The Great Grid Upgrade

Sea Link

Sea Link

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Executive Summary

Ex1.1 Introduction

Ex1.1.1 The Sea Link Project (hereafter referred to as the ‘Proposed Project’) is a proposal by National Grid Electricity Transmission plc (hereafter referred to as National Grid) to reinforce the transmission network in the South East and East Anglia. The Proposed Project is required to accommodate additional power flows generated from renewable and low carbon generation, as well as an addition to new interconnection with mainland Europe.

Ex1.1.2 The Proposed Project would achieve the required reinforcement of the network via a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400 kV overhead line, close to Richborough in Kent.

Ex1.1.3 The Proposed Project is split into three interlinked schemes, referred to as the Suffolk Onshore Scheme, the Offshore Scheme, and the Kent Onshore Scheme.

Ex1.1.4 This Report to Inform the Habitats Regulations Assessment (HRA) has been prepared on behalf of National Grid. It forms part of the application for a Development Consent Order (a 'DCO') for the Proposed Development submitted to the Secretary of State for Department for Energy Security and Net Zero (the “Secretary of State”), under Section 37 of The Planning Act (PA) 2008 (Ref-1).

Ex1.2 Methodology

Ex1.2.1 Whilst the HRA decisions must be taken by the competent authority (The Secretary of State as advised by the Planning Inspectorate as Examining Authority in the context of the DCO application), the information needed to undertake the necessary assessments must be provided by the applicant. The information needed for the competent authority to establish whether there are any likely significant effects (LSEs) or adverse effects on site integrity (AEoSI) that could arise as a result of the Proposed Project is therefore provided in this Report.

HRA Stage 1 – Screening for Likely Significant Effects

Ex1.2.2 The objective of the LSE test is to assess whether the Proposed Project, without any detailed appraisal, is likely to result in a significant effect upon a European Site or its qualifying features. Where it is deemed unlikely for the Proposed Project to result in LSE upon European Sites, usually because there is no mechanism for an adverse interaction (i.e. a pathway), these aspects can be ‘screened out’. If the risk of LSE cannot be ruled out alone on the basis of objective scientific evidence, a precautionary approach is applied and remaining aspects are taken forward to an Appropriate Assessment. The HRA must also consider the potential for effects ‘in combination’ with other plans and projects.

HRA Stage 2 – Appropriate Assessment

Ex1.2.3 Where it is determined at the screening stage that a conclusion of 'no Likely Significant Effect' cannot be drawn, the HRA assessment proceeds to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no specific technical analyses, or level of detail, that are classified by law as belonging to Appropriate Assessment rather than the screening for LSE. The Appropriate Assessment constitutes whatever level of further assessment is required to determine whether an adverse effect on site integrity (AEoSI) can be ruled out.

Ex1.3 Consultation with Natural England

Ex1.3.1 As required by Planning Inspectorate Advice on Habitats Regulations Assessments, and good practice, the HRA and its emerging findings were shared with Natural England on a regular basis during 2024. This has been through a combination of meetings and document sharing. A copy of this HRA was also shared with Natural England prior to DCO submission. The comments received and how they have been addressed in this report are contained in Appendix D.

Ex1.4 Stage 1 Screening: Likely Significant Effects

Ex1.4.1 A Stage 1 screening test of LSE was undertaken for relevant European Sites and their qualifying features.

Suffolk Onshore Scheme

Ex1.4.2 The following impact pathways have been screened in for Appropriate Assessment:

- Dust impacts on nightjar and woodlark associated with the Sandlings Special Protection Area (SPA), since a construction compound and trenchless drive compound will be within 20 m of the SPA.
- Construction/decommissioning phase noise and visual disturbance of nesting woodlark and nightjar at Sandlings SPA, and wintering birds using functionally-linked land for Alde Ore Estuary SPA/Ramsar, is screened into Appropriate Assessment given a construction compound and trenchless drive compound will be located adjacent to the SPA.
- Construction/decommissioning phase loss of functionally-linked foraging habitat for nightjar and woodlark associated with Sandlings SPA.

Ex1.4.3 The following impact pathways were screened out as not posing likely significant effects alone or in combination with other plans or projects:

- Direct loss of any area of European Site during construction or operation
- Atmospheric pollution (i.e. NOx, ammonia or nitrogen) on any European Site during construction or operation
- Disturbance on Outer Thames Estuary SPA during construction or operation
- Disturbance of other European Sites during operation
- Pollution of any European Site during construction or operation

- Loss of functionally-linked land from all European Sites except Sandlings SPA

Offshore Scheme

Ex1.4.4 The following impact pathways have been screened in for Appropriate Assessment:

- Impacts from temporary increases in SSC on reefs within the Thanet Coast Special Area of Conservation (SAC) and sandbanks within the Margate and Long Sands SAC;
- Effects from changes to marine water quality on reefs within Thanet Coast SAC and habitats of Thanet Coast & Sandwich Bay SPA and Sandwich Bat SAC, during cable installation and cable lay from the use of drilling fluids;
- Underwater noise impacts on harbour porpoise associated with the Southern North Sea SAC, harbour seal associated with the Wash and North Norfolk Coast SAC, and grey seal associated with Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC;
- Introduction and spread of invasive non-native species (INNS) during operation via the addition of cable protection at the Kent landfall to the qualifying features of the Thanet Coast SAC and Sandwich Bay SAC;
- Vessel collision risk impacts on harbour porpoise within the Southern North Sea SAC, harbour seal from the Wash and North Norfolk Coast SAC, and grey seal from the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC;
- Airborne sounds and visual disturbance impacts on red-throated diver, common tern, and little tern at Outer Thames Estuary SPA, lesser black-backed gull, sandwich tern, common tern and little tern at Alde-Ore Estuary SPA, avocet and little tern at Minsmere-Walberswick SPA, harbour seal associated with the Wash and North Norfolk Coast SAC, and grey seal associated with the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC;
- Potential for indirect effects through impacts to prey species on the red-throated diver, common tern, and little tern at Outer Thames Estuary SPA, lesser black-backed gull, sandwich tern, common tern and little tern at Alde-Ore Estuary SPA, and avocet and little tern at Minsmere-Walberswick SPA, and species foraging in the intertidal zone at Thanet Coast & Sandwich Bay SPA/Ramsar; and
- Effects of electromagnetic field (EMF) emissions impacts on harbour porpoise associated with the Southern North Sea SAC, during operation.

Ex1.4.5 The following impact pathways were screened out as not posing LSE alone or in combination with other plans or projects:

- Temporary physical disturbance to benthic habitats and species during construction;
- Underwater sound impacts during construction;
- Permanent loss of benthic habitats and species during operation; and
- Disturbance due to thermal emissions during operation.

Kent Onshore Scheme

Ex1.4.6 The following impact pathways have been screened in for Appropriate Assessment:

- Direct habitat loss during the construction phase at Thanet Coast & Sandwich Bay SPA/Ramsar site and Sandwich Bay SAC.
- Pollution through frac out of any trenchless construction method crossing Thanet Coast & Sandwich Bay SPA/Ramsar site and Sandwich Bay SAC
- Noise disturbance of birds using Thanet Coast & Sandwich Bay SPA/Ramsar site during construction.
- Impacts on Thanet Coast & Sandwich Bay SPA/Ramsar site due to loss of functionally-linked land for golden plover during operation of the Kent Onshore Scheme.
- Operational phase collision risk, associated with the new section of overhead powerline and species travelling to Stodmarsh SPA/Ramsar.

Ex1.4.7 The following impact pathways were screened out as not posing likely significant effects alone or in combination with other plans or projects:

- Atmospheric pollution (i.e. NOx, ammonia, or nitrogen) on any European Site during construction or operation
- Disturbance of any European Sites during operation
- Pollution of any European Site during construction or operation, except for risk of frac out affecting Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC during trenchless construction

In Combination

Ex1.4.8 Multiple schemes (LionLink Interconnector and East Anglia ONE North and East Anglia TWO offshore wind farms) will be making, or intend to make, landfall in Suffolk, with East Anglia ONE and TWO occurring between Sizewell and Aldeburgh and/or will be connecting to the proposed Friston Substation. The offshore cable routes will also all be traversing parts of Outer Thames Estuary SPA and Southern North Sea SAC, as will the Sea Link Offshore Scheme. As such, it is not possible to screen out ‘in combination’ effects at this stage. Impact pathways that may arise ‘in combination’ with the Proposed Project include disturbance of birds associated with Sandlings SPA, loss of functionally linked habitat for white-fronted goose associated with Minsmere-Walberswick SPA, and disturbance of red-throated diver of Outer Thames Estuary SPA and harbour porpoise of Southern North Sea SAC.

Ex1.5 Stage 2: Appropriate Assessment

Ex1.5.1 This section summarises the Stage 2 Appropriate Assessment for impact pathways that were not ruled out at the LSE screening stage and were deemed to require further assessment.

Suffolk Onshore Scheme

Construction Phase dust deposition on Sandlings SPA

Ex1.5.2 The risk posed to the SPA from dust deposition during compound set up, trenchless installation and cable laying within 200 m of the SPA is considered low, even in the absence of mitigation. Nonetheless, dust control measures are included as mitigation and are set out in Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice), secured through DCO Schedule 3 Requirement 6. With these measures in place, it is considered that no AEoSI on the qualifying features of Sandlings SPA would arise.

Construction Phase noise and visual disturbance of Sandlings SPA and functionally-linked land for Alde-Ore Estuary SPA/Ramsar site and Minsmere-Walberswick SPA/Ramsar

Ex1.5.3 To inform the assessment of noise, in meetings with Natural England a 60 dB LAmax threshold was agreed as being a reasonable precautionary threshold for significant disturbance. A 10 dB reduction has been allowed due to best practicable noise reduction means. The mapping shows that with noise fencing around the perimeter of the works area, the 60 dB contour would cover the southern-most part of the SPA, but scrutiny of the underlying data indicates this would only be during compound set up, which will take c. 1 month. Compound set up is programmed to occur outside the nesting season (March to August). This is secured in Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments and secured through DCO Schedule 3 Requirement 6. Therefore, no mitigation is needed beyond standard noise mitigation methods such as close-board fencing. The noise fence will also act as a visual screen and thus protect birds in the SPA from visual disturbance.

Ex1.5.4 Non-breeding bird surveys of the wetland parts of RSPB North Warren Reserve, and bird records generally, have identified that it is functionally-linked to both Minsmere-Walberswick SPA/Ramsar and Alde-Ore Estuary SPA/Ramsar. However, the aforementioned noise modelling undertaken for the project has identified that the 60 dB LAmax contour will only overlap with the RSPB reserve east of the former railway (the wetland parts of the reserve) to a very small extent. The affected small area of reserve does not support significant numbers of SPA/Ramsar birds. Therefore, no AEoSI of Minsmere-Walberswick SPA or Alde-Ore Estuary SPA will arise due to noise disturbance impacts of the Proposed Project on functionally-linked habitat in RSPB North Warren Reserve.

Construction Phase temporary loss of functionally linked land for Sandlings SPA

Ex1.5.5 Approximately 2.5 ha of acid grassland would be temporarily lost adjacent to Sandlings SPA due to the presence of the trenchless technique compound and associated section of cable trench east of Leiston Road. This field shows no evidence of nightjar/woodlark nesting (despite two seasons of breeding bird survey) but is well within 1 km of the nearest woodlark territories in the SPA and is adjacent to a field where the nearest woodlark territory outside the SPA was recorded in surveys for the Proposed Project.

Ex1.5.6 This loss will be temporary as it will occur during trenchless installation (which will occur in a single breeding season) and cable trench burial. Once that is complete the habitat will be restored and once again be available for nightjar and woodlark. Moreover, aside from any value it may have for SPA birds, acid grassland is an important and scarce habitat in itself. Therefore, as part of the broader habitat mitigation proposals for the Proposed Project approximately 6 ha of acid grassland will be restored, enhanced and maintained for 10 years following creation/restoration. Research indicates that vegetation that is kept suitably short and open, particularly if bare areas are created within the sward, is likely to be used for foraging by both species and may be used by nesting by woodlark.

Ex1.5.7 Therefore, it is considered that no AEoSI on the qualifying features of Sandlings SPA would arise from this impact pathway.

Offshore Scheme

Impacts from temporary increases in SSC during construction

Ex1.5.8 Thanet Coast SAC is less than 1 km from the Offshore Scheme and is designated for benthic habitats including reef. Margate and Long Sands SAC is 3.0 km west of the Offshore Scheme and is designated for the protection of Annex I sandbanks. Contaminant concentrations were found to vary throughout the route, but they all remained consistent with general background levels for this region of the North Sea.

Ex1.5.9 The maximum distance travelled by larger fractions of sands and gravels is expected to be approximately 20 m before subsequently re-depositing either directly back into the trench or within a few metres of the area of disturbance within tens of seconds. Fine sand may disperse up to a maximum distance of 17 km before settling to the seabed. However, this deposition will be limited to a thickness of less than 0.5 mm on the seabed, which is considered equivalent to natural variability.

Ex1.5.10 Tides and currents are expected to rapidly disperse particles suspended in the water column, quickly returning turbidity to baseline conditions. Thus, there is not anticipated to be an AEoSI on the qualifying features of the Thanet Coast SAC. Sandbanks in shallow water are dynamic and are usually subject to varying levels of natural turbidity and energy. This natural disturbance regime means they generally support only a low level of biodiversity. Therefore, there is not anticipated to be an AEoSI on the qualifying features of the Margate and Long Sands SAC.

Effects from changes to marine water quality during cable installation and cable lay from the use of drilling fluids during construction

Ex1.5.11 Trenchless techniques such as HDD are proposed at the Kent Landfall. It has been estimated that up to 40 m^3 of drilling fluid would be discharged at the Kent Landfall. The volume of drilling fluid would be very small and the regular tidal movement in the intertidal zone would act to rapidly disperse and dilute any drilling fluid released. Infaunal species associated with intertidal mud do not have high sensitivity to the drilling mud that may settle temporarily on the seabed. Additionally, drilling fluid discharges from the Proposed Project trenchless operations would be single events over a short period of time and all drilling fluids will be selected from the OSPAR List of Substances/Preparations Used and Discharged Offshore which are considered to 'Pose Little or No Risk to the Environment' (PLONOR).

Ex1.5.12 There will therefore be no AEoSI on the qualifying features of the Thanet Coast SAC Sandwich Bay SAC, or Thanet Coast & Sandwich Bay SPA as a result of changes in water quality due to use of drilling fluids.

Underwater noise impacts during construction

Ex1.5.13 The Offshore Scheme passes through the Southern North Sea SAC, which is designated for harbour porpoise, and within the foraging range of harbour seal, which is a qualifying feature of the Wash and North Norfolk Coast SAC, and grey seal, which is a qualifying feature of the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC. Harbour porpoise is the marine mammal species most sensitive to noise that is likely to be present in the vicinity of the Offshore Scheme. Potential impacts on this species can also be considered representative of impacts on pinnipeds.

Ex1.5.14 The highest peak sound pressure is expected to come from any SBP during pre-installation geophysical surveys. Other activities have lower sound intensity, such as cable lay, although they occur for longer. Modelling indicates that even at the most intensive impulsive sound source, auditory injury only has the potential to occur in marine mammals that are in very close proximity, i.e. within 63.1 m of the source.

Ex1.5.15 With regard to behavioural disturbance, the activity with the highest sound source is the operation of the SBP. The Effective Deterrent Range (EDR) for harbour porpoise is 5 km. The greatest densities close to the Offshore Scheme are expected in the winter months, when a seasonal restriction on works is already proposed to be in place for red-throated diver. This will allow construction and vessel presence during the winter period, when harbour porpoise densities are greatest, to be avoided. As the harbour porpoise is the most sensitive, potential impacts to this species can be considered representative of other species such as grey seal and harbour seal. Thus, the area of disturbance from the project activities identified above is small in relation to the distribution range of the populations of concern.

Ex1.5.16 The project has adopted standard JNCC measures for minimisation of injury from underwater sound generated from project geophysical surveys including a dedicated marine mammal observer present during SBP activities, and a soft-start or gradual increase in sound intensity for works to enable marine fauna to move away before any injury occurs.

Ex1.5.18 It is thus concluded there will be no AEoSI for the marine mammal qualifying features of the Southern North Sea SAC, Wash and North Norfolk Coast SAC, Humber Estuary SAC or Berwickshire or North Northumberland Coast SAC as a result of underwater noise.

Vessel collision risk impacts during construction

Ex1.5.19 Cetaceans, such as the harbour porpoise, are considered fast swimming, agile species, with rapid reflexes and good sensory capabilities. Moreover, marine mammals possess a thick subdermal layer of blubber (or fat deposits) which provides a level of protection to their vital organs, meaning they are reasonably resilient to minor strikes and collisions. The most lethal and serious injuries to cetaceans, primarily whales, are believed to be caused by large ships, typically 80 m and longer with large drafts, as well as vessels travelling faster than 14 knots.

Ex1.5.20 Avoidance behaviour exhibited by cetaceans is often associated with fast, unpredictable vessels such as speedboats and jet-skis rather than the large slow vessels used to lay subsea cables. Most of offshore construction works are anticipated to take place between April and October (inclusive). Works will avoid most of the winter period when it is understood that there are likely to be elevated numbers of harbour porpoise utilising the area of the Southern North Sea SAC that the cable corridor passes through. Given this, it is considered that there will be no AEoSI for the qualifying features of the Southern North Sea SAC as a result of potential vessel collisions.

Ex1.5.21 The risk to pinnipeds is generally considered lower than that for cetaceans. Simultaneous vessel activities are expected to occur during construction. However, this increase in vessel numbers is expected to be very small when compared to the background shipping levels in an already heavily trafficked area of the North Sea. Additionally, these vessels are primarily slow moving. The likelihood of vessel collision with grey seal is unlikely and it is therefore considered that there will be no AEoSI for the qualifying features of the Wash and North Norfolk Coast SAC, Humber Estuary SAC or Berwickshire and North Northumberland Coast SAC as a result of potential vessel collisions.

Airborne sounds and visual disturbance impacts during construction

Ex1.5.22 Surveys undertaken at Pegwell Bay recorded golden plover, which is a qualifying feature of the Thanet Coast and Sandwich Bay SPA, using the intertidal area and saltmarsh between October and February. Noise modelling indicates the worst-case construction activity is vibratory piling. Whilst the surveys identified waterbirds, including golden plover, using the entirety of the intertidal area for foraging at low water, areas of particular focus, for example around the mouth of the River Stour, are over 350 m from the areas where worse-case significant disturbance from construction noise sources may occur. In addition, sensitive high tide waterbird, including golden plover, roost locations were at least 500 m from the proposed exit pits works areas.

Ex1.5.23 The combination of distance of works from key roosts locations (beyond distances within which significant disturbance may occur), the restricted duration and extent of works within the intertidal zone, the limited intertidal zone at risk of significant noise and visual disturbance in the context of the wider Pegwell Bay intertidal resource, reduces the overall effect on key waterbird species and assemblages. Therefore, there will be no AEoSI for the qualifying features of the Thanet Coast and Sandwich Bay SPA.

Ex1.5.24 Any artificial lighting onboard vessels associated with the cable installation will be directional and only used in the vicinity of the work area when necessary. Given the temporary, short-term nature of the construction works, in an area that is already busy with shipping traffic, it is not anticipated that the addition of a small number of vessels required to construct the Offshore Scheme will considerably increase disturbance and displacement of lesser black-backed gull, sandwich tern, common tern and little tern. Therefore, there will be no AEoSI for the qualifying features of the Alde-Ore Estuary SPA and Minsmere-Walberswick SPA.

Ex1.5.25 Red-throated diver, common tern, and little tern are all qualifying features of the Outer Thames Estuary SPA, with non-breeding red-throated diver being considered highly sensitive to anthropogenic sources of disturbance. Works will avoid the key red-throated diver season. Whilst red-throated diver is considered to be sensitive to vessel traffic and movements, disturbance from vessel and operative presence, and any subsequent displacement, will be temporary and short term. It is not anticipated that the addition of a small number of vessels required to construct the Offshore Scheme will considerably increase disturbance and displacement of birds from baseline vessel traffic conditions, particularly as these works will avoid areas recorded as supporting higher concentrations of individuals. As such, the Offshore Scheme itself will not generate AEoSI for the qualifying features of the Outer Thames Estuary SPA.

Ex1.5.26 Some operations during the Construction Phase could result in changes in visual stimuli (including artificial light) and an increase in airborne sound, both of which could impact grey seal, which is a qualifying feature of the Humber Estuary SAC and the Berwickshire and North Northumberland Coast SAC, and harbour seal which is a qualifying feature of Wash and North Norfolk Coast SAC.

Ex1.5.27 Pegwell Bay hosts an important haul out site for harbour seal, and includes low numbers of pups born in the area, and Goodwin Sands, which is adjacent to the Offshore Scheme, is an important haul-out site for both harbour and grey seal. The haul-out location in the river Stour is just over 1 km from the Order Limits. In addition, most of the activities in Pegwell Bay will be taking place at low tide when the seals will be somewhat sheltered from airborne sound because they will be located at a level below the works, within the channel of the river itself.

Ex1.5.28 Furthermore, the nature of cable lay is transitory and localised to the Offshore Scheme extent. The trenchless works are also a short-term activity. As such, any effects will be short lived in any one location and any changes in visual stimuli, including at night, will be localised and limited in extent. It is therefore considered that there will be no AEoSI for the qualifying features of the Wash and North Norfolk Coast SAC, Humber Estuary SAC or Berwickshire and North Northumberland Coast SAC as a result of airborne sounds and visual disturbance.

Potential for indirect effects through impacts to prey species during construction

Ex1.5.29 At the Kent Landfall, the use of an excavator, jack-up barge (JUB) or back hoe dredger, cable lay barge, and temporary cofferdam will lead to the temporary disturbance of 0.02 km² of intertidal mudflat. Moreover, concrete mattresses/rock bags will be placed at the trenchless techniques entry/exit points which will then be removed approximately 1 week before cable pull-in, before permanent protection will be buried at the same location, temporarily disturbing the mudflat. During installation, the footprint of disturbance will be limited and temporary. Additionally, although disturbance will occur a second time during the burial of the permanent protection at trenchless entry/exit points, this will also only have a temporary effect as fauna associated with these habitats are generally restricted to the top 30 cm of sediment and thus recolonization is anticipated to be rapid. Therefore, physical disturbance would not have an AEoSI or on the qualifying features of the Thanet Coast and Sandwich Bay SPA and Ramsar.

Ex1.5.30 The Offshore Scheme passes through the Outer Thames Estuary SPA for approximately 29 km, at two locations. The Offshore Scheme leaves the Suffolk Landfall approximately 1.07 km to the north and 1.7 km to the south of the Alde-Ore Estuary SPA and Minsmere-Walberswick SPA, respectively. Herring and sandeel are considered particularly important prey items for seabirds (including red-throated diver). Only portions of the Outer Thames Estuary SPA overlap with preferred or marginal herring habitat, with a large proportion of the SPA falling within habitat unsuitable for herring.

Ex1.5.31 Herring and sandeel spawning and nursery grounds in the North Sea are widespread and cover a large proportion of the North Sea. Therefore, the number of available prey to be impacted compared to the wider availability in the North Sea is considered to be small. As a result, the impact of changes in prey availability on seabirds (including red-throated diver) is not anticipated to have an AEoSI on the qualifying features of the Outer Thames Estuary SPA, Alde-Ore Estuary SPA and Ramsar, or Minsmere-Walberswick SPA.

Introduction and spread of INNS during operation

Ex1.5.32 The only activities occurring within the intertidal area are located at the Kent Landfall. At this landfall, concrete mattresses will be used at trenchless entry/exit points over an area of 360 m^2. The landfall overlaps with the Sandwich Bay SAC. The landfall is also located 1.1 km from the Thanet Coast SAC. Post-construction, concrete mattressing will be buried and thus the area of hard structures exposed in the intertidal area with the potential for INNS colonisation is limited. Additionally, to ensure that the potential impact of INNS introduction is reduced, all rock and concrete mattresses used for cable protection will be cleaned and from a suitable source to match the local environment. Moreover, an INNS Management Plan and Marine Biosecurity Plan will be produced. Therefore, there is not anticipated to be an AEoSI for the qualifying features of the Thanet Coast or Sandwich Bay SAC as a result of INNS introduction.

Effects of EMF emissions impacts on harbour porpoise associated with the Southern North Sea SAC, during operation

Ex1.5.33 Power cables do not emit electric fields directly, as the metal sheath physically protecting the cable ensures the electric field is entirely confined within the cable. However, they do emit magnetic fields, that can indirectly induce electric fields in the surrounding sea water and marine fauna. Project specific modelling has been conducted for bundled cables buried to a depth of 1 m (for bundled cables the magnetic fields from each cable cancel each other out to a degree). For the bundled cable designs, the geomagnetic field and induced electric fields return to the background level at about 8 m from the seabed. Thus, there is very limited potential for harbour porpoise, which will spend most of their time in the water column, to come into close contact with any EMF emissions.

Ex1.5.34 Harbour porpoise forage for sandeel. Modelling of sandeel distribution in the North Sea has indicated that important sandeel areas overlap with the Offshore Scheme. However, the impact of EMF on fish is considered not significant as there is likely to be only a very small footprint around the cable where an increase in EMF would be detectable. Furthermore, given the wide-ranging nature of harbour porpoise, it is likely that they will be capable of avoiding any EMF effects directly or indirectly, and can easily forage in other areas. It is therefore unlikely that there would be a noticeable effect on marine mammal foraging, either directly or indirectly. Thus, there is not anticipated to be an AEoSI for the qualifying features of the Southern North Sea SAC as a result of EMF emissions.

Kent Onshore Scheme

Construction Phase direct loss of Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC

Ex1.5.35 The buried HVDC cable would traverse Thanet Coast and Sandwich Bay SPA/Ramsar and Sandwich Bay SAC for approximately 3 km. This includes traversing the saltmarsh and upper mudflat, and the intertidal mudflat that constitutes most of Pegwell Bay at low tide.

Ex1.5.36 Geotechnical investigations for the project have confirmed that trenchless techniques such as HDD are feasible and therefore the DCO does not contain any provision for surface trenching through the saltmarsh of Thanet Coast & Sandwich Bay SPA/Ramsar or Sandwich Bay SAC. Therefore, no AEoSI of the SPA would arise through habitat loss. Stuck drilling equipment is also a very low risk. If drilling equipment becomes stuck it will be freed by additional tooling and works at the entry or exit. The drill is too deep to consider excavating down to the equipment, other than the first 45 m (farmers field) and last 45 m (tidal flats beyond the saltmarsh). The chance of needing to excavate in the first / last 45 m is estimated at 1 in 200 based on previous projects.

Ex1.5.37 This will ensure no AEoSI for the qualifying features of the Thanet Coast and Sandwich Bay SPA/Ramsar.

Construction phase noise and visual disturbance of Thanet Coast & Sandwich Bay SPA/Ramsar

Ex1.5.38 As for Suffolk, 60 dB LAmax contours were calculated for all phases of the work. The mapping showed that with standard noise mitigation included, the 60 dB contour would remain outside the SPA/Ramsar site. The use of best practicable methods to reduce noise is committed to via measures NV01 to NV05 in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments**. There will therefore be no adverse effects on the integrity of Thanet Coast & Sandwich Bay SPA/Ramsar through noise.

Construction phase pollution of Thanet Coast & Sandwich Bay SPA/Sandwich Bay SAC

Ex1.5.39 The potential risk of frac out (where drilling fluids reach the surface due to fissures in the geology) while undertaking trenchless techniques beneath Pegwell Bay, has been considered. It is considered that frac out into the saltmarsh is a very low risk. If HDD is used, the drill will be within the chalk beneath the saltmarsh. Overlying the chalk are layers of clays that prevent the groundwater in the chalk aquifer from reaching the surface and they will also prevent the drilling fluid reaching the surface. If the Direct Pipe method is used instead of HDD, the fluid pressure at the cutting face is balanced against the groundwater pressure, so there is insufficient pressure to cause frac out.

Ex1.5.40 Nonetheless, measures will be implemented to minimize and address risk of surface frac out. These are contained in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**. Therefore, there is a high level of confidence that no AEoSI of Thanet Coast & Sandwich Bay SPA/Ramsar or Sandwich Bay SAC will arise.

Operational phase loss of functionally linked land for golden plover

Ex1.5.41 The HRA screening identified that functionally-linked arable foraging land used by golden plover associated with Thanet Coast & Sandwich Bay SPA during early winter (October to December) would be lost permanently due to the Minster Converter Station and Substation. It was therefore decided that best approach to address this was to secure favourable long-term management of arable land for golden plover.

Ex1.5.42 In order to confirm the area of habitat required, a calculation to determine the carrying capacity of arable land for golden plover has been utilised. This identified that 3.8 ha of arable land would need to be managed favourably for non-breeding golden plover to mitigate the loss of the arable land to the Minster Converter Station and Substation. However, as a precaution a 10 ha minimum parcel size was identified as being necessary.

Ex1.5.43 A series of detailed management prescriptions were developed and are provided in this report. Following further consideration by National Grid, including hydrological assessment, agriculture advice and landowner discussions, a parcel of land was included within the Order Limits in order to secure its delivery.

Ex1.5.45 No conflicting development proposals on this land have been identified. The fields are within 500 m of the Thanet Coast & Sandwich Bay SPA/Ramsar site (the tidal River Stour) and approximately 2.5 km upstream of the confluence with Pegwell Bay. Non-breeding golden plover are known to congregate in the tidal reaches of the River Stour, particularly around the river mouth. This places it well within the 5 km zone of influence around the SPA identified for golden plover and electricity infrastructure development in Natural England guidance. Moreover, wintering bird surveys being undertaken since December 2024 have identified non-breeding golden plovers on site in small numbers (since the fields are not currently being managed in an optimal manner for the species).

Ex1.5.46 The fields are also well placed being adjacent to South Richborough Pasture Local Wildlife Site. The fields are 60 m from Discovery Park at their closest but and 440m at their most distant. There are dense tree belts screening the fields from the business park. Moreover, the large size of the parcel (10 ha) compared to the area of land actually needed for mitigation (3.8 ha) enables considerable room to buffer proximity to the business park and dual carriageway to the east and River Stour Canal to the west.

Ex1.5.47 Detailed information on maintenance and monitoring of the mitigation land, including responsibilities, is set out within **Application Document 7.5.7.2 Outline Landscape and Ecology Management Plan – Kent** and is summarised in section 7 of this report. With this land included in the Kent Onshore Scheme and secured through inclusion in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments** and the outline Landscape and Ecology Management Plan, it can be concluded that no AEoSI for the qualifying features of the Thanet Coast & Sandwich Bay SPA/Ramsar will arise due to loss of functionally-linked land for golden plover associated with the SPA/Ramsar.

Operational period collision risk and associated displacement

Ex1.5.48 There is the potential for likely significant effects through collision of SPA birds with the new section of overhead powerline being installed to connect the Minster Converter Station and Substation to the existing Richborough to Canterbury overhead line. A series of vantage point surveys were undertaken between February 2023 and January 2024, to identify birds flying at potential collision height through the space which would be occupied by the new overhead line section. A three-month bird corpse search was also undertaken across areas located in direct proximity to the existing Richborough to Canterbury overhead line south of the River Stour Canal in early 2024. Using these data, a collision risk assessment has been undertaken and reviewed by Natural England.

Ex1.5.49 The assessment of avian collision risk concludes that the species predicted to be transiting through an ‘at-risk zone’ in the greatest numbers are cormorant, greylag goose, and mallard. None of these are species for which either Thanet Coast & Sandwich Bay SPA or Stodmarsh SPA/Ramsar are designated. For the majority of the species considered, when applying an avoidance rate of 99.9%, which is supported by the results of corpse searches along the existing overhead line, this results in fewer than one individual potentially colliding with the proposed OHL annually. Even for species where the extrapolated number of transits through the at-risk zone generates a potential collision event that exceeds one individual per year, such as Cormorant, Greylag Goose, and Mallard, given the caveats in generating the extrapolated annual transits, these annual figures are low in comparison to regional populations.

Ex1.5.51 Irrespective of these conclusions, the provision of bird diverters has been incorporated into the scheme to further minimise any risk during adverse weather or low light conditions. These are secured in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments** for the DCO. Fitting power lines with devices to make them more visible to flying birds is widely used to mitigate bird collisions. It is considered that in the context of the scheme and species involved, that hanging deflectors, especially those with fluorescent markings, offers the best solution to making the lines visible in adverse weather or low light conditions.

Ex1.5.52 It is therefore concluded that no AEoSI would occur on the qualifying features of either Thanet Coast & Sandwich Bay SPA or Stodmarsh SPA/Ramsar due to collisions with the new section of overhead line.

In Combination Effects

Suffolk Onshore Scheme

Ex1.5.53 The following plans or projects have been considered in combination: LionLink Interconnector, East Anglia ONE North Offshore Windfarm, East Anglia TWO Offshore Windfarm, Saxmundham to Pessenhall Water Mains Installation, Town Farm Solar Farm, Wissett Solar Farm, and South Saxmundham Garden Neighbourhood .

Offshore Scheme

Ex1.5.54 Fourteen developments have been identified with pathways that may affect European Sites. The following plans or projects will be considered in combination: Sizewell C Nuclear Power Station, Neuconnect interconnector, GridLink Interconnector, North Falls Offshore Windfarm, East Anglia ONE North Offshore Windfarm, East Anglia TWO Offshore Windfarm, East Anglia THREE Offshore Windfarm, Nautilus Offshore Interconnector, Five Estuaries Offshore Windfarm, and LionLink Offshore Interconnector.

Ex1.5.55 As agreed through consultation with Natural England, the Nemo Link interconnector and Thanet Offshore Windfarm and cables are included within the in-combination assessment and assessed appropriately for benthic impacts.

Kent Onshore Scheme

Ex1.5.56 No in combination effects other than loss of functionally-linked land are identified as requiring appropriate assessment given the distance of the nearest significant surface works in the Kent Onshore Scheme from the SPA/Ramsar site to the SPA (approximately 470 m from the trenchless installation pit) and the absence of any other projects that may involve direct loss of the SPA/Ramsar. The following plans or projects are considered in combination: Manston Airport, Residential Development, Canterbury Road, Ramsgate, Stonelees Golf Course Expansion, Richborough Energy Park, Goshall Valley Solar Farm, Land On The North East Side Of Nash Road, Land North and East of Canterbury Road, Land South of Westgate and Garlinge, Land On South Side Of Manston Court Road And West Side Of Haine Road, Land On The North West And South East Sides Of Shottendane Road, and Spitfire Green. They are discussed together as the potential pathway for in combination effects with the Kent Onshore Scheme is the same for each.

Ex1.5.57

Ex1.6 Conclusion

Ex1.6.1 It is concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of any qualifying features of European Sites. The overall conclusion is therefore that the Proposed Project will not result in an adverse effect on the integrity of European sites either alone or in combination with other plans or projects.

1. Introduction

1.1 Overview

1.1.1 The Sea Link Project (hereafter referred to as the 'Proposed Project') is a proposal by National Grid Electricity Transmission plc (hereafter referred to as National Grid) to reinforce the transmission network in the South East and East Anglia. The Proposed Project is required to accommodate additional power flows generated from renewable and low carbon generation, as well as accommodating additional new interconnection with mainland Europe.

1.1.2 This Report to Inform the Secretary of State's Habitats Regulations Assessment (HRA) has been prepared on behalf of National Grid. It forms part of the application for a Development Consent Order (a 'DCO') for the Proposed Development submitted to the Secretary of State for Department for Energy Security and Net Zero (the "Secretary of State"), under Section 37 of The Planning Act (PA) 2008.

1.1.3 The requirement for HRA is established through Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, herewithin referred to as the 'Habitats Directive', in Articles 6(3) and 6(4). The Habitats Directive is transposed into national legislation by the Conservation of Habitats and Species Regulations 2017 (as amended). These are hereafter referred to as the 'Habitats Regulations' (2017).

1.1.4 Under Regulation 63, any project that is likely to have a significant effect on a European Site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to an Appropriate Assessment to determine the implications for the site in view of its conservation objectives.

1.1.5 The purpose of this report is to provide all the relevant information needed for the Secretary of State for Energy Security and Net Zero (the relevant competent authority for the DCO application) to undertake Stages 1 and 2 of a Habitats Regulations Assessment as required under the Habitats Regulations. This document contains a full consideration of Likely Significant Effects (LSE) alongside an assessment to inform Appropriate Assessment.

1.1.6 The draft Order Limits, which illustrate the boundary of the Proposed Project, are illustrated on **Application Document 2.2.1 Overall Location Plan** and the proposed Suffolk Onshore Scheme is illustrated on **Application Document 2.2.2. Suffolk Location Plan**.

1.1.7 This document has been informed by the following ES chapters:

- **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**;
- **Application Document 6.2.1.5 Part 1 Introduction Chapter 5 EIA Approach and Methodology**;
- **Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and EIA Consultation**;

- **Application Document 6.2.2.2 Part 2 Suffolk Chapter 2 Ecology and Biodiversity**;
- **Application Document 6.2.3.3 Part Kent 3 Chapter 2 Ecology and Biodiversity**;
- **Application Document 6.2.4.4 Part 4 Marine Chapter 4 Marine Mammals**; and
- **Application Document 6.2.4.5 Part 4 Marine Chapter 5 Ornithology**.

1.2 The Proposed Project

1.2.1 National Grid owns, builds and maintains the electricity transmission network in England and Wales. Under the Electricity Act 1989, National Grid holds a transmission licence under which it is required to develop and maintain an efficient, coordinated, and economic electricity transmission system.

1.2.2 National Grid is also required, under Section 38 of the Electricity Act 1989, to comply with the provisions of Schedule 9 of the Act. Schedule 9 requires licence holders, in the formulation of proposals to transmit electricity, to:

- Schedule 9(1)(a) *'…have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest*;' and
- Schedule 9(1)(b) *'…do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects'*.

1.2.3 The Proposed Project is required to reinforce the transmission system in the South East of England and East Anglia. The Proposed Project would achieve the required reinforcement of the network via a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400 kV overhead line, close to Richborough in Kent.

1.2.4 The Proposed Project is split into three interlinked schemes, referred to as the Suffolk Onshore Scheme, the Offshore Scheme, and the Kent Onshore Scheme. These are described further below.

Suffolk Onshore Scheme

1.2.5 The proposed Suffolk Onshore Scheme would comprise:

- A connection from the existing transmission network via Friston Substation, including the substation itself. Friston Substation already has development consent as part of other third-party projects. If Friston Substation has already been constructed under another consent, only a connection into the substation would be constructed as part of the Proposed Project.
- A high voltage alternating current (HVAC) underground cable of approximately 1.9 km in length between the proposed Friston Substation and a proposed converter station (below).

- A 2 GW high voltage direct current (HVDC) converter station (including permanent access from the B1121 and a new bridge over the River Fromus) up to 26 m high plus external equipment (such as lightning protection, safety rails for maintenance works, ventilation equipment, aerials, similar small scale operational plant, or other roof treatment) near Saxmundham.
- An HVDC underground cable connection of approximately 10 km in length between the proposed converter station near Saxmundham, and a transition joint bay (TJB) approximately 900 m inshore from a landfall point (below) where the cable transitions from onshore to offshore technology.
- A landfall on the Suffolk coast (between Aldeburgh and Thorpeness).

Offshore Scheme

1.2.6 The proposed Offshore Scheme includes three distinct components, which are summarised below:

- Suffolk landfall: the area where the cable route transitions between the marine and terrestrial environment in Suffolk, between the settlements of Aldeburgh and Thorpeness.
- Approximately 122 km of subsea HVDC cable, running between the Suffolk Landfall location (between Aldeburgh and Thorpeness), and the Kent Landfall location at Pegwell Bay.
- Kent landfall: the area where the cable route transitions between the marine and terrestrial environment in Kent, located in the Pegwell Bay area to the south of the settlement of Cliffsend.

Kent Onshore Scheme

1.2.7 The proposed Kent Onshore Scheme would comprise:

- A landfall point on the Kent coast at Pegwell Bay.
- A Transition Joint Bay (TJB) approximately 800 m inshore to transition from offshore HVDC cable to onshore HVDC cable, before continuing underground for approximately 1.7 km to a new converter station (below).
- A 2 GW HVDC converter station, (including a new permanent access off the A256), up to 28 m high plus external equipment such as lightning protection, safety rails for maintenance works, ventilation equipment, aerials, and similar small scale operational plant near Minster. A new substation would be located immediately adjacent.
- Removal of approximately 2.2 km of existing HVAC overhead line, and installation of two sections of new HVAC overhead line, together totalling approximately 3.5 km, each connecting from the substation near Minster and the existing Richborough to Canterbury overhead line.

1.2.9 The Proposed Project also includes modifications to sections of existing overhead lines in Suffolk (only if Friston Substation is not built pursuant to another consent) and Kent, diversions of third-party assets, and land drainage from the construction and operational footprint. It also includes opportunities for environmental mitigation and compensation. The construction phase will involve various temporary construction activities including overhead line diversions, use of temporary towers or masts, working areas for construction equipment and machinery, site offices, parking spaces, storage, accesses, bellmouths, and haul roads, as well as watercourse crossings and the diversion of public rights of way (PROWs).

1.3 Legislation

1.3.1 The UK left the EU on 31 January 2020 under the terms set out in the EU (Withdrawal Agreement) Act 2020 ('the Withdrawal Act'), this established a transition period, which ended on 31 December 2020. The Withdrawal Act retains the body of existing EU-derived law within UK domestic law. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 amended the 2017 Habitats Regulations to decouple the 2017 Habitats Regulations from the EU Directives, whilst maintaining the protection and processes related to European Sites. The Habitats Regulations (and the Offshore Regulations) enable the protection of sites that host habitats and species of European Importance.

