity of **medium** for all impact pathways assessed due to their specific habitat requirements and/or low mobility, making them vulnerable to seabed disturbance. The magnitude of the impacts was assessed as **low** based on the highly localised, temporary nature of the construction works.

21.11.19 The assessment concluded that the significance of the effect was Minor and Not Significant on all fish and shellfish receptors. In the absence of any environmentally significant impact on prey species, it can be concluded that there will be no discernible effect on seabird species.

21.11.20 In conclusion, the **significance** of the effect has been assessed as **Negligible** and **Not Significant** for all designated intertidal and offshore ornithology species.

21.12 Preliminary assessment of changes in distribution of prey species – Operation

21.12.1 This preliminary assessment focuses on changes in distribution of prey species as an indirect result of permanent habitat loss from the deposition of external cable protection during operation. **Section 21.11**above describes the impact pathway.

21.12.2 The worst-case installation footprint for permanent habitat loss is presented in **Section 21.8** but summarised is **Table 21-19**.

Table 21-19 - Summary of footprint for permanent habitat loss

Phase	Construction *	Operation	Decommissioning
EGL 3 Project	0.915 km^2	To be confirmed	No new deposits but assumes cable protection remains in place.
EGL 4 Project	1.135 km^2	To be confirmed	
* Infrastructure crossings and remedial rock protection			

Greater Wash SPA

21.12.3 The maximum permanent seabed footprint from remedial cable protection within the Greater Wash SPA during operation is currently unknown. At the time of writing, planned engineering studies have not been completed to identify where remedial protection may be required in the Greater Wash SPA. This information would be available for assessment as part of the ES.

21.12.4 The baseline established that the draft Order Limits are not a preferred foraging area for the designated species of the Greater Wash SPA. In addition, with regards to fish and shellfish prey, **Volume 1, Part 3**, **Chapter 20: Fish and Shellfish** considered the following impact pathways during the operational phase on marine species including herring, sandeel and shellfish:

- Temporary habitat loss **(Section 20.10)**
- Permanent habitat loss **(Section 20.11)**
- Increased SSCs **(Section 20.12 and Section 20.13)**
- Underwater noise changes **(Section 20.14)**
- Electromagnetic changes and barrier to species movement **(Section 20.15)**
- Temperature increase **(Section 20.16)**

21.12.5 Herring, sandeel and shellfish were identified as having a value and **sensitivity** of **medium** for all impact pathways assessed due to their specific habitat requirements

and/or low mobility, making them vulnerable to seabed disturbance. The **magnitude** of the impacts was assessed as **low** based on the highly localised extent of potential habitat loss and the availability of alternative suitable habitats within the vicinity of the English Offshore Scheme.

21.12.6 The assessment concluded that the significance of the effect was Minor and Not Significant on all fish and shellfish receptors. In the absence of any environmentally significant impact on prey species, it can be concluded that there will be no discernible effect on seabird species.

21.12.7 In conclusion, the **significance** of the effect has been assessed as **Negligible** and **Not Significant** for all designated intertidal and offshore ornithology species.

All Species

21.12.8 The maximum permanent seabed footprint from remedial cable protection (assuming it is deposited outside of the Greater Wash SPA) would be no greater than 0.92 km^2 within the EGL 3 Project and 1.14 km^2 within the EGL 4 Project.

21.12.9 With regards to fish and shellfish prey, **Volume 1, Part 3**, **Chapter 20: Fish and Shellfish** considered the potential impacts of temporary and permanent habitat loss during construction on marine species including herring, sandeel and diadromous fish. The assessment concluded that the effect was **Minor** and **Not Significant** on all fish and shellfish receptors. In the absence of any environmentally significant impact on prey species, it can be concluded that there will be no discernible effect on seabird species.

21.12.10 In conclusion, the **significance** of the effect has been assessed as **Negligible** and **Not Significant** for all species.

21.13 Preliminary assessment of visual and physical disturbance or displacement – Construction and Decommissioning

21.13.1 Intertidal and marine bird species are mobile in nature and may be able to avoid anthropogenic disturbance. However, individual species react differently to offshore development, with some species actively choosing to avoid sources of disturbance (not returning until sometime later), whilst others show little sensitivity, continuing with their activities. Species sensitivity to disturbance can often depend on the time of year. During specific seasons some species may have limited ability to alter their use of an area. For example, during the chick-rearing period, birds need to return frequently to the colony to feed and care for chicks. Birds can be discouraged from using feeding grounds or be forced further afield to forage if there are regular disturbances. Post-breeding, certain species such as Atlantic puffin are flightless, as they undergo a moult causing them to spend extended periods of time rafting on the sea surface, making them vulnerable to vessel movements. For other species, such as red-throated diver, winter and spring months are the most sensitive period as they remain at sea to forage, making them sensitive to unnecessary flight.

21.13.2 Disturbance may result in the bird choosing to move to continue their activity elsewhere either by swimming or flying away. If the bird is continually disturbed, or they must move a significant distance to find alternative grounds, this can cause the birds to expend additional energy and reduce feeding time to avoid obstacles. There may be a significant impact, altering the condition or distribution of species. Displacement occurs

when a bird is deterred from entering an area because of the human activity that is taking place, which again may restrict their ability to access prime habitat.

21.13.3 **Table 21-15** presents the realistic worst-case design scenarios with regards to the number and duration of vessels which could be working within the draft Order Limits and specifically within the Greater Wash SPA during the construction and decommissioning phases of the English Offshore Scheme. For the purposes of a worst-case assessment it has further been assumed that the EGL 3 Project and the EGL 4 Project would be constructed or decommissioned sequentially without overlap, thus extending the duration of disturbance to species.

Greater Wash SPA

21.13.4 The draft Order Limits overlap the Greater Wash SPA for 66.4 km from the Anderby Creek Landfall seaward. The EGL 3 Project crosses the Greater Wash SPA for 36.3 km, and the EGL 4 Project crosses the Greater Wash SPA for 30.1 km. The Greater Wash SPA covers a total area of 3,535.7 km^2. Natural England's Advice on Operations for the Greater Wash SPA provides sensitivity assessments for the six designated bird features under the pressure 'visual disturbance'. The pressure benchmark for a significant effect is defined as "*The daily duration of transient visual cues exceeds 10% of the period of site occupancy by the feature."*

Little gull, Common tern, little tern and Sandwich tern

21.13.5 Little gull are present as non-breeding species within the site. Natural England's Advice on Operations indicates that they are not sensitive to visual disturbance (Natural England, 2025).