1.3.2 Areas of international importance for nature conservation are Special Areas of Conservation (SAC; designated for their habitats or fauna other than birds), Special Protection Areas (SPA; designated for birds) and Ramsar sites (wetlands of international importance). They are collectively referred to as Habitats Sites or European Sites and form part of a network of protected sites across the UK known as the 'National Site Network'.

1.3.3 Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) states that 'A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which— (a) is likely to have a significant effect on a European Site or a European offshore marine site (either alone or in combination with other plans or projects), and (b) is not directly connected with or necessary to the management of that site, must make an Appropriate Assessment of the implications of the plan or project for that site in view of that site's conservation objectives'.

1.3.4 Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended), and Regulation 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017, as part of the assessment of a proposal it is necessary for the Secretary of State (as Competent Authority) for the DCO application to consider whether the proposal is likely to have a significant effect on the interest features of a European Sites.

1.3.6 Where a conclusion is reached that a proposal (either on its own or in combination with other plans or projects) would be likely to have a significant effect, directly and/or indirectly, on a European Site , the Secretary of State is required to undertake an 'Appropriate Assessment' in order to further assess those effects and the implications for the European Site(s) in view of that sites conservation objectives. Plate 2.1 sets out the legislative basis for an Appropriate Assessment. Where , following assessment and consideration of mitigation measures, it cannot be established that an adverse effect on the integrity ("AEoSI") of a European Site can be ruled out, either alone or in-combination with other plans or projects, a proposal can only proceed where the requirements of the derogations process under Regulation 64 and 68 of the Habitats Regulations is satisfied.

1.3.7 European Site There are three legal tests which must be met and each needs to be passed for a derogation to be granted. It must be demonstrated that there are no alternatives to the proposal which meet the project objectives before the assessment can proceed to next step of the derogation assessment. Where no alternative solution exists, and so an adverse effect remains, a further assessment should be made of whether the proposal is required for imperative reasons of overriding public interest (IROPI). If the proposal meets that IROPI test, compensatory measures will be required and will need to be secured.

1.3.8 Over the years, the phrase 'Habitats Regulations Assessment' (HRA) has been used to describe the overall process set out in both 2017 Regulations, from the screening for LSE through to identification of IROPI. This has arisen in order to distinguish the overall process from the individual stage of "Appropriate Assess ment". Throughout this Report the term HRA is used for the overall process and restricts the use of Appropriate Assessment to the specific stage of that name.

1.3.9 In summary therefore, the HRA process can have up to three stages. However, all stages may not need to be completed depending on the outcome of each step. The HRA processes can be summarised as:

- Stage 1: Screening - to check if the proposal is likely to have a significant effect on the qualifying features of a European Site in view of that site's conservation objectives. If not, it is not necessary to proceed to the Appropriate Assessment or Derogation stages.
- Stage 2: Appropriate Assessment - to assess the likely significant effects of the proposal in more detail and identify ways to avoid or minimise any effects. Where there is a negative assessment (i.e. an AEoSI cannot be ruled out) consent must be refused unless the stage 3 derogation is satisfied.
- Stage 3: Derogation - to consider if proposals that would have an adverse effect on the integrity of a European Site qualify for an exemption.

1.3.10 This report provides information to inform the Secretary of State's HRA of the Proposed Project and is structured as follows:

- Section 2 – provides a detailed summary of the methodology for HRA;
- Section 3 – provides a summary of the qualifying interest features for the European Sites;
- Section 4 – comprises a Stage 1 shadow screening assessment of the effects of the Proposed Project on the European Sites;

- Section 5 – provides an assessment of other plans or projects to be considered in the in-combination assessment at the likely significant effects stage;
- Section 6 – summarises conclusions reached on the impact pathways screened in for the Stage 2 Appropriate Assessment;
- Section 7 – comprises a Stage 2 shadow Appropriate Assessment of the effects of the Proposed Project on the European Sites taking into account the mitigation proposed;
- Section 8 – comprises a Stage 2 shadow Appropriate Assessment of in combination effects; and
- Section 9 - comprises the conclusions reached.

1.3.11 Given that the Stage 2 shadow Appropriate Assessment concludes that an AEoSI from the Proposed Project (either alone or in-combination with other plans or projects) can be ruled out, information to inform a Stage 3 Derogations assessment is not required and consequently a Stage 3 derogations assessment is not included in this report.

2. Methodology

2.1 Introduction

2.1.1 Plate 2.1 below outlines the stages of HRA according to the Planning Inspectorate Advice on Habitats Regulations Assessments (The Planning Inspectorate, 2024).

2.1.2 Note that while this image shows all the stages of the HRA process, the information in this HRA report covers Stage 1 screening and provides information to inform a Stage 2 Appropriate Assessment by the Secretary of State. The report concludes that an AEoSI for European Sites or their qualifying features, either alone or in combination with other plans or projects can be ruled out. Natural England has been consulted on a draft of this Report to Inform HRA and their comments and responses from the applicant are provided in Appendix D.

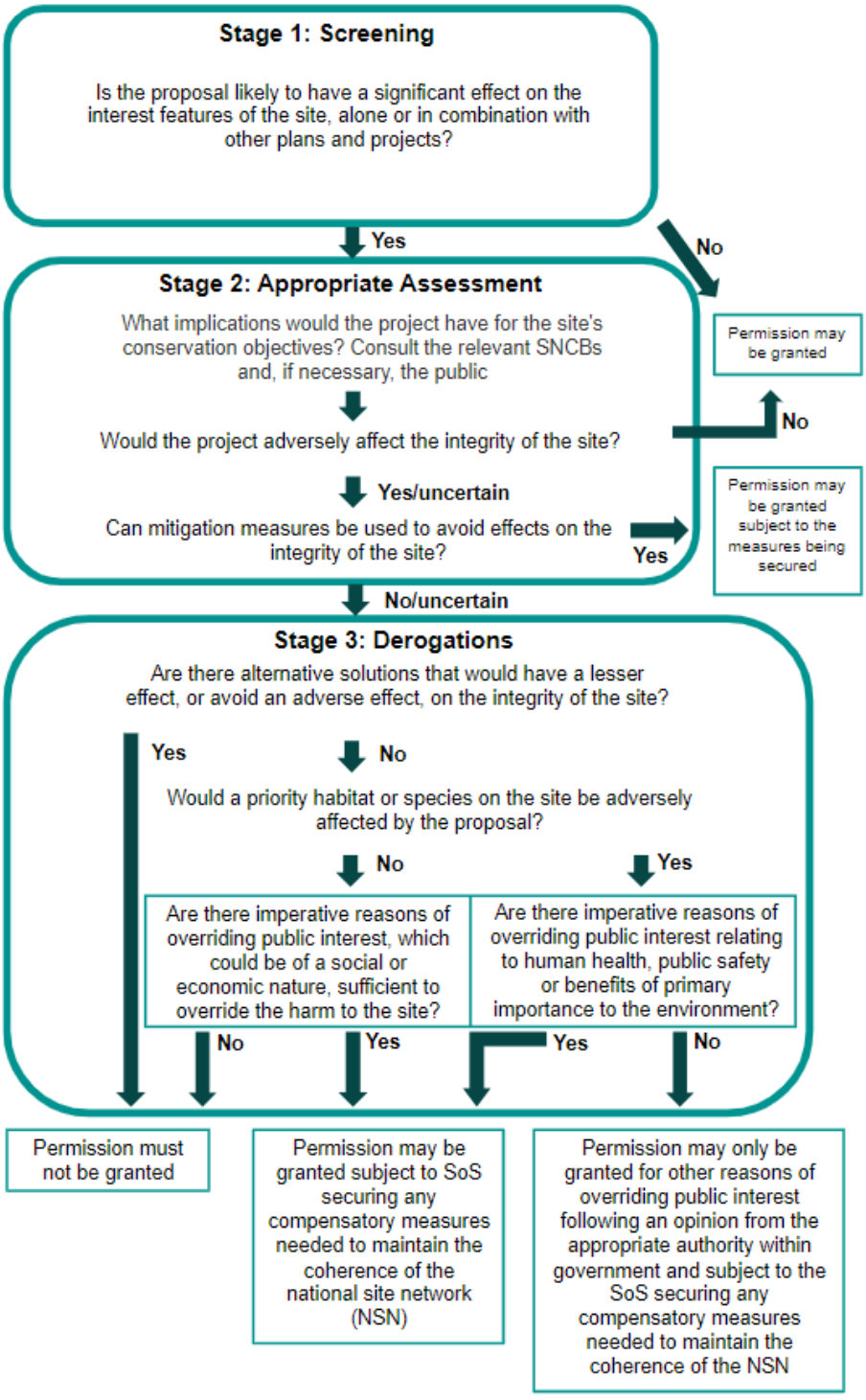

Plate 2.1 Four Stage Approach to Habitats Regulations Assessments of Projects. Image taken from an earlier version of Planning Inspectorate Advice on Habitats Regulations Assessments

2.1.4 The HRA Stage 1 shadow screening assessment has been carried out with reference to general guidance on HRA published by the UK government in 2021 (HM Government, 2021) and the Planning Inspectorate Advice on Habitats Regulations Assessments (The Planning Inspectorate, 2024). This assessment of LSEs takes account of relevant EU case law, for instance, the Holohan and People over Wind cases, discussed below.

2.1.5 Whilst the HRA decisions must be taken by the competent authority (The Secretary of State as advised by the Planning Inspectorate as Examining Authority in the context of the DCO application), the information needed to undertake the necessary assessments must be provided by the applicant. The information needed for the competent authority to establish whether there are any LSEs from the Proposed Project is therefore provided in this Report.

2.2 HRA Stage 1 – Screening for Likely Significant Effects

2.2.1 The objective of the LSE test is to assess whether the Proposed Project, without any detailed appraisal, is likely to result in a significant effect upon a European Site or its qualifying features. Where it is deemed unlikely for the Proposed Project to result in LSE upon European Sites, usually because there is no mechanism for an adverse interaction (i.e. a pathway), these aspects can be 'screened out'. If the risk of LSE cannot be ruled out alone on the basis of objective scientific evidence, a precautionary approach is applied, and remaining aspects are taken forward to a shadow Appropriate Assessment. The HRA must also consider the potential for LSE 'in combination' with other plans and projects.

2.2.2 This report has been prepared having regard to all relevant case law relating to the 2017 Regulations, the Habitats Directive, and Birds Directive. This includes the ruling by the Court of Justice of the European Union (CJEU) in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17) (CJEU, 2018). This case held that; "*it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site*" (paragraph 40). This establishes that 'mitigation measures' cannot be taken into account at the screening stage, but they can be taken into account in the Appropriate Assessment stage.

2.2.3 However, this ruling has since been qualified by the UK courts. On 15 August 2018, in the case of Langton (England & Wales High Court, 2018), the High Court ruled that conditions on badger cull licences preventing badger culling near a Special Protection Area or at certain times of year should not be classed as mitigation measures as described in the People over Wind ruling. The judge ruled that these licence conditions were properly characterised as "integral features of the project" and could therefore be relied on for the purposes of habitats screening. His reasoning was that it would be "*contrary to common sense for Natural England to assume that culling would take place at times and places where the applicants did not propose to do so*".

2.2.4 In 2018, the Holohan case (Holohan et al vs. An Bord Pleanála (C-461/17) (Court of Justice of the European Union, 2018)) confirmed that an Appropriate Assessment must ensure that a) where interest features of an SAC or SPA are outside the European Site boundary they must be taken into account (this is routinely done in the UK through consideration of functionally-linked land) and b) if there are habitats and species for which the site is not designated but which are essential to ensuring the site achieves its conservation objectives these must also be covered in the Appropriate Assessment.

2.2.5 In addition, the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European Sites or not. Therefore, pollution control measures can also be considered at Stage 1 - Screening for Likely Significant Effects.

2.3 HRA Stage 2 – Appropriate Assessment

2.3.1 Where it is determined at the screening stage that a conclusion of 'no Likely Significant Effect' cannot be drawn, the HRA assessment proceeds to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no specific technical analyses, or level of detail, that are classified by law as belonging to Appropriate Assessment rather than the screening for LSE. The Appropriate Assessment constitutes whatever level of further assessment is required to determine whether an adverse effect on site integrity (AEoSI) can be ruled out .

2.3.2 By virtue of the fact that it follows the screening process, there is an understanding that the analysis will be more detailed than that undertaken at the previous stage. One of the key considerations during Appropriate Assessment is whether there is available mitigation that would address the potential effect, allowing for a conclusion of no AEoSI. In practice, the Appropriate Assessment takes any element of the Proposed Development that could not be excluded as having LSE following HRA Stage 1 and assesses the potential for an effect either alone or in-combination with other plans or projects in more detail, with a view to concluding whether there would be an AEoSI on the qualifying features of the European Site. AEoSI include disruption of the coherent structure and function of the European Site(s) and the ability of the site to achieve its conservation objectives.

2.3.3 In 2018 the Holohan ruling was handed down by the European Court of Justice. Among other provisions paragraph 39 of the ruling states that '*As regards other habitat types or species, which are present on the site, but for which that site has not been listed, and with respect to habitat types and species located outside that site, … typical habitats or species must be included in the appropriate assessment, if they are necessary to the conservation of the habitat types and species listed for the protected area'* [emphasis added]. This ruling has been considered in relation to the Proposed Development and European Sites that are linked to the proposal via an impact pathway. For example, the Thanet Coast & Sandwich Bay SPA is designated partly for its populations of non-breeding over-wintering golden plover (*Pluvialis apricaria*), which range well beyond the designated site boundary. As such, their presence in significant numbers outside the designated site is factored into this assessment.

2.4 The Rochdale Envelope

2.4.1 In July 2018, the Planning Inspectorate published an update to Advice Note Nine: Rochdale Envelope (The Planning Inspectorate, 2018), explaining how the principles of the Rochdale Envelope should be used by DCOs for the Environmental Impact Assessment (EIA) process.

2.4.2 The Rochdale Envelope[1] is applicable where some of the details of a project have not been confirmed at the point when an application is submitted, and flexibility is sought to address uncertainty. Notwithstanding, all significant potential effects of a project must be properly addressed.

2.4.3 It encompasses three key principles:

- The assessment should use a cautious worst-case approach;
- The level of information assessed should be sufficient to enable the LSE of a project to be assessed; and
- The allowance for flexibility should not be abused to provide inadequate descriptions of projects.

2.4.4 This HRA has given due consideration to the Rochdale Envelope in the screening process for LSE and the worst-case (i.e., the potentially most impactful) construction, decommissioning, and operational scenarios have been assessed in relation to relevant impact pathways.

2.4.5 The environmental assessments have been undertaken based on the description of the Proposed Project provided in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**. To take account of the flexibility allowed in the Proposed Project, consideration has been given to the potential for effects to be of greater or of different significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LoD) or Order Limits.

2.4.6 For the HVDC cables the indicative alignments have been used as a reference but the assessment has assumed that in practice the cable could be laid anywhere within the lateral limit of deviation. For the Minster Converter Station and Minster Substation in the Kent Onshore Scheme, and the Saxmundham Converter Station in the Suffolk Onshore Scheme the indicative location has been used as a reference, but the assessment has assumed that in practice the converter station and substation could be laid anywhere within the lateral limit of deviation. Since the LoD covers a single large arable field, this does not materially affect the HRA.

[1] The Rochdale Envelope arises from two cases: R. v Rochdale MBC ex parte Milne (No.1) and R. v Rochdale MBC ex parte Tew [1999], which are cases that dealt with outline planning applications for a proposed business park in Rochdale.

2.4.8 For the new section of overhead line in the Kent Onshore Scheme the indicative alignments have been used as a reference, but the assessment has assumed that in practice the overhead line (new pylons) could be installed anywhere within the lateral limit of deviation. For the purposes of the collision risk impact assessment associated with this next section of overhead line, standard height pylons have been assumed (as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**), which are 50 m tall, with a potential LoD of 6 m further height.

2.4.9 For the offshore scheme, where some of the exact installation activities are not finalised, the assessment has taken a worst-case scenario approach for assessments. This includes assumptions in relation to factors such as exact installation techniques along each KP of the corridor, areas requiring cable protection measures and pre-installation works such as pre-sweeping, as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**.

2.4.10 The assessment has considered the possibility of construction impacts happening anywhere within the Order Limits. Where the indicative location of construction compounds and other features (e.g. culverts on ditches or the temporary bridge over the River Stour) have been given indicative locations, those have been the basis of assessment.

2.5 Data used in this report

2.5.1 In this report, the following sources of data have been used:

- Citations for European Sites;
- Conservation Objectives, Site Improvement Plans, and Supplementary Advice on the Conservation Objectives for European Sites;
- Guidance documents for specific impact pathways (referenced in the report where first used);
- Phase 1 Habitat Survey data for the Suffolk Onshore Scheme and Kent Onshore Scheme; and
- The Multi-Agency Geographic Information System (MAGIC) website.

2.5.2 Specific to this project, the HRA draws upon the following additional evidence:

- Two seasons of non-breeding bird survey in both Suffolk and Kent (covering 2022-2023 and 2023-2024);
- Two seasons of breeding bird survey in both Suffolk and Kent (2023 and 2024);
- Twelve months of bird vantage point survey of the alignment of the proposed new section of overhead line in the Ash Levels in Kent;
- An associated bird collision-risk assessment relating to the new section of overhead line in the Ash Levels in Kent, presented in Appendix C of this HRA;
- Construction noise modelling for the project in both Suffolk and Kent (operational noise is considered to be negligible as explained in this assessment);
- Traffic and air quality modelling in both Suffolk and Kent; and

- Detailed geological investigation and geotechnical work concerning Horizontal Direct Drilling beneath the Thanet Coast & Sandwich Bay SPA/Sandwich Bay SAC in Kent.

2.6 Consultation with Natural England

2.6.1 As required by Planning Inspectorate Advice on Habitats Regulations Assessments, and good practice, the HRA and its emerging findings were shared with Natural England on a regular basis during 2024. This has been through a combination of meetings discussing both Onshore schemes and the Offshore scheme and document sharing. It should also be noted that a meeting took place in October 2022 to discuss the Offshore scheme topic with marine specialists from NE. Meetings took place on 19 February 2024 (to discuss both onshore schemes), 24 May 2024 (to discuss the Kent Onshore Scheme and the Offshore Scheme), 7 June 2024 (Suffolk Onshore Scheme and the Offshore Scheme), 5 August (Suffolk Onshore Scheme), 6 August (Kent Onshore Scheme), 16 September (Suffolk Onshore Scheme),17 September (Kent Onshore Scheme) and 11 December 2024 (**Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and EIA Consultation**).

2.6.2 During and following these meetings Natural England provided feedback in writing on several specific points raised including noise impacts on sites of special scientific interest (SSSI) in Suffolk and Kent, proposed golden plover habitat creation in Kent, and the bird vantage point surveys and bird collision risk assessment for Kent. This was primarily via email on 9 August 2024. A draft copy of this HRA was also shared with Natural England prior to DCO submission. The comments received and how they have been addressed in this report are contained in Appendix D.

3. European Sites

3.1 Introduction

3.1.1 This section sets out the key information about the relevant European Sites. All European Sites are shown in **Appendix E Figure 1 European Sites**.

3.1.2 For each European Site the conservation objectives, qualifying features, and environmental vulnerabilities are provided, taken from the Site Improvement Plan or the Supplementary Advice on the Conservation Objectives, as relevant. Favourable condition information is not published for European Sites; that information is published for SSSIs but the interest features of SSSIs (and their condition) do not necessarily translate to the European Sites within which they lie. Therefore, this information is not provided below. As required by Planning Inspectorate Advice on Habitats Regulations Assessments, a summary table of all European Sites and qualifying features, and each impact pathway considered at each stage of assessment is included in Appendix A. A copy of the citation/Natura 2000 data sheet for each European Site is included in Appendix B.

3.1.3 There is no guidance that dictates the scope of an HRA in all circumstances and the study area for this HRA Report is largely dictated by the potential for interactions between impact pathways and European Site designations. The scope of the assessment is primarily guided by the identified impact pathways (the source-pathway-receptor model) for the receptors assessed and detailed in relevant Environmental Statement (ES) chapters.

3.1.4 As such, European Sites considered at this stage (Table 3.1) reflect receptor-specific impact pathways, their associated Zones of Influence (ZOI), and professional judgement. For benthic ecological and fish and shellfish receptors, the maximum ZOI is from sediment dispersion. For marine mammals, sites have been considered based on species-specific Management Units (MU), in addition to a species' ecology to reflect the wide-ranging nature of this taxon. Similarly, European Sites relevant to ornithological receptors consider species-specific ecology to reflect the high mobility and wide-ranging nature of these species. Therefore, when selecting which European Sites to screen for LSE, sites at great distances may also need to be considered to reflect the mobile nature of relevant qualifying features and their potential for interaction with the Proposed Project.

Table 3.1 European Sites considered within the HRA

European Site	Distance from Proposed Project (km)	Designated Features
Outer Thames Estuary SPA	0.0	Wintering populations of: • Red-throated diver (*G. stellata*). Breeding populations of:

European Site	Distance from Proposed Project (km)	Designated Features
		• Common tern (*Sterna hirundo*); and • little tern (*S. albifrons*).
Sandwich Bay SAC	0.0	• Embryonic shifting dunes; • shifting dunes along the shoreline with (*Ammophila arenaria*) ("white dunes"); • Shifting dunes with marram, fixed dunes with herbaceous vegetation ("grey dunes"); • Dune grassland. dunes with Salix repens ssp. argentea (*Salicion arenariae*); and • Dunes with creeping willow, humid dune slacks.
Southern North Sea SAC	0.0	• Harbour porpoise (*Phocoena phocoena*).
Thanet Coast SAC	0.0	• Reefs; and • Submerged or partially submerged sea caves.
Minsmere-Walberswick SPA/Ramsar	1.7	Wintering populations of: • Gadwall (*Anas strepera*); • Northern shoveler (*Anas clypeata*); • Hen harrier (*Circus cyaneus*); and • Greater white-fronted goose (*Anser albifrons albifrons*). Breeding populations of: • Great bittern (*Botaurus stellaris*) • Gadwall (*Anas strepera*) • Eurasian teal (*Anas crecca*); • Northern shoveler (*Anas clypeata*); • Eurasian marsh harrier (*Circus aeruginosus*); • Pied avocet (*Recurvirostra avosetta*); • Little tern (*Sterna albifrons*); and • European nightjar (*Caprimulgus europaeus*).
Thanet Coast and Sandwich Bay SPA/Ramsar	0.0	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and

European Site	Distance from Proposed Project (km)	Designated Features
		• Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: • Little tern (*Sterna albifrons*) (Breeding).
Sandlings SPA	20 m	• Nightjar (*Caprimulgus europaeus)*. • Woodlark (*Lullula arborea*).
Stodmarsh SPA/Ramsar	6.9	Wintering populations of: • Bittern (*Botaurus stellaris*). • Gadwall (*Anas Strepera*). • Hen harrier (*Circus cyaneus*). • Northern shoveler (*Anas clypeata*). Breeding populations of: • Gadwall (*Anas Strepera*). Regularly supports assemblages of breeding species: • Great crested grebe (*Podiceps cristatus*). • Lapwing (*Vanellus vanellus*). • Mallard (*Anas platyrhynchos*). • Moorhen (*Gallinula chloropus*). • Reed bunting (*Emberiza schoeniclus*). • Common tern (*Sterna hirundo*). • Coot (*Fulica atra*). • Redshank (*Tringa tetanus*). • Reed Warbler (*Acrocephalus scirpaceus*). • Shelduck (*Tadorna tadorna*). • Mute Swan (*Cygnus olor*). • Shoveler (*Anas clypeata*). • Teal (*Anas crecca*). • Tufted Duck (*Aythya fuligula*). • Water Rail (*Rallus aquaticus*). • Bearded Tit (*Panurus biarmicus*).

European Site	Distance from Proposed Project (km)	Designated Features
		• Cetti's Warbler (*Cettia cetti*). • Gadwall (*Anas strepera*). • Pochard (*Aythya farina*). • Sedge warbler (*Acrocephalus schoenobaenus*). Regularly supports assemblages of wintering waterfowl species: • Gadwall (*Anas strepera*). • Shoveler (*Anas clypeata*). • Bittern (*Botaurus stellaris*). • Hen harrier (*Circus cyaneus*). • Tufted duck (*Aythya fuligua*). • Wigeon (*Anas penelope*). • White-fronted geese (*Anser albifrons*). • Mallard (*Anas platyrhynchos*). • Lapwing (*Vanellus vanellus*). • Snipe (*Gallinago gallinago*).
Stodmarsh SAC	6.5	Desmoulin's whorl snail (*Vertigo moulinsiana).*
Alde Ore Estuary SPA/Ramsar	1.1	Wintering populations of : • Ruff (*Philomachus pugnax*); • Avocet (*Recurvirostra avosetta*); and • Redshank (*Tringa totanus*). Breeding populations of : • Marsh Harrier (*Circus aeruginosus*); • Lesser black-backed gull (*Larus fuscus*); • Avocet (*Recurvirostra avosetta*); • Sandwich tern (*Sterna* sandvicensis); and • Little tern (*Sterna albifrons*).
Margate and Long Sands SAC	3.0	• Sandbanks which are slightly covered by sea water all the time.
Wash and North Norfolk Coast SAC	110	• Sandbanks which are slightly covered by sea water all the time;

European Site	Distance from Proposed Project (km)	Designated Features
		• Mudflats and sandflats not covered by seawater at low tide; • Coastal lagoons; • Large shallow inlets and bays; • Reefs; • Salicornia and other annuals colonizing mud and sand; • Atlantic salt meadows (Glauco-Puccinellietalia maritimae); • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*); • Otter (*Lutra lutra*); and • Harbour seal (*Halichoerus grypus*).
Humber Estuary SAC	160	• Estuaries; • Mudflats and sandflats not covered by seawater at low tide; • Sandbanks which are slightly covered by sea water all the time; • Coastal lagoons; • Salicornia and other annuals colonizing mud and sand; • Atlantic salt meadows (Glauco-puccinellietalia maritimae); • Embryonic shifting dunes; • Shifting dunes along the shoreline with (Ammophila arenaria) ("white dunes"); • Fixed coastal dunes with herbaceous vegetation ("grey dunes"); • Dunes with (*Hippophae rhamnoides*); • Sea lamprey (*Petromyzon marinus*); • River lamprey (*Lampetra fluviatilis*); and • Grey seal (*Halichoerus grypus*).

European Site	Distance from Proposed Project (km)	Designated Features
Berwickshire and North Northumberland Coast SAC	412	• Mudflats and sandflats not covered by seawater at low tide; • Large shallow inlets and bays; • Reefs; • Submerged or partially submerged sea caves; and • Grey seal (*Halichoerus grypus*).

3.2 Sandlings SPA

Introduction

3.2.1 The site is notified for its internationally important populations of woodlark and nightjar. The SPA is made up of lowland heathland, acid grassland and forestry plantations on sandy soils which once supported extensive heathland; the main conservation interest of which lies in the open areas such as young plantation and rotational clearfell which provide suitable breeding habitat.

Conservation Objectives

3.2.2 With regard to the SPA (Natural England, 2011) and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below) and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
  - The extent and distribution of the habitats of the qualifying features;
  - The structure and function of the habitats of the qualifying features;
  - The supporting processes on which the habitats of the qualifying features rely;
  - The population of each of the qualifying features; and,
  - The distribution of the qualifying features within the site.

Qualifying Features

3.2.3 The site qualifies under Article 4.1 of the Directive (79/409/EEC) (English Nature, 2001) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- Nightjar (*Caprimulgus europaeus*); and
- Woodlark (*Lullula arborea*).

Environmental Vulnerabilities

3.2.4 The 2015 Natural England Site Improvement Plan (SIP) (Natural England, 2015) identifies the following threats and pressures linked to the site:

- Changes in species distributions.
- Inappropriate scrub control.
- Deer.
- Air pollution: impact of atmospheric nitrogen.
- Public access/disturbance.

3.2.5 The 2019 Supplementary Advice to the Conservation Objectives (SACO) (Natural England, 2019) provides more detail on these vulnerabilities.

3.3 Outer Thames Estuary SPA

Introduction

3.3.1 The Outer Thames Estuary Special Protection Area was designated to protect the red-throated diver (*Gavia stellata)* population and its supporting habitats (subtidal sands) in a favourable condition and has also been designated to protect the plunge-diving open water foraging habitats of common tern (*Sterna hirundo)* and little tern (*Sterna albifrons)*. The main part of the site is the outer part of the estuary (east of a line north from Sheerness, Kent, to Shoebury Ness, Essex); a separate area extending south along the coast of E Norfolk (from Caister-on-Sea) to Woodbridge, Suffolk and lying mainly within the 12 nautical mile zone, except for two small areas which extend slightly into the 12 nm zone offshore from about Lowestoft; and a third area lying slightly further north and partly within 12 nm, but also with a larger area extending well beyond the 12 nm zone) (Natural England, 2015).

Conservation Objectives

3.3.2 With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the ‘Qualifying Features’ listed below) and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
  - The extent and distribution of the habitats of the qualifying features.
  - The structure and function of the habitats of the qualifying features.
  - The supporting processes on which the habitats of the qualifying features rely.
  - The population of each of the qualifying features.
  - The distribution of the qualifying features within the site.

Qualifying Features

3.3.3 The site qualifies under Article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- Red-throated diver (*G. stellata)* (non-breeding).
- Common tern (Sterna hirundo).
- Little tern (Sterna albifrons).

Environmental Vulnerabilities

3.3.4 The Conservation Advice Package identifies the following threats and pressures linked to the site:

- Low to moderate sensitivity to physical removal or smothering of supporting habitats.
- Low sensitivity to siltation, abrasion and selective extraction.
- High sensitivity to non-physical disturbance (e.g. sound and lighting).
- Low to moderate sensitivity to toxic contamination.
- Low sensitivity to non-toxic contamination.
- Low sensitivity to selective extraction of prey species by fishing.
- Low to moderate sensitivity to biological disturbance.

3.4 Alde-Ore Estuary SPA/Ramsar

Introduction

3.4.1 The site is situated on the east coast of Suffolk between Aldeburgh in the north and Bawdsey in the south. The site comprises the estuary complex of the rivers Alde, Butley, and Ore, including Havergate Island and Orfordness. It is also partly covered by Alde-Ore and Butley Estuaries SAC but that European site is not discussed in this HRA as it is beyond any zones of influence from the Proposed Project.

Conservation Objectives

3.4.2 With regard to the SPA (Natural England, 2015) and the individual species and/or assemblage of species for which the site has been classified (the ‘Qualifying Features’ listed below) and subject to natural change:

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
  - The extent and distribution of the habitats of the qualifying features.
  - The structure and function of the habitats of the qualifying features.
  - The supporting processes on which the habitats of the qualifying features rely.

- The population of each of the qualifying features.
- The distribution of the qualifying features within the site.

Qualifying Features

3.4.3 The site qualifies as an SPA under Article 4.1 of the Directive (79/409/EEC) (Natural England, 2015) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- Marsh Harrier (*Circus aeruginosus)* (breeding).
- Lesser black-backed gull (*Larus fuscus) (*breeding).
- Ruff (*Philomachus pugnax)* (overwintering).
- Avocet (*Recurvirostra avosetta)* (breeding and overwintering).
- Sandwich tern (*Sterna sandvicensis)* (breeding).
- Little tern (*Sterna albifrons)* (breeding).
- Redshank (*Tringa totanus)* (overwintering).

3.4.4 The site also qualifies as an SPA under Article 4.1 for sustaining nationally important numbers of a range of non-breeding bird species. The site also qualifies under Article 4.2 by regularly supporting internationally important numbers of breeding lesser black-backed gull and non-breeding redshank.

3.4.5 The site qualifies as a Ramsar site for the following reasons:

- Ramsar criterion 2 - The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates.
- Ramsar criterion 3 - The site supports a notable assemblage of breeding and wintering wetland birds.
- Ramsar criterion 6 – The site supports internationally important populations of breeding lesser black backed gull, and non-breeding avocet and redshank.

Environmental Vulnerabilities

3.4.6 The 2015 Natural England SIP (Natural England, 2015) identifies the following threats and pressures linked to the site:

- Hydrological changes.
- Public access/disturbance.
- Inappropriate coastal management.
- Coastal squeeze.
- Inappropriate pest control.
- Changes in species distributions.
- Invasive species.
- Air pollution.

- Commercial fisheries.

3.5 Minsmere-Walberswick SPA/Ramsar

Introduction

3.5.1 The Minsmere-Walberswick SPA contains areas of grazing marsh, extensive reedbeds, the estuary of the River Blyth, and areas of lowland heath and woodland. The boundaries of the site follow those of the Minsmere-Walberswick Heath and Marshes SSSI.

Conservation Objectives

3.5.2 With regard to the SPA (Natural England, 2015) and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
  - The extent and distribution of the habitats of the qualifying features.
  - The structure and function of the habitats of the qualifying features.
  - The supporting processes on which the habitats of the qualifying features rely.
  - The population of each of the qualifying features.
  - The distribution of the qualifying features within the site.

Qualifying Features

3.5.3 The site qualifies as an SPA under Article 4.1 of the Directive (79/409/EEC) (Natural England, 2015) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- Great bittern (*Botaurus stellaris)*; (Breeding).
- Gadwall *(Anas strepera)*; (Non-breeding).
- Gadwall *(Anas strepera);* (Breeding).
- Eurasian teal (*Anas crecca)*; (Breeding).
- Northern shoveler (*Anas clypeata);* (Breeding).
- Northern shoveler (*Anas clypeata);* (Non-breeding).
- Eurasian marsh harrier (*Circus aeruginosus);* (Breeding).
- Hen harrier (*Circus cyaneus);* (Non-breeding).
- Pied avocet (*Recurvirostra avosetta);* (Breeding).
- Little tern (*Sterna albifrons);* (Breeding).
- European nightjar (*Caprimulgus europaeus);* (Breeding).

- Greater white-fronted goose (*Anser albifrons albifrons);* (Non-breeding).

3.5.4 The site qualifies as a Ramsar site for the following reasons:

- Ramsar criterion 1 - The site contains a mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between (JNCC, 2014). Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.
- Ramsar criterion 2 - This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc *Vertigo angustior* (Habitats Directive Annex II; British Red Data Book Endangered).
- Ramsar criterion 2 - An important assemblage of rare breeding birds associated with marshland and reedbeds including: *Botaurus stellaris, Anas strepera, Anas crecca, Anas clypeata, Circus aeruginosus, Recurvirostra avosetta, Panurus biarmicus*.

Environmental Vulnerabilities

3.5.5 The 2015 Natural England SIP (Natural England, 2015) identifies the following threats and pressures linked to the site:

- Coastal squeeze.
- Public access/disturbance.
- Changes in species distributions.
- Invasive species.
- Inappropriate pest control.
- Air pollution.
- Water pollution.
- Deer.
- Commercial fisheries.

3.6 Thanet Coast & Sandwich Bay SPA/Ramsar

Introduction

3.6.1 The Thanet Coast has the longest continuous stretch of coastal chalk in Britain (23 km), representing about 20% of UK coastal chalk and 12% of the coastal exposure in Europe. The chalk cliff face, cave and tunnel habitats and communities here are very uncommon in Europe and therefore important internationally.

3.6.2 The intertidal reef, together with the mudflats and sandflats that characterise the remainder of the coastline in North East Kent, provide valuable feeding grounds and roosting areas at low water for wintering waders, Golden Plover (*Pluvialis apricaria)* and Turnstone *Arenaria interpres* and a breeding population of Little Tern (*Sterna albifrons)*.

3.6.3 Sandwich Bay qualifies as a SAC for its fixed dunes with herbaceous vegetation (grey dunes), embryonic shifting dunes, shifting dunes with Marram grass (white dunes) (*Ammophila arenaria)* and dunes with creeping willow (*Salix arenaria)* as listed under Annex I of the EU Habitats Directive.

Conservation Objectives

3.6.4 With regard to the SPA (Natural England, 2014) and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below) and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
  - The extent and distribution of the habitats of the qualifying features.
  - The structure and function of the habitats of the qualifying features.
  - The supporting processes on which the habitats of the qualifying features rely.
  - The population of each of the qualifying features.
  - The distribution of the qualifying features within the site.

Qualifying Features

3.6.5 With regards to the SPA the site is designated for the following qualifying features:

- European golden plover (*Pluvialis apricaria)* (Non-breeding).
- Ruddy turnstone (*Arenaria interpres)* (Non-breeding).
- Little tern (*Sterna albifrons*) (Breeding).

3.6.6 With regards to the Ramsar (JNCC, 2008) criterion, the site is designated for the following:

- Ramsar Criterion 2 - supports 15 British Red Data Book wetland invertebrates.
- Ramsar Criterion 6 – species/populations occurring at levels of international importance.
- Species with peak counts in the winter:
  - Ruddy turnstone (*Arenaria interpres)* – 1,007 individuals representing 1% of the population (1998/99 – 2002/03).

Environmental Vulnerabilities

3.6.7 The 2014 Natural England SIP (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Changes in species distributions.
- Invasive species.
- Public access/disturbance.
- Hydrological changes.

- Air pollution: impact of atmospheric nitrogen deposition.
- Water pollution.
- Fisheries: commercial marine and estuarine.

3.6.8 The 2019 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.7 Sandwich Bay SAC

Introduction

3.7.1 The Thanet Coast has the longest continuous stretch of coastal chalk in Britain (23 km), representing about 20% of UK coastal chalk and 12% of the coastal exposure in Europe. The chalk cliff face, cave and tunnel habitats and communities here are very uncommon in Europe and therefore important internationally.

3.7.2 The intertidal reef, together with the mudflats and sandflats which characterise the remainder of the coastline in North East Kent, provide valuable feeding grounds and roosting areas at low water for wintering waders, Golden Plover (*Pluvialis apricaria)* and Turnstone (*Arenaria interpres*) and a breeding population of Little Tern (*Sterna albifrons)*.

3.7.3 Sandwich Bay qualifies as a SAC for its fixed dunes with herbaceaous vegetation (grey dunes), embryonic shifting dunes, shifting dunes with marram grass (white dunes) (*Ammophila arenaria)* and dunes with creeping willow (*Salix arenaria)* as listed under Annex I of the EU Habitats Directive.

Conservation Objectives

3.7.4 With regard to the SAC (Natural England, 2018) and the natural habitats and/or species for which the site has been designated (the ‘Qualifying Features’ listed below), and subject to natural change:

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

Qualifying Features

3.7.5 With regards to the SAC it is designated for the following:

- Embryonic shifting dunes.
- Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram.
- Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland.

- Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow.
- Humid dune slacks.

Environmental Vulnerabilities

3.7.6 The 2014 Natural England SIP (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Changes in species distributions.
- Invasive species.
- Public access/disturbance.
- Hydrological changes.
- Air pollution: impact of atmospheric nitrogen deposition.
- Water pollution.
- Fisheries: commercial marine and estuarine.

3.7.7 The 2019 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.8 Stodmarsh SPA/Ramsar

Introduction

3.8.1 Stodmarsh is designated as an SPA and SAC and is also designed as a Ramsar wetland site. The background details of these sites, including their features of designation and Conservation Objectives are detailed in the subsequent paragraphs.

3.8.2 This wetland site, located in the Stour valley, contains a wide range of habitats including open water, gravel pits, lagoons, extensive reedbeds and grazing marsh, scrub and alder carr, which together support a rich flora and fauna. Habitats are influenced by both freshwater and marine inputs. The vegetation is a good example of a southern eutrophic flood plain and a number of rare plants are found here. The invertebrate fauna is varied. The site is also of ornithological interest with its diverse breeding bird community. The site includes gravel pits, lagoons and reedbeds, and grassland habitats.

Conservation Objectives

3.8.3 With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the ‘Qualifying Features’ listed below) and subject to natural change:

- Ensure that the integrity of the site is maintained or restored as appropriate (Natural England, 2004), and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
  - The extent and distribution of the habitats of the qualifying features.
  - The structure and function of the habitats of the qualifying features.
  - The supporting processes on which the habitats of the qualifying features rely.

- The population of each of the qualifying features.
- The distribution of the qualifying features within the site.

Qualifying features

3.8.4 The site is designated as an SPA for the following features (JNCC, 2014):

- Wintering populations of:
  - Bittern (*Botaurus stellaris*).
  - Gadwall (*Anas Strepera*).
  - Hen harrier (*Circus cyaneus*).
  - Northern shoveler (*Anas clypeata)*.
- Breeding populations of:
  - Gadwall (*Anas Strepera*).
- Regularly supports assemblages of breeding species:
  - Great crested grebe (*Podiceps cristatus*).
  - Lapwing (*Vanellus vanellus*).
  - Mallard (*Anas platyrhynchos*).
  - Moorhen (*Gallinula chloropus*).
  - Reed bunting (*Emberiza schoeniclus*).
  - Common tern (*Sterna hirundo*).
  - Coot (*Fulica atra*).
  - Redshank (*Tringa tetanus*).
  - Reed Warbler (*Acrocephalus scirpaceus*).
  - Shelduck (*Tadorna tadorna*).
  - Mute Swan (*Cygnus olor*).
  - Shoveler (*Anas clypeata*).
  - Teal (*Anas crecca*).
  - Tufted Duck (*Aythya fuligula*).
  - Water Rail (*Rallus aquaticus*).
  - Bearded Tit (*Panurus biarmicus*).
  - Cetti's Warbler (*Cettia cetti*).
  - Gadwall (*Anas strepera*).
  - Pochard (*Aythya farina*).
  - Sedge warbler (*Acrocephalus schoenobaenus*).
- Regularly supports assemblages of wintering waterfowl species:

- Gadwall (*Anas strepera*).
- Shoveler (*Anas clypeata*).
- Bittern (*Botaurus stellaris*).
- Hen harrier (*Circus cyaneus*).
- Tufted duck (*Aythya fuligua*).
- Wigeon (*Anas penelope*).
- White-fronted geese (*Anser albifrons*).
- Mallard (*Anas platyrhynchos*).
- Lapwing (*Vanellus vanellus*).
- Snipe (*Gallinago gallinago*).