21.13.6 The draft Order Limits cover 59.4 km^2 of the 3,535.7 km^2 total area of the Greater Wash SPA; equivalent to 1.68% of the site. The baseline established that the draft Order Limits are not a preferred foraging area for the little gull and the three tern species within the Greater Wash SPA, with alternative prime grounds closer to nesting sites on the Norfolk coastline. Disturbance will be site specific for these species, limited to the area of the draft Order Limits. As the disturbance would not exceed the pressure benchmark of 10% of the site area and does not overlap with the prime foraging areas the **magnitude** of the impact has been assessed as **negligible.**

21.13.7 The three tern species are present as breeding features of the site between April and August. Natural England's Advice on Operations (Natural England, 2025, REF 21.70) states that the sensitivity of the features to visual disturbance is low. The advice notes that whilst foraging at sea, the tern species all have low sensitivity to visual disturbance from vessels. They are highly manoeuvrable in flight and as surface feeding species have low disturbance susceptibility as defined by (MIG-BIRD, 2022, REF 21.6). Whilst it is acknowledged that little tern have high habitat specialisation i.e., they may be limited in seeking alternative foraging areas, the baseline established that the draft Order Limits are a sufficient distance from the nesting sites within the Greater Wash SPA that the draft Order Limits are not prime foraging grounds for the species. The **sensitivity** of the species to the impact has been assessed as **low.**

21.13.8 In conclusion, the **significance** of the effect of visual and physical disturbance or displacement has been assessed as **Negligible** and **Not Significant** for little gull, Common tern, little tern and Sandwich tern during construction and decommissioning.

Common Scoter

21.13.9 Common scoter are present within the Greater Wash SPA during the period September to April. Natural England's Advice on Operations states that common scoter have a medium sensitivity to visual disturbance. However, the evidence presented in support of this conclusion indicates common scoter have high sensitivity to disturbance by vessel movements, with papers by (Kaiser *et al.* 2006, REF 21.71) indicating that common scoter in Liverpool Bay were observed to be flushed by large vessels at distances of up to 2 km, and low numbers or absence of individuals noted in areas of relatively intense anthropogenic disturbance even where areas held high prey biomass. (Fliessbach *et al.,* 2019, REF 21.25) also report high escape distances for individuals and flocks, with a mean escape distance per individual of 1.6 km (± 777 m, maximum escape distance of 3.2 km). (MIG-BIRD, 2022, REF 21.6). classify common scoter as having a very high (5 out of 5) disturbance susceptibility and high (4 out of 4) habitat specialisation. The **sensitivity** of the species to the impact of visual and physical disturbance or displacement has been assessed as **high**.

21.13.10 The draft Order Limits cover 59.4 km^2 of the 3,535.7 km^2 total area of the Greater Wash SPA. Natural England advise using a displacement buffer of 2.5 km for common scoter (response provided in Scoping Opinion). Applying the buffer to the draft Order Limits, it has been calculated that birds could be displaced from up to 254.5 km^2 of the SPA, equivalent to 7.2% of the total area of the Greater Wash SPA. This assumes that the EGL 3 Project and the EGL 4 Project would be undertaken concurrently, with activity throughout the draft Order Limits in the Greater Wash SPA at any one time. In reality, the footprint of the impact would be lower, as construction or decommissioning progress in a linear manner, with activity only occurring in one or two places at a time. Using the (Lawson *et al.,* 2015, REF 21.1) kernel density estimates it has been calculated that the number of birds temporarily displaced within the Greater Wash SPA would be 0.19. The Greater Wash SPA was designated based on the site supporting a count of 3,449 individuals (Mean of Peak 2002/03, - 2007/08) which represented 0.6% of the biogeographic population (Natural England, 2018, REF 21.72). The number of individuals displaced by the English Offshore Scheme (0.19 individuals) represents <0.01% of the population supported by the Greater Wash SPA.

21.13.11 The baseline established that the draft Order Limits are not a preferred foraging area for common scoter within the Greater Wash SPA, with alternative prime grounds available closer to the mouth of The Wash. As the disturbance would not exceed Natural England's pressure benchmark of 10% of the site area, impacts would be reversible with birds able to use the area once the vessels have passed through, and the draft Order Limits do not overlap with the prime foraging areas, the **magnitude** of the impact has been assessed as **negligible**.

21.13.12 In conclusion, the **significance** of the effect has been assessed as **Minor** and **Not Significant** for common scoter during construction and decommissioning.

Red-throated diver

21.13.13 The most sensitive period for red-throated diver within the Greater Wash SPA is for the period November to March (inclusive). Natural England's Advice on Operations states that red-throated diver have a high sensitivity to visual disturbance. They exhibit strong behavioural responses to anthropogenic sources of disturbance, avoiding shipping lanes and other areas of high activity (Atterbury *et al.,* 2021, REF 21.9); (Dierschke *et al*., 2017, REF 21.73); (Thompson *et al*., 2020, REF 21.74); (Burt *et al*., 2022, REF 21.75). (MIG-Bird, 2022, REF 21.6) categorise red-throated diver as having a

disturbance susceptibility score of 5 and a habitat specialisation score of 4 (highest values in both categories). Red-throated diver have a mean-max foraging range of 9 km (Woodward *et al*. 2019, REF 21.11), coupled with a mean escape distance of 750 m and a maximum of 1,700 m as observed by (Fliessbach *et al.,* 2019, REF 21.76). This means that if they are displaced by vessels from a specific foraging area they may have limited opportunity to find alternative locations. The **sensitivity** of the species to the impact has been assessed as **high.**

21.13.14 The draft Order Limits occupy 59.4 km^2 of the 3,535.7 km^2 total area of the Greater Wash SPA. Natural England advised that a buffer of 2 km should be considered for vessel displacement for red-throated diver (response to Scoping Opinion). Applying this buffer to the draft Order Limits, it has been calculated that birds could be displaced from up to 217.5 km^2 of the Greater Wash SPA, equivalent to 6.15% of the total area of the SPA. The calculation assumes that the EGL 3 Project and the EGL 4 Project would be undertaken concurrently, with activity throughout the draft Order Limits within the Greater Wash SPA at any one time. In reality, the footprint of the impact would be lower, as construction or decommissioning progress in a linear manner, with activity only occurring in one or two places at a time. Using the Lawson *et al.,* (2015, REF 21.1) kernel density estimates it has been calculated that the number of birds temporarily displaced within the Greater Wash SPA would be 66.4. The Greater Wash SPA was designated based on the site supporting a count of 1,407 individuals (Mean of Peak 2002/03 - 2005/06) which represented 8.3% of the Great Britain (GB) non-breeding population (Natural England, 2018, REF 21.77). The number of individuals displaced by the English Offshore Scheme (66.4 individuals) represents 4.7% of the population supported by the Greater Wash SPA.

21.13.15 Whilst this may result in the temporary disturbance or displacement of red-throated diver, it is not expected that there will be a permanent effect on the integrity of the red-throated diver population within the site. As established in the baseline, density data suggests that the preferred foraging areas for red-throated diver are not located at the Anderby Creek Landfall or along the English Offshore Scheme. Thus, red-throated diver will have access to alternative foraging areas during the construction and decommissioning phase of the English Offshore Scheme. As the disturbance would not exceed Natural England's pressure benchmark of 10% of the site area and impacts would be reversible with birds able to use the area once the vessels have passed through, the **magnitude** of the impact has been assessed as **negligible**.

21.13.16 In conclusion, the **significance** of the effect has been assessed as **Minor** and **Not Significant** for red-throated diver during construction and decommissioning.

Divers, grebes and mergansers

21.13.17 Divers, grebes and mergansers are highly sensitive to noise and visual disturbance (Atterbury *et al.,* 2021, REF 21.9). Species from this functional group may not resettle quickly after being flushed, with escape distances (i.e., the distance at which they will move away from a vessel) being several kilometres.

21.13.18 Species from the group known to be present within the region and that could therefore be found within the draft Order Limits and ZoI include red-throated, black throated and great northern diver, shag, cormorant, and Slavonian, red-necked and great crested grebe. Species generally forage in shallow waters over sandy or muddy seabeds or in rocky areas. The foraging ranges for these species are between approximately 9 and 33 km from the coastline (NatureScot, 2023, REF 21.63) using (Woodward *et al.,* 2019, REF 21.11), suggesting that they are unlikely to be present within the majority of the

draft Order Limits. The English Offshore Scheme is largely sited offshore >35 km from the coastline; only short sections of the EGL 3 Offshore Scheme namely KP 0 - KP 54 and KP142 and KP171, and EGL 4 Offshore Scheme KP 0 – KP55, KP 132 – KP167 and KP 414 – KP422 are within the foraging range. The area of the draft Order Limits within the foraging range is approximately 154 km^2, equivalent to 24% of the overall draft Order Limits.

21.13.19 As illustrated in **Volume 1, Part 3: Chapter 23 Shipping and Navigation** the areas of the draft Order Limits closer to the coast are subject to higher levels of shipping activity. The draft Order Limits already lies in areas where the functional group are anticipated to experience displacement, and as identified by the establishment of various SPAs in the region there are alternative prime feeding grounds for the species. Whilst it is acknowledged that the sensitivity of the functional group is high to disturbance and/or displacement pressure, due to the draft Order Limits not providing prime feeding grounds for the functional group the assessment has concluded that the **sensitivity** of the functional group to the impact is **medium**.

21.13.20 Construction and decommissioning would progress in a linear manner along the draft Order Limits. Disturbance and displacement impacts would be temporary and reversible with individuals able to return once vessels have passed through. There would be no permanent barrier to accessing foraging, loafing and resting areas. Alternative, preferred foraging areas are available in the wider region for the functional group and the English Offshore Scheme would not lead to a change in distribution of species. The **magnitude** of the impact has been assessed as **negligible**.

21.13.21 In conclusion, the **significance** of the effect has been assessed as **Minor** and **Not Significant** for divers, grebes and mergansers during construction and decommissioning.

Seaducks, geese and swans

21.13.22 Eighteen species from this functional group have been observed in the fields immediately behind the Anderby Creek Landfall site during the last five years by The Wetland Bird Survey and Goose & Swan Monitoring Programme (Woodward *et al.* 2024, REF 21.78, **Volume 2, Part 3 Appendix 3.21.A Supporting Information: Intertidal and Offshore Ornithology**). Although geese and swans migrate over long distances, their core foraging range from night roosts is typically 5 to 25 km depending on the species (Scottish Natural Heritage, 2016, REF 21.79). The impact of vessels on swans and geese is not well recorded. Goodship and Furness (2022, REF 21.80) collated evidence to advise on likely sensitivity to human disturbance (e.g., pedestrians), recommending a buffer zone of 50 m – 1,000 m depending on the species and the season (breeding or non-breeding).

21.13.23 Seaduck such as common scoter and eider are highly sensitive to visual disturbance, with escape distances of 2 – 3.2 km observed (Fliessbach *et al.* 2019, REF 21.76). (MIG-BIRD, 2022, REF 21.6) classify seaducks such as common scoter, common goldeneye and common eider as having either a high to very high (4-5 out of 5) disturbance susceptibility or high (4 out of 4) habitat specialisation. As seaduck are the more sensitive species in the functional group they drive the assessment of sensitivity. The **sensitivity** of the functional group to the impact has been assessed as **high**.

21.13.24 Seaduck are found in coastal waters, generally within 30 km of the coast (based on the foraging range for long-tailed duck, other species within the functional group have shorter foraging ranges). The English Offshore Scheme is largely sited offshore >35 km from the coastline; only short sections of the EGL 3 Offshore Scheme namely KP 0 - KP

54 and KP142 and KP171, and EGL 4 Offshore Scheme KP 0 – KP55, KP 132 – KP167 and KP 414 – KP422 are within the foraging range. The area of the draft Order Limits within the foraging range is approximately 154 km^2, equivalent to 24% of the overall draft Order Limits.

21.13.25 Construction and decommissioning would progress in a linear manner along the draft Order Limits. Disturbance and displacement impacts would be temporary and reversible with individuals able to return once vessels have passed through. There would be no permanent barrier to accessing foraging, loafing and resting areas. Alternative, preferred foraging areas are available in the wider region for the functional group and the English Offshore Scheme would not lead to a change in distribution of species. The **magnitude** of the impact has been assessed as **negligible**.

21.13.26 In conclusion, the **significance** of the effect has been assessed as **Minor** and **Not Significant** for seaducks, geese and swans during construction and decommissioning.

Waders

21.13.27 Waders are known to be sensitive to visual disturbance from vessel traffic, but in general there is more habituation to disturbance than species such as divers and seaducks. Waders are known to be present at the Anderby Creek Landfall using the intertidal area for foraging, and the fields behind for resting and foraging. No works would be undertaken in the intertidal area as a result of the English Offshore Scheme. The HDD would exit below the mean low water mark. Although there is the possibility of designated wader species from adjacent SPAs to be present utilising supporting habitat, the Anderby Creek Landfall is not a designated site for waders, with alternative preferred foraging habitat found within the Humber Estuary SPA. The **sensitivity** of this functional group has been assessed as **low**.

21.13.28 Vessels used for construction and decommissioning of the English Offshore Scheme would be slow moving in the nearshore and would take place in the context of existing sources of disturbance from recreational vessels, and public use of the intertidal area. Disturbance and displacement impacts would be temporary and reversible with individuals able to return once vessels have moved out of the nearshore. There would be no permanent barrier to accessing foraging, loafing and resting areas. Alternative, preferred foraging areas are available in the wider region for the functional group and the English Offshore Scheme would not lead to a change in distribution of species. The **magnitude** of the impact has been assessed as **negligible**.

21.13.29 In conclusion, the **significance** of the effect has been assessed as **Negligible** and **Not Significant** for waders during construction and decommissioning.