3.8.5 The site is designated as a Ramsar site under Ramsar Criteria 2 (JNCC, 2014):

- Six British Red Data Book wetland invertebrates;
- Two nationally rare plants, and five nationally scarce species; and
- A diverse assemblage of rare wetland birds.

3.8.6 The flora of the site includes the rare sharp leaved pondweed (*Potamogeton acutifolius*), which is considered critically endangered by the GB Red Book, as well as the vulnerable whorled water-milfoil (*Myriophyllum verticillatum*) rootless duckweed (*Wolffia arrhiza*) and *Carex divisa*. The site finds the presence of otter (*Lutra lutra*).

Environmental Vulnerabilities

3.8.7 The 2014 Natural England SIP (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Water pollution.
- Invasive species.
- Inappropriate scrub control.
- Air pollution.

3.8.8 The 2019 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.9 Stodmarsh SAC

3.9.1 Stodmarsh SAC is broadly coincident with Stodmarsh SPA and Ramsar site although the boundaries are not identical.

Qualifying features

3.9.2 The site is designated as an SAC (Natural England, 2014) for its:

- 1016 Desmoulin's whorl snail (*Vertigo moulinsiana).*

3.9.3 A sizeable population of Desmoulin's whorl snail (*Vertigo moulinsiana)* lives beside ditches within pasture on the floodplain of the River Stour, where reed sweet-grass (*Glyceria maxima)*, large sedges (*Carex* spp). and sometimes common reed (*Phragmites australis)* dominate the vegetation. Stodmarsh is a south-eastern outlier of the main swathe of sites and is important in confirming the role of underlying base-rich rock (chalk) as a factor determining this species' distribution.

Conservation Objectives

3.9.4 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

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

Environmental Vulnerabilities

3.9.5 The 2014 Natural England SIP identifies the following threats and pressures linked to the site:

- Water pollution.
- Invasive species.
- Inappropriate scrub control.
- Air pollution.

3.9.6 The 2019 SACO goes into more detail on these vulnerabilities.

3.10 Berwickshire & North Northumberland Coast SAC

3.10.1 This is an extensive and diverse stretch of coastline in north-east England and south-east Scotland. There is variation in the distribution of features of interest along the coast.

Conservation Objectives

3.10.2 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below) (Natural England, 2014) and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of the habitats of qualifying species.
- The structure and function of the habitats of qualifying species.
- The supporting processes on which the habitats of qualifying species rely.
- The populations of the qualifying species.
- The distribution of the qualifying species within the site.

Qualifying features

3.10.3 The site is designated as an SAC for its (Natural England, 2014):

- 1140 Mudflats and sandflats not covered by seawater at low tide.
- 1160 Large shallow inlets and bays.
- 1170 Reefs.
- 8330 Submerged or partially submerged sea caves.
- 1364 Grey seal *Halichoerus grypus*.

3.10.4 Due to the distance of this site from the Proposed Project and the large foraging range of grey seal (Liley, A Summary of the evidence base for disturbance effects to Annex 1 bird species on the Thames Basin Heaths & research on human access patterns to heathlands in southern England. , 2005), it is the only feature of Berwickshire and North Northumberland Coast SAC that has the potential to overlap with potential impact pathways associated with the Proposed Project. Therefore, grey seal is the only feature of Berwickshire and North Northumberland Coast SAC to be assessed within the HRA.

Environmental Vulnerabilities

3.10.5 The 2015 Natural England SIP for Northumberland Coastal (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Public access/Disturbance.
- Water pollution.
- Invasive species.
- Changes in species distribution.
- Coastal squeeze.
- Direct impact from third party.
- Transportation and service corridors.
- Fisheries: Commercial marine and estuarine.

3.10.6 The 2023 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.11 Humber Estuary SAC

3.11.1 The Humber is the second-largest coastal plain estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. It is a muddy, macro-tidal estuary, fed by the Rivers Ouse, Trent and Hull, Ancholme and Graveney.

Conservation Objectives

3.11.2 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below) (Natural England, 2015), and subject to natural change:

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

Qualifying features

3.11.3 The site is designated as an SAC (Natural England, 2014) for its:

- 1130 Estuaries.
- 1140 Mudflats and sandflats not covered by seawater at low tide.
- 1110 Sandbanks which are slightly covered by sea water all the time.
- 1150 Coastal lagoons.
- 1310 Salicornia and other annuals colonizing mud and sand.
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).
- 2110 Embryonic shifting dunes.
- 2120 Shifting dunes along the shoreline with (*Ammophila arenaria)* ("white dunes").
- 2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes").
- 2160 Dunes with (*Hippophae rhamnoides*).
- 1095 Sea lamprey (*Petromyzon marinus*).
- 1099 River lamprey (*Lampetra fluviatilis*).
- 1364 Grey seal (*Halichoerus grypus*).

3.11.4 Due to the distance of this site from the Proposed Project and the large foraging range of grey seal (Liley, 2005), it is the only feature of Humber Estuary SAC that has the potential to overlap with potential impact pathways associated with the Proposed Project. Therefore, grey seal is the only feature of Humber Estuary SAC to be assessed within the HRA.

Environmental Vulnerabilities

3.11.5 The 2015 Natural England SIP for Humber Estuary (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Water pollution.
- Coastal squeeze.
- Changes in species distributions.
- Undergrazing.
- Invasive species.
- Natural changes to site conditions.
- Public access/disturbance.
- Fisheries: Commercial marine and estuarine.
- Direct land take from development.
- Air pollution: impact of atmospheric nitrogen deposition.

3.11.6 The 2023 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.12 Margate & Long Sands SAC

3.12.1 Margate and Long Sands starts to the north of the Thanet coast of Kent and proceeds in a north-easterly direction to the outer reaches of the Thames Estuary. It contains a number of Annex I Sandbanks slightly covered by seawater at all times, the largest of which is Long Sands itself.

Conservation Objectives

3.12.2 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below) (Natural England, 2015), and subject to natural change;

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

Qualifying features

3.12.3 The site is designated as an SAC for its:

- 1110 Sandbanks which are slightly covered by sea water all the time.

Environmental Vulnerabilities

3.12.4 The 2015 Natural England SIP for Northumberland Coastal (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Fisheries: Commercial marine and estuarine.

3.12.5 The 2023 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.13 Southern North Sea SAC

3.13.1 The Southern North Sea SAC is the largest SAC in UK and European waters, covering 36,951 km^2 off the east coast of England.

Conservation Objectives

3.13.2 The conservation objectives for the Southern North Sea SAC (Natural England, 2019) are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status for harbour porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site.
- There is no significant disturbance of the species.
- The condition of supporting habitats and processes, and the availability of prey is maintained.

Qualifying features

3.13.3 The site is designated as an SAC (Natural England, 2017) for its:

- 1351 Harbour porpoise (*Phocoena phocoena).*

Environmental Vulnerabilities

3.13.4 The Southern North Sea SAC Conservation Objectives and Advice on Operations (Natural England, 2019) identifies the following threats and pressures linked to the site:

- Entanglement/bycatch.
- Contaminants.
- Anthropogenic underwater sound.
- Reduction in prey resource.
- Collision with vessels or installations.

3.14 Thanet Coast SAC

3.14.1 The Thanet Coast SAC covers the North and East coast of the Isle of Thanet and is designated for its reefs and submerged sea caves.

Conservation Objectives

3.14.2 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the ‘Qualifying Features’ listed below (Natural England, 2014)) and subject to natural change;

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

Qualifying features

3.14.3 The site is designated as an SAC (Natural England, 2014) for its:

- 1170 Reefs.
- 8330 Submerged or partially submerged sea caves.

Environmental Vulnerabilities

3.14.4 The 2015 Natural England SIP for Thanet Coast (Natural England, 2015) identifies the following threats and pressures linked to the site:

- Public access/disturbance.
- Fisheries: Commercial marine and estuarine.

3.14.5 The 2023 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

3.15 Wash & North Norfolk Coast SAC

3.15.1 Situated on the east coast of England, The Wash and North Norfolk Coast SAC encompasses the largest embayment in the UK, as well as extensive intertidal sand and mudflats, subtidal sandbanks, biogenic and geogenic reef, saltmarsh and a barrier beach system unique in the UK.

Conservation Objectives

3.15.2 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below (Natural England, 2014)), and subject to natural change;

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

– The distribution of the qualifying species within the site.

Qualifying features

3.15.3 The site is designated as an SAC for its (Natural England, 2015):

- 1110 Sandbanks which are slightly covered by sea water all the time.
- 1140 Mudflats and sandflats not covered by seawater at low tide.
- 1150 Coastal lagoons.
- 1160 Large shallow inlets and bays.
- 1170 Reefs.
- 1310 Salicornia and other annuals colonizing mud and sand.
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).
- 1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*).
- 1355 Otter (*Lutra lutra*).
- 1365 Harbour seal **(***Phoca vitulina)*

3.15.4 Due to the distance of this site from the Proposed Project and the large foraging range of harbour seal (Carter, et al., 2022), it is the only feature of Wash and North Norfolk Coast SAC that may overlap with potential impact pathways associated with the Proposed Project. Therefore, harbour seal is the only feature of the Wash and North Norfolk Coast SAC to be assessed within the HRA Stage 1 (Screening).

Environmental Vulnerabilities

3.15.5 The 2015 Natural England SIP for Northumberland Coastal (Natural England, 2014) identifies the following threats and pressures linked to the site:

- Public access/disturbance.
- Siltation.
- Fisheries: Recreational marine and estuarine.
- Invasive species.
- Inappropriate coastal management.
- Fisheries: Commercial marine and estuarine.
- Coastal squeeze.
- Change in land management.
- Air pollution: impact of atmospheric nitrogen deposition.

3.15.6 The 2023 SACO (Natural England, 2019) goes into more detail on these vulnerabilities.

4. Stage 1 Screening: Likely Significant Effects

4.1 Introduction

4.1.1 The Planning Inspectorate Advice on Habitats Regulations Assessments requires an evaluation of the potential for the Proposed Project to require other consents which could also require HRA by different competent authorities, and a statement as to whether the Proposed Project boundary overlaps with devolved administrations or other European Economic Area (EEA) States. It is confirmed that the Proposed Project boundary does not overlap with areas of devolved administrations or with those of other EEA States and that no other HRA-related consents will be required from different competent authorities.

4.1.2 The Planning Inspectorate Advice on Habitats Regulations Assessments also requires a summary table of all European Sites and qualifying features and each pathway of effect considered at each HRA Stage (screening, AA, and the derogations, as applicable), for each phase of the Proposed Development (construction, operation, and decommissioning, as relevant). This is therefore provided as Appendix A.

4.1.3 The Applicant recognises the importance of the English East Coast and its coastal wetlands as being globally important for migratory waterbirds using the East Atlantic Flyway (EAF) which extends from the Arctic to South Africa. The importance of the English East Coast and these wetland sites is reflected by a series of existing protected nature conservation areas, designated for their international importance, including SPAs and Ramsar Convention Wetlands of International Importance and underpinned by other national designations such as SSSIs. Detailed assessments of the relevant components which contribute to the East Atlantic Flyway are considered in this report.

4.2 Suffolk Onshore Scheme

4.2.1 The potential impacts considered in this section are determined by the nature of the scheme, the zones of influence and discussion with stakeholders such as Natural England. They are: direct habitat loss, loss of functionally-linked land, air quality, disturbance, and pollution.

Construction phase

Direct habitat loss

4.2.2 There will be no direct loss of any area of SAC, SPA, or Ramsar site as a result of the Proposed Project. Therefore, no likely significant effect will arise through this impact pathway.

Loss of functionally-linked land

4.2.3 This is defined as the loss of habitat that is outside the boundary of a European Site, but which is critical to its functioning. For example, the loss of habitat outside of an SPA which is used for foraging purposes by significant numbers (frequently defined as more than 1% of the population) of qualifying bird species for which the SPA is designated, is regarded as a significant loss of functionally-linked habitat. The distance related to loss of functionally-linked habitat is dependent on the species in question and can vary greatly as discussed earlier based on Natural England 2019 guidance on Impact Risk Zones for Sites of Special Scientific Interest Notified for Birds. Version 1.1.

4.2.4 Sandlings SPA is designated for nightjar and woodlark. These species nest primarily within the SPA, although in 2023 three nesting pairs of woodlark were recorded nesting within 200 m of one of the construction access routes (an existing track) connecting the Suffolk Onshore Boundary with Leiston Road. Several pairs were also recorded on Aldeburgh Golf Club, the closest of which was nesting approximately 100 m from the Suffolk Onshore Scheme Boundary. A further pair was recorded nesting in the northern part of the Proposed Project (between Friston and Knodishall) adjacent to the Suffolk Onshore Scheme Boundary. In 2024, woodlarks were recorded in similar locations, and three pairs of nesting woodlark were recorded in fields that had been left fallow north of Church Lane and west of Grove Road, adjacent to the Order Limits.

4.2.5 According to the aforementioned Natural England guidance, in addition to nesting in suitable habitat outside the SPA (acid grassland, or sandy fields left fallow in a given year) both woodlark and nightjar could forage up to 2 km from their nests. Both species have relatively broad foraging habitat requirements; in addition to heathland and early stage plantation, they will also forage in grazed grass heath and arable land, and have been recorded foraging in deciduous woodland, rough pasture, and domestic gardens. Arable land and acid grassland are both located within 2 km of the SPA and within the Suffolk Onshore Scheme Boundary. Therefore, likely significant effects on functionally-linked habitat for nightjar and woodlark are screened in and are taken forward to appropriate assessment.

4.2.6 The Outer Thames Estuary SPA is designated to protect open water marine foraging habitat for tern species and red-throated diver. Red-throated diver are sea birds that do not utilise habitats inland of the SPA. While the species of tern for which Outer Thames Estuary SPA is designated do nest on land, they nest in shingle and other unvegetated stony or sandy habitats that will not be affected by the Proposed Project. It is therefore concluded that likely significant effects on the Outer Thames Estuary SPA due to loss of functionally-linked habitat will not occur and the site is screened out from further assessment.

4.2.7 Based on two years' of wintering bird survey, populations of teal and shoveler constituting more than 1% of the population of Alde-Ore Estuary SPA/Ramsar site were recorded within the RSPB North Warren Nature Reserve east of the disused railway line. Thousands of non-breeding wigeon and teal, as well as shelduck, black-tailed godwit, herring gull, gadwall, and shoveler have been recorded on the RSPB North Warren Reserve beneath which the trenchless installation will occur. Some of these have also been recorded on farmland within the Suffolk Onshore Boundary during wintering bird surveys. However, there will be no loss of functionally linked habitat because this area will be traversed by Horizontal Direct Drilling rather than open cut trenching.

4.2.8 Regarding the inland areas of the Suffolk Onshore Boundary that will be subject to placement of construction compounds, open cut trenching and the Saxmundham Converter Station and Friston Substation, wintering birds were generally recorded in lower numbers. Aggregations of shorebird species were found in various locations. In particular, a wintering flock of up to 78 curlews (*Numenius arquata*) were present on inland fields in winter 2022/23 with slightly lower numbers in winter 2023/24, peaking at 39 in November 2023. These curlews likely originated from the Alde-Ore Estuary SPA and Ramsar, as this site is approximately 700 m from the fields in which the birds were recorded. This species is not a named qualifying feature of the SPA, but is part of the general SPA bird assemblage and the counts represent more than 1% of the SPA population for this species. However, as this field (north of Aldeburgh Road) will not be subject to any land take as part of the Suffolk Onshore Scheme, there will be no loss of functionally-linked land for the Alde-Ore Estuary SPA/Ramsar site.

4.2.9 Therefore, the land to be developed (temporarily or permanently) within the Suffolk Onshore Boundary does not include functionally-linked land for the Alde-Ore Estuary SPA/Ramsar site, despite it being less than 1 km from the Proposed Project. This is because the RSPB reserve will be traversed by HDD and therefore not subject to land take, while the field north of Aldeburgh Road is outside the land take footprint of the Suffolk Onshore Scheme.

4.2.10 Of the species identified in Natural England guidance as making significant use of land more than 2 km from designated site boundaries, none are reasons for designation of Alde-Ore Estuary SPA and one, non-breeding white-fronted goose, is a reason for designation of Minsmere-Walberswick SPA. The relevant marshland parts of the Minsmere-Walberswick SPA are located 5.6 km north of the Proposed Project. White-fronted goose can utilize habitat for roosting and foraging up to 10 km from the boundaries of the sites for which it is designated. However, two seasons of non-breeding surveys undertaken for this project have not recorded any flocks of white-fronted goose within the development footprint except within the RSPB North Warren Reserve, which will be traversed using Horizontal Direct Drilling. As a result no loss of functionally-linked land associated with SPAs designated for non-breeding birds will arise from the Suffolk Onshore Scheme.

4.2.11 Therefore, with regard to loss of functionally-linked land associated with European Sites arising from the Suffolk Onshore Scheme, only foraging habitat outside Sandlings SPA of value to nightjar and woodlark will be taken forward to appropriate assessment.

Air quality

4.2.12 Traffic exhaust emissions contribute oxides of nitrogen (NOx) and (from petrol exhausts) ammonia. These are pollutants in their own right, but they also contribute to nitrogen deposition (and thus acid deposition). Nitrogen deposition is a form of fertilisation that can change vegetation structure and species composition. Guidance from the Institute of Air Quality Management (IAQM) (Institute of Air Quality Management, 2019) and Natural England (Natural England, 2018) identify that traffic exhaust emissions can affect ecological sites within 200 m of the source. Approximately 12 ha of Sandlings SPA will be located within 200 m of a construction compound, the haul road, and the launch pit for trenchless techniques, as these will directly abut the southern boundary of the SPA, which will collectively result in traffic exhaust emissions. This amounts to 0.3% of the 3,406 ha SPA. The main source (since vehicles on the compound or cable route will be present for short periods or not sitting with their engine running for long periods) is annual average daily traffic driving past the SAC along the B1122 Leiston Road, which is adjacent to the SPA.

4.2.13 According to the UK Air Pollution Information System (www.apis.ac.uk) nitrogen deposition to acid grassland and heathland (the relevant SPA habitats) can affect the value of those habitats for both nightjar and woodlark. This is primarily due to changes in habitat structure. According to the same source, these species are not sensitive to changes in atmospheric NOx or ammonia or to acid deposition.

4.2.14 The assessment of exhaust emissions is based on established criteria in the guidance from the IAQM[2], in addition to consideration of advice from Natural England[3]. The IAQM thresholds set out criteria below which air quality modelling is not required because the change is so low as to be effectively imperceptible when normal variation in background flows is taken into account. According to modelling undertaken for the Environmental Statement construction traffic within 200 m of Sandlings SPA will result in a net increase of 8 AADT on the section of the road that passes the SPA. This is a very small increase, and well below the IAQM thresholds for triggering air quality modelling. Moreover, this will be a temporary increase in traffic flows rather than a permanent increase.

4.2.15 The critical load system for acid and nitrogen deposition assumes decades of continuous exposure[4]. Over the short term an elevation in deposition is unlikely to result in changes in vegetation communities over the temporary period the construction is likely to last, taking into account the considerable variation in background deposition that is likely to occur normally over relatively short time periods.

4.2.16 With regard to nitrogen deposition, Caporn et al (2016) [24] specifically addresses this point in sections 2.2.1 and 5.1 stating that '*The current rate of N deposition is primarily a proxy for long-term cumulative N deposition. Thus we would not expect that a change in N deposition, either increasing or decreasing, would immediately change species richness or composition, but instead these would be gradually influenced by longer-term changes in N deposition'.* Given the fact that the fluctuations in background nitrogen deposition are already considerable based on data from APIS, it is considered that the contributions of the Proposed Project would not materially influence long-term nitrogen deposition and thus acid deposition in the SPA because they would fall well within the annual variation in deposition rates. Since the Proposed Project would not materially influence long-term deposition, it would not interfere with the achievement of the air quality 'restore' target for the SPA.

4.2.17 In addition to traffic exhaust emissions, IAQM guidance (Institute of Air Quality Management, 2014) identifies that significant dust soiling can arise on ecological receptors located within 50 m of construction sites. Natural England advice in response to the PEIR HRA suggested that a more precautionary zone of 200 m should be used for HRA purposes. That larger 200 m zone has therefore been used in this HRA. A small part of Sandlings SPA (6.3ha or 0.2%) is located within 200 m of the eastern-most construction compound.

[2] air-quality-planning-guidance.pdf (iaqm.co.uk)

[3] https://publications.naturalengland.org.uk/publication/4720542048845824

[4] '*Typically, critical loads relate to the potential effects over periods of decades… critical loads provide the long-term deposition* [emphasis added] *below which we are sure that adverse ecosystem effects will not occur'*, source: page 220, World Health Organization. 2000. Air Quality Guidelines for Europe. WHO Regional Publications, European Series, No. 91. Second Edition

4.2.18 LSE on the SPA due to atmospheric pollution (i.e. NOx, ammonia or nitrogen) from construction traffic is therefore screened out of further consideration in Stage 2 - appropriate assessment. However, dust impacts on Sandlings SPA from construction are screened in due to the need to rely on mitigation that is not required by other legislation.

Disturbance

4.2.19 Disturbance can result from noise, movement, or light. The factors that influence a species response to a disturbance are numerous, but key is species sensitivity, the scale of the impact (e.g. the noise level) proximity of disturbance sources and timing/duration of the potentially disturbing activity. Some species of birds are sensitive to other visual disturbances such as human presence and the movement of vehicles. The concern regarding the effects of visual disturbance on birds stems from the birds expending more energy than is necessary and spending an increased amount of time responding to the disturbance rather than feeding (Riddington, Hassall, Lane, Turner, & Walter, 1996) . Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately survival of the birds. In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds (Gill, Sutherland, & Norris, 1998).

4.2.20 Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they, or any nestlings, are to predators. The distance at which a species takes flight when approached by a disturbing stimulus is known as the 'tolerance distance' (also called the 'escape flight distance') and differs between species to the same stimulus and within a species to different stimuli. Disturbance on heathland birds is well known from work undertaken within the Thames Basin Heaths and Dorset Heaths SPAs. With respect specifically to European nightjar *Caprimulgus europaeus*, Liley and Clarke (Liley & Clarke, 2002; Liley & Clarke, 2003) found that the density of individuals was directly related to the amount of surrounding development, with sites surrounded by higher levels of development, and therefore subject to greater number of visitors (for example walkers and dog walkers), supporting fewer nightjars. The species' breeding success appears to be much higher at less visited sites (Murison, 2002), with path proximity correlating strongly with nest failure, up to 225m from the path edge. Similarly, woodlark *Lullula arborea* are also affected significantly by disturbance. Mallord estimated that, for 16 sites in southern England, 34% more woodlark chicks would be raised if all sites were free from disturbance (Liley, 2005; Mallord, 2005).

4.2.21 The nightjar and woodlark breeding populations of Sandlings SPA are vulnerable to noise and visual disturbance. A construction compound (also being the drive compound for the Horizontal Direct Drilling) will be situated 20 m from the SPA at its closest and there will also be a section of cable trench close to the SPA. The HRA has been informed by noise monitoring data from within the SPA and modelling of the average (LAeq) and, where appropriate, maximum (LAmax) construction noise levels for the noisiest activities.

4.2.22 To inform the assessment of noise, in previous meetings with Natural England it was discussed that:

- Birds generally give no reaction to noise levels of 55 dB or below (Cutts & Allan, 1999); and

- A change above 3 dB is required for the difference to be perceptible and therefore a 3 dB change should be used for the purposes of HRA screening.

4.2.23 In discussion with Natural England, it was agreed that for the purposes of HRA screening (Likely Significant Effects) for the Proposed Project a change in noise levels of 3 dB over the baseline should be used to screen in effects for further consideration in appropriate assessment. The noise modelling indicates that the change in LAmax noise levels within Sandlings SPA due to construction will exceed 3 dB when compared to baseline levels. See **Appendix E Figure 2 Map of 3 dB change contour at Suffolk**. As a result, potential noise disturbance of Sandlings SPA during construction is screened in for appropriate assessment. The 3 dB contour associated with the acid grassland mitigation area at Hazlewood Common overlaps slightly with Alde-Ore Estuary SPA/Ramsar, but the only works proposed there are changes in farming practices and land management. The noise environment is therefore no different from that for conventional farming that already takes place. Therefore, potential noise disturbance of Alde-Ore Estuary SPA/Ramsar is screened out.

4.2.24 There will be use of an existing access track that passes through Sandlings SPA for a short distance in order to monitor the Horizontal Direct Drilling. This will be used by a small number of people no more than once a week, either on foot or in a Land Rover or similar. This is an existing track already used in this way for management and monitoring access to the RSPB North Warren Reserve. Therefore, it is not considered to pose a greater disturbance risk to the SPA than already exists, particularly since this part of Sandlings SPA is used for recreational activity by members of the public.

4.2.25 Disturbance from visual intrusion such as lighting, is likely to be most relevant if the works are immediately adjacent to an SPA. Lighting is likely to be an issue if the works result in the introduction lighting at a point that is within close proximity to a European Site that is currently unlit. There is an existing fence with vegetation separating the construction compound and trenchless drive compound location from the Sandlings SPA. Therefore, to ensure no visual disturbance, screens will need to be erected. Since these would constitute mitigation, they cannot be taken into account in the Likely Significant Effect test. Therefore, visual disturbance of nesting woodlark and nightjar at Sandlings SPA is also screened into Appropriate Assessment.

4.2.26 Non-breeding bird surveys, and bird records generally, for the wetland parts of RSPB North Warren Reserve have identified that it is functionally-linked to both Minsmere-Walberswick SPA/Ramsar and Alde-Ore Estuary SPA/Ramsar. Moreover, noise modelling has established that noise levels would exceed 3 dB LAmax above the baseline within the RSPB reserve east of the former railway (the wetland parts of the reserve). Therefore, in the absence of mitigation likely significant effects on Minsmere-Walberswick SPA or Alde-Ore Estuary SPA could arise due to noise disturbance impacts of the Proposed Project on functionally-linked habitat in RSPB North Warren Reserve and this matter is screened into the Appropriate Assessment.

4.2.27 With regard to the field north of Aldeburgh Road which has been recorded to support significant population of wintering curlews, noise modelling indicates that due to the presence of a construction compound to the north-east of this field the change in noise levels in the absence of mitigation would exceed 3dB LAmax. Therefore, potential for disturbance of birds functionally-linked to the Alde-Ore Estuary SPA/Ramsar site is screened into Appropriate Assessment.

4.2.28 The Outer Thames Estuary SPA is 860 m from the nearest surface works, such as the launch pit for trenchless installation at its closest, on the opposite side of RSPB North Warren Reserve. Given this distance, there will be no disturbance of red-throated diver or foraging tern species from the Suffolk Onshore Scheme. Likely significant effects on Outer Thames Estuary SPA due to disturbance can therefore be screened out of Appropriate Assessment.

Pollution

4.2.29 There is potential for changes in water quality resulting from:

- disturbance of contaminated soils and perched groundwater, and the creation of new pathways to sensitive receptors (including construction workers and controlled waters) during construction; and
- pollution of surface watercourses within or near the Proposed Project during construction and decommissioning, due to spillages or polluted surface water run-off entering a watercourse.

4.2.30 The quality of the water that feeds European Sites is an important determinant of the nature of their habitats and the species they support, and therefore integral to meeting a site's Conservation Objectives. Poor water quality can have a range of environmental impacts. At high concentrations, toxic chemicals and heavy metals can result in the immediate death of aquatic life (both flora and fauna). At lower concentrations, negative impacts may be more subtle and could increase vulnerability to disease or change the behaviour of wildlife. These substances, especially Polychlorinated Biphenyls (PCBs), accumulate in minuscule benthic organisms and then bio-magnify as they are passed up the food chain. Furthermore, they are not easily biodegraded over time. Overall, there are two broad types of toxic compounds in aquatic environments, namely synthetic and non-synthetic (i.e., naturally occurring) substances.

4.2.31 Toxic contamination may arise from synthetic toxic compounds, such as pesticides, PCBs (polychlorinated biphenyls) and biocides. Some of these substances are endocrine disrupting chemicals, which have the capacity to mimic animal hormones, or prevent their production or breakdown. As discussed above, many of the synthetic compounds tend to accumulate over time and are likely to be present in animal tissue or substrate for long periods of time. Another factor in determining the magnitude of water pollution is the amount of hydrological mixing and tidal flushing that a site receives.

4.2.32 Non-synthetic compounds, such as fuel oils and heavy metals, occur in the environment naturally at relatively low concentrations, but become toxic at higher concentrations. Oil pollution is particularly damaging (and persistent) in intertidal environments, where natural degradation and weathering of oils is slow.

4.2.33 In particular, construction compound S10 is adjacent to Sandlings SPA. There is potential for spillages, especially fuel spills from vehicles and plant percolating into the groundwater of this designated site. However, the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are European Sites or connect to European Sites.

4.2.34 Therefore, the construction phase on every project must have a duty of care to the water environment and produce and implement plans and procedures to prevent discharge from works entering surface, groundwater, wetlands, or coastal waters. As such, it is legitimate to take these into consideration at the screening stage of HRA since they are not being introduced specifically to protect European Sites. This is usually undertaken in the form of a Construction Environment Management Plan (CEMP) which includes measures for the protection of ground and surface waters, pollution prevention measures and an emergency response plan for pollution events.

4.2.35 The water quality protection measures to be implemented for the Proposed Project are set out in the **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice,** secured through the draft DCO Schedule 3 Requirement 6. Relevant measures embedded to ensure legislative compliance are cited below:

- W02: Have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident.
- W02: The use of all static plant such as pumps in appropriately sized spill trays.
- W02: Prevent refuelling of any plant or vehicle within 15 m of a watercourse.
- W02: Prevent storing of soil stockpiles within 15 m of a main river (16 m where river is tidal).
- W02: Inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids.
- GH05: All materials that could be hazardous to water quality will be stored in suitable areas, more than 8 m away from a watercourse, away from site traffic and in containers which are fit for purpose, meeting the requirements of the Control of Pollution (Oil Storage) Regulations.
- GG14: Fuels, oils and chemicals will be clearly marked as to their contents and stored responsibly, in a secure, bunded area with an impervious base, away from sensitive water receptors.
- GG14: All refuelling, oiling and greasing of construction plant and equipment will take place in an appropriate bunded area that includes an impervious base and where possible interceptor drains. All pumps, generators and similarly fuelled equipment are to be placed on drip trays or in a bunded area and all valves, hoses and associated re-fuelling equipment will be regularly inspected and turned off and securely locked when not in use. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potentially hazardous materials used during construction will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby.
- GG15: Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency).

- GG16: Where required, wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps.
- GG16: Ensure there is an adequate area of hard-surfaced road between the wash facility and the site exit, wherever site size and layout permits.
- W06: Where new or additional impermeable surfacing is required on any access tracks, bellmouths and in compound areas e.g. for parking provision, site offices, Sustainable Drainage Systems (SuDS) will be incorporated, appropriate to the existing ground conditions, with infiltration to ground preferred where conditions are suitable.
- W11: Surface water drainage from permanent above ground infrastructure would be managed and treated using sustainable drainage systems (SuDS) in accordance with policy and guidance requirements of the relevant Lead Local Flood Authorities.

4.2.36 As such, it is considered that new infrastructure can be constructed in a way to prevent pollution to the water environment to ensure no AEoSI from water pollution on any European Site. LSE can therefore be screened out for all European Sites through this impact pathway.

4.2.37 Moreover, there is no risk of frac out affecting onshore European Sites as the trenchless techniques such as HDD does not traverse any terrestrial European Sites with sensitive features.

Operational phase

4.2.38 The potential impacts considered in this section are determined by the nature of the scheme, the zones of influence and discussion with stakeholders such as Natural England. The impact pathways which have been considered are disturbance and pollution and air quality; no other impact pathways are considered relevant during the operational phase.

Disturbance

4.2.39 Once the Proposed Project is operational there will be limited requirement for day-to-day presence of people (typically two individuals at any time), and the infrastructure would not produce sounds that would result in disturbance of birds. Operational noise has been modelled and it has been determined that the 3 dB screening contour for potential disturbance does not extend far from Saxmundham Converter Station and Friston Substation. It does not intersect with any European Sites or areas of functionally linked land.

4.2.40 The only potential for disturbance would therefore be during maintenance. It is impossible to forecast exactly when maintenance crews may need to visit parts of the site, or how often. However, maintenance visits are likely to be infrequent and for short periods and will be much smaller in scale than works during construction. Given the area is an active agricultural landscape, with tractors, agricultural workers, and other mobile plant present as a matter of course, it is considered that maintenance crews and activities would not constitute a material change to this background level of activity. LSE on all European Sites as a result of disturbance during maintenance are therefore screened out.

4.2.41 Four ducts would be installed as part of the trenchless installation, one more duct would be installed than for the terrestrial HVDC underground cables to allow for a spare. Should a section of cable need to be replaced at the landfall, this spare duct would allow for a new section of cable to be pulled through rather than a repair to the existing or needing to re install ducts.

4.2.42 Therefore, likely significant effects due to disturbance relating to the monitoring of the cable and ducts are screened out.

Air quality

4.2.43 It is understood that the Saxmumdham Converter Station and Friston Substation will be connected to the existing Distribution Network Operator system to provide an electricity supply to the sites. However, as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**, a back-up diesel generator is proposed at each of the Substation and Converter Station during the operational phase. For the purposes of the assessment in **Application Document 6.2.2.8 Part 2 Suffolk Chapter 8 Air Quality** a study area of up to 200 m from the Converter Station and Substation boundary is considered appropriate. Beyond this distance it is judged that the effect of any emissions on local air quality would have no potential to be significant. There are no European Sites within 200 m of either boundary.

4.2.44 The generators will be operated during routine maintenance activities, which is likely to be every 1 –3 months. They may also be required during emergency scenarios. These backup generators are rarely used and have less than a 1% chance of operating per year. As the back-up generators are likely to run just 1% of the time and emissions are likely to be lower, the maximum annual NOx process contribution is likely to be in the order of 0.05 µg/m³ from each generator. This would not be visible in modelling when translated to nitrogen deposition and will reduce with distance. Given the distance of these generators from Sandlings SPA (at least 3 km) NOx and nitrogen deposition within the European Site will not be elevated at all. Therefore likely significant effects can be ruled out.

Pollution

4.2.45 As with construction phase impacts, the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are European Sites or connect to European Sites.

4.2.46 Therefore, during maintenance, National Grid has a duty of care to the water environment and produce and implement plans and procedures to prevent discharge from works entering surface, groundwater, wetlands or coastal waters. This is usually undertaken in the form of a Construction Environmental Management Plan which includes measures for the protection of ground and surface waters, pollution prevention measures, and an emergency response plan for pollution events. Specifically, surface water drainage from permanent access routes and the proposed Converter Station and Substation site would pose a low risk of contamination given the SuDS treatment measures proposed in commitment W11 in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** and secured through the draft DCO Schedule 3 Requirement 6**.**

4.2.47 On the basis of the types of maintenance activities that are envisaged, described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**, and given the control measures that maintenance activities would be subject to (GG05, GG28, GH05, W09) which are described in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** and secured through draft DCO Schedule 3 Requirement 6**,** impact pathways would be sufficiently weakened such that it is considered unlikely that significant effects on the water environment would arise. This is particularly the case given the distance of the Saxmundham Converter Station and Friston Substation from the nearest European Site (approximately 3km) and the absence of connecting watercourses.

4.2.48 As such, it is considered that maintenance of the new infrastructure (where required) will be designed in a way that prevents pollution to the water environment to ensure no AEoSI from water pollution on any European Site. LSE can therefore be screened out for all European Sites through this impact pathway.

Decommissioning phase

4.2.49 For the purposes of this assessment decommissioning impacts are considered to be very similar to construction phase impacts. As such, the impact pathways for the Construction phase that have been screened in for assessment of LSE are therefore automatically also screened in for the Decommissioning phase. No additional European Sites or impact pathways, specifically associated with the Decommissioning phase have been identified for further assessment.

4.3 Offshore Scheme

4.3.1 The potential impacts considered in this section are determined by the nature of the Proposed Project, the zones of influence and discussion with stakeholders such as Natural England. They are: temporary physical disturbance; temporary increase in SSC and sediment deposition; changes to marine water quality; underwater sound impacts; vessel collision risk; and airborne sounds and visual disturbance.

Construction phase

Temporary physical disturbance to benthic habitats and species

4.3.2 Activities associated with route preparation and cable installation can lead to direct physical disturbance of substrate which may lead to disturbance and/or loss of benthic habitats and species within the footprint and immediate vicinity of the works. Sensitivity to physical disturbance varies between receptors; for mobile receptors displacement, physiological/morphological damage may occur whilst for benthic habitats and sedentary or less mobile receptors, the likely impacts are physiological/morphological damage and mortality.

4.3.3 The Offshore Scheme will use a trenchless solution, such as trenchless techniques such as HDD, at both landfall locations. At the Suffolk Landfall, the entry/exit points, where the cable will be pulled for subsequent submarine installation, will be entirely in the subtidal environment, thus avoiding the intertidal area, as well as avoiding any sites designated for benthic habitats and species.

4.3.4 Similarly, in Kent, the trenchless solution will avoid saltmarsh habitat, exiting approximately 105-140 m seaward of this habitat, within intertidal mudflats. The cable will be pulled through and installed by traditional trenching techniques (similar to activities further offshore) in the intertidal zone and into the subtidal. The total area of disturbance at the Kent Landfall is 0.02 km^2. The Kent Landfall is located within the Thanet Coast SAC, which is designated for reefs and sea caves. However, as the installation activities associated with the Proposed Project are located in an area of intertidal mudflat and as the disturbance footprint will be limited to the works, a significant distance from any features of the SAC, any LSE can be screened out for Thanet Coast SAC.

4.3.5 A number of pre-installation and cable installation activities will temporarily disturb seabed habitats. However, cable installation activities avoid interaction with sites designated for benthic habitats and species, with the closest site, Margate and Long Sands SAC, located 2 km to the west of the Offshore Scheme Boundary. Margate and Long Sands SAC is designated for 'Sandbanks which are slightly covered by sea water all the time'. Although fine sediments are dynamic and mobile in nature, sandbanks in shallow water are subject to significant wave and tidal energy, activities are not anticipated to have an impact on the features of the SAC, and thus any LSE can be screened out for Margate and Long Sands SAC.

4.3.6 Therefore, it is not anticipated that there will be a likely significant effect on any European Sites via this impact pathway and thus it can be screened out of further assessment.

Temporary increase in suspended sediment concentration and sediment deposition leading to increased turbidity and smothering effects

4.3.7 Construction activities have the potential to increase suspended sediment concentration (SSC) creating a plume within the water column. This in turn can lead to increased deposition as suspended sediments settle out of the water column. Increased SSC can lead to elevated turbidity levels which may reduce the feeding efficiency and subsequent growth rates of filter feeders if clogging of feeding structures occurs. Any contaminants, such as heavy metals and toxins, within the sediments, can also be released into the water column and may alter marine water quality with subsequent indirect effects on species.

4.3.8 Increased deposition can smother the seabed potentially resulting in changes to seabed geomorphology, sediment structure, and habitats. This would have an impact on species that currently rely on these habitats for food and refuge, leading to potential indirect effects on survival, growth, reproduction, and displacement of individuals.

4.3.9 Larger sediment fractions would settle rapidly, within the immediate vicinity (within 20 m) of the Offshore Scheme. Finer fractions may be carried in suspension beyond this distance, settling on the seabed within 14 days. Based on calculations undertaken to inform **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**, fine sand will settle within a maximum distance of 17 km. However, this deposition would be limited to a thickness of less than 0.5 mm on the seabed. Due to the small magnitude of the deposition thickness, any accumulation of sediment on the seabed would be unlikely to be detectable in the field.

4.3.10 Moreover, Thanet Coast SAC is less than 1 km from the Offshore Scheme and is designated for benthic habitats including reef, which has the potential to be impacted by increases in SSC and deposition. In addition, Margate and Long Sands SAC, located approximately 3.0 km from the Offshore Scheme, is designated for the protection of Sandbanks which are slightly covered by sea water all the time.

4.3.11 Therefore, Thanet Coast SAC and Margate and Long Sands SAC are screened in for further assessment.

Changes to marine water quality during cable installation and cable lay from the use of drilling fluids

4.3.12 The Offshore Scheme will use a trenchless solution, such as HDD, at both landfall locations. At the Suffolk Landfall, the entry/exit points will be entirely in the subtidal environment. At the Kent Landfall, the entry/exit points will be located within an area of intertidal mudflat.

4.3.13 The use of a trenchless solution such as HDD, and therefore the discharge of drilling fluids, may lead to a temporary local reduction in water quality at the trenchless technique exit point. Therefore, only receptors in the immediate vicinity of the trenchless technique exit points have the potential to be in contact with drilling fluids if a leak or spill occurs.