Auks

21.13.30 Auks' sensitivity to visual disturbance is lower than that of other functional groups. (MIG-BIRD, 2022, REF 21.6) score common guillemot, razorbill and Atlantic puffin as having a disturbance susceptibility of 3 (out of 5), with Atlantic puffin scoring 2 (out of 5). (Fliessbach *et al.,* 2019, REF 21.76) report escape distances to be on average 395 m (± 216 m) for razorbill, suggesting that the zone of influence of displacement and disturbance would be limited to within the draft Order Limits. The **sensitivity** of the species to the impact has been assessed as **low**.

21.13.31 Construction and decommissioning would progress in a linear manner along the draft Order Limits. Disturbance and displacement impacts would be temporary and reversible with individuals able to return once vessels have passed through. There

would be no permanent barrier to access foraging, loafing and resting areas. Alternative, preferred foraging areas are available in the wider region for the functional group and the English Offshore Scheme would not lead to a change in distribution of species. The **magnitude** of the impact has been assessed as **negligible**.

21.13.32 In conclusion, the **significance** of the effect has been assessed as **Negligible** and **Not Significant for** auks during construction and decommissioning.

21.14 Preliminary assessment of visual and physical disturbance or displacement – Operation

21.14.1 The English Offshore Scheme would be designed to minimise any maintenance requirements. Following installation, routine maintenance of the High Voltage Direct Current (HVDC) submarine cables is not anticipated, but periodic inspection surveys, cable repair and remedial works would be required. **Section 21.8**: Realistic worst-case design scenarios states the worst-case assumptions with regards to the number and duration of vessels which could be working within the draft Order Limits and specifically within the Greater Wash SPA during the operational phases of the English Offshore Scheme. It has been assumed that vessels could be present at any time of the year.

Greater Wash SPA

Little gull, Common tern, Little tern and Sandwich tern

21.14.2 Little gull are present as non-breeding species within the Greater Wash SPA. Natural England's Advice on Operations indicates that they are not sensitive to visual disturbance.

21.14.3 Common tern, little tern and Sandwich tern are present as breeding features of the Greater Wash SPA between April and August. Natural England's Advice on Operations states that the sensitivity of the features to visual disturbance is Low. Works within the English Offshore Scheme during operation would be limited to the use of vessels at least 500 m from low water i.e., from the HDD exit point seaward. The baseline assessment established that the Anderby Creek Landfall is not a known nesting site for the species and therefore there is no impact pathway. Whilst foraging at sea, the tern species all have low sensitivity to visual disturbance from vessels. They are highly manoeuvrable in flight and as surface feeding species have low disturbance susceptibility as defined by (MIG-BIRD, 2022, REF 21.6). The **sensitivity** of the species to the impact has been assessed as **low.**

21.14.4 The draft Order Limits occupy 59.4 km^2 of the 3,535.7 km^2 total area of the Greater Wash SPA; equivalent to 1.68% of the Greater Wash SPA. The baseline established that the draft Order Limits are not a preferred foraging area for the little gull and the three tern species within the Greater Wash SPA, with alternative prime grounds closer to nesting sites on the Norfolk coastline. Disturbance will be site specific for these species, limited to the area of the draft Order Limits, temporary and transient in nature. As the disturbance would not exceed Natural England's pressure benchmark of 10% of the site area and does not overlap with the prime foraging areas, the **magnitude** of the impact has been assessed as **negligible.**

21.14.5 In conclusion, the **significance** of the effect has been assessed as **Negligible** and **Not Significant** for little gull, common tern, little tern and Sandwich tern during operation.

Common Scoter

21.14.6 Common scoter are present within the Greater Wash SPA during the period September to April. (MIG-BIRD, 2022, REF 21.6) classify common scoter as having a very high (5 out of 5) disturbance susceptibility and high (4 out of 4) habitat specialisation. (Fliessbach *et al.,* 2019, REF 21.76) also report high escape distances for individuals and flocks, with a mean escape distance per individual of 1.6 km (± 777 m, maximum escape distance of 3.2 km). The **sensitivity** of the species to the impact has been assessed as **high**.

21.14.7 The EGL 3 Project crosses the Greater Wash SPA for 36.3 km, and the EGL 4 Project crosses the Greater Wash SPA for 30.1 km. Natural England advised (in response to the Scoping Opinion) that a buffer of 2.5 km should be used to calculate displacement impacts. Assuming a 2.5 km displacement buffer around the EGL 3 Project and EGL 4 Project centreline, it has been calculated that birds could be displaced from up to 214 km^2 of the Greater Wash SPA, equivalent to 6.05% of the total area of the Greater Wash SPA. This assumes that the activity during operation would be continuous along the cable e.g., an inspection survey, rather than throughout the draft Order Limits as experienced during construction, and that birds would be displaced from the entire route at once. It therefore represents a worst-case scenario. In reality, the footprint of the impact would be lower, as the inspection survey progresses in a linear manner, with birds able to return to the area, or the remedial works would be confined to one location. Using the Lawson *et al.* (2015, REF 21.1) density estimates it has been calculated that the number of birds temporarily displaced within the Greater Wash SPA would be 0.16 (kernel density estimate).

21.14.8 The baseline assessment established that the draft Order Limits is not a preferred foraging area for common scoter within the Greater Wash SPA, with alternative prime grounds closer to the mouth of The Wash. As the disturbance would not exceed Natural England's pressure benchmark of 10% of the site area, impacts would be reversible with birds able to use the area once the vessels have passed through, and the draft Order Limits does not overlap with the prime foraging areas, the **magnitude** of the impact has been assessed as **negligible**.

21.14.9 In conclusion, the **significance** of the effect has been assessed as **Minor** and **Not Significant** for common scoter during operation.

Red-throated diver

21.14.10 The most sensitive period for red-throated diver within the Greater Wash SPA is for the period November to March (inclusive). Natural England's Advice on Operations states that red-throated diver have a high sensitivity to visual disturbance. They exhibit strong behavioural responses to anthropogenic sources of disturbance, avoiding shipping lanes and other areas of high activity (Atterbury *et al.,* 2021, REF 21.9) ; (Dierschke *et al*., 2017, REF 21.73); (Thompson *et al*., 2020, REF 21.74); (Burt *et al*., 2022, REF 21.75). (MIG-Bird, 2022, REF 21.6) categorise red-throated diver as having a disturbance susceptibility score of 5 and a habitat specialisation score of 4 (highest values in both categories). Red-throated diver have a mean-max foraging range of 9 km (Woodward *et al*. 2019, REF 21.11), coupled with a mean escape distance of 750 m and a maximum of 1,700 m as observed by(Fliessbach *et al.,* 2019, REF 21.76). This means that if they are displaced by vessels from a specific foraging area they may have limited opportunity to find alternative locations. The **sensitivity** of the species to the impact has been assessed as **high**.