4.3.14 At the Suffolk Landfall, it has been estimated that up to 7,240 m^3 of drilling fluid will be discharged. At the Kent Landfall, it has been estimated that up to 40 m^3 of drilling fluid will be discharged. The potential dispersion of suspended particles is considered to be a maximum of 17 km (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**). However, these volumes of drilling fluid will be very limited and the regular tidal movement in the intertidal zone acting to disperse and dilute any drilling fluid released.

4.3.15 All drilling fluids used, such as bentonite, will be selected from the OSPAR List of Substances/Preparations Used and Discharged Offshore (2021) which are considered to 'Pose Little or No Risk to the Environment' (PLONOR). Additionally, where entry/exit points are located in the intertidal area (i.e. at the Kent Landfall) drilling fluid will be captured where possible (control measure LVS05 in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**).

4.3.16 The entry/exit points at the Kent Landfall, are located within the Sandwich Bay SAC and Thanet Coast & Sandwich Bay SPA/Ramsar. In addition, Thanet Coast SAC is designated for benthic marine features and is located within the maximum potential ZOI (17 km) from the trenchless entry/exit points. Therefore, these sites are screened in for further assessment.

Underwater sound impacts

4.3.17 Vessel activity and cable installation activities could generate underwater sound, which has the potential to directly affect marine species. Underwater sound has a range of potential effects depending on the type of sound and proximity to the sound source. The range of potential effects include lethal effect and physical injury, auditory injury, behavioural responses, and masking.

4.3.18 Several activities during the construction phase will generate underwater sound, including:

- Multibeam echosounder surveys (MBES) – operating frequency 170 – 450 kHz;

- Side-scan sonar (SSS) - operating frequency 300 – 600 kHz;
- Sub-bottom profiling (SBP) – operating frequency of 0.5-12 kHz;
- Ultra-short baseline (USBL) – operating frequency of 21 – 31 kHz;
- Cable installation – operating frequency of 1 - 15 kHz;
- Cable lay vessel (operating with dynamic positioning) – operating frequency of 0.005 - 3.2 kHz; and
- Support vessels – operating at a variety of frequencies, as vessels are continuously moving, any impacts will be transient and short term.

4.3.19 There is potential for Unexploded Ordnance (UXO) detonation to be required prior to the cable installation programme. At this time, there is no information on likely UXO detonation requirements so LSE cannot be assessed here, but this activity will be subject to a separate marine licence application and HRA (which will consider effects alone and in combination) before it can be consented. A detailed UXO survey, including use of multiple gradiometers and ROV inspections combined with high resolution MBES, is planned to be carried out in 2025 to better detect and define potential UXOs.

4.3.20 Few formal studies have been conducted on the impacts of underwater sound on marine invertebrates, although invertebrates are believed to be sensitive to particle motion rather than to sound pressure (Taormina, et al., 2018). At present there are no published sound sensitivity thresholds for invertebrates. Some lab-based studies have demonstrated some behavioural changes of certain species in response to pile driving (Carrol, Przeslawski, Duncan, Gunning, & Bruce, 2017; Popper & Hawkins, 2018), although repeated exposure resulted in the habituation or tolerance to underwater noise (Solan, et al., 2016). Field based studies revealed no evidence of increased mortality in bivalves or lobsters, or of reduced catch-rates for plankton or reef-associated invertebrates when exposed to acute underwater noise (Wale, Simpson, & Radford, 2013). These studies found responses in invertebrates varied depending on species, with little evidence of increased mortality or ecosystem impacts.

4.3.21 The noise levels associated with the Proposed Project construction activities will be operating at frequencies that are not expected to have an impact on benthic ecology. Thus, the zone of influence of underwater noise is expected to be localised to the Offshore Scheme. Therefore, European Sites designated for subtidal benthic habitats and species beyond this zone of influence have been screened out of further assessment.

4.3.22 The installation activity with the highest sound source is expected to be SBP. This activity operates at frequencies of 0.5-12 kHz within the hearing range of harbour porpoise, harbour seal, and grey seal.

4.3.23 There is one European Site designated for harbour porpoise within the North Sea Inter-Agency Marine Mammal Working Group (IAMMWG) Management Unit (MU). The Offshore Scheme passes through the Southern North Sea SAC, thus the Southern North Sea SAC is screened in for further assessment as there is potential for underwater noise to impact the harbour porpoise feature of this site.

4.3.24 For pinnipeds, European Sites within the South East England Special Committee on Seals (SCOS) Seal Management Unit (SMU), Wash and North Norfolk Coast SAC and Humber Estuary SAC, will be screened in for further assessment as there is the potential for individuals from these sites to interact with the Offshore Scheme and the underwater noise generated by associated activities. Moreover, the Berwickshire and North Northumberland Coast SAC, within the North East England SMU, has also been screened into further assessment, as known foraging ranges of the designated grey seal feature (448 km) include this SMU, and thus connectivity between these areas and the Offshore Scheme may occur. Therefore, it is not possible, at this stage, to rule out the potential of a likely significant effect on the pinniped features of Wash and North Norfolk Coast SAC, Humber Estuary SAC, and Berwickshire and North Northumberland Coast SAC. Thus, these sites are screened into further assessment for the underwater noise impact pathway.

Vessel collision risk

4.3.25 Installation activities will involve the deployment of several vessels. Therefore, there is a risk of collision between vessels and marine mammals associated with the Proposed Project. Direct strikes from vessels, including sharp objects such as propellers, have the potential to cause lethal injury to marine mammals.

4.3.26 Marine mammals have been reported as involved in vessel strikes in the North Sea and wider Atlantic (Winkler, Panigada, Murphy, & Ritter, 2020). Vessel strikes can result in physical impairment or even mortality, which may reduce foraging abilities and fitness at an individual level (Moore M. J., et al., 2013) or population level. Vessel speed and draft depth are thought to be the biggest factors concerning collision risk and severity, with higher vessel speeds producing greater impact force and larger drafts being associated with increased mortality (Rockwood, Calambokidis, & Jahncke, 2017).

4.3.27 The vessels supporting construction activities typically operate at low speeds of 0 to 7 knots. At these speeds it is unlikely that vessels pose a significant risk to marine mammals. Moreover, some studies have correlated avoidance behaviour with sustained or increased vessel traffic (Culloch, et al., 2016) and (Erbe, et al., 2019). Therefore, it is likely individuals are habituated to vessel presence in the Greater Thames Estuary and Southern North Sea, which are subject to high levels of vessel traffic (European Maritime Safety Agency (EMSA), 2018).

4.3.28 However, as the Offshore Scheme passes through the Southern North Sea SAC, at this stage, it is not possible to rule out the potential of a likely significant effect on the harbour porpoise feature of Southern North Sea SAC, and therefore it is screened in for further assessment. Similarly, due to the foraging ranges of harbour seals and grey seals (273 and 448 km, respectively) there is potential for individuals from Wash and North Norfolk Coast SAC, Humber Estuary SAC, and Berwickshire and North Northumberland Coast SAC to interact with vessels associated with the Offshore Scheme. Therefore, the Wash and North Norfolk Coast SAC, Humber Estuary SAC, and Berwickshire and North Northumberland Coast SAC are screened in for further assessment.

Airborne sounds and visual disturbance

4.3.29 Airborne sound produced by the Proposed Project is likely to be limited to the use of project construction vessels. These vessels would operate at slow speeds during cable installation.

4.3.30 At the Kent Landfall, a trenchless solution, such as HDD, will be used to make landfall. This trenchless solution will completely avoid saltmarsh habitat, exiting approximately 105 - 140 m down shore of this habitat, exiting within intertidal mudflats within the Thanet Coast and Sandwich Bay SPA. Waders and waterbirds use intertidal habitat, and a jack up barge or similar will be required in the vicinity to support entry/exit pits. Therefore, there is potential for impact on the important ecological features of Thanet Coast and Sandwich Bay SPA (including golden plover).

4.3.31 The Offshore Scheme also passes through the Outer Thames Estuary SPA, where vessel presence has the potential to disturb seabird species, including the wintering red-throated diver feature. Seabirds are known to raft together at sea in groups. Thus, when a vessel passes through or within close proximity to a raft, many individuals could be disturbed at once. Red-throated divers are also highly sensitive to anthropogenic sources of disturbance, including vessel movements. Moreover, the tern and gull features of Alde-Ore Estuary SPA and Ramsar, and Minsmere-Walberswick SPA are understood to utilise foraging grounds within the vicinity of the Offshore Scheme, and thus may also be affected by the airborne sound and visual disturbance associated with the project activities. Therefore, the Outer Thames Estuary SPA, Alde-Ore Estuary SPA and Ramsar, and Minsmere-Walberswick SPA is screened into further assessment.

4.3.32 Vessel movements, and their associated airborne sound, may lead to the disturbance of seals. Sounds produced from shipping traffic have been associated with “flushing” of seals at haul-out sites (Jansen, Boveng, van Hoef, Dahle, & Bengston, 2014). There are high levels of existing traffic that currently utilise the North Sea and Thames, and seals still haul out regularly around the estuary, likely indicating a degree of habituation to airborne vessel noise and visual disturbance. However, seals are understood to have large foraging ranges, and individuals from Berwickshire and North Northumberland Coast SAC, Humber Estuary SAC, or Wash or North Norfolk Coast SAC have the potential to occur and / or haul-out within the vicinity of the Offshore Scheme. Thus, the Berwickshire and North Northumberland Coast SAC, Humber Estuary SAC, or Wash or North Norfolk Coast SAC is screened into further assessment.

Potential for indirect effects through impacts to prey species

4.3.33 Disturbance of the seabed during construction of the Proposed Project has the potential to affect prey availability. This may lead to indirect effects on species that forage within their range, including seabirds and marine mammals.

4.3.34 The Kent Landfall will use a trenchless solution, exiting within intertidal mudflats within the Thanet Coast and Sandwich Bay SPA and Ramsar. Landfall activities will include the use of an excavator, JUB or back hoe dredger, cable lay barge, and temporary cofferdam, leading to the temporary disturbance of 0.02 km^2 of intertidal mudflat. Moreover, concrete mattresses/rock bags will be placed at the trenchless entry/exit points which will then be removed approximately one week before cable pull-in, before permanent protection will be buried at the same location, temporarily disturbing the mudflat. From the entry/exit points, the cable will be pulled through and installed by traditional trenching techniques (similar to activities further offshore) in the intertidal zone and into the subtidal. The waterbird features of the Thanet Coast and Sandwich Bay SPA and Ramsar are understood to forage on the intertidal mudflats and saltmarshes for small crustaceans and worms (The Wildlife Trusts, 2024), which are likely to be temporarily disturbed during intertidal works. Therefore, the Thanet Coast and Sandwich Bay SPA and Ramsar have been screened in for further assessment.

4.3.35 The Offshore Scheme passes through the Outer Thames Estuary SPA for approximately 29 km, at two locations, passing directly through the areas for foraging common tern and little tern, and non-breeding (wintering) red-throated diver. In addition, it is also understood that the tern and gull are features of Alde-Ore Estuary SPA and Ramsar, and Minsmere-Walberswick SPA (Woodward, Thaxter, Owen, & Cook, 2019). Therefore, there is potential for indirect effect on the features of these sites, thus the Outer Thames Estuary SPA, Alde-Ore Estuary SPA and Ramsar, and Minsmere-Walberswick SPA are screened in for further assessment.

4.3.36 Construction activities which disturb the seabed or produce underwater sound could impact demersal fish and shellfish species which are prey items for marine mammals. The Offshore Scheme Boundary passes through the Southern North Sea SAC, which is designated for harbour porpoise. Moreover, due to the foraging ranges of seals (278 km and 448 km, for harbour and grey seal respectively (Carter, et al., 2022)), individuals from the Wash and North Norfolk Coast SAC, the Humber Estuary SAC, and the Berwickshire and North Northumberland Coast SAC may forage for prey within the vicinity of the Offshore Scheme. Harbour porpoise forage mainly for sandeel, whilst both harbour and grey seals forage principally for benthic fish (e.g., flatfish and sandeel) and gadoids (e.g., cod and hake) (Wilson & Hammond, 2016).

4.3.37 Marine mammals can be very wide-ranging in their foraging trips. Areas within the Offshore Scheme have been identified as low intensity spawning and nursery grounds for sandeel (**Application Document 6.2.4.4 Part 4 Marine Chapter 4 Fish and Shellfish Ecology**). However, as impacts from construction phase activities to the seabed are likely to be localised, and will be small in extent, confined largely to a small area around the cable installation, and in many cases temporary, any indirect effects via impacts to prey species of marine mammals are not anticipated to be significant. Therefore, the potential for indirect effects through impacts to prey species for features of the Southern North Sea SAC, the Wash and North Norfolk Coast SAC, the Humber Estuary SAC, and the Berwickshire and North Northumberland Coast SAC have been screened out of further assessment.

Operational phase

4.3.38 For the purposes of this assessment operational impacts of the Offshore Scheme are considered to be very similar to construction phase impacts, with the addition of effects of electromagnetic field (EMF) emissions and thermal emissions.

Permanent loss of benthic habitats and species

4.3.39 Cable protection is required where third-party assets cross the route, burial cannot be achieved, and/or at trenchless installation entry/exit points to mitigate the effects of mobile sediments. This would lead to disturbance and/or loss of benthic habitats and species. This would also introduce artificial hard substrata which could have the capacity to function as an artificial rocky reef, allowing species dependent on hard substrates to colonise areas that might have previously been unsuitable.

4.3.40 Options for external cable protection include:

- Placement of remedial rock berms. Rock berms would be 7 m wide (no lowering) at the base giving a total area of loss of 0.084 km^2 over a length of 12 km;
- 0.017 km^2 of loss from rock backfill over a length of 38 km (between KP35 to KP58, and between KP81.5 to KP96.5);

- 360 m^2 of loss from the placement of concrete mattresses at the Suffolk Landfall. Rock bags/concrete mattresses would measure 0.3 m x 3.0 m x 6.0 m or 0.45 m x 3.0 m x 6.0 m and there are assumed to be five per trenchless entry/exit point; and
- 0.05 km^2 of loss from concrete mattresses/rock berm protection at cable crossings. There are ten in-service cable crossings that would require protection (maximum footprint of 0.005 km^2 per crossing).

4.3.41 Cable protection is not anticipated within any European Sites designated for benthic habitats or species. Therefore, it is not anticipated that there will be a likely significant effect on any European Sites via this impact pathway and thus it can be screened out of further assessment.

Introduction and spread of invasive non-native species (INNS) via the addition of cable protection

4.3.42 Rock berms, rock backfill, and concrete mattresses are proposed for a number of locations along the Offshore Scheme to protect the cable at intersections with other cables or pipeline infrastructure and in areas where burial cannot be achieved. This could provide additional habitat for any existing epifaunal INNS populations, allowing for localised spreading.

4.3.43 Some studies have demonstrated the ability for artificial hard structures to function as artificial rocky reef, which are known to be preferred habitat for many INNS acting as 'ecological stepping stones' (Adams, Miller, Aleynik, & Burrows, 2014). This could facilitate the colonisation and spread of INNS in areas of benthic habitat that may have previously been unsuitable. However, there remain uncertainties surrounding this theory (Coolen, et al., 2020) and the function of artificial structures as 'stepping stones' remains unclear.

4.3.44 Infrastructure associated with cable routes, including cable protection, are usually restricted to a narrow strip along parts of the cable route. Although, there are concerns around introduced substrata providing habitat for INNS, particularly given the substantial growth of marine infrastructure in the North Sea, the available field studies of cables indicate a colonisation of the provided new habitat by endemic, rather than invasive fauna (OSPAR Commission, 2023). Several studies indicate that the risk of the establishment of non-native species on hard substrates in subtidal areas exists, but is lower compared to structures in the intertidal zone (Kuhnz, Buck, Lovera, Whaling, & Barry, 2015; Sherwood, et al., 2016). As subsea cables, and associated protection structures, are almost exclusively proposed to be laid in the subtidal environment, this makes them less prone to colonisation by non-native species (OSPAR Commission, 2023). In addition, to date no spread of INNS has been documented to have been caused by submarine cabling (Taormina, et al., 2018).

4.3.45 The only activities occurring within the intertidal area are located at the Kent Landfall. At this landfall, concrete mattresses will be used at trenchless entry/exit points over an area of 360 m^2. Several INNS are known to be present along the Kent coast, including the carpet sea squirt (*Didemnum vexillum*), Chinese mitten grab (*Eriocheir sinensis*), Pacific oyster (*Magallana gigas*), Japanese wireweed (*Sargassum muticum*), and wakame (*Undaria pinnatifida*) (McKnight, 2024), and as such, concrete mattress installation may provide suitable substrate for colonisation by these species. The offshore scheme passes directly though the Sandwich Bay SAC and occurs 1.1 km from the Thanet Coast SAC. Thanet Coast SAC is designated for chalk reefs which support a unique algal assemblage and subsea caves. Sandwich Bay SAC is designated primarily for dune habitats; however, mudflats are included as part of site description and the boundaries of the site include the intertidal habitats at Pegwell Bay. Their proximity to the Proposed Project presents a likely pathway for potential impact from INNS introduction and as such have been screened in for further assessment.

Disturbance due to thermal emissions

4.3.46 Submarine power cables are known to produce heat during operation. When buried in the seabed this can increase the temperature of surrounding sediment (Emeana, et al., 2016). Such heat has the potential to cause sediment-dwelling and demersal mobile organisms to move away from the affected area. Increased heat may also alter physio-chemical conditions for epifaunal species and bacterial activity (with shifts in bacterial community composition and changes in nitrogen cycling) in surrounding sediments, contributing to altered faunal composition and localised ecological shifts (Meissner, Schabelon, Bellebaum, & Sordyl, 2006; Hicks, et al., 2018).

4.3.47 Sensitivity to the thermal emissions depends on the sensitivity of the species associated with the particular benthic habitats. Sediment particle size composition has been identified as an influence on heat transfer in sediments (Emeana, et al., 2016), with coarser sediments found to experience the greatest temperature change but only to a short distance from the heat source.

4.3.48 The Offshore Scheme is expected to use one bundled cable which would be buried to a target burial depth between 1 m – 2.5 m below the seabed (as per control measure FSF01 in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**). Heat dissipation modelling undertaken for a similar cable installation project (AECOM, 2022) for bundled cables buried at a depth of 1.5 m, indicated that within 500 mm of the seabed surface the increase in sediment temperature was limited to approximately 3°C. However, seawater at the seabed surface will have a cooling effect and will dissipate any temperature increases further. Therefore, as Margate and Long Sands SAC is 2 km from the Offshore Scheme, the site has been screened out of further assessment.

4.3.49 Whilst the sediment surrounding the cable may be heated, there is negligible capability to heat the overlying water column as seawater at the seabed surface will have a cooling effect and will dissipate any temperature increases further reducing any effects on epibenthic communities. Therefore, Thanet Coast SAC has been screened out of further assessment due to the lack of sediment features, as well as Southern North Sea SAC as there is not likely to be an effect on the prey items for the harbour porpoise feature.

Effects of electromagnetic field (EMF) emissions

4.3.50 EMFs may be emitted during the operational phase of the Proposed Project. EMF has potential to disrupt sensory mechanisms in magneto-sensitive and electrosensitive marine species. The worst-case scenario for the Offshore Scheme is two HVDC cables and one fibre optic cable bundled as one in one trench buried to a depth of 1 m to 2.5 m, with field intensities between 53 and 126 µT at the seabed surface. The geometric field would be reduced to background levels within around 8 m from the cable, having only a very localised effect (**Application Document 6.3.4.7.B Appendix 4.7.B Electromagnetic Deviation Study**).

4.3.51 There is very little information about the sensitivity of benthic species to EMF but there have been a small number of experiments undertaken in a laboratory environment. There is evidence from these studies that some benthic invertebrates are able to detect EMF. For example, mussels, shrimp (*Crangon crangon)* and crabs (*Rhithropanopeus harrisii)*, were all exposed to a static B-field of 3,700 µT for three months, and no differences in survival between experimental and control animals were detected (Bochert & Zettler, 2006). Additionally, in another laboratory study of common rag worm (*H. diversicolor*) there was no evidence of avoidance or attraction behaviours at an EMF of 1000 µT (Jakubowska, Urban-Malinga, Otremba, & Andrulewicz, 2019) a much higher intensity than will the emitted by the Offshore Scheme. Moreover, all sites designated for subtidal benthic features are over 1 km from the Offshore Scheme, and thus are screened out of further assessment.

4.3.52 EMF emissions from the cables have the potential to disturb foraging grounds for cetaceans. Species such as harbour porpoise forage on gadoids, and flatfish , and other sandy demersal species (Stone & Tasker, 2006), thus the effects of EMF may indirectly impact on these cetaceans. As the Offshore Scheme passes through the Southern North Sea SAC, there is potential for an indirect likely significant effect on the harbour porpoise feature as a result of EMF; therefore, the Southern North Sea is screened into further assessment.

Decommissioning phase

4.3.53 Following the completion of the Operational phase, the Decommissioning phase will take place. As this work is planned decades into the future, it is not yet known what the exact methodology will be for decommissioning, as this will be based on the best available technology available at the time of decommissioning.

4.3.54 In the years leading up to the end of the Proposed Project's operational life, options for decommissioning will be evaluated through integrated environmental, technical, and economic assessments. The objective in undertaking these assessments will be to minimise the short- and long-term effects on the environment. The level of decommissioning will be based upon the regulations, best practices, and available technology at the time of decommissioning. The principal options for decommissioning include:

- Full removal of the cable; and
- Leaving the cable buried in-situ.

4.3.55 In the event of the full removal of the cable, this would have the potential to cause similar impacts to the Construction Phase of the Proposed Project. Should the cable be left in-situ, there would likely be no impact pathways to European Sites. Thus, as a worst-case scenario, impacts during decommissioning may be of a similar magnitude to Construction Phase activities, depending upon the decommissioning option selected. Therefore, as a worst case, and for the purposes of this assessment, decommissioning impacts are considered to be very similar to construction phase impacts. For example, the scale and locations of any works to remove installed infrastructure (should it ever be required) are expected to be similar to that required for its installation.

4.4 Kent Onshore Scheme

4.4.1 The potential impacts considered in this section are determined by the nature of the scheme, the zones of influence and discussion with stakeholders such as Natural England. They are: direct habitat loss, loss of functionally-linked land, collision risk from the new overhead line, air quality, disturbance and pollution.

Construction phase

Direct habitat loss

4.4.2 The nearest onshore works to any European Site will be the trenchless installation receiving pit west of St Augustine's Golf Club 470m from Thanet Coast & Sandwich Bay SPA/Ramsar site. However, the cable will traverse the SPA/Ramsar in the intertidal environment and this is therefore screened in for appropriate assessment.

Air quality

4.4.3 Thanet Coast & Sandwich Bay SPA and Sandwich Bay SAC are vulnerable to atmospheric nitrogen deposition and lie within 200 m of the A256. The assessment is based on established criteria in the Design Manual for Roads and Bridges, and Natural England published guidance[5]. Sandwich Bay SAC is designated for its sand dune habitat. According to mapping on MAGIC (www.magic.gov.uk) there is no SAC sand dune within 200 m of the A256. Therefore, there will be no air quality impacts on SAC interest features and the SAC can be screened out.

4.4.4 Saltmarsh is the most nitrogen-sensitive supporting habitat for golden plover in Thanet Coast & Sandwich Bay SPA/Ramsar). There is saltmarsh within 200 m of the A256, with the closest area being approximately 75 m from the road. According to Air Pollution Information System (www.apis.ac.uk) golden plover is not sensitive to NOx or ammonia in the atmosphere, or to acid deposition on their saltmarsh habitats. However, golden plover is potentially sensitive to nitrogen deposition on their habitats, although the outcome can be positive as much as negative (potential negative impact on species due to impacts on the species' broad habitat, and potential positive impact on species due to impacts on the species' food supply).

[5] https://publications.naturalengland.org.uk/publication/4720542048845824

4.4.5 There would be a net increase of approximately 280 AADT on the section of the road that passes within 200 m of the Thanet Coast & Sandwich Bay SPA/Ramsar on the A256 Richborough Way (between the Sevenscore and Ebbsfleet Roundabouts). . The impact has been modelled. Worst-case changes in NOx concentrations at the SPA/Ramsar due to the Kent Onshore Scheme are forecast to be 0.04µgm^{-3} or 0.1% of the critical level for NOx. The contribution of the Kent Onshore Scheme to nitrogen deposition rates are an order of magnitude less than NOx and therefore would not show in the modelling, being effectively zero (i.e. less than 0.00 kgN/ha/yr). Ammonia emissions will also be imperceptible since the majority of vehicles will be Heavy Good Vehicles or other diesel vehicles which do not emit ammonia. Moreover, this will be a temporary increase in traffic flows rather than a permanent increase. As with the Suffolk Onshore Scheme assessment, since the Proposed Project would not materially influence long-term nitrogen or acid deposition it would not interfere with the achievement of the air quality 'restore' target for the SPA.

4.4.6 In addition to traffic exhaust emissions, IAQM guidance (Institute of Air Quality Management, 2014) identifies that significant dust soiling can arise on ecological receptors located within 50 m of construction sites. Natural England advice in response to the PEIR HRA suggested that a more precautionary zone of 200 m should be used for HRA purposes. That larger 200 m zone has therefore been used in this HRA. However, there are no surface dust-generating activities within 200 m of any European Sites in Kent.

4.4.7 LSE on Thanet Coast & Sandwich Bay SPA/Ramsar due to atmospheric pollution and dust can therefore be screened out from appropriate assessment.

Disturbance

4.4.8 The bird populations of Thanet Coast & Sandwich Bay SPA/Ramsar are vulnerable to noise and visual disturbance. Disturbance can result from noise, movement, or light. The closest onshore surface construction to the Thanet Coast & Sandwich Bay SPA/Ramsar is the trenchless installation receiving pit west of Saint Augustine's Golf Club, as the trenchless installation at landfall will occur beneath the golf course. The trenchless technique launch pit is located approximately 470 m from the SPA at its closest. As discussed for the Suffolk Onshore Scheme it has been agreed with Natural England regarding this application that a 3 dB change in noise levels compared to the baseline constitutes a likely significant effect. Noise modelling for this application has confirmed that the 3 dB change contour does extend as far as the SPA/Ramsar. See **Appendix E Figure 4 Map of 3 dB change contour at Kent**. Therefore, noise disturbance of Thanet Coast & Sandwich Bay SPA/Ramsar is screened in for appropriate assessment. SPA birds (golden plover) use some land around the onshore cable route. However, since the Minster Converter Station and Substation field will be lost directly no disturbance of significant numbers of golden plover outside the SPA/Ramsar, beyond that which would occur anyway from habitat loss, is expected to occur and therefore disturbance of golden plover in functionally linked land as a specific impact pathway distinct from permanent loss of functionally linked land is screened out.

4.4.9 Disturbance from visual intrusion such as lighting is likely to be most relevant if the works are immediately adjacent to an SPA. The onshore trenchless installation receiving pit is 470 m from the nearest part of Thanet Coast & Sandwich Bay SPA/Ramsar, which is on the opposite side of the golf course. Therefore, no visual disturbance will arise, and this source of impact can therefore be screened out.

4.4.10 The next nearest European Site (Stodmarsh SAC/SPA/Ramsar) is 6.5 km (for the SAC) and 6.9 km (for the SPA/Ramsar) from the Proposed Project at its closest and is therefore well outside any zone for construction-related disturbance.

4.4.11 Therefore, visual disturbance of Thanet Coast & Sandwich Bay SPA/Ramsar and noise and visual disturbance of all other European Sites can be screened out from disturbance impacts associated with the Kent Onshore Scheme.

Pollution

4.4.12 There is a direct potential pathway for pollution of Thanet Coast & Sandwich Bay SPA/Sandwich Bay SAC via Minster Stream and other watercourses that drain into the SPA and SAC, as well as via the trenchless installation launch pit, which would be situated in the subtidal part of the SPA/SAC. There is also an indirect pathway to Stodmarsh SAC/SPA on a rising tide, due to the Proposed Project crossing the River Stour and the SAC/SPA being downstream of the tidal limit on that river.

4.4.13 However, as with Suffolk, the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are European Sites or connect to European Sites.

4.4.14 Therefore, the construction phase on every project must have a duty of care to the water environment and produce and implement plans and procedures to prevent discharge from works entering surface, groundwater, wetlands or coastal waters. For the DCO this is to take the form of a Construction Environment Management Plan (CEMP), which includes measures for the protection of ground and surface waters, pollution prevention measures and an emergency response plan for pollution events.

4.4.15 The water quality protection measures to be implemented for the Proposed Project are set out in **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice**, secured through DCO Schedule 3 Requirement 6, and relevant measures are cited below:

- W02: Have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident.
- W02: The use of all static plant such as pumps in appropriately sized spill trays.
- W02: Prevent refuelling of any plant or vehicle within 15 m of a watercourse.
- W02: Prevent storing of soil stockpiles within 15 m of a main river (16 m where river is tidal).
- W02: Inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids.
- GH05: All materials that could be hazardous to water quality will be stored in suitable areas, more than 8 m away from a watercourse, away from site traffic and in containers which are fit for purpose, meeting the requirements of the Control of Pollution (Oil Storage) Regulations.

- GG14: Fuels, oils and chemicals will be clearly marked as to their contents and stored responsibly, in a secure, bunded area with an impervious base, away from sensitive water receptors.
- GG14: All refuelling, oiling and greasing of construction plant and equipment will take place in an appropriate bunded area that includes an impervious base and where possible interceptor drains. All pumps, generators and similarly fuelled equipment are to be placed on drip trays or in a bunded area and all valves, hoses and associated re-fuelling equipment will be regularly inspected and turned off and securely locked when not in use. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potentially hazardous materials used during construction will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby.
- GG15: Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency).
- GG16: Where required, wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps.
- GG16: Ensure there is an adequate area of hard-surfaced road between the wash facility and the site exit, wherever site size and layout permits.
- W06: Where new or additional impermeable surfacing is required on any access tracks, bellmouths and in compound areas e.g. for parking provision, site offices, Sustainable Drainage Systems (SuDS) will be incorporated, appropriate to the existing ground conditions, with infiltration to ground preferred where conditions are suitable.
- W11: Surface water drainage from permanent above ground infrastructure would be managed and treated using sustainable drainage systems (SuDS) in accordance with policy and guidance requirements of the relevant Lead Local Flood Authorities.

4.4.16 As such, it is considered that new infrastructure can be constructed in a way to prevent pollution to the water environment to ensure no AEoSI from water pollution on any European Site. However, the trenchless installation will traverse Thanet Coast & Sandwich Bay SPA/Ramsar site and Sandwich Bay SAC. Therefore pollution impacts from any frac out are taken forward to Appropriate Assessment.

Operational phase

Loss of functionally-linked land

4.4.17 Although loss of functionally linked land will commence during the construction period it is a permanent impact and is therefore discussed in the operational section of this HRA. Stodmarsh SPA/Ramsar site is located 6.9 km west of the Proposed Project at its closest point. However, none of the long-distance foraging/roosting geese or swan species identified in Natural England guidance ('Impact Risk Zones Guidance Summary: Sites of Special Scientific Interest Notified for Birds. Version 1.1') are identified as being species for which the SPA or Ramsar site is specifically designated. Therefore, the SPA/Ramsar is located too far from the Kent Onshore Boundary for functionally-linked land associated with the SPA/Ramsar to be affected and is thus screened out of further assessment.

4.4.18 Golden plover is the only species for which Thanet Coast & Sandwich Bay SPA/Ramsar site is designated that makes significant use of farmland for roosting and foraging. Unpublished guidance from Natural England ('Impact Risk Zones Guidance Summary: Sites of Special Scientific Interest Notified for Birds. Version 1.1') indicates that 'pylons and overhead cables' could significantly affect wintering golden plover up to 5 km from the sites for which they are a qualifying feature.

4.4.19 The first season (2022-23) of wintering bird surveys undertaken for the Proposed Project recorded a flock of 370 golden plover (more than 1% of both the SPA population and the latest Wetland Bird Survey counts) flying over the railway line between the proposed Minster Convertor Station and fields to the west, on a single survey visit in December 2022. No repeat of this level of activity was recorded in other months or during the 2023-24 non-breeding bird survey, including during nocturnal surveys which would have detected any greater activity at night than during the day. Smaller flocks of golden plover (maximum of 13 individuals) were recorded in December 2023 and January 2024 in the fields north of the proposed Minster Converter Station and Substation, where the construction compounds (K01 and K02) would be situated and this marginally exceeds 1% of the SPA/Ramsar population of the species.

4.4.20 Notwithstanding the fact that a large flock of golden plover were only recorded once, it is assumed for the purposes of this assessment that the Minster Converter Station field, which will be entirely lost to wintering waterfowl and waders, does constitute functionally-linked land for golden plover associated with Thanet Coast & Sandwich Bay SPA/Ramsar; albeit not functionally-linked land of highest importance.

4.4.21 As part of the Kent Onshore Scheme there will be an HVAC connection, by overhead line, from the existing Richborough to Canterbury 400 kV overhead line to the proposed Minster Substation. This will be made via a new section of double overhead line of approximately 1 km in length. The proposed new section of overhead line would be routed to the northeast from the existing Richborough to Canterbury overhead line, crossing the River Stour and a section of the railway, and connecting to the proposed Minster 400 kV Substation. There are already powerlines crossing the River Stour approximately 1 km to the west of the proposed new overhead line, but the Proposed Project would increase the number of powerlines crossing the river. There would be a potential effect of displacement (and thus effective loss of functionally-linked land) if birds avoid the new section of overhead powerline and surrounding area.

4.4.22 It is considered that LSE on Thanet Coast & Sandwich Bay SPA/Ramsar site due to loss of functionally-linked land for golden plover cannot be screened out. This impact is therefore taken forward to appropriate assessment.

Collision risk

4.4.23 As discussed earlier, part of the Kent Onshore Scheme will include a HVAC connection across the River Stour by overhead line, from the existing Richborough to Canterbury 400 kV overhead line to the proposed Minster Substation and proposed Minster Converter Station. The main sources of potential risk to birds from the presence of overhead lines are:

- Mortality of injury through collision with overhead lines (including conductors and earth wires) or supporting structures; and
- Mortality through electrocution on transmission lines or supporting structures.

4.4.24 The principal factors affecting the risk of bird mortality through collision and electrocution are:

- Species specific morphology, biology and vision;
- Landscape and topography (e.g., siting of OHLs near important habitats or flyways);
- Weather affecting flight capability or visibility (strong winds/fog/heavy rain); and
- Technical aspects of the transmission line (spacing of conductors, creation of perches).

4.4.25 Earth wires are thought to be responsible for a much higher rate of collisions than the thicker, often bundled conductor wires. Earth wires are harder for birds to see, being thinner in diameter and typically positioned at the top of the wire array. Birds trying to gain height to avoid the larger more visible conductor wires may fail to see the earth wire.

4.4.26 Based on surveys during winter 2022-2023 the only bird associated with Thanet Coast & Sandwich Bay SPA likely to be present in the broad proximity of these overhead lines would be golden plover. A significant assemblage (370 birds) was recorded on a single survey visit in December 2022, utilising flooded fields north-east of the River Stour. Golden plover has an inherently low risk of colliding with overhead lines as the species is small and manoeuvrable. There are few, if any, records of collision mortality for this species.

4.4.27 However, the River Stour may also be a migration corridor for non-breeding birds travelling to and from Stodmarsh SPA/Ramsar, approximately 8.4 km to the west of the location of the new overhead lines crossing the river. Bittern, shoveler, gadwall, hen harrier, mallard, wigeon, pochard, tufted duck, snipe, water rail, and lapwing are all referenced within the SPA citation assemblage. Any birds flying along the river to reach Stodmarsh must already cross one set of powerlines spanning the river, but the presence of a second set potentially increases collision risk for vulnerable species.

4.4.28 Therefore, the potential for collision risk associated with species travelling to Stodmarsh SPA/Ramsar is screened in for appropriate assessment.

Disturbance

4.4.29 Once the Proposed Project is operational there will be limited requirement for day-to-day presence of people (typically two individuals at any time), and the infrastructure would not produce sounds that would result in disturbance of birds. Operational noise has been modelled and it has been determined that the 3dB screening contour for potential disturbance would not intersect with any European Sites or areas of functionally linked land. See **Appendix E Figure 4 Map of 3dB change contour at Kent**.

4.4.30 The only potential for disturbance would therefore be during maintenance. It is impossible to forecast exactly when or how often maintenance crews may need to visit parts of the site. However, maintenance visits are likely to be infrequent and for short periods and will be much smaller in scale than construction. Given the area is an active agricultural landscape, with tractors, agricultural workers and other mobile plant present as a matter of course, it is considered that maintenance crews and activities would not constitute a material change to this background level of activity.

4.4.31 Four ducts would be installed as part of the trenchless installation, one more duct would be installed than for the terrestrial HVDC underground cables to allow for a spare. Should a section of cable need to be replaced at the landfall, this spare duct would allow for a new section of cable to be pulled through rather than a repair to the existing or needing to reinstall ducts. LSE as a result of operation disturbance on all European Sites is therefore screened out.

Air quality

4.4.32 It is understood that the Minster Converter Station and Substation site will be connected to the existing Distribution Network Operator system to provide an electricity supply to the sites, both temporarily during construction and permanently for operation. However, as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**, a back-up diesel generator is proposed at each of Minster Substation and Converter Station during the operational phase. For the purposes of the assessment in **Application Document 6.2.3.8 Part 3 Kent Chapter 8 Air Quality** a study area of up to 200 m from the Minster Converter Station and Substation boundary is considered appropriate. Beyond this distance it is judged that the effect of any emissions on local air quality would have no potential to be significant.

4.4.33 The generators will be operated during routine maintenance activities, which is likely to be every 1 –3 months. They may also be required during emergency scenarios. These backup generators are rarely used and have less than a 1% chance of operating per year. As the back-up generators are likely to run just 1% of the time and emissions are likely to be lower, the maximum annual PC is likely to be in the order of 0.05 µg/m³ from each generator, at the nearest sensitive ecological receptor (the Weather Lees Hill woodland component Sandwich Bay to Hacklinge Marshes SSSI), which is well below 1% of the critical level. This would not be visible in modelling when translated to nitrogen deposition. Given the distance of these generators from Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC (at least 1 km) NOx and nitrogen deposition within the European Sites will not be elevated at all. Therefore LSE on Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC can be ruled out.

Pollution

4.4.34 As with Suffolk, the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are European Sites or connect to European Sites.

4.4.35 Therefore, during maintenance, National Grid has a duty of care to the water environment and will produce and implement plans and procedures to prevent discharge from works entering surface, groundwater, wetlands or coastal waters. This is usually undertaken in the form of an Environmental Management Plan which includes measures for the protection of ground and surface waters, pollution prevention measures and an emergency response plan for pollution events. Specifically, the Minster Converter Station and Substation will be served with drainage systems that embed SuDS for attenuation of runoff to green field runoff rates in line with the requirements of the receiving watercourse authorities (Internal Drainage Board, Environment Agency or Lead Local Flood Authority and provide treatment of runoff (shown in **Application Document 2.14.2 Indicative General Arrangement Plans - Kent**). These are secured by commitment W11 in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**.

4.4.36 Surface water drainage from permanent access routes and the proposed Converter Station and Substation site would pose a low risk of contamination given the SuDS treatment measures proposed, which are described in commitment W11 of **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** and secured through the DCO Schedule 3 Requirement 6**.**

4.4.37 On the basis of the types of maintenance activities that are envisaged, described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**, and given the control measures that maintenance activities would be subject to (GG05, GG28, GH05, W09), which are described in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**, and secured through DCO Schedule 3 Requirement 6, no LSE on the water environment would arise.

4.4.38 As such, it is considered that maintenance of the new infrastructure (where required) can be designed in a way to prevent pollution to the water environment to ensure no AEoSI from water pollution on any European Site. LSE as a result of operational pollution can therefore be screened out for all European Sites.

Decommissioning phase

4.4.39 For the purposes of this assessment decommissioning impacts are considered to be very similar to construction phase impacts. As such, the impact pathways for the Construction phase that have been screened in for assessment of LSE are therefore automatically also screened in for the decommissioning phase. No additional European Sites or impact pathways, specifically associated with the decommissioning phase have been identified for further assessment.

5. Other plans and projects

5.1.1 It is a legal requirement to consider the impacts of the Proposed Project 'in combination' with other plans and projects. This section discusses other relevant plans and projects that could occur simultaneously with the Proposed Project. The relevance of these projects has been identified based on the scale of development, timeframe, and location, and thus the potential for similar impacts on the same European Sites.

5.1.2 The methodology used to identify the other plans and projects to be included in the in combination assessment is identical to that used for the Environmental Statement Cumulative Effects Assessment and is presented in **Application Document 6.3.1.5.A Cumulative Effects Assessment Methodologies**. All the potential 'in combination' effects discussed below would be construction or decommissioning phase impacts on the European Sites mentioned below.

5.1.3 Once the other schemes being considered 'in combination' are operational the only potential for in combination effects would be if they required maintenance simultaneously. Even if they did, the number of crews and location would not result in significant disturbance in a working agricultural landscape. Similarly, due to the Proposed Project's location in the heavily trafficked Thames Estuary and temporary nature of any works during operation, any overlap in maintenance in the offshore environment would not result in significant disturbance. Note that Nautilus Interconnector will now make landfall at Isle of Grain and therefore only offshore elements will be considered for in combination effects.

5.2 Suffolk Onshore Scheme

5.2.1 The Suffolk Onshore Scheme was determined to have potential for LSE alone during construction for the impact pathways of loss of functionally-linked land and dust emissions. It was also determined to have potential for LSE alone due to construction disturbance, except with regard to Outer Thames Estuary SPA. Therefore, there will also be potential for LSE 'in combination' with other projects through these 'screened in' pathways of impact.

5.2.2 No LSEs would arise from disturbance on Outer Thames Estuary SPA due to the distance between the SPA and the trenchless installation compound meaning the 3dB contour would not overlap. There is therefore no scope for LSE of the Suffolk Onshore Scheme in combination with other plans or projects on this European Site from this impact pathway. The Stage 1 screening concluded that the Suffolk Onshore Scheme would not result in any direct habitat loss from European Sites and therefore poses no risk of in combination effects through this pathway.

5.2.3 It was also determined not to result in LSE through construction vehicle exhaust emissions because the very small number of annual average vehicle movements forecast (8 AADT) is a negligible change that is well within normal variation in vehicle movements and would not be visible in air quality modelling, and being temporary would not influence long-term nitrogen deposition. For these reasons, there is no potential for any LSE in combination with other projects.

5.2.4 No LSEs would arise to European Sites from the Suffolk Onshore Scheme from aquatic pollution (spillages and runoff) because of the controls embedded in the project to comply with other legislation (unrelated to European Sites) that makes it an offence to pollute watercourses. The acceptable pollutant concentrations which these embedded measures are set to achieve are specifically intended to capture the cumulative impact of many projects over a catchment. Therefore their implementation will ensure no LSE will result from the Suffolk Onshore Scheme 'in combination' with other projects.

5.2.5 Moving to operation, the Suffolk Onshore Scheme was determined not to result in LSE alone because of distance of the Saxmundham Converter Station and Minster Substation from the nearest European Sites (3 km) and absence of connecting impact pathways. Since there are no connecting impact pathways there is no mechanism for the operational Suffolk Onshore Scheme to have a likely significant effect 'in combination' with other projects.

5.2.6 In summary, the Suffolk Onshore Scheme is likely to result in significant effects 'in combination' with other projects for the impact pathways of construction phase loss of functionally-linked land, dust emissions, and disturbance. Each relevant project that could have effects 'in combination' with the Suffolk Onshore Scheme is discussed below.

LionLink Interconnector

5.2.7 NGV is developing plans for the LionLink (formerly known as 'EuroLink') Interconnector. This is a multi-purpose interconnector (MPI) that would supply around 1.8 gigawatts of clean electricity, enough to power approximately 1.8 million homes. It is intended to enable electricity to flow between the UK and The Netherlands and would also connect to offshore wind generation in the North Sea. There is no detailed ecological impact assessment in the public domain at the time of writing, and the the Planning Inspectorate website notes that an application is expected in late 2025.

5.2.8 As with the Proposed Project the current intention is for landfall to be made at the Suffolk coast, although further north than the Proposed Project, near Walberswick. The offshore cable would traverse Outer Thames Estuary SPA and Southern North Sea SAC. As such there is potential for it to have similar impacts to the Proposed Project. However, since the development of LionLink is running up to 12 months behind the Proposed Project these impacts are unlikely to arise simultaneously. Terrestrial impact pathways that may arise from LionLink are similar to those of the Proposed Project and therefore include disturbance of birds associated with Sandlings SPA, and loss of functionally linked habitat for nightjar and woodlark from Sandlings SPA and for white-fronted goose associated with Minsmere-Walberswick SPA.

5.2.9 Disturbance of Sandlings SPA could arise if the two projects cause noise levels exceeding the 3dB screening threshold agreed with Natural England, during the nightjar and woodlark nesting season. Functionally-linked land impacts on Sandlings SPA could also arise if both schemes result in loss of high quality foraging/nesting habitat (i.e. acid grassland) over the same timetable. Disturbance and loss of functionally-linked land 'in combination' effects are therefore screened in and discussed in the Appropriate Assessment.

5.2.10 There will be no loss of significant functionally-linked land for white-fronted goose from Minsmere-Walberswick SPA/Ramsar due to the Proposed Project, or any other non-breeding birds for which nearby SPAs are designated. Noise could affect the adjacent North Warren RSPB Reserve, which does support the species, but modelling for the Proposed Project has shown that this can be confined to a small area immediately east of the old railway line and thus not affect areas of value for white-fronted goose or other SPA species (teal and shoveler) found at more than 1% of SPA populations in the reserve.

5.2.11 Effects 'in combination' cannot be screened out at this stage and will therefore be considered further in the appropriate assessment.

East Anglia ONE North Offshore Wind Farm

5.2.12 Scottish Power Renewable's East Anglia ONE North Project has been consented but is not yet operational. The cable will make landfall north of Thorpeness and then connect to the proposed Friston Substation. The offshore cable will traverse Outer Thames Estuary SPA and Southern North Sea SAC and the array will be located within Southern North Sea SAC. Given the East Anglia ONE project was consented in 2022, it is possible it will have been constructed by the time construction starts on the Proposed Project. However, there is potential for it to have similar impacts to the Proposed Project, over a similar timetable.

5.2.13 As with the Proposed Project and LionLink Interconnector, the current intention is for landfall to be made at the Suffolk coast, although the cable route would not come through the same corridor as the Proposed Project, or LionLink. However, there is potential for it to have similar 'in combination' effects with the Proposed Project as those of the other two schemes, over a partially overlapping timetable.

5.2.14 As with Lion Link, therefore, disturbance of Sandlings SPA could arise if the three projects (LionLink, East Anglia ONE and the Proposed Project) cause noise levels exceeding the 3 dB change threshold agreed with Natural England, during the nightjar and woodlark nesting season. Functionally-linked land impacts on Sandlings SPA could also arise if both schemes result in loss of high quality foraging/nesting habitat (i.e. acid grassland) over the same timetable.

5.2.15 Disturbance and loss of functionally-linked land 'in combination' effects with this project are therefore screened in and discussed in the Appropriate Assessment.

East Anglia TWO Offshore Wind Farm

5.2.16 Scottish Power Renewable's East Anglia TWO Project has been consented but is not yet operational. East Anglia ONE North and TWO are discrete projects with separate DCOs; however, they have the same landfall location, share an onshore cable route and include the development of the Friston Substation. same corridor as the Proposed Project, East Anglia ONE, or LionLink. However, there is potential for it to have similar in combination effects with the Proposed Project as those other three schemes, over a partially overlapping timetable. Given that the onshore elements of the project are identical to East Anglia ONE North, the potential for likely significant effects is also identical.

5.2.17 Disturbance and loss of functionally-linked land 'in combination' effects with this project are therefore screened in and discussed in the Appropriate Assessment.

Saxmundham to Peasenhall Water Mains Installation and Saxmundham South Garden Neighbourhood

5.2.18 The Saxmundham to Peasenhall Water Mains installation is located 6.97 km from the Suffolk Onshore Scheme and involves the installation of a 250 mm diameter pipeline running 7.7 km between Lodgewood Water Tower, Peasenhall to Saxmundham Water Tower. The Saxmundham South Garden overlaps with the Suffolk Onshore Scheme and comprises a 44 ha site which will include 800 dwellings, a new primary school, community facilities and employment land along with the provision of green infrastructure and open space.

5.2.19 It has been confirmed through two years of wintering bird surveys that the Suffolk Onshore Scheme Boundary does not support a significant population of non-breeding birds associated with Minsmere-Walberswick SPA or Alde-Ore Estuary SPA. Loss of functionally-linked habitat associated with either SPA will therefore not arise.

5.2.20 Both these Saxmundham projects are in a similar location to the Suffolk Onshore Scheme and will potentially involve disturbance of nesting nightjar associated with Sandlings SPA, or non-breeding birds associated with Minsmere-Walberswick SPA or Alde-Ore Estuary SPA, depending on details of works footprint and timing of works.

5.2.21 These projects are therefore screened in for appropriate assessment.

Town Farm Solar Farm and UKZ139 BC Wissett Solar Farm

5.2.22 Both developments lie within 10 km of Minsmere-Walberswick SPA and thus within the zone that white-fronted goose could be travelling through to roost or forage away from the SPA. Potentially significant habitat loss impacts may therefore arise for non-breeding birds associated with the SPA.

5.2.23 However, it has been confirmed through two years of wintering bird surveys that the Suffolk Onshore Scheme Boundary does not support a significant population of non-breeding birds associated with Minsmere-Walberswick SPA or Alde-Ore Estuary SPA. Loss of functionally-linked habitat associated with either SPA will therefore not arise.

5.2.24 Therefore, there will be no potential for ‘in combination’ effects and these developments are considered no further in this report.

5.3 Offshore Scheme

5.3.1 The Offshore Scheme was determined to have the potential for LSE alone during construction for the impact pathways of temporary physical disturbance and permanent loss of benthic habitats and species and disturbance due to thermal emissions. Therefore, it is likely to also result in significant effects ‘in combination’ with other projects through these ‘screened in’ pathways of impact.

5.3.2 The Stage 1 screening concluded that the Offshore Scheme would not result in any temporary physical disturbance to benthic habitats and species features of European Sites and therefore poses no risk of in combination effects through this pathway.

5.3.3 Similarly, the Offshore Scheme was determined not to result in any permanent loss of benthic habitats and species features of European Sites and therefore poses no risk of in combination effects through this pathway.

5.3.4 Moreover, the Offshore Scheme was determined not to result in LSE through disturbance from thermal effects as any thermal effects would be limited and localised to the cable, leading to no LSE on qualifying features of European Sites. For these reasons, there is no scope for any LSE in combination with other projects.

5.3.5 In summary, the Suffolk Onshore Scheme will result in LSE 'in combination' with other projects for the impact from temporary increases in SSC, effects from changes to marine water quality from the use of drilling fluids, underwater noise impacts, the introduction and spread of INNS, vessel collision risk impacts, airborne sounds and visual disturbance impacts, potential for indirect effects through impacts to prey species, and effects of EMF emissions. Each relevant project that could have effects 'in combination' with the Offshore Scheme is discussed below.

Sizewell C Nuclear Power Station

5.3.6 This is the expansion of the Sizewell nuclear licence site north of Sizewell B Nuclear Power Station. This will accommodate two new European pressurised reactors with a 3.2 GW electricity generation capacity.

5.3.7 The DCO application for Sizewell C was made by the Secretary of State in 2022 (The Planning Inspectorate, 2022), with a HRA submitted as part of the application.. Based on the location of the project, there is potential for 'in combination' effects on the ornithology features of Outer Thames Estuary SPA.

5.3.8 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

NeuConnect Interconnector

5.3.9 This is a proposed 1.4GW capacity offshore multipurpose interconnector project from Wilhemshaven, Germany to the Isle of Grain, Kent developed by Meridam, Allianz Capital and Kansai Electric Power. This project aims to be the first energy connection between the UK and Germany in order to transfer energy between the two countries and increase grid capacity for increased electricity demand and supply from offshore wind assets. The offshore aspects of this development are the HVDC subsea cable and cable landfall location.

5.3.10 An Environmental Appraisal Report was written in 2020. Due to the location of the offshore aspects of the NeuConnect project, the HVDC subsea cable and cable landfall location, there is potential for 'in combination' effects on the ornithology features of Outer Thames Estuary SPA, benthic features of Margate and Long Sands SAC, and harbour porpoise features of Southern North Sea SAC.

5.3.11 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

GridLink Interconnector

5.3.12 This is a proposed 1.4 GW capacity offshore project from Dunkerque, France to Kingsnorth, Kent developed by iCON Infrastructure LLP, aims to transfer energy between UK and France. Additionally, it aims to improve grid capacity for increases in offshore wind electricity generation. The offshore, coastal, and intertidal components of the project will consist of HVDC subsea cable and landfall location.

5.3.13 A Marine Environmental Report was completed in 2021. Due to the location of the offshore aspects of the GridLink project, HVDC subsea cable and landfall location, there is potential for 'in combination' effects on benthic features of Margate and Long Sands SAC, and the harbour porpoise feature of Southern North Sea SAC.

5.3.14 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

North Falls Offshore Windfarm

5.3.15 The main Offshore Wind Array for the North Falls Offshore Windfarm will be located off the Essex and Suffolk coastline and has been developed by SSE and RWE. The wider array will be split over two separate arrays cumulatively consisting of 71 wind turbine generators across a 150 km^2 area. The maximum wind turbine height will be 397 m above Mean High Water Spring (MHWS) and will be supported by either monopile, pin pile, suction caisson, or Gravity Base Structure foundations.

5.3.16 The DCO application was submitted to the Planning Inspectorate in July 2024, with construction proposed to commence in 2025/2026 under the current programme.. Due to the location of the offshore aspects of the project, HVDC subsea cable and landfall location, there is potential for 'in combination' effects on benthic habitat features of Margate and Long Sands SAC, and the marine mammal features of Southern North Sea SAC, Humber Estuary SAC, The Wash and North Norfolk Coast SAC.

5.3.17 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

East Anglia ONE North Offshore Windfarm

5.3.18 This will be a 208 km^2 wind farm developed by Scottish Power Renewables consisting of 67 turbines with a combined electricity generation capacity of 800 MW, an extension of the existing East Anglia ONE array It is part of the East Anglia Hub which includes three arrays off the coast of Suffolk.

5.3.19 This project has been consented but is not yet operational. The cable will make landfall north of Thorpeness and then connect to the proposed Friston substation. The offshore cable will traverse Outer Thames Estuary SPA and Southern Sea SAC and the array will be located within Southern North Sea SAC.

5.3.20 Given this project was consented in 2022, it is possible it will have been constructed by the time construction starts on the Proposed Project. However, there is potential for it to have similar impacts to the Proposed Project, over a similar timetable. This may therefore need to be considered in the 'in combination' assessment for the DCO. There is potential for 'in combination' effects on ornithology features of Outer Thames Estuary SPA, including the red-throated diver, and harbour porpoise of Southern North Sea SAC.

5.3.21 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

East Anglia TWO Offshore Windfarm

5.3.22 A proposed 255 km^2 wind farm developed by Scottish Power Renewables consisting of 75 turbines. Each turbine will have an electricity generation capacity of 19MW and 22m high.

5.3.23 Scottish Power's East Anglia TWO project has been consented but is not yet operational. East Anglia ONE North and TWO are discrete projects with individual DCOs; however, they share a portion of the offshore cable corridor, have the same landfall location, and share an onshore cable route.

5.3.24 Given this project was consented in 2022, it is possible it will have been constructed by the time construction starts on the Proposed Project. However, there is potential for it to have similar impacts to the Proposed Project, over a similar timetable. This may therefore need to be considered in the 'in combination' assessment for the DCO. There is potential for 'in combination' effects on ornithology features of Outer Thames Estuary SPA, including the red-throated diver, and harbour porpoise of Southern North Sea SAC.

5.3.25 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

East Anglia THREE Offshore Windfarm

5.3.26 A proposed 370 km^2 wind farm developed by Scottish Power Renewables (SPR) and Vattenfall consisting of 120 to 240 wind turbines with a combined electricity generation capacity of 1200MW. It is part of the East Anglia Hub which includes three arrays off the coast of Suffolk, with the East Anglia THREE array being 79 km from Lowestoft, Suffolk. All wind turbines are located in a water depth of 35 m to 45 m.

5.3.27 Consent for the project was received in August 2017 and construction commenced in July 2022. Therefore, there is potential for 'in combination' effects on ornithology features of Outer Thames Estuary SPA, including the red-throated diver, and harbour porpoise of Southern North Sea SAC.

5.3.28 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

Nautilus Offshore Interconnector

5.3.29 This is a 1.4 GW capacity connection between Belgium with the UK being developed by NGV. The aim will be to increase transfer in offshore wind electricity generation and improve grid capacity in both countries to achieve this. The offshore aspect of the development includes subsea HVDC connecting the Belgian landfall with the UK and Offshore HVDC converter platform.

5.3.30 NGV have recently sought to connect into the Grain Substation at the Isle of Grain in Medway, a proposed approach that was agreed by Ofgem as part of its Initial Project Assessment (IPS) published in November 2024. Although it is understood that the proposed connection agreement for connection to the proposed Friston substation has not yet been cancelled, this is likely to happen in 2025.

5.3.31 Whether the Nautilus project pursues the proposed connection to the Isle of Grain, or reverts to the Friston connection site (though this is considered to be highly unlikely), it will need to cross the Offshore Scheme in the offshore environment traversing both Outer Thames Estuary SPA and Southern North Sea SAC.

5.3.32 There is no detailed ecological impact assessment in the public domain at time of writing, but the Planning Inspectorate website notes than an application is expected in 2028. If the project does make landfall at Isle of Grain, there is potential for it to have impacts on ornithology features of Outer Thames Estuary SPA and the harbour porpoise feature of Southern North Sea SAC, over a similar timetable. This will therefore need to be considered in the 'in combination' assessment for the DCO.

5.3.1 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

Five Estuaries Offshore Windfarm

5.3.2 This is a proposed 149 km^2 wind farm, 37 km off the Suffolk Coast is being developed. The array consists of 79 turbines with a combined electricity generation capacity of 50 GW. Each turbine will be between 397 m high.

5.3.3 The DCO application was submitted to the Planning Inspectorate in March 2024 and accepted for examination on 22 April 2024. Construction is due to commence in 2027 with full operation in 2030 under the current schedule (Five Estuary Wind Farm Ltd , 2020). Due to the location of the offshore aspects of the project, HVDC subsea cable and landfall location, there is potential for 'in combination' effects on benthic habitat features of Margate and Long Sands SAC, ornithology features of Outer Thames Estuary SPA, Alde-Ore Estuary SPA / Ramsar, and the marine mammal features of Southern North Sea SAC, Humber Estuary SAC, The Wash and North Norfolk Coast SAC. This will therefore need to be considered in the 'in combination' assessment.

5.3.4 Effects 'in combination' cannot be screened out at this stage and this project will therefore need to be considered in the 'in combination' assessment.

LionLink Offshore Interconnector

5.3.5 This is a 1.8 GW connection between the Netherlands and the UK is being developed. The aim is to increase transfer in offshore wind electricity generation and improve grid capacity in both countries. The offshore aspect of the development includes subsea HVDC connecting the Belgian landfall with the UK landfall in Suffolk and Offshore HVDC converter platform.

5.3.6 There is a lack of available information regarding this project, thus, following a precautionary approach, effects 'in combination' cannot be screened out at this stage.

NEMO Link

5.3.7 Nemo Link is a 1 GW HVDC submarine interconnector connecting Richborough Energy Park in Kent, UK to Zeebrugge, Belgium via two 130 km HVDC subsea cables. The UK landfall is situated in Richborough, Kent with the subsea cables running through Pegwell Bay, intersecting the Offshore Scheme at KP113.1.

5.3.8 As this project has been operational for several years, it does not fit into the criteria for in combination development set out in the Planning Inspectorate's Advice on Habitats Regulations Assessments. However, it has been added into the in combination assessment at the request of Natural England. Therefore, effects 'in combination' are screened into further assessment.

Thanet Offshore Windfarm

5.3.9 This development has been added in following Statutory Consultation with Stakeholders.

5.3.10 Constructed Thanet Offshore Windfarm is located approximately 11 km off the coast of Thanet district in Kent, England. The windfarm covers an area of 35 km^2, and at the closest point sits 0.6 km^2 from the Offshore Scheme. The Thanet Offshore Windfarm export cables intersect the Offshore Scheme on approach to the Kent Landfall, at KP 107.594 and KP 107.647. Planning permission for the project was granted in 2006 with the windfarm officially opening in 2010.

5.3.11 Red-throated diver has been identified as a sensitive receptor for both Thanet Offshore Windfarm and the Proposed Project. Therefore, following a precautionary approach, effects 'in combination' cannot be screened out at this stage.

London Array Offshore Windfarm

5.3.12 This development has been added in following Statutory Consultation with Stakeholders.

5.3.13 London Array offshore windfarm, lying 1.2 km to the west of the Proposed Project Offshore Scheme, covers an area of 122.5 km^2. The Project consists of 175 turbines. This also includes the Blue Transmission London Array export cable, approximately 8.3 km from the Offshore Scheme boundary. This windfarm export cable does not cross the Offshore Scheme boundary. Construction of phase 1 of the wind farm began in 2011 and inaugurated in 2013.

5.3.14 Red-throated diver has been identified as a sensitive receptor for both London Array Offshore Windfarm and the Proposed Project. Therefore, following a precautionary approach, effects 'in combination' cannot be screened out at this stage.

5.4 Kent Onshore Scheme

5.4.1 The Kent Onshore Scheme was determined to be likely to result in significant effects alone during construction for the impact pathway of direct habitat loss because it will traverse Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC. LSEs were also determined likely to arise from construction disturbance due to the 3 dB contour overlapping with the Thanet Coast & Sandwich Bay SPA/Ramsar site. Therefore, it will also have the potential to result in LSE 'in combination' with other projects through these 'screened in' pathways of impact.

5.4.2 The Kent Onshore Scheme was determined not to result in LSE through construction vehicle exhaust emissions because the impact is not visible in air quality modelling, and being temporary would not influence long-term nitrogen deposition. For these reasons, there is no scope for any LSE in combination with other projects.

5.4.3 No LSEs would arise to European Sites from the Kent Onshore Scheme from aquatic pollution (spillages and runoff) because of the controls embedded in the project to comply with other legislation (unrelated to European Sites) that make it an offence to pollute watercourses. The acceptable pollutant concentrations which these embedded measures are set to achieve are specifically intended to capture the cumulative impact of many projects over a catchment. Therefore, their implementation will ensure no LSE will result from the Suffolk Onshore Scheme 'in combination' with other projects.

5.4.4 Moving to operation, the Kent Onshore Scheme was determined not to result in LSE alone on Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC from disturbance or air quality impacts of the generators required for emergency situations, because of the distance from the Minster Converter Station and Substation (approximately 1 km). Since there are no connecting impact pathways there is no mechanism for the operational Kent Onshore Scheme to have a likely significant effect 'in combination' with other projects.

5.4.5 The Kent Onshore Scheme was determined to be likely to result in significant effects alone due to collision risk for birds associated with Stodmarsh SPA/Ramsar site upstream. However, there are no other projects proposing new overhead lines downstream of Stodmarsh SPA/Ramsar and therefore no potential exists for 'in combination' effects with other projects. The Kent Onshore Scheme was determined to have the potential for r LSE alone with regard to loss of functionally-linked land for golden plover associated with Thanet Coast & Sandwich Bay SPA/Ramsar and collision risk for birds associated with Stodmarsh SPA/Ramsar site upstream..

5.4.6 Therefore, in summary, the Kent Onshore Scheme is likely to result in significant effects 'in combination' with other projects for one impact pathway: operational phase loss of functionally-linked land (for which a likely significant effect alone had already been identified. Each relevant project that could have effects 'in combination' with the Kent Onshore Scheme is discussed below.

Manston Airport

5.4.7 fGiven that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. The expansion of Manston Airport has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, and is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Residential Development, Canterbury Road, Ramsgate, Kent

5.4.8 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Canterbury Road has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Land On the North East Side of Nash Road

5.4.9 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Land On the North East Side of Nash Road has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Land North and East of Canterbury Road

5.4.10 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Land North and East of Canterbury Road has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Land South of Westgate and Garlinge

5.4.11 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Land South of Westgate and Garlinge has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Land on South Side of Manston Court Road and West Side of Haine Road

5.4.12 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Land on South Side of Manston Court Road and West Side of Haine Road has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Land on the North West and South East Sides of Shottendane Road

5.4.13 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Land on the North West and South East Sides of Shottendane Road has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Spitfire Green

5.4.14 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. Residential development at Spitfire Green has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Stonelees Golf Course Expansion

5.4.15 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. The expansion of Stoneless Golf Course has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Richborough Energy Park

5.4.16 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. The Richborough Energy Park project has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

Goshall Valley Solar Farm

5.4.17 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. The Goshall Valley Solar Farm project has the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given it is also located within 5 km of the SPA. Effects 'in combination' cannot be screened out at this stage.

6. Conclusion of Likely Significant Effects

6.1.1 A Stage 1 screening test of LSE has been undertaken for relevant European Sites and their qualifying features for the following impact pathways listed below. The sections which follow (paragraph 7.2 to 7.5) summarise the impact pathways and the European Sites to which they relate, which have been screened in for Stage 2 Appropriate Assessment. :

Construction/Decommissioning

- Direct habitat loss.
- Air quality.
- Loss of functionally-linked habitat.
- Disturbance (noise and visual including lighting).
- Pollution.
- Temporary physical disturbance to subtidal benthic habitats and species.
- Permanent loss of subtidal benthic habitats and species.
- Temporary increase in SSC.
- Changes to water quality.
- Introduction and spread of INNS.
- Underwater noise.
- Vessel collision risk.
- Airborne sounds and visual disturbance.

Operation

- Disturbance (noise and visual).
- Pollution.
- Collision risk (Kent overhead line only).
- Temporary physical disturbance to subtidal benthic habitats and species.
- Permanent loss of subtidal benthic habitats and species.
- Temporary increase in SSC.
- Introduction and spread of INNS.
- Underwater noise.
- Vessel collision risk.
- Airborne sounds and visual disturbance.
- Effects of EMF emissions.

- Thermal emissions.

6.2 Suffolk Onshore Scheme

6.2.1 The following impact pathways have been screened in for Appropriate Assessment:

- Dust impacts on nightjar and woodlark associated with the Sandlings SPA, since a construction compound and trenchless drive compound will be within 20 m of the SPA.
- Construction/decommissioning phase noise and visual disturbance of nesting woodlark and nightjar at Sandlings SPA, and wintering birds using functionally-linked land for Alde Ore Estuary SPA/Ramsar, is screened into Appropriate Assessment given a construction compound and trenchless drive compound will be located adjacent to the SPA.
- Construction/decommissioning phase loss of functionally-linked foraging habitat for nightjar and woodlark associated with Sandlings SPA.

6.3 Offshore Scheme

6.3.1 In summary, the following impact pathways have been screened in for Appropriate Assessment:

- Impacts from temporary increases in SSC on reefs within the Thanet Coast SAC and sandbanks within the Margate and Long Sands SAC.
- Effects from changes to marine water quality on reefs within Thanet Coast SAC, Thanet Coast & Sandwich Bay SPA, and Sandwich Bay SAC during cable installation and cable lay from the use of drilling fluids.
- Underwater noise impacts on harbour porpoise associated with the Southern North Sea SAC, harbour seal associated with the Wash and North Norfolk Coast SAC, and grey seal associated with Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC.
- Introduction and spread of INNS via the addition of cable protection at the Kent landfall to the qualifying features of the Thanet Coast SAC.
- Vessel collision risk impacts on harbour porpoise within the Southern North Sea SAC, harbour seal from the Wash and North Norfolk Coast SAC, and grey seal from the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC.
- Airborne sounds and visual disturbance impacts on red-throated diver, common tern, and little tern at Outer Thames Estuary SPA, lesser black-backed gull, sandwich tern, common tern and little tern at Alde-Ore Estuary SPA, avocet and little tern at Minsmere-Walberswick SPA, harbour seal associated with the Wash and North Norfolk Coast SAC, and grey seal associated with the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC.
- Potential for indirect effects through impacts to prey species on the red-throated diver, common tern, and little tern at Outer Thames Estuary SPA, lesser black-backed gull, sandwich tern, common tern and little tern at Alde-Ore Estuary SPA, and avocet and little tern at Minsmere-Walberswick SPA.

- Effects of EMF emissions impacts on harbour porpoise associated with the Southern North Sea SAC.

6.4 Kent Onshore Scheme

6.4.1 In summary, the following impact pathways have been screened in for Appropriate Assessment:

- Direct habitat loss during the construction phase at Thanet Coast & Sandwich Bay SPA/Ramsar site and Sandwich Bay SAC.
- Pollution through frac out of any trenchless construction method crossing Thanet Coast & Sandwich Bay SPA/Ramsar site and Sandwich Bay SAC.
- Noise disturbance of birds using Thanet Coast & Sandwich Bay SPA/Ramsar site.
- Impacts on Thanet Coast & Sandwich Bay SPA/Ramsar site due to loss of functionally-linked land for golden plover during operation of the Kent Onshore Scheme.
- The potential for operational phase collision risk cannot be dismissed, associated with the new section of overhead powerline and species travelling to Stodmarsh SPA/Ramsar.

6.5 In Combination

6.5.1 Multiple schemes (LionLink Interconnector, and East Anglia ONE and TWO offshore wind farms) will be making, or intend to make, landfall in Suffolk, with East Anglia One and Two occurring between Sizewell and Aldeburgh, and/or will be connecting to the proposed Friston Substation. The offshore cable routes will also all be traversing parts of Outer Thames Estuary SPA and Southern North Sea SAC, as will the Offshore Scheme. As such, it is not possible to screen out ‘in combination’ effects at this stage. Impact pathways that may arise ‘in combination’ with the Proposed Project include disturbance of birds associated with Sandlings SPA, loss of functionally linked habitat for white-fronted goose associated with Minsmere-Walberswick SPA, and disturbance of red-throated diver of Outer Thames Estuary SPA and harbour porpoise of Southern North Sea SAC. There are also multiple schemes in Kent that lie within 5km of Thanet Coast & Sandwich Bay SPA/Ramsar site and could therefore result in cumulative losses of functionally linked habitat for wintering golden plover, along with the Kent Onshore Scheme.

7. Stage 2: Appropriate Assessment

7.1.1 This section presents the Stage 2 Appropriate Assessment for impact pathways that were not screened out at the LSE stage and were deemed to require further assessment. At this stage, any design controls that have been embedded into the design of the offshore scheme have been considered. The assessment also considers how these controls may reduce the effect of each impact pathway, thus reducing the potential for an AEoSI.

7.1.2 The following sections consider designated European Sites that could not be screened out of having a LSE. Best available scientific evidence has been reviewed to determine whether project activities will have an AEoSI on a European or Ramsar site, in view of the sites conservation objective(s). The assessment takes into account the proposed mitigation which is to be secured in reaching a conclusion on whether an AEoSI from the impact pathway (either alone or in combination with other plans or projects) can be ruled out.

7.2 Suffolk Onshore Scheme

Construction Phase

Dust deposition on Sandlings SPA

7.2.1 In Section 3, which reported on HRA screening, it was identified that a construction compound, the trenchless launch location and (to a lesser extent) a section of cable trench would lie within 200 m of Sandlings SPA, with the compound being 20 m from the SPA at its closest. It is not feasible to quantify the degree of dust that might deposit on SPA vegetation in the absence of mitigation as a wide range of factors affect the amount of dust that may arise; these are not readily quantified and there are no calculation tools available to do this. However, it can be stated that for any deposited dust to have an AEoSI of the SPA it would need to be sufficiently thick in depth to coat leaves, and long in duration (i.e. not being washed off by rainfall for such an amount of time) to materially interfere with photosynthesis. Even then, major botanical effects would need to arise to change the SPA habitat structure sufficiently to affect its nesting value for woodlark or nightjar. Therefore, the risk posed to the SPA, even in the absence of mitigation, is low.

7.2.2 Nonetheless, it is considered necessary to implement dust control measures, as are implemented as standard on construction sites. To ensure that dust deposition is sufficiently insignificant such that no material dust build up would occur on vegetation within the SPA, the following control and management measures will be implemented (see **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**), secured through DCO Schedule 3 Requirement 6:

- GG17: Where required, wheel washing will be provided at each main construction works compound access point on to the highway. An adequate supply of water will be made available at these locations at all times. Road sweepers will be deployed on public roads where necessary to prevent excessive dust or mud deposits.

- GG18: Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. Avoid dry sweeping of large areas.
- GG19: Earthworks and stockpiled soil will be protected by covering, seeding or using water suppression where appropriate.
- GG20: Bonfires and the burning of waste material will be prohibited.
- AQ02: Carry out regular site inspections to monitor compliance with the AQMP, record inspection results, and make an inspection log available to the local authority when asked .
- AQ02: Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- AQ03: Erect solid screens or barriers around dusty activities or the site boundary so that they are at least as high as any stockpiles on site, or fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- AQ03: Keep site fencing, barriers and scaffolding clean using wet methods.
- AQ03: Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
- AQ08: Inspect on-site haul routes for integrity and investigate necessary repairs to the surface as soon as reasonably practicable.
- AQ08: Record all inspections of haul routes and any subsequent action in a site log book.
- AQ04: Impose and signpost a maximum-speed-limit on unsurfaced haul roads and work areas.
- AQ08: Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- AQ05: Use enclosed chutes and conveyors and covered skips.
- AQ05: Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

7.2.3 With these measures in place, it is considered that no AEoSI on the qualifying features of Sandlings SPA would arise.

Loss of functionally linked land for Sandlings SPA

7.2.4 In the HRA screening section it was identified that there would be loss of nightjar and woodlark foraging habitat. This will be temporary as it will occur during trenchless installation (which will occur in a single breeding season) and cable trench burial. Once that is complete the habitat will be restored and once again available for nightjar and woodlark. Arable land is abundant in the area, and surveys in 2024 indicate that arable land on sandy soils in this area very quickly becomes suitable for woodlark. This occurs in particular when it is left fallow;, fields that were not fallow in 2023 did not support woodlark, while those same fields left fallow in 2024 did support woodlark due to the sandy soils and sparse vegetation. This illustrates that arable land in the area routinely moves in and out of suitability for woodlark as part of normal farming practice, and this will not be changed by the Suffolk Onshore Scheme. Indeed, the areas of temporary bare ground left on sandy soils by the project after completion of construction will be of value as foraging (and possibly nesting) areas for woodlark.

7.2.5 There will be no permanent loss of habitat of foraging or nesting value for woodlark or nightjar from Sandlings SPA, as the only significant areas of permanent land take would be for the Saxmundham Converter Station and Friston Substation, which are well over 2 km from the SPA and are not on shallow sandy soils. However, approximately 2.5 ha of acid grassland would be temporarily lost adjacent to Sandlings SPA due to the presence of the trenchless technique compound and associated section of cable trench east of Leiston Road. This field shows no evidence of nightjar/woodlark nesting (despite two seasons of breeding bird survey) but is well within 1 km of the nearest woodlark territories in the SPA and is adjacent to a field where the nearest woodlark territory outside the SPA was recorded in surveys for the Proposed Project. This loss of foraging habitat would last for a single nesting season. A further area (totalling approximately 8 ha) of acid grassland north of the golf course would also be temporarily removed while it is traversed by the cable trench; however, given the speed with which the trench would be installed (approximately 100 m to 300 m a week), any temporary loss at a given time would be minimal other than from the 7 m wide haul route. Moreover, that area has become less suitable for nightjar and woodlark in late summer 2024 due to planting works undertaken by the golf course as part of their plans for expansion.

7.2.6 Aside from any value it may have for SPA birds, acid grassland is an important and scarce habitat in itself. Therefore, as part of the broader habitat mitigation proposals for the Proposed Project the Proposed Project will restore and enhance approximately 6 ha of acid grassland that will be managed in a favourable way, for 10 years following creation/restoration, to offset the lag time in restoration of the existing acid grassland that can be expected once the compound and cable trench works are complete. The creation and management of this grassland is set out in the **outline Landscape and Ecology Management Plan (oLEMP) for Suffolk (Application Document 7.5.7.1)** and secured through DCO Schedule 3 Requirement 6. This grassland is on suitably sandy soils adjacent to other blocks of acid grassland and is approximately 1.6 km from Sandlings SPA. A key part of management will be minimizing use of pesticides and herbicides and avoiding liming. Measures may also involve localised scrub and bracken clearance, where required, creation of brash piles as refuges for reptiles and habitat for invertebrates, increasing grazing intensity if the vegetation is too dense, and reducing grazing intensity if it is too short. If there are bare areas there will also be consideration of raking/light harrowing (e.g. 5-10 cm tilth) and then sowing with seed.

7.2.8 While not being specifically created for the purpose of providing foraging or nesting habitat for woodlark and nightjar associated with Sandlings SPA, the surveys undertaken for this project, and published research[6] indicate that vegetation that is kept suitably short and open, particularly if bare areas are created within the sward, is likely to be used for foraging by both species and may be used by nesting by woodlark. This would incidentally offset any effects from the temporary loss of acid grassland adjacent to Sandlings SPA.

7.2.9 Moreover, breeding bird surveys for the Proposed Project in 2023 and 2024 have shown that woodlark (and likely nightjar) use land outside the SPA opportunistically. In 2024, surveys showed that arable land on sandy soils that had been left fallow had been used for nesting by woodlarks. This shows that habitat structure (i.e. short vegetation on sandy soils) is more important than actual botanical species composition. Therefore, the trenchless compound field is very likely to come back into use as foraging habitat in the next nesting season after works have ceased, without any lag time for acid grassland to re-establish. Therefore, it is considered that no AEoSI on the qualifying features of Sandlings SPA would arise from this impact pathway.

Noise and visual disturbance of Sandlings SPA and functionally-linked land for Alde-Ore Estuary SPA/Ramsar site and Minsmere-Walberswick SPA/Ramsar

7.2.10 Given the proximity of construction works to Sandlings SPA, noise and visual disturbance of the SPA during construction was taken forward to appropriate assessment.

7.2.11 To inform the assessment of noise, in meetings with Natural England it was agreed that:

- birds generally give no reaction to noise levels of 55 dB or below (Cutts & Allan, 1999); and
- a change above 3 dB is required for the difference to be perceptible and therefore a 3 dB change should be used for the purposes of HRA screening.

7.2.12 However, it was also agreed that there is a difference between an increase in sound being perceptible as a change and it being disturbing. Therefore, while a 3 dB change is a suitable threshold for HRA screening (for example) a greater change would likely be needed to actually cause disturbance

7.2.13 If the threshold for no reaction is 55 dB, and any noise would need to be at least 58 dB to be perceptibly louder (i.e. 3 dB greater than 55 dB), then it was agreed with Natural England that a reasonable precautionary threshold for significant disturbance would be 60 dB (i.e. 5 dB above 55 dB). RSPB confirmed in a meeting regarding this project that they would agree with the use of a 60 dB threshold.

[6] https://bou.org.uk/blog-hawkes-woodlark-ground-disturbance/

7.2.15 With this in mind 60 dB LAmax contours were calculated for all phases of the work. The 60 dB contour is shown for the project as whole on **Appendix E Figure 3 Map of 60 dB average LAmax contour at Suffolk**. For the purposes of this modelling and in line with guidance, a 10 dB reduction has been assumed due to best practicable noise reduction means. In some cases, close-board noise fencing will be the most appropriate method to achieve this 10 dB reduction, but there is potentially a 10 dB to 20 dB reduction available through the use of quieter plant, alternative methods and suitable handling techniques. The mapping showed that with noise fencing around the perimeter of the works area, the 60 dB contour would cover the southern-most part of the SPA but scrutiny of the underlying data indicates this would only be during compound set up, which will take c. 1 month. The c. 4 month trenchless installation itself would not result in the 60 dB contour straying into the SPA because of the distance from the SPA (approximately 40 m) and the use of standard noise mitigation methods such as fencing. The use of best practicable means to reduce noise is commitment B23 in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments** and secured through DCO Schedule 3 Requirement 6.

7.2.16 Throughout two seasons of breeding bird survey, no SPA birds were recorded nesting in the part of the SPA that would be subject to potentially disturbing noise levels during compound establishment. Moreover, Sandlings SPA is designated for its nesting nightjar and woodlark. These species are either absent (nightjar) or non-breeding (woodlark) during the period September to January inclusive. Works that can be scheduled to take place between September and January inclusive would not result in disturbance of nesting nightjar or woodlark.

7.2.17 Compound set up is programmed to occur outside the nesting season (March to August). This is secured in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments** and secured through DCO Schedule 3 Requirement 6. Therefore, no mitigation is needed beyond standard noise mitigation methods such as close-board fencing. The noise fence will also act as a visual screen and thus protect birds in the SPA from visual disturbance. The fencing in this location will not interfere materially with sightlines and openness due to the dense woody vegetation along the former railway line and the SPA boundary. All the open sightlines are generally north of the trenchless compound field. With this fencing, and the seasonal constraint on compound set up in place, no AEoSI on the qualifying features of the Sandlings SPA will arise due to disturbance.

7.2.18 Non-breeding bird surveys of the wetland parts of RSPB North Warren Reserve, and bird records generally, have identified that it is functionally-linked to both Minsmere-Walberswick SPA/Ramsar and Alde-Ore Estuary SPA/Ramsar. However, the aforementioned noise modelling undertaken for the project has identified that the 60 dB LAmax contour will only overlap with the RSPB reserve east of the former railway (the wetland parts of the reserve) to a very small extent, reducing to 60 dB 30 m east of the railway. The affected small area of reserve does not support significant numbers of SPA/Ramsar birds. Therefore, no AEoSI of Minsmere-Walberswick SPA or Alde-Ore Estuary SPA will arise due to noise disturbance impacts of the Proposed Project on functionally-linked habitat in RSPB North Warren Reserve.

7.2.20 With regard to the field north of Aldeburgh Road, which has been recorded to support a significant population of wintering curlew, noise modelling indicates that despite a construction compound to the north-east of this field, the 60 dB LAmax contour will only intrude into a small part of this field. Therefore, as the disturbance to the wintering birds within this area is minimal, there will be no AEoSI from this impact pathway on the qualifying features of Alde-Ore Estuary SPA/Ramsar site, which is functionally-linked to this area.

Decommissioning Phase

7.2.21 For the purposes of this assessment, decommissioning impacts are considered to be very similar to construction phase impacts. As such, the impact pathways for the construction phase that have been assessed at this stage are considered to encompass those associated with the decommissioning phase. No additional European Sites or impact pathways, specifically associated with the Decommissioning phase have been identified for further assessment. As no AEoSI has been identified on qualifying features of any European Sites associated with the Construction phase, no AEoSI has been concluded for the decommissioning phase.