21.14.11 The draft Order Limits occupy 59.4 km^2 of the 3,535.7 km^2 total area of the Greater Wash SPA. Natural England advised (in response to the Scoping Opinion) that a buffer of 2 km should be used to calculate displacement impacts. Assuming a displacement buffer around the EGL 3 Project and EGL 4 Project centreline, it has been calculated that birds could be displaced from up to 177 km^2 of the Greater Wash SPA, equivalent to 5.00% of the total area of the Greater Wash SPA. The calculation assumes that the activity during operation would be continuous along the cable e.g., an inspection survey, rather than throughout the draft Order Limits as experienced during construction, and that birds would be displaced from the entire route at once. It therefore represents a worst-case scenario. In reality, the footprint of the impact would be lower, as the inspection survey progresses in a linear manner, with birds able to return to the area, or remedial works would be confined to one location. Using the Lawson *et al.* (2015, REF 21.1) density estimates it has been calculated that the maximum number of birds temporarily displaced within the Greater Wash SPA would be 54 (kernel density estimate).

21.14.12 Whilst this may result in the temporary disturbance or displacement of red-throated diver, it is not expected that there will be a permanent effect on the integrity of the red-throated diver population within the Greater Wash SPA. As established in the baseline, density data suggests that the preferred foraging areas for red-throated diver are not located at the Anderby Creek Landfall or along the English Offshore Schemes. Thus, red-throated diver will have access to alternative foraging areas during the operational phase of the English Offshore Schemes. As the disturbance would not exceed Natural England's pressure benchmark of 10% of the site area, impacts would be reversible with birds able to use the area once the vessels have passed through, operations would be transient, and the draft Order Limits does not overlap with the prime foraging areas, the **magnitude** of the impact has been assessed as **negligible**.

21.14.13 In conclusion, the **significance** of the effect has been assessed as **Minor** and **Not Significant** for red-throated diver during operation.

Divers, grebes and mergansers

21.14.14 The preliminary assessment for visual and physical disturbance or displacement during operation for this functional group concluded that the species within the group have a **sensitivity** of **medium**. The **magnitude** of the impact during construction and decommissioning was assessed as **negligible**. During operation the number of vessels would be significantly reduced with no activity taking place in the draft Order Limits during some years. The magnitude of the impact during operation is therefore lower than during construction and decommissioning and the conclusion that the **significance** of the effects would be **Minor** and **Not Significant** for divers, grebes and mergansers remains valid for the operational phase.

Seaducks, geese and swans

21.14.15 The preliminary assessment for visual and physical disturbance or displacement during operation for this functional group concluded that the species within the group have a **sensitivity** of **high**. The **magnitude** of the impact during construction and decommissioning was assessed as **negligible**. During operation the number of vessels would be significantly reduced with no activity taking place in the draft Order Limits during some years. The magnitude of the impact during operation is therefore lower than during construction and decommissioning and the conclusion that the **significance** of the effects would be **Minor** and **Not Significant** for seaduck, geese and swans remains valid for the operational phase.

Waders and Auks

21.14.16 The preliminary assessment for visual and physical disturbance or displacement during operation for these functional groups concluded that the species within the group have a **sensitivity** of **low**. The **magnitude** of the impact during construction and decommissioning was assessed as **negligible**. During operation the number of vessels would be significantly reduced with no activity taking place in the draft Order Limits during some years. The magnitude of the impact during operation is therefore lower than during construction and decommissioning and the conclusion that the **significance** of the effects would be **Negligible** and **Not Significant** for waders and auks remains valid for the operational phase.

21.15 Transboundary Effects

21.15.1 The English Offshore Scheme lies wholly in UK waters. Given the approximate distance of 130 km to the UK EEZ boundary, there is no potential for international transboundary impacts. Separate applications will be submitted to the relevant Statutory Authority for the Scottish Schemes. Where the English and Scottish Schemes meet, collaborative environmental assessments will ensure impacts are fully assessed.

21.16 Further work to be undertaken

21.16.1 The information provided in this PEIR is preliminary and the final assessment of potential significant effects will be reported in the ES. This section describes the further work to be undertaken to support the intertidal and offshore ornithology assessment which will be presented in the ES.

Baseline

21.16.2 Natural England commissioned surveys of the Greater Wash SPA plus a 10 km seaward buffer, which were undertaken over the 2022/23 winter period (Natural England 2025, pers. comm.) The Applicant has received preliminary data from Natural England and will ensure that the most up to date data are used in the assessment within the ES.

21.16.3 Coastal vantage point surveys continue to support the assessment of effects associated with the English Offshore Scheme. Data from these surveys will be incorporated in the assessment of effects for the English Offshore Scheme in the ES.

River Nene temporary quay

21.16.4 Should this design option be taken forward further data collection will be undertaken to determine the species present and abundance at the proposed location of the temporary quay. This will include any data from vantage point surveys conducted to support the assessment of effects for the English Onshore Scheme.

Assessment

21.16.5 As part of the scoping response for the English Offshore Scheme the Marine Management Organisation (MMO) recommended that a vessel disturbance assessment should be undertaken if works within the Greater Wash SPA are carried out during the wintering period for common scoter and red-throated diver (September – April inclusive) or if the timing of the works to be undertaken are unknown at the stage of writing.

Preliminary assessments have been provided in **Section 21.13 and 21.14** for construction and decommissioning and operation respectively. These use the recommended buffer zones around vessels for the assessment of 100% displacement of red-throated diver and common scoter, calculate the proportion of the Greater Wash SPA impacted, and estimate the number of birds impacted using the using distribution maps from Lawson *et al.* (2015). The estimated number of vessel days occurring within the Greater Wash SPA between September and April (ideally on a monthly basis), accounting for variation in the distribution of vessels across the Greater Wash SPA and the impact on the calculations of area and number of birds potentially affected would be presented in the ES.

21.16.6 Information in respect to remedial rock protection during the operational phase is currently not available. Further design is required to determine this, and therefore this assessment will be provided within the ES.