7.3 Offshore Scheme

Construction Phase

Temporary increase in SSC and sediment deposition leading to increased turbidity and smothering effects

7.3.1 Seabed disturbance from pre-installation and installation activities have the potential to increase SSC, creating a sediment plume in the water column that can travel away from the Offshore Scheme before the sediment is deposited on the seabed. SSC and depositional loads will vary along the Offshore Scheme depending on the local environmental conditions, particularly the sediment type and degree of water movement (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

7.3.2 Thanet Coast SAC is less than 1 km from the Offshore Scheme and is designated for benthic habitats including reef. Margate and Long Sands SAC is 3.0 km west of the Offshore Scheme and is designated for the protection of Annex I sandbanks (JNCC, 2017a).

7.3.3 There are several potential effects on benthic receptors that can result from increased SSC and sediment deposition on benthic features including:

- reduced photosynthesis due to increased turbidity, resulting in reduced primary production in algae;
- smothering of invertebrate species and clogging of respiratory and feeding apparatus; and
- indirect effects of the release of contaminants, such as heavy metals and hydrocarbons, during sediment mobilisation, on benthic species.

7.3.5 SSC and depositional loads will vary along the Offshore Scheme depending on the local environmental conditions, particularly sediment type and degree of water movement. The majority of the route (approximately 80%) is comprised of sublittoral sand and coarse sediments (**Application Document 6.2.4.2 Part 4 Marine Chapter 3 Benthic Ecology**). Modelling has been undertaken to estimate the extent of sediment dispersion before deposition occurs from cable installation activities (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Physical Environment**). Based on calculations of fall velocity, the maximum distance travelled by larger fractions of sands and gravels is expected to be approximately 20 m before subsequently re-depositing either directly back into the trench or within a few meters of the area of disturbance within tens of seconds (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

7.3.6 However, fine sands, silts and clay may be transported greater distances beyond the Offshore Scheme as they are carried in suspension by prevailing currents and tides. According to calculations reported in **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**, fine sand may disperse up to a maximum distance of 17 km before settling to the seabed. However, this deposition will be limited to a thickness of less than 0.5 mm on the seabed, which is considered very small and equivalent to natural variability. Due to the small magnitude of the deposition thickness, any accumulation of sediment on the seabed is unlikely to be detectable in the field. Sediment dispersion modelling has also indicated that although SSC may be as great as 300 mg/l, this is only expected to occur within the first 24 hours after disturbance. Following this, concentrations up to 100 mg/l may occur up to 11 km from the Offshore Scheme.

7.3.7 Long-term increase in SSC above 250 mg/l can impair the growth of filter-feeding organisms (Essink, 1999; Widdows, Bayne, Livingstone, Newell, & Donkin, 1979). However, any increase in suspended sediments at this concentration will be short-term and temporary, as tides and currents are expected to rapidly disperse particles suspended in the water column, quickly returning turbidity to baseline conditions. Furthermore, studies demonstrate that epifauna associated with the Thanet Coast SAC, including filter feeders such as blue mussel, have the ability to tolerate short-term elevations in SSC (Essink, 1999) and withstand temporary periods of sediment deposition at thicknesses up to 2 cm (Hutchinson, Hendrick, Burrows, Wilson, & Last, 2016), a significantly greater deposition than that associated with the Offshore Scheme. Therefore, predicted increases in SSC and associated sediment deposition are not expected to adversely affect the benthic features of the Thanet Coast SAC from installation activities (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**). Thus there is not anticipated to be an AEoSI on the qualifying features of the Thanet Coast SAC.

7.3.8 Sandbanks in shallow water are dynamic and are usually subject to varying levels of natural turbidity and energy. This natural disturbance regime means they generally support only a low level of biodiversity. Given this, the sensitivity of sandbanks to increased SSC and deposition is considered negligible (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**), and therefore there is not anticipated to be an AEoSI on the qualifying features of the Margate and Long Sands SAC.

7.3.10 Finally, contaminant concentrations were found to vary throughout the route, but they all remained consistent with general background levels for this region of the North Sea. Therefore, increased SSC and deposition is not anticipated to result in detectable changes in sediment bound contaminants above background levels, thus having no AEoSI on the qualifying features of the Thanet Coast or Margate and Long Sands SACs.

Changes to marine water quality during cable installation and cable lay from the use of drilling fluids

7.3.11 Trenchless techniques such as HDD are proposed at the Kent Landfall. The associated discharge of drilling fluids at the breakout location has the potential to alter marine water quality and negatively affect benthic receptors in the surrounding habitat within the Thanet Coast SAC, Sandwich Bay SAC and Thanet Coast & Sandwich Bay SPA. It has been estimated that up to 40 m^3 of drilling fluid would be discharged at the Kent Landfall. Although the potential dispersion of suspended particles is considered to be a maximum of 17 km (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**), the volume of drilling fluid would be very small and the regular tidal movement in the intertidal zone would act to rapidly disperse and dilute any drilling fluid released.

7.3.12 The trenchless entry/exit points at the Kent Landfall are located within an area of intertidal mud (**Application Document 6.4.4.2.4 Habitats present at, and location of, trenchless solution entry/exit points**). Infaunal species associated with this habitat do not have high sensitivity to the drilling mud that may settle temporarily on the seabed. The presence of mudflat suggests that the bay is sheltered from wave action; however, considering the regular tidal movement in the intertidal zone, the sensitivity of any receptors likely to be in the vicinity of any trenchless fluid release is considered low (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**).

7.3.13 Additionally, drilling fluid discharges from the Proposed Project trenchless operations would be single events over a short period of time. All drilling fluids used, such as bentonite, will be selected from the OSPAR List of Substances/Preparations Used and Discharged Offshore (2021) which are considered to ‘Pose Little or No Risk to the Environment’ (PLONOR). Additionally, where entry/exit points are in the intertidal area (i.e. at the Kent Landfall) drilling fluid will be captured where possible (control measure LVS05 in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, Table 1.2). Therefore, the magnitude of any changes to marine water quality from the use of drilling fluids is considered small.

7.3.14 Given this impact pathway was assessed as not significant, (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**), it is not anticipated that there will be an AEoSI on the qualifying features of the Thanet Coast SAC Sandwich Bay SAC, or Thanet Coast & Sandwich Bay SPA as a result of change,s in water quality due to use of drilling fluids.

Underwater noise

7.3.15 As outlined in Paragraph 4.3.18, several activities undertaken during the lifetime of the project will generate underwater sound. The Offshore Scheme passes through the Southern North Sea SAC, which is designated for harbour porpoise, and within the foraging range of harbour seal, which is a a qualifying feature of the Wash and North Norfolk Coast SAC, and grey seal, which is a qualifying feature of the Humber Estuary SAC and Berwickshire and North Northumberland Coast SAC.

7.3.16 As the harbour porpoise is the marine mammal species most sensitive to noise that is likely to be present in the vicinity of the Offshore Scheme, potential impacts on this species can also be considered representative of impacts on pinnipeds, which are qualifying features of the other SACs screened into this Appropriate Assessment.

7.3.17 Of the sound generating activities associated with the Offshore Scheme that would occur within the hearing range of marine mammals, the highest peak pressure is expected to come from any SBP during pre-installation geophysical surveys. Other activities have lower sound intensity, such as cable lay, although they occur for longer. Thus, marine mammals present within the vicinity of the Offshore Scheme may be at risk of auditory effects. To determine the distances at which auditory effects have the potential to occur, the propagation of sound associated with these activities has been calculated (**Application Document 6.2.4.4 Part 4 Marine Chapter 4 Marine Mammals**). Calculations were undertaken using the latest version of the National Marine Fisheries Service (NMFS) spreadsheet, together with the National Oceanic and Atmospheric Association (NOAA) guidance manual (available from Marine Mammal Acoustic Technical Guidance & Other Acoustic Tools | NOAA Fisheries[7]).

7.3.18 Modelling indicates that auditory injury, as indicated by permanent threshold shift (PTS)[8] could result from SBP activities; however, even at the most intensive impulsive sound source, auditory injury only has the potential to occur in marine mammals that are in very close proximity, i.e. within 63.1 m of the source. For the USBL (acoustic positioning) source the threshold is not reached at any distance because the sound level is below the threshold (**Application Document 6.2.4.4 Part 4 Marine Chapter 4 Marine Mammals**).

7.3.19 Behavioural disturbances are the most likely effect resulting from underwater sound in the marine environment. The latest thresholds for underwater sound effects do not include quantitative thresholds for behavioural disturbance (NMFS, 2018; Southall B. , et al., 2019) reflecting both a lack of empirical evidence and a high level of variability in behavioural responses, which have been shown to often be unrelated to the sound level received (Gomez, et al., 2016).

7.3.20 With regard to behavioural disturbance, the activity with the highest sound source is the operation of the SBP. The distance from this sound source at which disturbance is reported to occur in harbour porpoise, referred to as the Effective Deterrent Range (EDR), is 5 km (JNCC, 2020). Within the Southern North Sea SAC, harbour porpoise is present year-round, but exhibits some seasonal movements between the north and south of the SAC. The greatest densities of harbour porpoise close to the Offshore Scheme are expected in the winter months, which would coincide with the seasonal restriction in place for red-throated diver. This includes a seasonal restriction for offshore cable burial activities in the Outer Thames Estuary SPA (1 November – 31 March) and a reduced seasonal restriction (1 January – 31 March) for landfall cable installation activities at the Suffolk landfall in Aldeburgh only. This will allow construction and vessel presence during the winter period, when harbour porpoise densities are greatest, to be avoided.

[7] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools.

[8] A permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level. PTS can occur from a variety of causes, but it is most often the result of intense and/or long-term repeated noise exposures.

7.3.21 These restrictions are secured through **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** (secured by DCO Schedule 3 Requirement 6), **Application Document 7.8 Red Throated Diver Protocol** (secured through DCO Schedule 3 Requirement 5) and **Application Document 3.1 draft Development Consent Order** (secured through DCO Schedule 16 Deemed Marine Licence)**.** The Applicant has not included the pre-lay grapnel run activities within the seasonal restriction commitment for the Outer Thames Estuary SPA, as these activities have an even lower disturbance profile than the installation works themselves, i.e., fewer vessels, shorter working period..

7.3.22 Harbour porpoise, grey seal, and harbour seal all have the potential to be present within the vicinity of the Offshore Scheme. As the harbour porpoise is the most sensitive, potential impacts to this species can be considered representative of other species. Thus, the area of disturbance from the project activities identified above is small in relation to the distribution range of the populations of concern. In addition, as project vessels are continuously moving, any disturbance impacts will be transient, intermittent, and short-term. The magnitude of the effect is therefore considered to be small.

7.3.23 The project has adopted standard JNCC measures for minimisation of injury from underwater sound generated from project geophysical surveys (JNCC 2017; JNCC 2019). This includes a dedicated marine mammal observer present during SBP activities. There will be a 500 m observation zone around the vessel within which no SBP activities can commence until a period of at least 20 minutes has passed during which no marine mammals have been observed. In addition, prior to equipment operating at full power, a soft-start or gradual increase in sound intensity is required, so any marine fauna (such as marine mammals) present has the opportunity to move away before any injury occurs. These restrictions are captured in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** and secured through DCO Schedule 3 Requirement 6. No other geophysical survey activities associated with the Proposed Project are considered likely to result in injury and as such, only SBP activities require the adoption of JNCC measures. Therefore, any injury to marine mammals from any of the geophysical survey activities is considered unlikely.

7.3.24 Underwater sound can also be emitted during cable construction works, including from cable lay and support vessels, and during the placement of cable protection. Cable laying activities (including the operation of vessel engines) is considered unlikely to generate sufficient sound source levels for permanent threshold shift (PTS[9]) in marine mammals, and that the potential for temporary threshold shift (TTS[10]) is only likely in very close proximity to the source (Todd, et al., 2014).

[9] a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level. PTS can occur from a variety of causes, but it is most often the result of intense and/or long-term repeated noise exposures. PTS is considered auditory injury.

[10] a recoverable reversible increase in the threshold of audibility, most commonly resulting from long-term noise exposure not high enough to cause PTS.

7.3.26 Therefore, for auditory injury to occur in relation to the Proposed Project, exceptional circumstances would need to occur to reach the thresholds capable of causing these effects, such as an animal remaining stationary within close proximity of the installation activities for a prolonged period of time (Nedwell, Brooker, & Barham, 2012). Thus, when considering the mobile nature of marine mammals, the timing and transient nature of the cable installation activities, and the relatively low level non-impulsive sound sources associated with installation, PTS or TTS are considered highly unlikely to occur.

7.3.27 The area of disturbance from the project activities associated with the Offshore Scheme is small in relation to the distribution range of the qualifying feature populations of concern. In addition, as project vessels are continuously moving, any disturbance impacts will be transient, intermittent, and short-term.

7.3.28 Despite the high sensitivity of the qualifying features, adherence to appropriate JNCC guidelines will minimise injurious impacts to marine mammals. Although behavioural responses may occur, they will be temporary and localised and in the case of harbour porpoise, installation activities are currently planned to avoid the majority of the winter months, targeting favourable weather. The density of animals around the Suffolk region of the Offshore Scheme are lower during summer months.

7.3.29 When considering the above, it is not anticipated that there will be any AEoSI for the marine mammal qualifying features of the Southern North Sea SAC, Wash and North Norfolk Coast SAC, Humber Estuary SAC or Berwickshire or North Northumberland Coast SAC as a result of underwater noise.

Vessel collision

7.3.30 Southern North Sea SAC, Wash and North Norfolk Coast SAC, Humber Estuary SAC, and Berwickshire and North Northumberland Coast SAC all have marine mammals as qualifying features of their designations. Vessel strikes with marine mammals can result in physical injury, which may reduce foraging abilities and fitness at an individual level, or even mortality (Moore M. , et al., 2013; Southall, et al., 2019).

7.3.31 Construction activities associated with the Proposed Project will involve the deployment of a number of vessels including survey, cable lay, guard and rock placement vessels, and additional specialised support vessels such as a jack up barge for the works at the trenchless breakout point in the nearshore (for the Suffolk Landfall only as the trenchless exit is in the intertidal zone at Pegwell Bay).

7.3.32 Cetaceans, such as the harbour porpoise, are considered fast swimming, agile species, with rapid reflexes and good sensory capabilities. Moreover, marine mammals possess a thick subdermal layer of blubber (or fat deposits) which provides a level of protection to their vital organs, meaning they are reasonably resilient to minor strikes and collisions (Wilson, Batty, Daunt, & Carter, 2007). The most lethal and serious injuries to cetaceans, primarily whales, are believed to be caused by large ships, typically 80 m and longer with large drafts, as well as vessels travelling faster than 14 knots (Laist, Knowlton, Mead, Collet, & Podesta, 2001). Higher vessel speeds produce a greater impact force and larger drafts have been associated with increased mortality (Dahne, et al., 2013; Rockwood, Calambokidis, & Jahncke, 2017; Southall, et al., 2019).

7.3.34 Avoidance behaviour exhibited by cetaceans is often associated with fast, unpredictable vessels such as speedboats and jet-skis (Bristow & Reeves, 2001; Gregory & Rowden, 2001) while neutral or positive reactions, particularly in dolphins, have been observed with larger, slower moving vessels such as cargo ships (Ng & Leung, 2003; Sini, Canning, Stockin, & Pierce, 2005). Although there have been reports of vessel strikes with cetaceans, evidence of risk is limited. Mortality and injury of cetaceans resulting from vessel strikes have been mostly reported in large baleen whales which are slow swimming (IAMMWG, 2015). There are few reports of vessel strikes with harbour porpoise and other small cetaceans, likely due to the avoidance behaviour of these species, particularly porpoise (Wisniewska, et al., 2018; Roberts, Collier, Law, & Gaion, 2019).

7.3.35 The majority of offshore construction works are anticipated to take place between April and October (inclusive) targeting the favourable weather windows (see **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**). Works will avoid most of the winter period when it is understood that there are elevated numbers of harbour porpoise utilising the area of the Southern North Sea SAC that the cable corridor passes through (JNCC, 2019).

7.3.36 Given this, the likelihood of Proposed Project construction vessels colliding with harbour porpoise is low given both the relatively low density of individuals predicted at the time of construction, and the low number of vessels. Minimisation of the risk of collisions is further supported by the anticipated slow speed of vessels moving through the area surrounding the cable corridor during construction of the Offshore Scheme.

7.3.37 Therefore, it is considered that there will be no AEoSI for the qualifying features of the Southern North Sea SAC as a result of potential vessel collisions.

7.3.38 The risk to pinnipeds is generally considered lower than that for cetaceans (Jones, et al., 2017). Although there have been reports of vessel strikes to pinnipeds, including several cases of ‘corkscrew’ type injuries ascribed to vessel propellers and thrusters, evidence of a wide spread risk is limited (Bexton, Thompson, Brownlow, Milne, & Bidewell, 2012). Indeed, later research has shown that very similar injuries observed on harbour seal and grey seal pups were the result of predation from adult grey seals which are now thought to be responsible for a high proportion of the assumed propellor duct injuries (Brownlow, Onoufriou, Bishop, Davison, & Thompson, 2016). For slow-moving dredging operations (Todd, et al., 2014) individual seals have been seen to easily avoid vessel movements.

7.3.39 Simultaneous vessel activities (i.e., cable lay vessel together with guard vessels) are expected to occur during construction. However, this increase in vessel numbers is expected to be very small when compared to the background shipping levels in an already heavily trafficked area of the North Sea. Additionally, these vessels are primarily slow moving, with operational speeds ranging from 0 km to 7 km per day, with transit speeds remaining ≤12 knots (see **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**). At these slow operational speeds, individual seals will likely be able to easily avoid vessels, greatly reducing the risk of collision. Vessels transiting between the cable corridor and port, which travel at higher speeds, pose an increased likelihood of collision and potential for injury. However, these journeys will be relatively infrequent and likely for a short period.

7.3.41 Although the occurrence of any collisions could cause injury or death, the likelihood of vessel collision with grey seal is unlikely when considering the agility of pinnipeds and the slow vessel operation speeds. It is therefore considered that there will be no AEoSI for the qualifying features of the Wash and North Norfolk Coast SAC, Humber Estuary SAC or Berwickshire and North Northumberland Coast SAC as a result of potential vessel collisions.

Airborne sounds and visual disturbance

7.3.42 Surveys undertaken at Pegwell Bay recorded golden plover, a qualifying feature of the Thanet Coast and Sandwich Bay SPA, using the intertidal area and saltmarsh between October and February, with a peak count of 421 individuals in December 2023 (See **Application Document 6.2.4.5 Part 4 Marine Chapter 5 Marine Ornithology**).

7.3.1 Noise modelling has been carried out to determine the effect of construction plant noise on ornithological receptors in Pegwell Bay. L_{Amax} and L_{Aeq} indices are used to characterise and quantify different aspects of a given noise event, over the time period of interest. A L_{Amax} (maximum A-weighted Sound Pressure Level)[11] corresponds with the loudest single noise level one would hear during the noise event or time period of interest, such as the loudest bang, or passing vehicle-engine noise. On the other hand, a L_{Aeq} (A-weighted equivalent continuous sound pressure level) is akin to the “average” noise level over the noise event or time period of interest. It accounts for all of the noise (i.e. the fluctuating highs and lows, including the L_{Amax} noise event) during that time, and represents, in a single number, the "average" level of noise.

7.3.1 Calculations have been provided to present a representative worst-case scenario of construction activity in the form of noise contours to show the highest noise levels produced by the loudest plant equipment at different distances from the source. The worst-case construction activity is identified to be vibratory piling. Due to the intermittent nature of piling as a noise source, the L_{Amax} levels are used in the predictions.

7.3.2 BS 5228[12] does not contain a database of L_{Amax} noise levels from construction plant (save for a small number of vehicle pass-by noise levels); therefore, for the purpose of this assessment, likely L_{Amax} have been sourced from AECOM’s library of measured and manufacturer data of the worst-case representative plant operating under typical conditions as follows:

Vibratory Sheet Piling 119 dB L_{Amax} [13]

[11] L_{Amax} referred to here uses the fast time-weighting, as required by BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise.

[12] BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise.

[13] AECOM’s historical vibratory sheet piling monitoring data indicate that LAmax levels measured at 10 m from the piling rig (when in operation) vary between 78 to 104 dB between different piles and operation steps. Based on this, the average L_{Amax} sound emission level of 91 dB (at 10 m) has been assumed to be representative of vibratory sheet piling. The sound power level reported above has been derived from this figure.

7.3.2 Table 7.1 and Table 7.2 below show predicted L_{Amax} noise levels at different distances from the noise source. The predictions have been completed using a simplified propagation calculation, which has allowed the production of a generalised table of L_{Amax} levels as a function of distance. The simplified noise propagation calculation method excludes the effect of ground absorption, screening effects and intervening changes in ground height; these elements would further reduce the predicted noise levels at receptor locations. This means the simplified predictions will give an over estimation (under still conditions) compared to ones that include these effects in an open environment.

Table 7.1 Indicative L_{Amax} noise level decay. dB L_{Amax} vs distance

Activity	80 dB	75 dB	70 dB	65 dB	60 dB	55 dB
Vibratory Sheet Piling	36 m	63 m	112 m	200 m	353 m	628 m

Table 7.2 Indicative L_{Amax} noise level decay. Distance (50 m intervals) vs dB L_{Amax}

Activity	50 m	100 m	150 m	200 m	250 m	300 m	350 m	400 m	450 m	500 m
Vibratory Sheet Piling	77 dB	71 dB	68 dB	65 dB	63 dB	62 dB	60 dB	59 dB	58 dB	57 dB

7.3.1 Whilst the surveys identified waterbirds, including golden plover, using the entirety of the intertidal area for foraging at low water, areas of particular focus, e.g., around the mouth of the River Stour are over 350 m from the areas where worse-case significant disturbance from construction noise sources may occur. In addition, sensitive high tide waterbird, including golden plover, roost locations were at least 500 m from the proposed exit pits works areas.

7.3.2 Waterbirds, including the qualifying species in the Thanet Coast and Sandwich Bay SPA have varying degrees of sensitivity to visual disturbance from human activities. Various parameters are used to measure disturbance responses, with Flight Initiation Distance (FID) being the most important one. This is defined as the distance at which a bird or group of birds starts to escape (such as by walking, swimming or flying away) when approached by a disturbance agent. The FID is meaningful because it reflects the trade-off between costs of escape (energetic cost of flight and the temporary loss of calorific intake) and the inferred risk of being predated upon. A review of disturbance distances for selected bird species and recommended buffer zones for visual disturbance is provided by NatureScot. This includes the following recommendations for waterbirds species relevant to the Kent landfall:

- Golden Plover – medium sensitivity 200-500 m.

7.3.4 Different noise and visual disturbance elements are likely to operate on bird receptors simultaneously, whereby it is likely that visual disturbance overrides aural stimuli. While construction noise is likely to have fallen to non-disturbing levels by 350 m from source (on worse-case predictions), visual stimuli will likely exert impacts up to 500 m from source.

7.3.5 The combination of distance of works from key roost locations (beyond distances within which significant disturbance may occur), restricted duration and extent of works within the intertidal zone, limited intertidal zone at risk of significant noise and visual disturbance in the context of the wider Pegwell Bay intertidal resource, reduces the overall effect anticipated on key waterbird species and assemblages. In addition, the seasonal timing for these works outside of the core wintering months may further avoid any overall effect; however, as set out above, this is not considered necessary to avoid significant effects on golden plover. Given the temporary, short-term nature of the construction works, it is not anticipated that the addition of a small number of vessels required to construct the Offshore Scheme would materially affect disturbance and displacement of golden plover. Therefore, there will be no AEoSI for the qualifying features of the Thanet Coast and Sandwich Bay SPA.

7.3.6 Red-throated diver, common tern, and little tern are all qualifying features of the Outer Thames Estuary SPA, with non-breeding red-throated diver being considered highly sensitive to anthropogenic sources of disturbance. The tendency of red-throated diver to form groups on the sea means that if a vessel passes through or close to a group, it has the potential to disturb and displace many individuals at once. However, given the temporary nature of the impact and its short duration, it is anticipated that any effects on energy budgets of birds are extremely unlikely to result in population dynamic effects (see **Application Document 6.2.4.5 Part 4 Marine Chapter 5 Marine Ornithology**). The impact is only likely to affect a small number of individuals and there is an abundance of alternative feeding/loafing grounds in the wider area that could be used in the short term.

7.3.7 In addition, vessels will travel at slow speeds with a maximum operational speed of 7 km per day, and a maximum transitional speed of 12 knots. However, due to the 24/7 nature of the works, vessels will be operating during hours of darkness, and lighting will be required to ensure operations on the vessels can be conducted safely. As artificial lighting can attract and disorientate seabirds, as well as repel them and cause them to avoid the area (Adams, Fernandez-Juricic, Bayne, & St Clair, 2021), any artificial lighting on board vessels associated with the cable installation will be directional and only used in the vicinity of the work area when necessary. These restrictions are secured through **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** (secured by DCO Schedule 3 Requirement 6) and **Application Document 7.8 Red Throated Diver Protocol** (secured by DCO Schedule 3 Requirement 5).

7.3.8 Other seabirds which are qualifying features of the Outer Thames Estuary SPA and/or Alde-Ore Estuary SPA are expected to be present in offshore waters during construction of the works. During the breeding season, this includes lesser black-backed gull, sandwich tern, common tern and little tern.

7.3.10 Sensitivities of seabirds to disturbance from vessels have been assigned using data produced by the MMO (2018), Fliessbach et al. (2019) and Garthe and Hüppop (2004) which show the level of displacement cause by vessels. Taking into consideration the expected abundance of species in the Study Area, and their foraging ranges (Woodward, Thaxter, Owen, & Cook, 2019), sensitivities to disturbance are shown in Table 7.3

Table 7.3 Sensitivities of seabirds to disturbance from vessels

Species	Sensitivity
Lesser black-backed gull	Low
Sandwich tern	Low
Common tern	Low
Little tern	Medium
Red-throated diver	High

7.3.11 Vessel presence has the potential to disturb multiple individuals at any one time. Seabirds are known to raft together at sea in groups. Thus, when a vessel passes through or within close proximity to a raft, many individuals could be disturbed at once. This could interrupt foraging and/or nesting and loafing activities for all species, resulting in the displacement of birds to quieter areas, reduced foraging time and increased energy expenditure.

7.3.12 However, effects on energy expenditure are unlikely to have population-wide effects on seabirds, for example effects on reproduction, due to the small numbers of individuals likely to be affected in a localised area. In addition, any birds that are present during the disturbance are likely to find alternative foraging and loafing grounds in the wider North Sea area, due to the large area of suitable habitat.

7.3.13 Project vessels will be travelling at low speeds and will be constantly moving in offshore waters and therefore their presence in offshore foraging and loafing areas will be short-term and temporary, with seabirds returning once the vessel has moved on. In addition, the Offshore Scheme and wider North Sea are typically characterised by both commercial and recreational heavy shipping traffic occurring both day and night, with major shipping channels also crossing the Offshore Scheme. The small number of vessels required for construction of the Offshore Scheme is considered minor compared to the total baseline number of vessels within the vicinity of the works and wider North Sea at any one time. Therefore, any seabirds present in the vicinity of the construction vessels are expected to have some habituation to the disturbance created by vessel presence and associated effects including disturbance from noise and artificial lighting.

7.3.14 Given the temporary, short-term nature of the construction works, in an area that is already busy with shipping traffic, it is not anticipated that the addition of a small number of vessels required to construct the Offshore Scheme will considerably increase disturbance and displacement of lesser black-backed gull, sandwich tern, common tern and little tern . Therefore, there will be no AEoSI for the qualifying features of the Alde-Ore Estuary SPA and Minsmere-Walberswick SPA.

7.3.15 Whilst red-throated diver is considered to be sensitive to vessel traffic and movements, disturbance from vessel and operative presence and any subsequent displacement, will be temporary and short term. It is not anticipated that the addition of a small number of vessels required to construct the Offshore Scheme would materially affect disturbance and displacement of birds from baseline vessel traffic conditions, particularly as these works avoid areas recorded as supporting higher concentrations of individuals. As such, the Offshore Scheme itself will not generate AEoSI for the qualifying features of the Outer Thames Estuary SPA. Some operations during the Construction Phase could result in changes in visual stimuli (including artificial light) and an increase in airborne sound, both of which could impact grey seal, which is a qualifying feature of the Humber Estuary SAC and the Berwickshire and North Northumberland Coast SAC, and harbour seal which is a qualifying feature of Wash and North Norfolk Coast SAC.

7.3.16 The Humber Estuary SAC, Wash and North Norfolk Coast SAC, and Berwickshire and North Northumberland Coast SAC are all located more than 100 km from the Offshore Scheme (**Application Document 6.2.4.4 Part 4 Marine Chapter 4 Marine Mammals**). However, the Offshore Scheme does fall within the foraging range of both grey and harbour seal, and therefore individuals from these sites could be present in the vicinity of the works associated with the Offshore Scheme.

7.3.17 Seals spend time hauled out on land and at the sea-surface, making them more susceptible to airborne sound and visual stimuli. These can lead to avoidance behaviour which could cause individuals to stop resting, feeding, travelling, and/or socialising. Repeated disturbance could therefore result in permanent displacement and/or a decline in fitness and productivity. However, they also show habituation to certain types of visual and sound disturbance (Jones, et al., 2017).

7.3.18 The Greater Thames Estuary is a highly trafficked area and as hauling out still occurs regularly around the estuary, this likely indicates a degree of habituation to airborne vessel noise and visual disturbance. Spatial analysis indicated a high co-occurrence of seals and shipping vessels within 50 km of the coastline near haul-out sites, with no evidence of related population declines (Jones, et al., 2017).

7.3.19 However, at Pegwell Bay, the trenchless exit pit would be within the intertidal environment, in the muddy/sandy sediment seaward of the saltmarsh, in order to avoid any impacts on this protected habitat. This additional construction activity, may have the potential to cause airborne noise and visual disturbance.

7.3.20 Pegwell Bay hosts an important haul out site for harbour seal, and includes low numbers of pups born in the area, and Goodwin Sands, which is adjacent to the Offshore Scheme, is an important haul-out site for both harbour and grey seal. As the Kent Landfall trenchless exit point would be located within the intertidal zone of Pegwell Bay, it is also likely that construction activities associated with this, as well as changes in visual stimuli, such as lighting from vessels operating at night, has the potential to disturb hauled-out seals. The haul-out location in the river Stour is just over 1 km from the Order Limits. In addition, most of the activities in Pegwell Bay will be taking place at low tide when the seals will be somewhat sheltered from airborne sound because they will be located at a level below the works, within the channel of the river itself.

7.3.22 Furthermore, the nature of cable lay is transitory and localised to the Offshore Scheme extent. The trenchless works are also considered to be a short-term activity. As such, any effects will be short lived in any one location and any changes in visual stimuli, including at night, will be localised and limited in extent. It is therefore considered that there will be no AEoSI for the qualifying features of the Wash and North Norfolk Coast SAC, Humber Estuary SAC or Berwickshire and North Northumberland Coast SAC as a result of airborne sounds and visual disturbance.

Potential for indirect effects through impacts to prey species

7.3.23 Potential for indirect effects through impacts to prey were screened in for further assessment in relation to Thanet Coast and Sandwich Bay SPA and Ramsar, Outer Thames Estuary SPA, Alde-Ore Estuary SPA and Ramsar, and Minsmere-Walberswick SPA.

7.3.24 In Kent, the trenchless solution would completely avoid saltmarsh habitat, exiting approximately 105-140 m down-shore of this habitat, exiting within intertidal mudflats. The cable would be pulled through and installed by trenching techniques (similar to activities further offshore) in the intertidal zone and into the subtidal. As the trenchless entry/exit points at the Kent Landfall are located within the intertidal range, there is potential for temporary disturbance to prey species and foraging grounds for ornithological features of the Thanet Coast and Sandwich Bay SPA and Ramsar.

7.3.25 At the Kent Landfall, the use of an excavator, JUB or back hoe dredger, cable lay barge, and temporary cofferdam would lead to the temporary disturbance of 0.02 km^2 of intertidal mudflat. Moreover, concrete mattresses/rock bags will be placed at the trenchless technique entry/exit points which will then be removed approximately 1 week before cable pull-in, before permanent protection is buried at the same location, temporarily disturbing the mudflat. During installation, the footprint of disturbance will be limited and temporary. Additionally, although disturbance will occur a second time during the burial of the permanent protection at trenchless entry/exit points, this will also only have a temporary effect as fauna associated with these habitats are generally restricted to the top 30 cm of sediment (Ashley, Budd, Lloyd, & Watson, 2024), and thus recolonisation is anticipated to be rapid (Lewis, Davenport, & Kelly, 2002). Further investigations have shown that in soft sediment habitats, such as those present in Pegwell Bay, cable trenches infill over time, with benthic communities recovering into the affected areas as the sediments re-establish and recover (McQuillan, et al., 2024; Tillin, et al., 2024). As such, previous reviews of the effects of cable installation on seabed habitats have concluded that cable installation effects result in only temporary and localised effects (RPS 2019). Therefore, due to the temporary and limited installation footprint compared to wider available area of habitat, it is not anticipated that physical disturbance would have an AEoSI or on the qualifying features of the Thanet Coast and Sandwich Bay SPA and Ramsar.

7.3.26 The Offshore Scheme passes through the Outer Thames Estuary SPA for approximately 29 km, at two locations. Firstly, as the Offshore Scheme leaves the Suffolk Landfall and secondly, midway along the route of the Offshore Scheme at the outer reaches of the Thames Estuary. This SPA is designated for foraging common tern and little tern, and non-breeding (wintering) red-throated diver. All three of these species are likely to be present in the Study Area and to interact with the Offshore Scheme.

7.3.28 The Offshore Scheme leaves the Suffolk Landfall approximately 1.07 km to the north and 1.7 km to the south of the Alde-Ore Estuary SPA and Minsmere-Walberswick SPA, respectively. The Offshore Scheme is within the foraging ranges of tern and gull features of these sites (Woodward, Thaxter, Owen, & Cook, 2019) and these three species have the potential to interact with the Offshore Scheme.

7.3.29 Herring and sandeel are considered particularly important prey items for seabirds (including red-throated diver). The continuation of prey availability within the Outer Thames Estuary SPA is considered essential to support the non-breeding population of red-throated diver through the construction phase of the Proposed Project. As shown in **Application Document 6.2.4.3 Part 4 Marine Chapter 3 Fish and Shellfish Ecology** and **Application Document 6.2.4.4 Detailed Spawning Analysis of Herring and Sandeel**, only small portions of the Outer Thames Estuary SPA overlap with preferred or marginal herring habitat, with a large proportion of the SPA falling within habitat unsuitable for herring.

7.3.30 Herring and sandeel spawning and nursery grounds in the North Sea are widespread and cover a large proportion of the North Sea (see **Application Document 6.2.4.3 Part 4 Marine Chapter 3 Fish and Shellfish Ecology**). Therefore, the number of available prey to be impacted compared to the wider availability in the North Sea is considered to be small. Furthermore, effects to herring and sandeel habitat are expected to be highly localised, and due to the dynamic nature of the sandy sediment present in herring and sandeel habitats, the seabed is expected to recover rapidly to normal conditions following the disturbance.

7.3.31 As a result, the impact of changes in prey availability on seabirds (including red-throated diver) is not anticipated to have an AEoSI on the qualifying features of the Outer Thames Estuary SPA, Alde-Ore Estuary SPA and Ramsar, or Minsmere-Walberswick SPA.

Operational phase

Introduction and spread of INNS

7.3.32 The risk of INNS introduction and spread is greatest in the intertidal area, where the introduction of cable protection may provide suitable substrate for INNS colonisation. Some studies have demonstrated the ability for artificial hard structures to function as artificial rocky reef, which are known to be preferred habitat for many INNS acting as ‘ecological stepping stones’ (Adams, Miller, Aleynik, & Burrows, 2014), although there remains uncertainty around this theory.

7.3.33 The only activities occurring within the intertidal area are located at the Kent Landfall. At this landfall, concrete mattresses will be used at trenchless entry/exit points over an area of 360 m^2. The landfall overlaps with the Sandwich Bay SAC. The landfall is also located 1.1 km from the Thanet Coast SAC. Sandwich Bay SAC is designated for dune habitats but includes mudflats and sandflats within its boundary. Thanet Coast SAC is designated for the protection of chalk reefs and subtidal sea caves. These chalk reefs host an unusually rich littoral flora community, with the Thanet coast remaining the sole known location for some algal species (JNCC, 2005). Several INNS are known to be already present along the Kent coast, including the algal species Japanese wireweed (*Sargassum muticum*) and wakame (*Undaria pinnatifida*) (McKnight, 2024), which are both known to compete with local species.

7.3.34 However, post-construction, concrete mattressing will be buried and thus the area of hard structures exposed in the intertidal with the potential for INNS colonisation is limited. Additionally, to ensure that the potential impact of INNS introduction is reduced, all rock and concrete mattresses used for cable protection will be cleaned and from a suitable source to match the local environment (control measure BE03 in **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice**). Moreover, an INNS Management Plan and Marine Biosecurity Plan will be produced to provide a framework for preventing the introduction and spread of INNS associated with the Proposed Project (control measure BE01 in **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice**; **Application Document 7.5.12 Outline Offshore Invasive Non Native Species Management Plan; Application Document 7.7 Marine Biosecurity Plan**). Therefore, there is not anticipated to be an AEoSI for the qualifying features of the Thanet Coast or Sandwich Bay SAC as a result of INNS introduction.

Disturbance to marine mammals from EMF emissions

7.3.35 Power cables do not emit electric fields directly, as the metal sheath physically protecting the cable ensures the electric field is entirely confined within the cable. However, they do emit magnetic fields, that can indirectly induce electric fields in the surrounding sea water and marine fauna.

7.3.36 Cetaceans are capable of sensing electromagnetic fields, an ability that enables them use differences in field direction, intensity, and inclination of the earth's geomagnetic field for orientation and navigation purposes. The migratory behaviour of many species indicates that they likely rely on the earth's magnetic field for navigation (Walker, Diebel, & Kirschvink, 2003). This includes the harbour porpoise, which is the qualifying feature of the Southern North Sea SAC (**Application Document 6.2.4.4 Part 4 Chapter 4 Marine Mammals**).

7.3.37 Project specific modelling has been conducted for bundled cables buried to a depth of 1 m (for bundled cables the magnetic fields from each cable cancel each other to a degree). For the bundled cable designs, the geomagnetic field and induced electric fields return to the background level at about 8 m from the seabed (**Application Document 6.3.4.7.B Electromagnetic Deviation Study).** In the unlikely occurrence of the worst-case scenario of two unbundled cables, this distance would be about 20 m. Thus, there is very limited potential for harbour porpoise, which will spend most of their time in the water column, to come into close contact with any EMF emissions. Indirect effects, through impacts on prey items are considered more likely, since evidence suggests that fish, and elasmobranchs in particular, have a higher sensitivity to EMF.

7.3.38 Harbour porpoise forage for sandeel. Modelling of sandeel distribution in the North Sea has indicated that important sandeel areas overlap with the Offshore Scheme (Gilles, et al., 2016). However, the impact of EMF on fish was considered not significant (**Application Document 6.2.4.3 Part 4 Marine Chapter 3 Fish and Shellfish Ecology** as there is likely to be only a very small footprint around the cable where an increase in EMF would be detectable. Furthermore, given the wide-ranging nature of harbour porpoise, it is likely that they will be capable of avoiding any EMF effects directly or indirectly, and can easily forage in other areas.

7.3.39 It is therefore unlikely that there would be a noticeable effect on marine mammal foraging, either directly or indirectly. Thus, there is not anticipated to be an AEoSI for the qualifying features of the Southern North Sea SAC as a result of EMF emissions.

Decommissioning Phase

7.3.40 In the event of the full removal of the cable, this would have the potential to cause similar impacts to the Construction Phase of the Proposed Project. Should the cable be left in-situ, there would likely be no impact pathways to benthic receptors. Thus, as a worst-case scenario, impacts during decommissioning may be of a similar magnitude to Construction Phase activities, depending upon the decommissioning option selected. Therefore, as a worst case, and for the purposes of this assessment, decommissioning impacts are considered to be very similar to construction phase impacts. For example, the scale and locations of any works to remove installed infrastructure (should it ever be required) are expected to be similar to that required for its installation.

7.4 Kent Onshore Scheme

Construction Phase

Direct loss of the SPA/Ramsar and SAC habitat

7.4.1 The buried HVDC cable would traverse Thanet Coast and Sandwich Bay SPA/Ramsar and Sandwich Bay SAC for a distance of approximately 3 km. This includes traversing the saltmarsh and upper mudflat, and the intertidal mudflat that constitutes most of Pegwell Bay at low tide.

7.4.2 **Application Document 6.2.1.3 Part 1 Introduction Chapter 3 Main Alternatives Considered** sets out the main alternatives considered in relation to the Kent Onshore Scheme and the reasons behind the decision to cross Thanet Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC by trenchless technique.

7.4.3 Geotechnical investigations for the project have confirmed that trenchless techniques such as HDD are feasible and therefore the DCO will not contain any provision for surface trenching through the saltmarsh of Thanet Coast & Sandwich Bay SPA/Ramsar or Sandwich Bay SAC. This contrasts with Nemo Link, which did contain such a provision, and ultimately did undertake surface works in the saltmarsh. The trenchless installation will be 15 m -18 m below the surface at the location of the saltmarsh within the SPA as set out in **Application Document 6.3.1.4.C Kent and Suffolk Landfall Feasibility Technical Assessment Report**. Therefore, no AEoSI of the SPA or SAC or Ramsar would arise through habitat loss.

7.4.4 Stuck drilling equipment is also a very low risk. If drilling equipment becomes stuck it will be freed by additional tooling and works at the entry or exit. The drill is too deep to consider excavating down to the equipment, other than the first 45 m (farmers field) and last 45 m (tidal flats beyond the saltmarsh). The chance of needing to excavate in the first / last 45 m is estimated at 1 in 200 based on previous projects.

7.4.5 This will ensure no AEoSI for the qualifying features of the Thanet Coast and Sandwich Bay SPA/Ramsar or Sandwich Bay SAC.

Noise and visual disturbance of Thanet Coast & Sandwich Bay SPA/Ramsar

7.4.6 Given the 3 dB change contour overlaps with the Thanet Coast & Sandwich Bay SPA/Ramsar, noise and visual disturbance of the SPA during construction was taken forward to appropriate assessment.

7.4.7 To inform the assessment of noise, in previous meetings with Natural England, it was agreed that:

- birds generally give no reaction to noise levels of 55 dB or below (Cutts & Allan, 1999);
- a change above 3 dB is required for the difference to be perceptible and therefore a 3 dB change should be used for the purposes of HRA screening.

7.4.8 However, it was also agreed that there is a difference between an increase in sound being perceptible as a change and it being disturbing. Therefore, while a 3 dB change is a suitable threshold for HRA screening (for example) a greater change would likely be needed to actually cause disturbance.

7.4.9 If the threshold for no reaction is 55 dB, and any noise would need to be at least 58 dB to be perceptibly louder (i.e. 3 dB greater than 55 dB), then it was agreed with Natural England that a reasonable precautionary threshold for significant disturbance would be 60 dB (i.e. 5 dB above 55 dB). RSPB confirmed in a meeting regarding this project that they would agree with the use of a 60 dB threshold.

7.4.10 With this in mind 60 dB LAmax contours, were calculated for all phases of the work. These are shown for the project as whole on **Appendix E Figure 5 Map of 60 dB average LAmax contour at Kent**. For the purposes of this modelling and in line with guidance, a 10 dB reduction has been allowed due to best practicable noise reduction means. In some cases close-board noise fencing will be the most appropriate method to achieve this 10 dB reduction, but there is potentially a 10 dB to 20 dB reduction available through the use of quieter plant, alternative methods and suitable handling techniques. The mapping showed that with standard noise mitigation included, the 60 dB contour would remain outside the SPA/Ramsar site. The use of best practicable methods to reduce noise is commitment B44 in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments**. There will therefore be no adverse effects on the integrity of Thanet Coast & Sandwich Bay SPA/Ramsar through noise.

Pollution of Thanet Coast & Sandwich Bay SPA/Sandwich Bay SAC

7.4.11 The potential risk of frac out, where drilling fluids reach the surface due to fissures in the geology while undertaking trenchless techniques beneath Pegwell Bay, has been considered. It is considered that frac out into the saltmarsh is a very low risk. If HDD is used, the drill will be within the chalk beneath the saltmarsh. Overlying the chalk are layers of clays that prevent the groundwater in the chalk aquifer from reaching the surface and they will also prevent the drilling fluid reaching the surface. If the DirectPipe method is used instead of HDD, the fluid pressure at the cutting face is balanced against the groundwater pressure, so there is insufficient pressure to cause frac out.

7.4.12 The Mitigation measures being implemented to minimise and address the risk of surface frac out or break out are contained in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** measure B09:

- Ensuring sufficient surveys have been undertaken to understand the ground conditions to inform the final design;
- Design a profile sufficiently deep for the methodology and conditions, with hydrofracture modelling used to check that there is a sufficient factor of safety;
- Use of a drilling fluids engineer to design and monitor the fluid properties;

- Ensure that the trenchless bore is sufficiently clean of cuttings during drilling;
- Monitoring fluid pressures in the bore, and returns to the entry pit, during drilling;
- The use of “spotters” i.e, personnel stationed above the onshore drill line to look for any frac out or break out; and
- If drilling fluid losses occur, lost circulation material (LCM) may be added to seal the ground. As a last resort, cementitious grout may be used to seal fractures.

7.4.13 In the very unlikely event that a frac out in the saltmarsh does occur, the standard approach that would be followed by drilling engineers is that:

- Drilling stops as soon as frac out is reported or suspected. This stops any further loss of fluid to the frac out location.
- The location of the frac out is established and based on advice from the ECOW, the most suitable remediation actions are determined.
- If the frac out is small in size and is not smothering any vegetation or breeding sites it may be left in situ. Seawater at high tide will break down the bentonite into its constituent parts of water and clay.
- If it is determined that it needs to be removed it can be either washed using pumps and seawater or freshwater to a safe location, or a small sump (30 cm x 30 cm x 30 cm) can be dug in a suitable location to allow a sump pump to remove the fluid. The pump and hoses can be hand carried to the location. Brushes or pumped water can be used to wash drilling fluid from the surrounding area into the sump.

7.4.14 Therefore, there is a high level of confidence that no adverse effect on the integrity of Thanet Coast & Sandwich Bay SPA/Ramsar or Sandwich Bay SAC will arise.

Operational Phase

Loss of functionally linked land for golden plover

7.4.15 **Application Document 6.2.1.3 Part 1 Introduction Chapter 3 Main Alternatives Considered** sets out the main alternatives considered in relation to the Kent Onshore Scheme and the reasons behind the decision to locate the Minster Converter Station and Substation within Minster Marshes.

7.4.16 The HRA screening identified that functionally-linked arable foraging land used by golden plover associated with Thanet Coast & Sandwich Bay SPA during early winter (October to December) would be lost permanently due to the Minster Converter Station and Substation.

7.4.17 Two methods of addressing this loss have been agreed in principle as being acceptable to Natural England:

- delivering wet grassland elsewhere within an area likely to be used by golden plover from the SPA/Ramsar; or
- managing an area of arable land closer to the SPA/Ramsar than the Minster Converter Station and Substation in such a way that it enhances the value of the land for golden plover for the duration of the scheme.

7.4.19 Natural England have advised (email via Discretionary Advice Service 09/08/24) that: '*…the hydrology and surrounding land use means that wet grassland is unlikely to be successful in this location… it may be worth exploring options to secure arable land closer to the coast* [than the field being lost] *and ensure it is farmed so that there is bare ground in winter. If this option is taken forward, we would expect no pesticides to be used on this land to ensure greater populations of soil invertebrates.'*

7.4.20 Ultimately, it was determined following hydrological investigation that creating an area of wet grassland in Minster Marshes or Ash Level would require manipulation of the water levels in the ditch system using the existing Internal Drainage Board control structures which may have effects on other farmland in the area. In addition, Natural England in correspondence over these proposals expressed uncertainty over whether such an area of wet grassland could be kept sufficiently wet. It was therefore decided that more certainty of delivery and efficacy existed over the second proposal of securing favourable long-term management of arable land for golden plover.

7.4.21 In order to confirm the area of habitat required, a calculation to determine the carrying capacity of arable land for golden plover has been utilized. The initial calculation based on the winter 2022-23 survey identified the following requirement:

- Assume the seasonal period for non-breeding golden plover is October to March = 183 days (seasonal presence).
- Golden plover survey data for the Proposed Project shows the only record of numbers exceeding 1% of the SPA population was a count of 370 birds in December 2022. Therefore, the monthly peak across the survey period (Oct-Mar) is 0, 0, 370, 0, 0, 0. Therefore, the annual peak mean is (370 / 6) = 61.67 individuals.
- Expressed as bird-days = 183 days x 61.67 individuals = 11,285.61 bird-days.
- According to published data (Gillings, Fuller, & Sutherland, 2007) the golden plover carrying capacity of arable land (bird-day per ha) is 1,560 bird-days per ha (in mixed arable farmland).
- 11,285.61 / 1,560 = 7.23 ha habitat creation requirement .

7.4.22 This calculation has been updated to take account of the full two seasons of wintering bird survey undertaken for the Kent Onshore Scheme. Since such a large flock was never recorded again (even with nocturnal surveys included in winter 2023-24) the calculated amount of land required is reduced:

- 61.67 (2022/23) + 3.17 (2023/24) = summed annual peak mean of 64.84 individuals / 2 = annual peak mean of 32.42 individuals.
- Expressed as bird-days = 183 days x 32.42 individuals = 5,932.86 bird-days.
- 5,932.86 / 1,560 = 3.80 ha habitat creation requirement .

7.4.23 However, to allow for the fact that some areas of a given land parcel may not be suitable (due for example to proximity to field hedgerow and tree boundaries), the need to avoid leaving 'orphaned' fragments of land, any existing use by birds, the fact that golden plover prefer large open areas, and the fact that a larger parcel would also mitigate any temporary habitat losses due to construction, a 10 ha minimum parcel size was identified as being necessary.

7.4.25 A series of rules were set to identify suitable parcels of land for golden plover mitigation:

- The mitigation must be a minimum of 10 ha in area, as the habitat need calculations (agreed with Natural England) identify a parcel of this size is required. This could be a single field, or a complex of adjacent fields provided there is minimum interruption of flightlines and sightlines between parcels (i.e. absence of tall, dense hedgerows).
- The field(s) must be as close or closer to the SPA/Ramsar than the Minster Converter Station field. This effectively means it must be within c. 1 km of the SPA/Ramsar.
- The field(s) must be in arable production (preferred) or capable of being converted to arable production.
- In the majority of years of a crop rotation, it must be possible to maintain bare ploughed ground for as long as possible between October and December.
- The management will minimise pesticide (herbicide and insecticide) use as much as possible. An absolute prohibition on pesticide use is being investigated, but to ensure that continued farming viability, is not compromised, a specific ban on soil applied insecticides (including seed treatments) is considered to be sufficient, as this will ensure no harm to the soil biota. Insecticides will not be applied to the Spring cereal crop after around mid-March, until it is harvested. Insecticides that affect soil invertebrates will not be applied.
- No public recreational access will be permitted to the area.
- There will be no topping, grazing, or application of any fertilisers, manure, or lime.
- There will be no application of herbicides to the area, apart from those containing the following permitted active ingredients:
    - amidosulfuron;
    - clodinafop-propargyl;
    - fenoxaprop-P-ethyl;
    - pinoxaden; and
    - tri-allate.
- Where the ground is bare some reploughing during the extended bare ground period may be useful to bring soil invertebrates to the surface.
- The field(s) must be available for the alternative cropping regime prior to the loss of the Minster Converter Station field (i.e., from winter 2026).
- The field(s) must be secured for the lifetime of the scheme or ‘in perpetuity’ (typically defined as 80 years), whichever is sooner. **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 of the Environmental Statement** for the DCO identifies that the design life for the Minster Converter Station and Substation is 40 years but that it is likely refurbishment would extend the life (given future electricity needs) rather than it being subject to decommissioning. If it was decommissioned it would likely be restored to agricultural use. Given the potential for the Converter Station to not be decommissioned, 80 years is an appropriate period to secure the mitigation.

7.4.26 These criteria identified a series of potential clusters of land that were discussed with Natural England and the Kent planning authorities. Following that discussion and further consideration by National Grid, including hydrological assessment, agriculture advice and landowner discussions, a parcel of land has been identified and included within the Order Limits in order to secure its delivery, the location of this land in relation to the SPA is shown in the **General Arrangement Plans (Sheet Six)** for the Kent Onshore Scheme and also in the Landscape and Ecology Management Plan, **Application Document 7.5.7.2.4 Minster Converter and Substation Enhancement Areas**. No individual field in this group meets the necessary requirement to be a minimum of 10 ha in size. However, there are no visual barriers between the fields in this cluster (with the boundaries being ditches rather than tall dense hedgerows); as such bringing all three fields forward together would meet the necessary requirements.

7.4.27 No conflicting development proposals on this land have been identified. The fields are within 500 m of the Thanet Coast & Sandwich Bay SPA/Ramsar site (the tidal River Stour) and approximately 2.5 km upstream of the confluence with Pegwell Bay. Non-breeding golden plover are known to congregate in the tidal reaches of the River Stour, particularly around the river mouth. This places it well within the 5 km zone of influence around the SPA identified for golden plover and electricity infrastructure development in Natural England guidance. Moreover, wintering bird surveys being undertaken since December 2024 have identified non-breeding golden plovers on site in small numbers (since the fields are not currently being managed in an optimal manner for the species).

7.4.28 The fields are also well placed being adjacent to South Richborough Pasture Local Wildlife Site. The fields are 60 m from Discovery Park at their closest and 440 m at their most distant. There are dense tree belts screening the fields from the business park. Moreover, the large size of the parcel (10 ha) compared to the area of land actually needed for mitigation (3.8 ha) enables considerable room to buffer proximity to the business park and dual carriageway to the east and River Stour Canal to the west.

7.4.29 The soils present within this cluster comprise predominantly one Soil Association: Newchurch 2. These soils are described as seasonally wet deep clay soils developed in marine alluvium, often used for winter cereals. According to **Application Document 6.2.3.6 Part 3 Kent Chapter 6 Agriculture & Soils** agricultural land is mapped as predominantly Grade 2 land on the Provisional Agricultural Land Classification (ALC) mapping (no detailed mapping is available).

7.4.30 Based on the characteristics of the soils and the predominance of high-grade land across this cluster, it is assumed that all fields are capable of supporting arable production on an on-going basis (all are currently under arable cultivation). The soils are relatively heavy (clay-rich) and thus would be susceptible to compaction as a result of agricultural operations. As part of implementation of the mitigation the fields would be assessed for compaction and any subsoiling requirements identified to maximize the number of soil invertebrates present (in particular earthworms).

7.4.31 Detailed information on maintenance and monitoring of the mitigation land, including responsibilities, is set out within **Application Document 7.5.7.2 Outline Landscape and Ecology Management Plan - Kent**. With this land included in the Kent Onshore Scheme and secured through inclusion in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments** and the outline Landscape and Ecology Management Plan, it can be concluded that no AEoSI for the qualifying features of the Thanet Coast & Sandwich Bay SPA/Ramsar will arise due to loss of functionally-linked land for golden plover associated with the SPA/Ramsar.

Collision risk and associated displacement

7.4.32 As identified in the HRA screening section, there is the potential for likely significant effects through collision of SPA birds with the new section of overhead powerline being installed to connect the Minster Converter Station and Substation to the existing Richborough to Canterbury overhead line.

7.4.33 A series of vantage point surveys have been undertaken during 2023, commencing in February and completing January 2024, to identify birds flying at potential collision height through the space which would be occupied by the new overhead line section. This is reported in **Application Document 6.2.3.2.F Appendix 3.2.F Vantage Point Survey Report incorporating Collision Risk Assessment**. A three-month bird corpse search was also undertaken across areas located in direct proximity to the existing Richborough to Canterbury overhead line south of the River Stour Canal in early 2024. This is reported in **Application Document 6.2.3.2.F Appendix 3.2.F Overhead Line Mortality Monitoring Report**. Using these data, a collision risk assessment has been undertaken and reviewed by Natural England. It is presented in Appendix C of this report.

7.4.34 The assessment of avian collision risk concludes that the species predicted to be transiting through an ‘at-risk zone’ in the greatest numbers are cormorant, greylag goose, and mallard. None of these are species for which either Thanet Coast & Sandwich Bay SPA or Stodmarsh SPA/Ramsar are designated. For the majority of the species considered, when applying an avoidance rate of 99.9%, which is supported by the results of corpse searches along the existing overhead line, this results in fewer than one individual potentially colliding with the proposed OHL annually. Even for species where the extrapolated number of transits through the at-risk zone generates a potential collision event that exceeds one individual per year, such as Cormorant, Greylag Goose, and Mallard, given the caveats in generating the extrapolated annual transits, these annual figures are low in comparison to regional populations.

7.4.35 Irrespective of these conclusions, the provision of bird diverters will further minimise any risk during adverse weather or low light conditions. These are secured in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments** for the DCO. Fitting power lines with devices to make them more visible to flying birds is widely used to mitigate bird collisions. A wide range of wire marking devices has been used, generally falling into three basic designs: spiral devices which wrap around the wire (and may act to reduce line vibration as well as making power lines more visible to birds), hanging devices which are suspended from the wire with fixed or swinging plates or flappers; and spheres (also known as aviation balls).

7.4.37 On other overhead powerlines around sensitive wetlands (an example being the Wildfowl and Wetland Trust reserve at Welney),[14] the bird diverters have spinning reflectors, with glow-in-the-dark panels, which makes them more visible for a time after dusk. Hanging deflectors are also used. It is considered that in the context of the scheme and species involved, that hanging deflectors, especially those with fluorescent markings offer the best solution to making the lines visible in adverse weather or low light conditions. These are different from the passive spiral ring diverters likely used on the existing Richborough to Canterbury overhead line. There are also numerous examples of powerlines crossing wetland sites that are nonetheless of national or international importance for birds e.g. Ouse Washes SPA, Nene Washes SPA, Upper Nene Valley Gravel Pits SPA, Thames Estuary & Marshes SPA, The Swale SPA, Medway Estuary & Marshes SPA. Moreover, the existing Richborough to Canterbury overhead line runs through wet grassland west of the Proposed Project. Aside from bird strike this also shows that wintering birds are not displaced from fields just because of presence of overhead lines. It is therefore concluded that no AEoSI would occur on the qualifying features of either Thanet Coast & Sandwich Bay SPA or Stodmarsh SPA/Ramsar due to collisions with the new section of overhead line.

Decommissioning Phase

7.4.38 For the purposes of this assessment, decommissioning impacts are considered to be very similar to construction phase impacts. As such, the impact pathways for the Construction phase that have been assessed at this stage are considered to encompass those associated with the Decommissioning phase. No additional European Sites or impact pathways, specifically associated with the Decommissioning phase have been identified for further assessment. Specifically regarding the buried cable through the saltmarsh of Sandwich Bay SAC and Thanet Coast to Sandwich Bay SPA/Ramsar, it is assumed that while the cables may be removed, the ducts would be left in place or at least not directly excavated, since these would be 15-18 m below the surface. As no AEoSI has been identified on qualify features of any European Sites associated with the Construction phase, no AEoSI has been concluded for the decommissioning phase.

[14] Partnership works to keep swans in the air | WWT)

8. In Combination Effects

8.1.1 In accordance with Planning Inspectorate Advice on Habitats Regulations Assessments the following will be considered for the HRA in combination assessment:

- Projects that are under construction;
- Permitted application(s) not yet implemented;
- Submitted application(s) not yet determined;
- All refusals subject to appeal procedures not yet determined;
- Projects on the Planning Inspectorate's National Infrastructure Programme of Projects; and
- Projects identified in the relevant development plan (and emerging development plans – with appropriate weight being given as they move closer to adoption) recognizing that much information on any relevant proposals will be limited and the degree of uncertainty which may be present.

8.2 Suffolk Onshore Scheme

8.2.1 The following plans or projects have been considered in combination: LionLink Interconnector, East Anglia ONE North Offshore Windfarm, East Anglia TWO Offshore Windfarm, Saxmundham to Pessenhall Water Mains Installation, Town Farm Solar Farm, Wissett Solar Farm, and South Saxmundham Garden Neighbourhood .

LionLink Interconnector, East Anglia ONE North Offshore Windfarm and East Anglia TWO Offshore Windfarm

8.2.2 These projects are all discussed together because they have similar impacts in broadly similar locations, on overlapping programmes, and could all therefore have disturbance or loss of functionally-linked land (particularly acid grassland) impacts on Sandlings SPA.

8.2.3 Disturbance of Sandlings SPA would only arise if multiple projects were to cause noise levels exceeding the 60 dB threshold agreed with Natural England and were to do so during the nightjar and woodlark nesting season. In combination effects would not arise due to works being undertaken for multiple projects in the same location at the same time, as space constraints would not allow for works close to the SPA to be undertaken for multiple projects simultaneously, even if the programme for the other schemes were to accelerate. Moreover, the noise zone of influence for East Anglia ONE North and East Anglia TWO is further north than that for Sea Link, and LionLink and therefore would not overlap.

8.2.5 A potential in combination effect could arise with the LionLink, and Sea Link projects following each other temporally, extending the overall potential disturbance period. However, it has been established for the Suffolk Onshore Scheme that disturbance of the SPA can be avoided by maintaining noise levels in the SPA to below 60 dB and/or avoiding the most potentially disturbing works near to the SPA (i.e. compound set up for the Proposed Project) during the nesting season. Therefore, it is possible for all projects to be constructed without disturbance of nesting nightjar and woodlark in Sandlings SPA.

8.2.6 Temporary loss of functionally-linked land for Sandlings SPA would arise from the Proposed Project through removal of acid grassland close to Sandlings SPA to enable the trenchless installation to be undertaken. This field would be occupied by surface construction infrastructure for approximately 6 months which would include the nightjar and woodlark nesting season. For the temporary duration of works this will be offset by leaving an area of arable land on sandy soils fallow and/or seeding it as acid grassland to be maintained for 30 years, which will have a long-term benefit.

8.2.7 East Anglia ONE North and East Anglia TWO already have requirements in their DCOs ensuring they will not have AEoSI on Sandlings SPA, including measures recommended by Natural England (specifically, all cable line construction works in the boundary, or within 200 m, of the Sandlings Special Protection Area SPA and Leiston–Aldeburgh SSSI is to be undertaken outside of the breeding bird season (1 February to 31 August for woodlark and 1 of April to 31 August for nightjar).

8.2.8 The LionLink project has not developed their impact assessment to a stage where mitigation requirements have been reported. Proposed mitigation for LionLink is therefore currently unknown but it can be assumed that the project will be subject to similar controls by statutory bodies to avoid an adverse effect on integrity. One option for doing this would be to undertake a similar exercise of creating acid grassland during construction which would (like the Proposed Project) result in a short-term net increase in foraging habitat given the amount of fallow land on sandy soils that will remain following works, until restored to a previous cropping regime. This would avoid any in combination effect.

8.2.9 Therefore, it can be concluded that delivery of these projects can be managed without an adverse ‘in combination’ effect on the integrity of qualifying features of Sandlings SPA or any other European Sites.

Saxmundham to Peasenhall Water Mains Installation

8.2.10 Disturbance of Sandlings SPA would only arise if multiple projects were to cause noise levels exceeding the 60 dB threshold agreed with Natural England and were to do so during the nightjar and woodlark nesting season. In combination effects would not arise due to works being undertaken for multiple projects in the same location at the same time, as space constraints would not allow for works close to the SPA to be undertaken for multiple projects simultaneously, even if the programme for the other schemes were to accelerate.

8.2.12 A potential in combination effect could arise with Saxmundham to Peasenhall Water Mains Installation depending on when it occurred. However, as discussed above, it has been established for the Proposed Project that disturbance of the SPA can be avoided by maintaining noise levels in the SPA to below 60 dB and/or avoiding the most potentially disturbing works near to the SPA (i.e., compound set up for the Proposed Project) during the nesting season. Therefore, it is possible for both projects to be constructed without disturbance of nesting nightjar and woodlark in Sandlings SPA.

8.2.13 There will be no significant disturbance of non-breeding curlew (an assemblage feature of Alde-Ore Estuary SPA), or of non-breeding birds using RSPB North Warren Reserve (which is functionally linked to both Minsmere-Walberswick SPA and Alde-Ore Estuary SPA) due to the Proposed Project, since the 60 dB contour will not materially impact those areas. Provided the Water Mains Installation project follows the same mitigation approach, no in combination effects would arise.

8.2.14 Therefore, it can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of any qualifying features of European Sites.

8.3 Offshore Scheme

8.3.1 Fourteen developments have been identified with pathways that may affect European Sites. The following plans or projects will be considered in combination: Sizewell C Nuclear Power Station, Neuconnect interconnector, GridLink Interconnector, North Falls Offshore Windfarm, East Anglia ONE North Offshore Windfarm, East Anglia TWO Offshore Windfarm, East Anglia THREE Offshore Windfarm, Nautilus Offshore Interconnector, Five Estuaries Offshore Windfarm, and LionLink Offshore Interconnector.

8.3.2 As agreed through consultation with Natural England, the Nemo Link interconnector and Thanet Offshore Windfarm cables are included within the in-combination assessment and assessed appropriately for benthic impacts

8.3.3 In relation to other fully operational projects, developments that will be completed prior to the Offshore Scheme construction activities, where little to no operation and maintenance activities are expected, are not considered as part of the cumulative assessment. These development include the following:

- Atlantic Crossing 1;
- Mercator;
- Pan European Crossing; and
- Tangerine.

Sizewell C Nuclear Power Station

8.3.4 Currently, there are three parts of this development that could result in cumulative effects with the Offshore Scheme; these are the proposed sea defences, a temporary jetty and cooling water system. An Environmental Impact Assessment and Habitats Regulations Assessment has already been carried out for the Sizewell C Nuclear Power Station, which included the recommendation of mitigation measures.

8.3.5 The boundary for all offshore developments at Sizewell C is 5.38 km northeast of the Offshore Scheme. This falls within the boundaries of the Outer Thames Estuary SPA and Southern North Sea SAC and the ZOI for the temporary increase of SSC and deposition. Thus, there is the potential for some overlap in a temporary increase in SSC and sediment deposition. However, at this distance any increased SSC will be very small, and any sediment deposition will be limited to a thickness that is unlikely to be detectable in the field. Therefore,. it can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of any qualifying features of European Sites via this impact pathway.

8.3.6 To mitigate against the introduction and spread of INNS via the addition of cable protection, all rock and concrete mattresses used for cable protection will be clean and from a suitable source (control measure BE03 in **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice**) and an INNS Management Plan and Marine Biosecurity Plan will be produced to provide a framework for preventing the introduction and spread of INNS associated with the Proposed Project (control measure BE01 in **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice**; **Application Document 7.5.12 Outline Invasive Non Native Species Management Plan**; and **Application Document 7.7 Marine Biosecurity Plan**). Therefore, the risk of a cumulative impact from the accidental introduction and spread of INNS is not anticipated, and Therefore, it can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of any qualifying features of European Sites via this impact pathway.

8.3.7 Simultaneous construction activities in and adjacent to the marine environment could increase the levels of disturbance to birds occurring in the marine environment. However, the Sizewell C Offshore Works would be located at a suitable distance away (approx. 5 km) from the Proposed Project for cumulative effects not to occur, particularly given the mobile nature of the features and the low sensitivity to disturbance in the marine environment shown by gulls and terns. Appropriate commitments are provided in the Sizewell C EIA to secure suitable mitigation measures to minimise project specific impacts. Therefore, it can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of any qualifying features of European Sites.

NeuConnect Interconnector

8.3.8 The NeuConnect HVDC subsea cable crosses the Offshore Scheme at KP 50.7, traversing both the Southern North Sea SAC and the Outer Thames Estuary SPA. Construction commenced in 2023 with full operation planned for 2028.There is, therefore, the potential for some overlap in a temporary increase in SSC and sediment deposition.

8.3.9 However, as coarse sediment fractions (gravel and coarse sand) re-deposit within a few metres of the disturbance, any significant increase in SSC and deposition will have a limited area of effect, localised to the Proposed Project cable. Therefore, given the limited and temporary nature of any significant impact, any observable cumulative effects are extremely unlikely.

8.3.11 Finer sediment fractions (including fine sands, silts, and clays) will be transported by prevailing tides and currents, this will cause SSC levels to reduce across the areas associated with NeuConnect and the Offshore Scheme as the particles are dispersed through the water column and diluted over a wider area. Additionally, the likelihood of overlap of the construction windows of these projects low and thus any likelihood of a cumulative impact is also low. It can therefore be concluded that the Proposed Project and the NeuConnect Interconnector would not pose a significant cumulative effect on qualifying features of the European Sites.

GridLink Interconnector

8.3.12 The Gridlink HVDC subsea cable crosses the Offshore Scheme at KP101.3, between the Southern North Sea SAC and Margate and Long sands SAC, and adjacent to the Outer Thames Estuary SPA. This falls within the ZOI for the temporary increase of SSC and deposition, thus there is the potential for some overlap in a temporary increase in SSC and sediment deposition.

8.3.13 However, as coarse sediment fractions (gravel and coarse sand) re-deposit within a few metres of the disturbance, any significant increase in SSC and deposition will have a limited area of effect, localised to the Proposed Project cable. Therefore, given the limited and temporary nature of any significant impact, any observable cumulative effects are extremely unlikely.

8.3.14 Finer deiment fractions (including fine sands, silts and clays) will be transported further by prevailing tides and currents, this will cause SSC levels to reduce across the area associated with GridLink and the Offshore Scheme as the particles are dispersed through the water column and diluted over a wider area. Additionally, the likelihood of overlap of the construction windows of these projects is low and thus any likelihood of a cumulative impact is also low. Therefore, it can be concluded that delivery of these projects can be managed without an adverse ‘in combination’ effect on the integrity of any qualifying features of European Sites.

North Falls Offshore Windfarm

8.3.15 The DCO application for North Falls Offshore Windfarm was submitted to Planning Inspectorate in July 2024 with construction commencing in 2025/2026 under the current programme. Commercial operation of the array and associated infrastructure is scheduled by 2030.

8.3.16 The northern export cable corridor crosses the Offshore Scheme at approximately KP 52.0, whilst the southern corridor crosses at KP 53.0. These crossings are located in the Outer Thames Estuary, 40 km from the coastline (North Falls Offshore Windfarm, 2023), therefore, falling within the ZOI for the temporary increase of SSC and deposition resulting from the Offshore Scheme, thus creating some potential for overlap. However, any increase SSC will be very minor, and any sediment deposition will be limited to a thickness which is unlikely to be detectable in the field. Any observable cumulative effects to qualifying features of European Sites from the Offshore Scheme and North Falls Offshore Windfarm are highly unlikely to occur. Therefore, it can be concluded that delivery of these projects can be managed without an adverse ‘in combination’ effect on the integrity of any qualifying features of European Sites

East Anglia ONE North Offshore Windfarm and East Anglia TWO Offshore Windfarm

8.3.17 The East Anglia ONE North Order Limit is located approximately 0.36 km north east of the Offshore Scheme. The export cable corridor for East Anglia TWO Windfarm is approximately 350 m from the northern extent of the Offshore Scheme, in shallow waters close to the Suffolk Landfall inside the Outer Thames Estuary SPA and Southern North Sea SAC boundary.

8.3.18 Thus, there is potential for some overlap in the ZOI for the potential impact of a temporary increase in SSC and deposition. The water column may experience an increase in suspended sediment concentration and turbidity during simultaneous construction operations across a wider area. However, any increase in SSC will be very small, and any sediment deposition will be limited to a thickness which is unlikely to be detectable in the field. Therefore, any observable cumulative effects are extremely unlikely to affect European Sites via this construction pathway.

8.3.19 Simultaneous or protracted cable laying from multiple projects could increase the number of project-related vessels (and thus sound and visual disturbance) in areas supporting species sensitive to disturbance, in particular red-throated diver (considered to be the most sensitive) as well as increasing temporary disturbance to foraging habitats and further decreasing water quality.

8.3.20 Both projects are located in an area already characterised by high levels of shipping activity and vessels used in both projects will be slow moving and only present in discrete areas for a short amount of time. The cumulative disturbance of seabed habitat and potential temporary loss of foraging opportunities will be small-scale and quickly recoverable. Any reduction in water quality from increased SSC are likely to be highly localised over a small spatial overlap where East Anglia ONE North Offshore Windfarm is in close proximity to the Offshore Scheme in comparison to the total amount of foraging habitat for seabirds and waterbirds in the North Sea.

8.3.21 Effects from EMF and thermal emissions on benthic ecology receptors associated with the Proposed Project were concluded to be extremely limited and of a negligible magnitude (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**). Therefore, any cumulative effects will be local and small in scale and thus not considered to be significant.

8.3.22 In isolation both projects are unlikely to result in significant effects to red-throated diver or other birds. However, unmitigated, there is the potential for construction activities associated with both projects to act cumulatively in generating a level of sustained or protracted disturbance, that could sequentially disturb or increase the frequency with which red-throated diver is displaced. Therefore, to mitigate against cumulative effects on red-throated diver, National Grid has committed to implementing a full seasonal restriction between 1 November – 31 March for Proposed Project offshore cable installation activities in the Outer Thames Estuary SPA and a reduced seasonal restriction between 1 January – 31 March for landfall cable installation activities at the Suffolk Landfall in Aldeburgh. These restrictions exclude the pre-lay grapnel run as these activities have an even lower disturbance profile than the installation works themselves, i.e., fewer vessels, shorter working period. Works at the Suffolk landfall are away from areas recorded as supporting higher concentrations of red-throated diver and therefore, even with a reduced seasonal restriction no disturbance to significant concentrations of red-throated diver are predicted. This is secured in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and**

Commitments (REAC) and **Application Document 7.8 Red Throated Diver Protocol**.

8.3.23 As a result, it can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of any qualifying bird features of European Sites.

East Anglia THREE Offshore Windfarm

8.3.24 **East Anglia THREE Offshore Windfarm** began construction in July 2022 and is scheduled to be completed by 2026, which would result in no temporal interaction during construction with the Offshore Scheme. Should East Anglia THREE be delayed there may be some potential for overlap in a temporary increase in SSC and sediment deposition within the Outer Thames Estuary SPA and Southern North Sea SAC. However, any increased SSC will be very minor, and any sediment deposition will be limited to a thickness which is unlikely to be detectable in the field. Therefore, any cumulative effects on the European Sites are considered highly unlikely.

8.3.25 Effects from EMF and thermal emissions on benthic ecology receptors associated with the Proposed Project were concluded to be extremely limited and of a negligible magnitude (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**). Therefore, any cumulative effects will be local and small in scale so not considered to be significant.

8.3.26 Simultaneous or protracted cable laying from multiple projects could increase the number of project-related vessels (and thus sound and visual disturbance) in areas supporting species sensitive to disturbance, in particular red-throated diver, as well as increasing temporary disturbance to foraging habitats and further decreasing water quality.

8.3.27 Both projects are located in an area already characterised by high levels of shipping activity and vessels used in both projects will be slow moving and only present in discrete areas for a short amount of time. The cumulative disturbance of seabed habitat and potential temporary loss of foraging opportunities will be small-scale and quickly recoverable. Any reduction in water quality from increased SSC are likely to be highly localised over a small spatial overlap where East Anglia THREE Offshore Windfarm is in close proximity to the Proposed Project in comparison to the total amount of foraging habitat for seabirds and waterbirds in the North Sea.

8.3.28 Effects from EMF and thermal emissions on benthic ecology receptors associated with the Proposed Project were concluded to be extremely limited and of a negligible magnitude (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**). Therefore, any cumulative effects will be local and small in scale so not considered to be significant.

8.3.30 In isolation both projects are unlikely to result in significant effects to red-throated diver or other birds. However, unmitigated, there is the potential for construction activities associated with both projects to act cumulatively in generating a level of sustained or protracted disturbance, that could sequentially disturb or increase the frequency with which red-throated diver are displaced. Therefore, to mitigate against cumulative effects on red-throated diver, National Grid has committed to implementing a full seasonal restriction between 1 November – 31 March for Proposed Project offshore cable installation activities in the Outer Thames Estuary SPA and a reduced seasonal restriction between 1 January – 31 March for landfall cable installation activities at the Suffolk Landfall in Aldeburgh. These restrictions exclude the pre-lay grapnel run. As a result, for qualifying bird species, no AEoSI on the Outer Thames Estuary SPA is anticipated, this it can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of the European Sites.

Nautilus Offshore Interconnector

8.3.31 Currently, the Nautilus potential routeing options currently overlap with the Offshore Scheme. However, there was no detailed ecological impact assessment in the public domain at time of writing, with non-statutory consultation and community engagement closed in October 2021 with the application now expected to be submitted in 2028. No construction programme is available so worst-case temporal overlap is assumed.

8.3.32 Their proposed landfall options are inside the Outer Thames Estuary SPA and Southern North Sea SAC boundary. Thus, there is potential for some overlap in the ZOI for the potential impact of a temporary increase in SSC and deposition. However, any increase SSC will be very minor, and any sediment deposition will be limited to a thickness which is unlikely to be detectable in the field. Therefore, any observable cumulative effects are extremely unlikely pose a significant cumulative effect on the European Sites.

8.3.33 Simultaneous or protracted cable laying from multiple projects could increase the number of project-related vessels (and thus sound and visual disturbance) in areas supporting species sensitive to disturbance, in particular red-throated diver (considered to be the most sensitive), as well as increasing temporary disturbance to foraging habitats and further decreasing water quality.

8.3.34 Both projects are located in an area already characterised by high levels of shipping activity and vessels used in both projects will be slow moving and only present in discrete areas for a short amount of time. The cumulative disturbance of seabed habitat and potential temporary loss of foraging opportunities would be small-scale and quickly recoverable. Any reduction in water quality from increases in suspended sediment are likely to be highly localised over a small spatial overlap where the Nautilus Offshore Interconnector is in close proximity to the Proposed Project in comparison to the total amount of foraging habitat for seabirds and waterbirds in the North Sea.

8.3.36 In isolation both projects are unlikely to result in significant effects to red-throated diver or other birds. However, unmitigated, there is the potential for construction activities associated with both projects to act cumulatively in generating a level of sustained or protracted disturbance, that could sequentially disturb or increase the frequency with which red-throated diver are displaced. Therefore, to mitigate against cumulative effects on red-throated diver, National Grid has committed to implementing a full seasonal restriction between 1 November – 31 March for Proposed Project offshore cable installation activities in the Outer Thames Estuary SPA and a reduced seasonal restriction between 1 January – 31 March for landfall cable installation activities at the Suffolk Landfall in Aldeburgh. These restrictions exclude the pre-lay grapnel run as these activities have an even lower disturbance profile than the installation works themselves, i.e., fewer vessels, shorter working period. It can be concluded that delivery of these projects can be managed without an adverse 'in combination' effect on the integrity of European Sites. .

Five Estuaries Offshore Windfarm

8.3.37 The Five Estuaries northern export cable crosses the Offshore Scheme at KP 50.181 and southern corridor at KP 52.719, traversing both the Outer Thames Estuary SPA and Southern North Sea SAC. Construction is due to commence in 2027 with full operation in 2030. There is therefore potential overlap during the construction, operation and decommissioning phases, due to cables crossing.

8.3.38 Although there is the potential for some overlap in a temporary increase in SSC and sediment deposition, any increase SSC will be very minor, and any sediment deposition will be limited to a thickness which is unlikely to be detectable in the field. Additionally, the features of the European Sites are not considered to be sensitive to the effects of SSC. Therefore, cumulative effects from the Offshore Scheme and Five Estuaries Offshore Windfarm are highly unlikely to occur.

8.3.39 Simultaneous or protracted cable laying from multiple projects could increase the number of project-related vessels (and thus sound and visual disturbance) in areas supporting species sensitive to disturbance, in particular red-throated diver (considered to be the most sensitive), as well as increasing temporary disturbance to foraging habitats and further decreasing water quality.

8.3.40 Both projects are located in an area already characterised by high levels of shipping activity and vessels used in both projects will be slow moving and only present in discrete areas for a short amount of time. The cumulative disturbance of seabed habitat and potential temporary loss of foraging opportunities will be small-scale and quickly recoverable. Any reduction in water quality from increases suspended sediment are likely to be highly localised over a small spatial overlap where Five Estuaries Offshore Windfarm crosses the Proposed Project in comparison to the total amount of foraging habitat for seabirds and waterbirds in the North Sea.

8.3.42 In isolation both projects are unlikely to result in significant effects to red-throated diver or other birds. However, unmitigated, there is the potential for construction activities associated with both projects to act cumulatively in generating a level of sustained or protracted disturbance, that could sequentially disturb or increase the frequency with which red-throated diver are displaced. Therefore, to mitigate against any cumulative effects on red-throated diver, National Grid has committed to implementing a full seasonal restriction between 1 November – 31 March for Proposed Project offshore cable installation activities in the Outer Thames Estuary SPA and a reduced seasonal restriction between 1 January – 31 March for landfall cable installation activities at the Suffolk Landfall in Aldeburgh. These restrictions exclude the pre-lay grapnel run as these activities have an even lower disturbance profile than the installation works themselves, i.e., fewer vessels, shorter working period. Works at the Suffolk landfall are away from areas recorded as supporting higher concentrations of red-throated diver and therefore, even with a reduced seasonal restriction no disturbance to significant concentrations of red-throated diver are predicted. This secured in **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)** and **Application Document 7.8 Red Throated Diver Protocol**.

8.3.43 As a result, for all qualifying bird species, no in combination AEoSI of the Outer Thames Estuary SPA is anticipated..

LionLink Offshore Interconnector

8.3.44 Construction of LionLink is due to commence in 2027 with the final connection date being in 2029 under the current schedule based on project engagement with National Grid Ventures.

8.3.45 The marine cables are unlikely to cross the Offshore Scheme. The direction of the Lionlink cable and the current emerging landfall preference for Lionlink is at Southwold/Reydon and an alternative location at Walberswick, approximately 20 km from the Offshore Scheme's Suffolk Landfall (LionLink, 2024). LionLink will however traverse both the Outer Thames Estuary SPA and Southern North Sea SAC and therefore there is the potential for some overlap in a temporary increase in SSC and sediment deposition. Any increase SSC will be very minor, and any sediment deposition will be limited to a thickness which is unlikely to be detectable in the field. Additionally, the features of the European Sites are not considered to be sensitive to the effects of SSC Therefore, cumulative effects from the Offshore Scheme and the LionLink Interconnector are highly unlikely to occur.