River Nene Temporary Quay

21.16.7 Assessment of effects associated with the temporary quay will be provided within the ES should the option be taken forward. The following effects are proposed to be included within the assessment:

- Temporary increases and deposition of suspended sediments
- Changes in prey distribution
- Visual and physical disturbance and displacement

Bibliography

REF 21.1 Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J., Reid, J.B., Way, L. and O'Brien, S.H. (2015) An assessment of the numbers and distribution of wintering red-throated diver, little gull and common scoter in the Greater Wash. JNCC Report No. 574. JNCC, Peterborough. Available at: An assessment of the numbers and distributions of wintering red-throated diver, little gull and common scoter in the Greater Wash | JNCC Resource Hub [Accesses 3 April 2025]

REF 21.2 An assessment of the numbers and distributions of wintering red-throated diver, little gull and common scoter in the Greater Wash | JNCC Resource Hub [Accessed 31 March25]

REF 21.3 Natural England (2013). Conservation Advice for Marine Protected Areas [online]. Available at: https://publications.naturalengland.org.uk/file/6042656250789888 [Accessed February 2025]

REF 21.4 JNCC (2019). Marine Protected Area Advice [online]. Available at: Marine Protected Areas | JNCC - Adviser to Government on Nature Conservation [Accessed February 2025]

REF 21.5 MIG-Birds (2017) Joint SNCB Interim Displacement Advice Note Available at: https://data.jncc.gov.uk/data/9aecb87c-80c5-4cfb-9102-39f0228dcc9a/joint-sncb-interim-displacement-advice-note-2022.pdf [Accessed February 2025]

REF 21.6 MIG-Birds (2022) Joint SNCB Interim Advice on the Treatment of Displacement for Red-Throated Diver. Available at: Joint SNCB Interim Advice On The Treatment Of Displacement For Red-Throated Diver (2022) [Accessed February 2025].

REF 21.7 Natural England (2025) Responses to ExQ2 - Appendix M5 - Natural England's Best Practice Protocol for Vessels in Red-throated Diver SPAs. Available at: EN010136-000769-EN010136 497410 Morgan Offshore Wind Generation Assets Appendix M5 - Natural England's Best Practice Protocol for Vessels in Red-throated Diver SPAs - Deadline 5.pdf [Accessed February 2025].

REF 21.8 Natural England (2018) Natural England offshore wind cabling: ten years experience and recommendations. Available at: EN010080-001240-Natural England - Offshore Cabling paper July 2018.pdf [Accessed February 2025].

REF 21.9 Atterbury, A., Canning, S., Dinwoodie, K., Hall, R., Piesinger, N., Stewart, D., Thorpe, E. & West, L. (2021) Natural England and JNCC guidance on key sensitivities of habitats and Marine Protected Areas in English waters to aggregate resource extraction. JNCC Report No. 694. JNCC, Peterborough, ISSN 0963-8091. Available at: https://data.jncc.gov.uk/data/6e02f22c-846f-400b-80a4-38f549e52c00/JNCC-Report-694-FINAL-WEB.pdf [Accessed February 2025]

REF 21.10 Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W. and Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156 53-61. Available at: Seabird_foraging_ranges_as_a_preliminary20160706-6286-dsn1mz-libre.pdf [Accessed February 2025].

REF 21.11 Woodward, I., Thaxter, C.B., Owen, E. and Cook, A.S.C.P. (2019) Desk-based revision of seabird foraging ranges used for HRA screening. BTO Research Report No. 724. ISBN: 978-1-912642-12-0.

REF 21.12 Austin, G., Frost, T., Mellan, H. and Balmer, D. (2017) Results of the third Non-Estuarine Waterbird Survey, including Population Estimates for Key Waterbird Species. BTO

Research Report No. 697. Available at: https://www.bto.org/sites/default/files/publications/rr697.pdf [Accessed February 2025].

REF 21.13 Woodward, I.D., Calbrade, N.A., Birtles, G.A., Feather, A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. and Frost., T.M. 2024. Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO, RSPB, JNCC and NatureScot. British Trust for Ornithology, Thetford

REF 21.14 Natural England and JNCC (2016) Departmental Brief: Greater Wash potential Special Protection Area. Available at: https://consult.defra.gov.uk/natural-england-marine/greater-wash-potential-special-protection-area-com/supporting_documents/V9%20FINAL%20Greater%20Wash%20Departmental%20Brief%2017%20October%202016%20ready%20for%20consultation.pdf [Accessed February 2025].

REF 21.15 Outer Dowsing Offshore Wind (2024) Environmental Statement Chapter 12: Offshore and Intertidal Ornithology. Available at: Chapter 12 Offshore and intertidal Ornithology [Accessed February 2025].

REF 21.16 APEM (2021) Hornsea Four Environmental Statement A2.5. Volume A2, Chapter 5: Offshore & Intertidal Ornithology. Available at: Test [Accessed February 2025]

REF 21.17 RPS group (2013). Hornsea Offshore Wind Farm Project One: Environmental Statement: Volume 5 - Offshore Annexes Chapter 5.5.1: Ornithology Technical Report (Report No. UK04-050200-REP-0040). Report by SMart Wind. Available at: https://tethys.pnnl.gov/publications/hornsea-offshore-wind-farm-project-one-environmental-statement-volume-5-offshore [Accessed February 2025]

REF 21.18 NIRAS Consulting Ltd. (2018) Hornsea Three Offshore Wind Farm Environmental Statement: Volume 2, Chapter 5 - Offshore Ornithology. Available at: Hornsea Three Draft ES Chapter 5 Offshore Ornithology [Accessed February 2025].

REF 21.19 Natural England (2013). Conservation Advice for Marine Protected Areas. https://publications.naturalengland.org.uk/file/6042656250789888 [Accessed February 2025]

REF 21.20 Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. and Fuller, R.J. (2013) Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford. ISBN 978-1-908581-28-0

REF 21.21 BEIS (2022) UK Offshore Energy Strategic Environmental Assessment. Future leasing/licensing for offshore renewable energy, offshore oil & gas and gas storage and associated infrastructure. OESEA4 Environmental Report. Available at: UK Offshore Energy Strategic Environmental Assessment Environmental Report [Accessed February 2025].

REF 21.22 National Grid Viking Link Ltd. and Energinet.dk (2017) Volume 2: UK Offshore Environmental Statement - Viking Link.

REF 21.23 GridLink Interconnector Ltd. (2020) GridLink Marine Environmental Report.

REF 21.24 JNCC (1995) An atlas of seabird distribution in northwest European waters. Available at: An atlas of seabird distribution in north-west European waters | JNCC Resource Hub [Accessed February 2025].

REF 21.25 Fliessbach, K.L., Borkenhagen, K., Guse, N., Markones, N., Schwemmer, P. and Garthe, S. (2019) A Ship Traffic Disturbance Vulnerability Index for Northwest European Seabirds as a Tool for Marine Spatial Planning. *Front. Mar. Sci* vol. 6. Available at: Frontiers | A Ship Traffic Disturbance Vulnerability Index for Northwest European Seabirds as a Tool for Marine Spatial Planning [Accessed February 2025].

REF 21.26 Mendel, B., Schwemmer, P., Peschko, V., Müller, S., Schwemmer, H., Mercker, M. and Garthe, S. (2019) Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (*Gavia* spp.). *Journal of Environmental Management* **231** 429-438. Available at: Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (Gavia spp.) [Accessed February 2025].

REF 21.27 Duckworth, J., Green, J., Daunt, F., Johnson, L., Lehikoinen, P., Okill, D., Petersen, A., Petersen, K., Välsänen, R., Williams, J., William, S. & O'Brien, S. (2020) Red-throated diver energetics project: preliminary results from 2018/19. JNCC Report No. 638. Available at: Red-throated Diver Energetics Project: Preliminary Results from 2018/19 [Accessed February 2025]

REF 21.28 Wilson, L.J., O'Brien, S.H., Webb, A., Reid, J.B., Cranswick, P.A., Smith, L. & Hall, C. 2009. The numbers of inshore waterbirds using the Greater Wash during the non-breeding season; an assessment of the area's potential for qualification as a marine SPA. JNCC Report No. 393.

REF 21.29 RPS (2013). Hornsea Offshore Wind Farm Project One Chapter 5.5.1 Ornithology Technical Report (PINS Doc Ref 7.5.5.1). Available at: Hornsea Offshore Wind Farm Project One [Accessed December 2024]

REF 21.30 The Crown Estate (2021). 2005-2007, ECON Ecological, Race Bank, Boat-based Ornithological Surveys. Available at: 2005-2007, ECON Ecological, Race Bank, Boat-based Ornithological Surveys | Marine Data Exchange [Accessed December 2024]

REF 21.31 Equinor (2021). Dudgeon and Sheringham Shoal Offshore Wind Farm Extensions Preliminary Environmental Information Report Appendix 13.1 - Offshore Ornithology Technical Report. Available at: Appendix 13.1 Offshore Ornithology Technical Report.pdf [Accessed December 2024]

REF 21.32 Schwemmer, P., Mendel, B., Sonntag, N., Dierschke, V. & Garthe, S. 2011. Effects of ship traffic on seabirds in offshore waters: implications for marine conservation and spatial planning. Ecological Applications, Vol. 21, No. 5, pp. 1851-1860. DOI: 10.2307/23023122

REF 21.33 Pichegru, L., Nyengera, R., McInnes, A, M. & Pistorius, P. 2017. Avoidance of seismic survey activities by penguins. Scientific Reports, 7, 16305

REF 21.34 Van Kruchten & van der Hammen (2011). Case Study Sanwich Terns - a probabilistic analysis of the ecological effects of dreding. Available at: Case Study Sanwich Terns - a probabilistic analysis of the ecological effects of dreding | Request PDF (researchgate.net) [Accessed February 2025]

REF 21.35 Cook, A.S.C.P. & Burton, N.H.K (2010) A review of the potential impacts of marine aggregate extraction on seabirds. Marine Environment Protection Fund Project 09/P130. Available at: rr563.pdf [Accessed February 2025].

REF 21.36 Natural England and JNCC (2018) European Site Conservation Objectives for Greater Wash SPA (UK9020329).

REF 21.37 Natural England and JNCC (2016) Departmental Brief: Greater Wash potential Special Protection Area. Available at: V9 FINAL Greater Wash Departmental Brief 17 October 2016 ready for consultation.pdf [Accessed February 2025].

REF 21.38 JNCC (2020) Greater Wash SPA. Available at: https://jncc.gov.uk/our-work/greater-wash-spa/#toc [Accessed February 2025]

REF 21.39 Natural England (2023) Greater Wash SPA. Available at: https://designatedsites.naturalengland.org.uk/Marine/Seasonality.aspx?SiteCode=UK9020329&SiteName=Greater%20Wash&SiteNameDisplay=Greater+Wash+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=6,6 [Accessed February 2025]

REF 21.40 Natural England (2019) Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SPA. Available at: Marine site detail [Accessed February 2025].

REF 21.41 Natural England (1981) Saltfleetby - Theddlethorpe Dunes SSSI. Available at: 1002613 [Accessed February 2025].

REF 21.42 Natural England (2010) Saltfleetby - Theddlethorpe Dunes SSSI: Condition of Features. Available at: Site feature condition [Accessed February 2025].

REF 21.43 BTO (2024) Barnacle Goose. Available at: https://www.bto.org/understanding-birds/birdfacts/barnacle-goose [Accessed 26 September 2024]

REF 21.44 RSPB (2024) Sanderling. Available at: https://www.rspb.org.uk/birds-and-wildlife/sanderling [Accessed 19 September 2024]

REF 21.45 RSPB (2024) Wigeon. Available at: https://www.rspb.org.uk/birds-and-wildlife/wigeon [Accessed 19 September 2024]

REF 21.46 Natural England 2023. Lincolnshire Coronation Coast. Available at: Lincolnshire Coronation Coast NNR No. 1 Declaration 2023 [Accessed February 2025]

REF 21.47 JNCC (2007) Humber Estuary Ramsar. Available at: untitled Information Sheet on Ramsar Wetlands (RIS) [Accessed February 2025]

REF 21.48 Natural England (2024) Humber Estuary Ramsar. Available at Designated Sites View Humber Estuary RAMSAR [Accessed February 2025]

REF 21.49 Dias, M.P., Martin, R., Pearmain, E.J., Burfield, I.J., Small, C., Phillips, R.A., Yates, O., Lascelles, B., Borboroglu, P.G. and Croxall, J.P. (2019) Threats to seabirds: A global assessment. *Biological Conservation* **237** 525-537.

REF 21.50 OSPAR (2023) Climate Change Thematic Asessment. In: OSPAR, 2023: Quality Status Report 2023. OSPAR Commission, London. Available at: Climate Change Thematic Assessment [Accessed February 2025].

REF 21.51 Macgregor, C.J., Gillings, S., Balmer, D.E., Boersch-Supan, P., Harris, S.J. and Hereward, H.F.R. (2024) Impacts of highly pathogenic avian influenza on seabird populations in the North Sea are detectable in sea-watchers' migration counts. *Bird Study* 1-15

REF 21.52 Harris, S.J., Baker, H., Balmer, D.E., Bolton, M., Burton, N.H.K., Caulfield, E., Clarke, J.A.E., Dunn, T.E., Evans, T.J., Hereward, H.R.F., Humphreys, E.M., Money, S. and O'Hanlon, N.J. (2024) Seabird population trends and causes of change: 1986 - 2023, the annual report of the Seabird Monitoring Programme. BTO Research Report 771. British Trust for Ornithology, Thetford. Available at: smp_annual_report_2021-23.pdf [Accessed February 2025].

REF 21.53 MacDonald, A., Heath, M.R., Edwards, M., Furness, R.W., Pinnegar, J.K., Wanless, S., Speirs, D.C. & Greenstreet, S.P.R. (2015) Climate-driven trophic cascades affecting seabirds around the British Isles. Oceanography & Marine Biology CRC Press

REF 21.54 Burton, N.H.K., Daunt, F., Kober, K., Humphreys, E.M. and Frost, T.M. (2023) Impacts of climate change on seabirds and waterbirds in the UK and Ireland. *MCCIP Science*

Review 2023. Available at: Impacts of Climate Change on Seabirds and Waterbirds .pdf [Accessed February 2025].

REF 21.55 Capuzzo, E., Lynam, C.P., Barry, J., Stephens, D., Forster, R.M., Greenwood, N., McQuatters-Gollop, A., Silva, T., van Leeuwen, S.M. and Engelhard, G.H. (2018) A decline in primary production in the North Sea over 25 years, associated with reductions in zooplankton abundance and fish stock recruitment. *Global Change Biology* **24**(1). Available at: Global Change Biology | Environmental Change Journal | Wiley Online Library [Accessed February 2025].

REF 21.56 RSPB (2024) The closure of sandeel fisheries: our legacy of campaigning. Available at: The closure of sandeel fisheries: our legacy of campaigning [Accessed February 2025]

REF 21.57 Defra (2024) Consultation outcome: Government response. Available at: Government response - GOV.UK [Accessed February 2025].

REF 21.58 Brenninkmeijer, A., Stienen, E.W.M., Klaassen, M. and Kersten, M. (2002) Feeding ecology of wintering terns in Guinea-Bissau. *Ibis* **144**(4) 602-613.

REF 21.59 Natural England (2024) Greater Wash SPA: Advice on Operations. Available at: Designated Sites View [Accessed April 2025]

REF 21.60 Price, J.J. and Thompson, S.A. (2006) Water clarity and diving behaviour in wintering common Loons. *Waterbirds* **290**(2) 169-175.

REF 21.61 Natural England (2024) Natural England Conservation Advice for Marine Protected Areas: Exe Estuary SPA. Available at: Marine site detail [Accessed April 2025].

REF 21.62 Natural England (2024) Natural England Conservation Advice for Marine Protected Areas: Falmouth Bay to St Austell Bay SPA. Available at: Marine site detail [Accessed April 2025].

REF 21.63 NatureScot (2023) Available at: Guidance Note 3: Guidance to support Offshore Wind applications: Marine Birds - Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges | NatureScot [Accessed April 2025].

REF 21.64 Cefas (2018) Marine bird abundance: Marine online assessment tool. Available at: Abundance - Marine online assessment tool [Accessed February 2025].

REF 21.65 Frederiksen, M., Edwards, M., Richardson, A.J., Halliday, N.C. and Wanless, S. (2006) From plankton to top predators: bottom-up control of a marine food web across four trophic levels. *Journal of Animal Ecology* **75**(6) 1259-1268. Available at: From plankton to top predators: bottom-up control of a marine food web across four trophic levels - FREDERIKSEN - 2006 - Journal of Animal Ecology - Wiley Online Library [Accessed February 2025]

REF 21.66 Wanless, S., Greenstreet, S., Jensen, H., Daunt, F., Hamer, K.C. and Harris, M.P. (2008) The impact of the sandeel fishery closure on seabird food consumption, distribution, and productivity in the northwestern North Sea. *Canadian Journal of Fisheries and Aquaculture Science* **63**(3) 362-381.

REF 21.67 Reach, I., Kyle-Henney, M., Barr, N., Warner, I., Lowe, S. and Lloyd Jones D. (2024) Identifying and mapping sandeel potential supporting habitat: an updated method statement. Available at: Identifying_and_Mapping_Sandeel_Potential_Supporting_Habitat_An_Updated_Method_2024_w_Appendices.pdf [Accessed February 2025].

REF 21.68 EEA (2019) Circalittoral coarse sediment. Available at: EUNIS -Factsheet for Circalittoral coarse sediment [Accessed February 2025].

REF 21.69 JNCC (2024) Circalittoral coarse sediment. Available at: Circalittoral coarse sediment - JNCC Marine Habitat Classification [Accessed February 2025].

REF 21.70 Natural England (2025) Advice on Operations: Greater Wash SPA. Available at: Designated Sites View [Accessed April 2025].

REF 21.71 Kaiser, M.J., Galanidi, M., Showler, D.A., Elliott, A.J., Caldow, R.W.G., Rees, E.I.S., Stillman, R.A. and Sutherland, W.J. (2006) Distribution and behaviour of Common Scoter *Melanitta nigra* relative to prey resources and environmental parameters. *Ibis* **148**(1) 110-128. Available at: Distribution and behaviour of Common Scoter Melanitta nigra relative to prey resources and environmental parameters - KAISER - 2006 - Ibis - Wiley Online Library [Accessed February 2025].

REF 21.72 Natural England (2018) Greater Wash SPA UK9020329 Citation Version 2.2 Available at: https://publications.naturalengland.org.uk/publication/4597871528116224. [Accessed April 2025]

REF 21.73 Dierschke, V., Furness, R.W., Gray, C.E., Petersen, I.K., Schmutz, J., Zydelis, R. and Daunt, F. (2017) Possible behavioural, energetic and demographic effects of displacement of red-throated divers. JNCC Report No. 605. Available at: Possible Behavioural, Energetic and Demographic Effects of Displacement of Red-throated Divers [Accessed February 2025].

REF 21.74 Thompson, D., O'Brien, S., Ruffino, L., Johnson, L., Lehikoinen, P., Okill, D., Petersen, A., Petersen, I.K., Väisänen, R., Williams, J. and Williams, S. (2020) Red-throated diver energetics project: 2020 field season report. JNCC Report No. 673. Available at: Red-Throated Diver Energetics Project - 2020 Field Season Report [Accessed February 2025]

REF 21.75 Burt, M.L., Mackenzie, M.L., Bradbury, G. and Drake, J. (2022) Investigating effects of shipping on common scoter and red-throated diver distributions in Liverpool Bay SPA. NECR42. Natural England. Available at: Investigating effects of shipping on common scoter and red-throated diver distributions in Liverpool Bay Special Protection Area (SPA) - NECR425 [Accessed February 2025].

REF 21.76 Fliessbach, K.L., Borkenhagen, K., Guse, N., Markones, N., Schwemmer, P. and Garthe, S. (2019) A Ship Traffic Disturbance Vulnerability Index for Northwest European Seabirds as a Tool for Marine Spatial Planning. Front. Mar. Sci. 6:192. doi: 10.3389/fmars.2019.00192 Available at: https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2019.00192/full [Accessed July 2024]

REF 21.77 Natural England (2018) Greater Wash SPA UK9020329 Citation Version 2.2 Available at: https://publications.naturalengland.org.uk/publication/4597871528116224. [Accessed April 2025]

REF 21.78 Woodward, I.D., Calbrade, N.A., Birtles, G.A., Feather, A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. and Frost, T.M. (2024) Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO/RSPB/JNCC/NatureScot. Thetford. Available at: waterbirds_in_the_uk_webs_gsmp_202223.pdf [Accessed February 2025].

REF 21.79 Scottish Natural Heritage (2016) Assessing Connectivity with Special Protection Areas (SPAs) Guidance. Available at: https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf [Accessed February 2025]

REF 21.80 Goodship, N.M. and Furness, R.W. (MacArthur Green) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com