8.3.46 Simultaneous or protracted cable laying from multiple projects could increase the number of project-related vessels (and thus sound and visual disturbance) in areas supporting species sensitive to disturbance, in particular red-throated diver, as well as increasing temporary disturbance to foraging habitats and further decreasing water quality.

8.3.47 Both projects are located in an area already characterised by high levels of shipping activity and vessels used in both projects will be slow moving and only present in discrete areas for a short amount of time. The cumulative disturbance of seabed habitat and potential temporary loss of foraging opportunities will be small-scale and quickly recoverable. Any reduction in water quality from increases in suspended sediment are likely to be highly localised over a small spatial overlap where the Lionlink is in close proximity to the Proposed Project in comparison to the total amount of foraging habitat for seabirds and waterbirds in the North Sea.

8.3.48 In isolation both projects are unlikely to result in significant effects to red-throated diver or other birds. However, unmitigated, there is the potential for construction activities associated with both projects to act cumulatively in generating a level of sustained or protracted disturbance, that could sequentially disturb or increase the frequency with which red-throated diver are displaced. However, to mitigate against any cumulative effects on red-throated diver, National Grid has committed to implementing a full seasonal restriction between 1 November – 31 March for Proposed Project offshore cable installation activities in the Outer Thames Estuary SPA and a reduced seasonal restriction between 1 January – 31 april for landfall cable installation activities at the Suffolk Landfall in Aldeburgh. These restrictions exclude the pre-lay grapnel run as these activities have an even lower disturbance profile than the installation works themselves, i.e., fewer vessels, shorter working period. Works at the Suffolk landfall are away from areas recorded as supporting higher concentrations of red-throated diver and therefore, even with a reduced seasonal restriction no disturbance to significant concentrations of red-throated diver are predicted. As a result, for all qualifying bird species, no in combination AEoSI on the qualifying features of the Outer Thames Estuary SPA is anticipated.

Hanson Aggregate Marine Ltd Area 528/2

8.3.49 The application for this site was submitted in 2016, with a commencement date of 1 August 2017, and an end date of 31 July 2024. Therefore, no temporal interaction with the Proposed Project is anticipated, and cumulative effects on the qualifying features of European Sites are considered highly unlikely.

NEMO Link

8.3.50 NEMO Link intersects the Offshore Scheme at KP 113.1. As this project has been operational for several years, it does not fit into the criteria for in combination development set out in the Planning Inspectorate's Advice on Habitats Regulations Assessments. However, it has been added into the in combination assessment at the request of Natural England.

8.3.51 NEMO Link has been fully operational since 31 January 2019. Therefore, there is no construction overlap between the projects, thus eliminating in-combination effects on benthic features via SSC and sediment deposition.

8.3.52 NEMO Link underwent EIA with any mitigation measures required committed to and delivered under its consent. Any operational impacts to birds are expected to be highly localised and very minor. Red-throated diver has been identified as a sensitive receptor for construction activities associated with both NEMO Link and the Proposed Project, with operation and maintenance activities expected to occur on a much smaller scale compared to the construction phase.

8.3.53 As a result, for all qualifying bird species, no observable cumulative effects are anticipated.

Thanet Offshore Windfarm

8.3.54 As this project has been operational for several years, it does not fit into the criteria for in combination development set out in the Planning Inspectorate's Advice on Habitats Regulations Assessments. However, it has been added into the in combination assessment at the request of Natural England.

8.3.55 Thanet Offshore Windfarm export cables intersect the Offshore Scheme on the approach to the Kent Landfall. However, planning permission for the project was granted in 2006 with the windfarm officially opening in 2010. Therefore, it is not considered possible that there will be any cumulative impacts from construction phase activities.

8.3.56 Thanet Offshore Windfarm export cables intersect the Offshore Scheme at KP 107.594 and KP 107.647. and intersects Sandwich Bay SAC. Any direct loss of benthic habitats and species at this crossing does not constitute a cumulative effect as the marine environment at the crossing point is the current baseline, impacts upon which are already considered in **Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**.

8.3.57 Thanet Offshore Windfarm is now operational and has undergone EIA with its own mitigation measures set committed to and delivered under its consent. Any operational impacts to birds are expected to be highly localised and very minor. Red-throated diver has been identified as a sensitive receptor for construction activities associated with both Thanet Offshore Windfarm and the Proposed Project. However, operation and maintenance activities are expected to occur on a much smaller scale compared to the construction phase.

As a result, for all qualifying bird species, no observable cumulative effects are anticipated

London Array Offshore Windfarm

8.3.58 As this project has been operational for several years, it does not fit into the criteria for in combination development as part of the baseline set out in the Planning Inspectorate's Advice on Habitats Regulations Assessments. However, it has been added into the in combination assessment at the request of Natural England

8.3.59 The export cable associated with this windfarm does not cross the Offshore Scheme boundary. Construction of phase 1 of the wind farm began in 2011 and inaugurated in 2013. Therefore, there is no temporal interaction with the Proposed Project anticipated during the construction phase of the Offshore Scheme, and any cumulative effects on European Sites are considered highly unlikely.

8.3.60 The London Array Offshore Windfarm is now operational. Any operational impacts to birds are expected to be highly localised and very minor. Red-throated diver has been identified as a sensitive receptor for construction activities associated with both Thanet Offshore Windfarm and the Proposed Project. However, operation and maintenance activities are expected to occur on a much smaller scale compared to the construction phase.

8.3.61 As a result, for all qualifying bird species, no observable cumulative effects are anticipated.

8.4 Kent Onshore Scheme

8.4.1 No in combination effects other than loss of functionally-linked land are identified as requiring appropriate assessment given the distance of the nearest significant surface works in the Kent Onshore Scheme from the SPA/Ramsar site to the SPA (approximately 470m from the trenchless installation pit) and the absence of any other projects that may involve direct loss of the SPA/Ramsar. This is also the case because of the distance of the Kent Onshore Scheme from Stodmarsh SPA/SAC/Ramsar and the absence of any other scheme including new overhead lines across the River Stour. This means, for example, that the SPA/Ramsar site is too far from the Kent Onshore Scheme to be affected by noise to discuss potential for in combination effects from other pathways.

8.4.2 Manston Airport, Residential Development Canterbury Road Ramsgate, Stonelees Golf Course Expansion, Richborough Energy Park, Goshall Valley Solar Farm, Land On The North East Side Of Nash Road, Land North and East of Canterbury Road, Land South of Westgate and Garlinge, Land On South Side Of Manston Court Road And West Side Of Haine Road, Land On The North West And South East Sides Of Shottendane Road, and Spitfire Green

8.4.3 The following plans or projects are considered in combination: Manston Airport, Residential Development, Canterbury Road, Ramsgate, Stonelees Golf Course Expansion, Richborough Energy Park, Goshall Valley Solar Farm, Land On The North East Side Of Nash Road, Land North and East of Canterbury Road, Land South of Westgate and Garlinge, Land On South Side Of Manston Court Road And West Side Of Haine Road, Land On The North West And South East Sides Of Shottendane Road, and Spitfire Green. They are discussed together as the potential pathway for in combination effects with the Kent Onshore Scheme is the same for each.

8.4.4 Given that some parts of the Kent Onshore Scheme support significant numbers of golden plover, the Proposed Project has the potential for effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, which according to Natural England guidance can be affected by electricity infrastructure development up to 5 km from the SPAs for which they are designated. All the projects screened into Appropriate Assessment in combination have the potential for similar effects on golden plover associated with Thanet Coast & Sandwich Bay SPA, through loss of functionally-linked habitat, given they are also located within 5 km of the SPA.

8.4.5 However, with the project taking a precautionary approach to mitigation (given large numbers of golden plover were only recorded in December 2022 out of two seasons of non-breeding bird survey) it is considered that the delivery of mitigation for loss of golden plover foraging habitat would ensure no net loss of such habitat as a result of the Proposed Project thus avoiding any in combination effects even if such losses did arise from this other plan or project. This mitigation measure is secured through **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**, secured through DCO Schedule 3 Requirement 6. As a result of this mitigation, no residual effects are identified to remain. The projects identified may themselves result in loss of functionally-linked habitat, pending the results of detailed bird surveys for those projects, but that is something for them to assess based on surveys for their applications and then mitigate as necessary. The contribution of the Proposed Project to loss of functionally-linked land is addressed by the mitigation proposed irrespective of additional loss of functionally-linked land from those other projects. As such no in combination adverse effects on integrity are anticipated.

8.5 Transboundary Effects

8.5.1 All works associated with the Proposed Project fall within the UK jurisdiction (12 NM). Given the distance of the Proposed Project from French waters (approximately 25 km), no likely significant transboundary effects have been identified.

9. Conclusion

9.1.1 The Proposed Project will not result in an adverse effect on the integrity of any European Sites either alone or in combination with other plans or projects.

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Appendix A Table of European Sites and impact pathways

Summary of impact pathways and qualifying features for each European Site considered in the HRA

HRA Stage	Stage of Scheme	Scheme	Impact Pathway	Habitats Sites	Qualifying Features
Screening	Construction	Suffolk Onshore	Direct habitat loss	All European Sites	Various
		Kent Onshore	Direct habitat loss	All European Sites	Various
		Suffolk Onshore	Loss of functionally-linked land	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
				Alde-Ore Estuary SPA/Ramsar	Wintering populations of: • Ruff (*Philomachus pugnax*); • Avocet (*Recurvirostra avosetta*); and • Redshank (*Tringa totanus*). Breeding populations of: • Marsh Harrier (*Circus aeruginosus*); • Lesser black-backed gull (*Larus fuscus*); • Avocet (*Recurvirostra avosetta*); • Sandwich tern (*Sterna* sandvicensis); and • Little tern (*Sterna albifrons*).
				Outer Thames Estuary SPA	Wintering populations of: • Red-throated diver (*G. stellata*). Breeding populations of: • Common tern (*Sterna hirundo*); and • Little tern (*S. albifrons*).
		Kent Onshore	Loss of functionally-linked land	Thanet Coast & Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
				Stodmarsh SPA/Ramsar	• Bittern (*Botaurus stellaris*), Non-breeding • Gadwall (*Anas strepera*), Breeding and Non-breeding • Shoveler (*Anas clypeata*), Non-breeding • Hen harrier (*Circus cyaneus*), Non-breeding • Waterbird assemblage • Breeding bird assemblage

Suffolk Onshore	Air quality (dust and exhaust emissions)	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
Kent Onshore	Air quality (dust and exhaust emissions)	Sandwich Bay SAC	• Embryonic shifting dunes. • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram. • Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland. • Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow. • Humid dune slacks.
		Thanet Coast and Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
Offshore	Temporary physical disturbance to benthic habitats and species	Thanet Coast SAC	• Reefs; and • Submerged or partially submerged sea caves.
		Margate and Long Sands SAC	• Sandbanks which are slightly covered by sea water all the time.
Offshore	Temporary increase in SSC and sediment deposition leading to increased turbidity and smothering effects	Thanet Coast SAC	• Reefs; and • Submerged or partially submerged sea caves.
		Margate and Long Sands SAC	• Sandbanks which are slightly covered by sea water all the time.
Offshore	Changes to marine water quality during cable installation and cable lay from the use of drilling fluids	Thanet Coast SAC	• Reefs; and Submerged or partially submerged sea caves.
		Thanet Coast & Sandwich Bay SPA	• European golden plover (*Pluvialis apricaria)* (Non-breeding). • Ruddy turnstone (*Arenaria interpres)* (Non-breeding). • Little tern (*Sterna albifrons*) (Breeding).
		Sandwich Bay SAC	• Embryonic shifting dunes. • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram. • Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland.

			• Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow. • Humid dune slacks.
Suffolk Onshore	Pollution (terrestrial)	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
Kent Onshore	Pollution (terrestrial)	Thanet Coast & Sandwich Bay SPA	• European golden plover (*Pluvialis apricaria)* (Non-breeding). • Ruddy turnstone (*Arenaria interpres)* (Non-breeding). • Little tern (*Sterna albifrons*) (Breeding).
		Sandwich Bay SAC	• Embryonic shifting dunes. • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram. • Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland. • Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow. • Humid dune slacks.
		Stodmarsh SAC	• Desmoulin’s whorl snail (*Vertigo moulinsiana*)
		Stodmarsh SPA	• Bittern (*Botaurus stellaris*), Non-breeding • Gadwall (*Anas strepera*), Breeding and Non-breeding • Shoveler (*Anas clypeata*), Non-breeding • Hen harrier (*Circus cyaneus*), Non-breeding • Waterbird assemblage • Breeding bird assemblage
Suffolk Onshore	Disturbance (noise and visual)	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
Kent Onshore	Disturbance (noise and visual)	Thanet Coast & Sandwich Bay SPA/Ramsar	• European golden plover (*Pluvialis apricaria)* (Non-breeding). • Ruddy turnstone (*Arenaria interpres)* (Non-breeding). • Little tern (*Sterna albifrons*) (Breeding).
Offshore	Underwater sound impacts	Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).

		Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
		Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).
		Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
Offshore	Vessel collision risk	Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).
		Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
		Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).
		Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
Offshore	Airborne sounds and visual disturbance	Outer Thames Estuary SPA	Wintering populations of: • Red-throated diver (*G. stellata*). Breeding populations of: • Common tern (*Sterna hirundo*); and • Little tern (*S. albifrons*).
		Alde-Ore Estuary SPA/Ramsar	Wintering populations of: • Ruff (*Philomachus pugnax*); • Avocet (*Recurvirostra avosetta*); and • Redshank (*Tringa totanus*). Breeding populations of: • Marsh Harrier (*Circus aeruginosus*); • Lesser black-backed gull (*Larus fuscus*); • Avocet (*Recurvirostra avosetta*); • Sandwich tern (*Sterna* sandvicensis); and • Little tern (*Sterna albifrons*).
		Minsmere-Walberswick SPA	Wintering populations of: • Gadwall (*Anas strepera*); • Northern shoveler (*Anas clypeata*); • Hen harrier (*Circus cyaneus*); and • Greater white-fronted goose (*Anser albifrons albifrons*). Breeding populations of:

			• Great bittern (*Botaurus stellaris*) • Gadwall (*Anas strepera*) • Eurasian teal (*Anas crecca*); • Northern shoveler (*Anas clypeata*); • Eurasian marsh harrier (*Circus aeruginosus*); • Pied avocet (*Recurvirostra avosetta*); • Little tern (*Sterna albifrons*); and • European nightjar (*Caprimulgus europaeus*).
		Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
		Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).
		Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
		Thanet Coast and Sandwich Bay SPA/Ramsar	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and • Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: • Little tern (*Sterna albifrons*) (Breeding).
	Offshore	Potential for indirect effects through impacts to prey species	Thanet Coast and Sandwich Bay SPA/Ramsar	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and • Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: • Little tern (*Sterna albifrons*) (Breeding).
			Outer Thames Estuary SPA	Wintering populations of: • Red-throated diver (*G. stellata*). Breeding populations of: • Common tern (*Sterna hirundo*); and • little tern (*S. albifrons*).
			Alde-Ore Estuary SPA/Ramsar	Wintering populations of: • Ruff (*Philomachus pugnax*);

				• Avocet (*Recurvirostra avosetta*); and • Redshank (*Tringa totanus*). Breeding populations of : • Marsh Harrier (*Circus aeruginosus*); • Lesser black-backed gull (*Larus fuscus*); • Avocet (*Recurvirostra avosetta*); • Sandwich tern (*Sterna* sandvicensis); and • Little tern (*Sterna albifrons*).
			Minsmere-Walberswick SPA/Ramsar	Wintering populations of: • Gadwall (*Anas strepera*); • Northern shoveler (*Anas clypeata*); • Hen harrier (*Circus cyaneus*); and • Greater white-fronted goose (*Anser albifrons albifrons*). Breeding populations of: • Great bittern (*Botaurus stellaris*) • Gadwall (*Anas strepera*) • Eurasian teal (*Anas crecca*); • Northern shoveler (*Anas clypeata*); • Eurasian marsh harrier (*Circus aeruginosus*); • Pied avocet (*Recurvirostra avosetta*); • Little tern (*Sterna albifrons*); and • European nightjar (*Caprimulgus europaeus*).
			Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).
			Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
			Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).
			Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
Operational	Offshore	Permanent loss of benthic habitats and species	Thanet Coast SAC	• Reefs; and • Submerged or partially submerged sea caves.
			Margate and Long Sands SAC	• Sandbanks which are slightly covered by sea water all the time.

	Offshore	Introduction and spread of INNS via the addition of cable protection	Thanet Coast SAC	• Reefs; and • Submerged or partially submerged sea caves.
			Sandwich Bay SAC	• Embryonic shifting dunes. • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram. • Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland. • Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow. • Humid dune slacks.
	Offshore	Disturbance due to thermal emissions	Margate and Long Sands SAC	• Sandbanks which are slightly covered by sea water all the time.
			Thanet Coast SAC	• Reefs; and • Submerged or partially submerged sea caves.
	Offshore	Effects of EMF emissions	Thanet Coast SAC	• Reefs; and • Submerged or partially submerged sea caves.
			Margate and Long Sands SAC	• Sandbanks which are slightly covered by sea water all the time
			Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).
	Kent Onshore	Disturbance (noise and visual)	All European Sites	Various
	Kent Onshore	Air quality	All European Sites	Various
	Kent Onshore	Pollution (terrestrial)	All European Sites	Various
	Suffolk Onshore	Disturbance (noise and visual)	All European Sites	Various
	Suffolk Onshore	Air quality	All European Sites	Various
	Suffolk Onshore	Pollution (terrestrial)	All European Sites	Various

		Kent Onshore	Loss of functionally-linked land	Thanet Coast & Sandwich Bay SPA/Ramsar	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and • Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: Little tern (*Sterna albifrons*) (Breeding).
		Kent Onshore	Collision Risk	Thanet Coast & Sandwich Bay SPA/Ramsar	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and • Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: Little tern (*Sterna albifrons*) (Breeding).
				Stodmarsh SPA/Ramsar	• Great bittern (*Botarus stellaris*) • Gadwall (*Anas strepera*) • Northern Shoveler (*Anas clypeata*) • Hen harrier (*Circus cyaneus*) • Waterbird assemblage • Breeding bird assemblage
Appropriate Assessment	Construction	Offshore	Temporary increase in SSC and sediment deposition leading to increased turbidity and smothering effects	Thanet Coast SAC	• Reefs
				Margate and Long Sands SAC	• Sandbanks which are slightly covered by sea water all the time.
		Offshore	Changes to marine water quality during cable installation and cable lay from the use of drilling fluids	Thanet Coast SAC	• Reefs
		Offshore	Underwater sound impacts	Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).

		Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
		Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).
		Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
Offshore	Vessel collision risk	Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).
		Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
		Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).
		Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
Offshore	Airborne sounds and visual disturbance	Thanet Coast and Sandwich Bay SPA	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and • Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: • Little tern (*Sterna albifrons*) (Breeding).
		Outer Thames Estuary SPA	Wintering populations of: • Red-throated diver (*G. stellata*). Breeding populations of: • Common tern (*Sterna hirundo*); and • Little tern (*S. albifrons*).
		Alde-Ore Estuary SPA/Ramsar	Breeding populations of: • Lesser black-backed gull (*Larus fuscus*); • Sandwich tern (*Sterna* sandvicensis); and • Little tern (*Sterna albifrons*).
		Minsmere-Walberswick SPA	Breeding populations of: • Pied avocet (*Recurvirostra avosetta*); and • Little tern (*Sterna albifrons*).
		Wash and North Norfolk Coast SAC	• Harbour seal (*Halichoerus grypus*).
		Humber Estuary SAC	• Grey seal (*Halichoerus grypus*).

		Berwickshire and North Northumberland Coast SAC	• Grey seal (*Halichoerus grypus*).
Offshore	Potential for indirect effects through impacts to prey species	Thanet Coast and Sandwich Bay SPA	Wintering populations of: • European golden plover (*Pluvialis apricaria*) (Non-breeding); and • Ruddy turnstone (*Arenaria interpres*) (Non-breeding). Breeding populations of: • Little tern (*Sterna albifrons*) (Breeding).
		Outer Thames Estuary SPA	Wintering populations of: • Red-throated diver (*G. stellat*a). Breeding populations of: • Common tern (*Sterna hirundo*); and • Little tern (*S. albifrons*).
		Alde-Ore Estuary SPA/Ramsar	Breeding populations of: • Lesser black-backed gull (*Larus fuscus*); • Sandwich tern (*Sterna* sandvicensis); and • Little tern (*Sterna albifrons*).
		Minsmere-Walberswick SPA	Breeding populations of: • Pied avocet (*Recurvirostra avosetta*); and • Little tern (*Sterna albifrons*).
Suffolk Onshore	Loss of functionally-linked land	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
Suffolk Onshore	Air quality (dust)	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
Suffolk Onshore	Disturbance (noise and visual)	Sandlings SPA	• Nightjar (*Caprimulgus europaeus*) • Woodlark (*Lullula arborea*)
Kent Onshore	Direct loss of habitat	Thanet Coast & Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
		Sandwich Bay SAC	• Embryonic shifting dunes.

				• Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram. • Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland. • Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow. • Humid dune slacks.
	Kent Onshore	Disturbance (noise and visual)	Thanet Coast & Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
	Kent Onshore	Pollution	Thanet Coast & Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
Operational	Offshore	Introduction and spread of INNS via the addition of cable protection	Thanet Coast SAC	• Reefs.
			Sandwich Bay SAC	• Embryonic shifting dunes. • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram. • Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland. • Dunes with Salix repens ssp. argentea (Salicion arenariae); Dunes with creeping willow. • Humid dune slacks.
	Offshore	Effects of EMF emissions	Southern North Sea SAC	• Harbour porpoise (*Phocoena phocoena*).
	Kent Onshore	Loss of functionally-linked land	Thanet Coast & Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
	Kent Onshore	Collision risk	Thanet Coast & Sandwich Bay SPA/Ramsar	• Golden plover (*Pluvialis apricaria*), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Turnstone (*Arenaria interpres*), Non-breeding
			Stodmarsh SPA/Ramsar	• Bittern (*Botaurus stellaris*), Non-breeding • Gadwall (*Anas strepera*), Breeding and Non-breeding • Shoveler (*Anas clypeata*), Non-breeding

	• Hen harrier (*Circus cyaneus*), Non-breeding • Waterbird assemblage • Breeding bird assemblage

Appendix B Citations for European Sites

Appendix C Collision Risk Assessment

C.1 Introduction

C.1.1 This Annex should be read in conjunction with **Application Document 6.2.3.2.G Appendix 3.2.G OHL Mortality Monitoring Survey Report** and is intended to specifically assess the potential for bird mortality as a consequence of collisions with the new proposed section of Overhead Line (OHL) associated with the Kent Onshore Scheme.

C.1.2 The Survey Area in the context of the vantage point surveys, existing Richborough to Canterbury 400kV OHL corpse searches and assessment presented here, refers to the area where the proposed OHL in Kent will be located.

C.1.3 There is currently no statistical model available which provides a robust assessment of potential avian mortality from collision with OHL, with collisions usually site, season and species specific. It was therefore agreed with Natural England on 30 January 2024, not to undertake statistical modelling. Instead, this assessment of collision risk considers the levels and patterns of flight activity recorded during vantage point surveys in the context of the proposed alignment of the OHL and with regard to potential collision mortality impacts at a designated site or regional population scale. No modelling of predicted annual collisions and mortality has been made. The assessment is supported by targeted corpse searches of mortality events along the existing OHL located to the east and west of the proposed OHL route. Where surveys indicate potential conflicts then mitigation is proposed to address these concerns.

C.1.4 The assessment, therefore, considers the following:

- Recorded levels of flight activity, including the proportion of those occurring at a height where collision may be a risk; potential interaction with the proposed OHL route and factors influencing flight behaviour.
- Annual levels of bird activity; species where there is a potential risk of collision, including consideration of avoidance factors and importance in the context of designated site and regional populations.
- Mortality events associated with the existing OHL.
- Measures to reduce the potential for collision risk.

Vantage Point Surveys

C.1.5 The vantage point survey was primarily focused on the proposed OHL route with vantage points positioned to view the proposed pylon and line locations north and south of the River Stour Canal, but flights and activity were also recorded beyond this area, primarily within fields beyond the proposed OHL route but also adjacent to the proposed Minster Converter Station and Substation site. (**See Application Document 6.4.3.2.F.1 Kent Vantage Point Survey Locations**).

C.1.6 The purpose of flight activity (vantage point) surveys is to record flight lines of bird species potentially sensitive to collision with infrastructure, to inform an assessment of collision risk with infrastructure, in this case the OHL. The survey methodology follows

that outlined within NatureScot guidance (NatureScot, 2017), with the direction of movement, height and activity of all target and secondary species recorded, in addition to details recorded on number, age, sex and behaviour of individual birds (where possible).

Target Species

C.1.7 The selection of target species was primarily based upon the qualifying species of the nearby internationally and nationally designated sites, which are:

- Thanet Coast Special Protection Area (SPA) and Ramsar – which overlap with the intertidal areas within the wider Kent Onshore scheme,
- Stodmarsh SPA and Ramar – located approximately 8 km west, and
- Sandwich Bay and Hacklinge Marshes Site of Special Scientific Interest (SSSI).

C.1.8 The designated sites' citations and qualifying species are detailed in the wintering **(Application Document 6.2.3.2.B Appendix 3.2.B Wintering Bird Survey Report and Application Document 6.2.3.2.C Appendix 3.2.C Wintering Bird Survey Report) and breeding bird (Application Document 6.2.3.2.D Appendix 3.2.D Breeding Bird Survey Report and Application Document 6.2.3.2.E Appendix 3.2.E Breeding Bird Survey Report)** reports. A review of these designated sites resulted in a priority target species list for the vantage point survey, as follows:

- Golden Plover, Turnstone, Little Tern - qualifying species of the Thanet Coast SPA and Ramsar.
- Ringed Plover, Greenshank, Red-throated Diver, Sanderling, Great Crested Grebe - 'note-worthy fauna' of the Thanet Coast SPA and Ramsar.
- Bittern, Hen Harrier, Shoveler, Gadwall - qualifying species of the Stodmarsh SPA.
- Species associated with nearby Sandwich Bay and Hacklinge Marshes SSSI, notably Dunlin, Oystercatcher, Curlew, Redshank, Grey Plover, Sanderling, Ringed Plover, Mallard, Shelduck, Brent Goose and Little Tern.

C.1.9 In addition to the species set out above the following were also selected as target species, where they are not already covered by the above criteria:

- Raptor and wader species listed on Annex I of the Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), and
- All diver and grebe species, ducks, geese and swans, cormorants and herons.

Vantage Point Locations

C.1.10 Two vantage point (VP) locations were utilised, to allow the full extent of the proposed OHL to be covered, as shown in **Application Document 6.4.3.2.F.1 Kent Vantage Point Survey Locations**. These were referenced as VPA (western VP) and VPB (eastern VP).

C.1.11 These were positioned based on the land access available at the start of the survey (February 2023), and were located along the River Stour Canal to encompass the entire proposed OHL area within two 1 km, 180 degree viewsheds (referenced in this report as the 'primary viewshed'). These VPs were positioned within the access and topographical limitations of needing to be located on a Public Right of Way (PRoW).

C.1.12 Note, however, that birds were recorded whenever they were sighted beyond the 1km viewshed, with a ‘secondary viewshed’ of 2 km used as a reference as to when birds were leaving the Survey Area and cessation of flightline tracking could be considered.

Survey Programme, Duration and Timings

C.1.13 Six hours of survey visits were undertaken from each VP per month from February 2023 to January 2024, with each vantage point watch period comprising a maximum of two continuous hours with at least a 30-minute break between watches to assist surveyor concentration. This resulted in 72 hours of survey effort at each VP (144 hours total survey effort).

C.1.14 Survey visits were timed to coincide with the rising and high tide periods for the Thanet Coast and Sandwich Bay SPA /Ramsar, to record use of inland areas of birds from the nearby intertidal areas. Each VP survey visit included survey periods within the window two hours either side of high tide. Survey visits were also planned to encompass dusk and dawn periods, with each month’s visits planned to encompass at least one dawn and one dusk period whenever possible (when tide timings and daylight allowed).

Height Bands

C.1.15 The following height bands were utilised during the VP survey when estimating the height of birds in flight:

- Band A – Below power line height (0 - <15 m);
- Band B – Corresponding to broad power line height (15m – 50 m); and
- Band C - Above power line height' (>50 m).

C.1.16 The height bands were based upon potential OHL specifications provided by National Grid at the time of survey and also from review of criteria applied to the previous Richborough to Canterbury 400kV OHL assessment (National Grid, 2016) which is comparable and would connect to the proposed OHL for the Kent Onshore Scheme. While the use of pylons with heights between 40 m and 50 m were being considered at the time the survey started in 2023, the practical difficulty of judging a narrow 10m height band (i.e., 40-50 m) and likely limited difference in resulting collision risk, resulted in the use of a wider precautionary 15-50 m band which encompassed the potential heigh range of pylons being considered at the time.

C.1.17 As per NatureScot guidance, a bird’s flight height is estimated at the time of detection and then at 15 second intervals thereafter, in tandem with recording of flight paths.

Corpse Searches

C.1.18 For full details of the corpse searches, including data analysis methods, please refer to **Application Document 6.2.3.2.G Appendix 3.2.G OHL Mortality Monitoring Survey Report**.

C.1.19 An adapted version of the Scottish Natural Heritage (SNH) 2009 bird corpse search methodology (incorporating methods for bats (Scottish Natural Heritage, 2021) and the most recent SNH guidance on bird assessment for wind turbine mortality monitoring (Scottish Natural Heritage, 2017) was conducted across areas located in direct proximity to existing OHL within the Survey Area, south of the River Stour Canal.

C.1.20 This broadly entailed a walked transect near the existing OHL to record bird corpses that could be attributable to OHL collisions.

C.1.21 A control transect was also walked in fields located away from the existing OHL, approximately 500 m to the south. This was to provide data to account for any comparable background rates of corpse occurrence.

C.1.22 A three month survey period was conducted to target the winter period in January / February (the period when highest bird concentrations may occur in conjunction with periods of poor visibility and weather which may increase the risk of OHL collisions), then continuing into March / April for the spring migration season (where large numbers of migrant species could also conduct flights through the existing OHL, again increasing the risk of OHL collision).

C.1.23 Weekly or fortnightly searches (depending on access restrictions) were undertaken by suitably experienced and trained surveyors.

C.1.24 The survey visits commenced shortly after sunrise, to minimise opportunism for diurnal scavengers to remove corpses and maximise the chance of finding corpses as a result of nocturnal activity. The surveyors walked each transect within the pre-defined transect visually searching a minimum 5 m on each side of the transect centreline (though any visible signs between the two pairs of existing OHL or within 25 m were also investigated). An approximate one-hour search time is expected per transect. When a dead bird was encountered, the surveyor recorded the location of the corpse using a GPS device, to an accuracy of +/- 5 m.

C.1.25 Consideration was also given to surveyor efficiency and scavenger removal rates.

Assessment Parameters and Assumptions

C.1.26 Whilst there is currently no statistical model available which provides a robust assessment of potential mortality from collision with OHL, it is important to understand the numbers of individuals transiting through a ‘risk height range’ (broadly the electric cables of the OHL) and therefore potentially at risk from collision. Consideration is given to the likely rate of collision including criteria specific to individual species such as biometric data (e.g., average size, flight speed, flight style). As with analysis of collision risk for onshore wind farms, the data from the vantage point recording period (survey effort) has been extrapolated to provide an estimate of bird activity during a year, which in turn is used to generate an expected number of individuals transiting through the risk height range annually.

C.1.27 The ‘risk height range’ assessed within this report is the range of heights at which birds are at risk from collision with OHL suspended power lines. A number of broad criteria and assumptions informed by the OHL specifications have been applied and as such, provide an exaggerated worst-case scenario:

- Risk of collision zone encompasses the zone between the vertical upper and lower power line and the horizontal space between the two sets of parallel pylons. The risk height range is likely to be overly precautionary as it includes areas beneath the lower cables when accounting for cable ‘sag’ and empty spaces between sets of power lines. This results in a much larger window for collision than actually exists.
- Risk of collision from the pylons themselves is excluded, as it is assumed that birds will visually detect and avoid these large structures.

- The distribution of flights is unaffected by the presence of pylons – so the density of bird flights is uniform across each span.
- The risk to each bird is independent of other birds – i.e., no account is taken of avoidance behaviour or the influence of leading birds altering the flight paths of an entire flock in a manner that increases or decreases risk of collision.

C.1.28 Broadly the risk height range' was assigned as 15 m-50 m based upon the assumed OHL specifications at the time.

C.1.29 Unlike determining collision risk for wind farms where the generally accepted assumption is that bird flight is random and as such any recorded flight could interact with a turbine, the short length of proposed OHL is a spur from an existing OHL, with the new OHL route crossing the River Stour. As such, it is this topographical feature which is likely to have the greatest influence on bird flights and this is supported by field observations. Therefore, a distinction in the dataset has been made between bird flights recorded as directly interacting with the proposed new OHL route, i.e., where birds are making flights through the route and those which don't interact with the route. A precautionary 200m buffer has also been applied to the proposed OHL route, to allow for any inaccuracies in the observer mapping of flights. As such, any flights which transit through the buffer have also been considered as flights which have the potential to interact with the proposed OHL and therefore, be at risk of collision.

C.1.30 It is important to note that in this assessment no modeling of the likely actual annual collisions has been undertaken. As such, no quantitative assessment of mortality can be provided and only the number of individuals potentially at risk is provided.

Analysis of Bird Survey Data

C.1.31 A total of 19 target species were recorded during vantage point surveys between February 2023 and January 2024.

C.1.32 The target species recorded, along with the number of flights recorded and total number of individuals involved is presented in Appendix Table C.1. From the total recorded flights, the proportion of the recorded flights occurring at risk height, i.e., between 15m – 50m (at any point of the recorded flight), from across the survey area, irrespective of direction and interaction with proposed OHL route is presented in Appendix Table C.1.

Appendix Table C.1 Species recorded, total number of flights and total number of individuals

Species	Number of Flights	Number of Individuals	Proportion (%) of recorded flights at risk height within the survey area
Cormorant	175	2,694	47
Curlew	3	5	100
Dunlin	1	5	100
Little Egret	14	14	64

Species	Number of Flights	Number of Individuals	Proportion (%) of recorded flights at risk height within the survey area
Gadwall	11	73	55
Greylag Goose	7	306	71
Grey Heron	47	48	49
Hobby	10	10	90
Lapwing	11	637	18
Mallard	120	354	59
Marsh Harrier	107	114	39
Mute Swan	21	90	24
Mediterranean Gull	2	13	0
Peregrine	14	15	93
Short-eared Owl	2	2	50
Shelduck	10	15	50
Teal	7	88	29
White-fronted Goose	1	43	0
Whimbrel	1	2	100

Factors influencing flight behaviour and activity

C.1.33 A range of factors can influence flight behaviour and therefore, the risk of bird collision. This includes landscape and topography, especially where river corridors and valleys which may funnel bird movements, as well higher value habitats such as wetlands which may attract high concentrations of individuals, are present. Therefore, to contextualise how birds were observed using the survey area and the types of flights that were made, with regard to potential risk of collision, a brief overview of the most frequently recorded target species, is provided in Appendix Table C.2

Appendix Table C.2 Overview of target species usage of the survey area

Species	Usage of the survey area
Cormorant	One of the most frequently recorded species and while the largest flocks were recorded during the winter months (February, March and December 2023 and January 2024), flights of this species were recorded throughout the year as smaller groups and often within the at-risk height band. The largest single flock was of c. 450 birds (above risk

Species	Usage of the survey area
	height) during December 2023, but several watches recorded several hundred birds on a single visit (as an aggregate of multiple flight lines). Many flights appeared to comprise local movements, following the River Stour Canal and existing OHL possibly as navigational aids. Anecdotal evidence from local bird surveyors suggests that cormorant movements are linked to a large roost at Stodmarsh.
Marsh Harrier	Frequently recorded, usually as individual birds with some flights of long duration, including long periods within the at-risk height band, such as during display flights. Flights were recorded throughout the year, in almost every month. It was noted that marsh harrier flights included extended foraging and display adjacent to the existing OHL.
Mallard	Frequently recorded, generally as flights of individuals or small groups. While many flights were at low level and broadly following the River Stour Canal, many did occur within the at-risk height band.
Lapwing	Several flights of birds at risk height (flocks of 31, 7 and 16) were recorded in December and January. Otherwise, occasional flocks of sometimes large numbers (including 26 birds during September, flocks of 120, 53 and 13 birds during November and 200, 100 and 70 in December) were recorded, but all as flights above the at-risk height band. A single recording of c. 90 birds during January 2024 represents the only recording of this species at ground level within the viewshed or immediate area.
Greylag Goose	Large flocks of 133 and 95 birds were recorded in September and December, passing through the viewshed within the at-risk height band. Another large flock of 64 birds was recorded above risk height in November. The species otherwise was generally limited to being recorded beyond the viewshed or as flights of single birds.
Peregrine	The small number of flights attributed to this species include flights in the risk zone from birds perched on the existing OHL, with flights originating or ending on pylons. Relatively few flights were recorded. While appearing to use the pylons irregularly in summer, the species was consistently recorded using the pylons within secondary data during December and January. This indicates infrequent or seasonal use of the pylons as hunting perches.
Little Egret	Recorded occasionally as individual birds and more frequently during the summer months, but did include flights within the at-risk height band, between waterbodies or leaving the viewshed.
Mute Swan	A flight of ten birds was recorded during November at risk height but at distance from the proposed OHL. Generally, flights of this species were limited and comprised small numbers of birds flying below risk height. Flights originated from small groups (less than ten birds) settled in fields in proximity to the River Stour.

Species	Usage of the survey area
Other Species	A number of other species including Dunlin, Curlew, Whimbrel, Shelduck, Hobby and Short-eared Owl have single or few flights attributed to them and while including flights within the at-risk height band, the small number of birds or short flight times recorded mean that these species may be unlikely to generate collisions within an assessment. Flightlines of a few species (i.e., White-fronted Goose) were recorded above the at-risk height and so were not recorded at risk of collision.

Potential interactions with proposed OHL route

C.1.34 As set out in Appendix Table C.2, observations of flight behaviour indicate that for many of the species recorded, flight activity would appear to be closely aligned with direct flights along the River Stour corridor. These individuals are therefore likely to be transiting through the air space of the proposed OHL route, i.e., a zone in which there is the risk of collision. To explore the impact of this further, Appendix Table C.3 presents the flights at risk height and the proportion of these which are directly expected to potentially interact with the OHL route.

Appendix Table C.3 The number of birds recorded flying at risk height and the proportion of these with the potential to interact with the proposed OHL route

Species	Number of Flights	Number of Individuals	Proportion (%) of recorded flights at risk height within the survey area
Cormorant	83	576	89
Curlew	3	5	100
Dunlin	1	5	100
Little Egret	9	9	100
Gadwall	6	64	83
Greylag Goose	5	238	100
Grey Heron	23	24	96
Hobby	9	9	89
Lapwing	2	23	50
Mallard	71	237	92
Marsh Harrier	42	46	71

Species	Number of Flights	Number of Individuals	Proportion (%) of recorded flights at risk height within the survey area
Mute Swan	5	21	60
Mediterranean Gull	0	0	N/A
Peregrine	13	14	85
Short-eared Owl	1	1	100
Shelduck	5	6	100
Teal	2	45	100
White-fronted Goose	0	0	N/A
Whimbrel	1	2	100

C.2 Annual flight activity and potential interactions with proposed OHL route

C.2.1 The VP watches only represent a sample of flight activity. To understand the annual occurrence of birds making flights through the at risk zone and therefore the number of individuals potentially exposed annually to risk of collision, the number of flights recorded during vantage point surveys between February 2023 and January 2024 as at risk height and with the potential to interact with the proposed OHL route (see Appendix Table C.1) has been extrapolated to determine the number of individuals potentially at risk annually. To establish this, each target species was assessed against the status and occurrence months likely for each species in Kent as well as the patterns of occurrence recorded during the vantage point surveys.

C.2.2 It should be noted that this process has not accounted for fluctuations between months, i.e., no weighting has been applied to months with higher observed occurrence, but rather it has assumed the potential for equal occurrence across the period when present. For some species, such as Cormorant, where the species is considered as resident but showed markedly higher numbers of observations and individuals during the winter months, both a breeding and non-breeding figure is provided. The following text categorises each species and the extent to which the flight activity data has been scaled up.

- Resident species (Gadwall, Greylag Goose, Grey Heron, Mallard, Mute Swan, Peregrine, Raven, Shelduck): In the course of a year there is an average of 12.3 hours per day of time between sunrise and sunset. The sample of flight activity has been scaled up by the factor of 12.3 X 365 / 72 to give a measure of predicted flight activity per year.
- Resident species with noticeable variation in recorded occurrence during breeding and non-breeding seasons (Cormorant, Little Egret, Marsh Harrier): In the course of the breeding season (April – September (six months)) there is an average of 14.8 hours per day of time between sunrise and sunset and in the course of the non-breeding season (October – March (six months)) there is an average of 9.7 hours per day of time between sunrise and sunset. The sample of flight activity has been

scaled up by the factor of 14.8 X 183 / 36 to give a measure of predicted flight activity during the breeding season and by the factor of 9.7 X 182 / 36 to give a measure of predicted flight activity during the non-breeding season.

- Breeding Summer Migrant Species (Hobby, Mediterranean Gull): In the course of the summer and passage periods when summer migrants are present (April – October (seven months)) there is an average of 14.2 hours per day of time between sunrise and sunset. The sample of flight activity has been scaled up by the factor of 14.2 X 214 / 42 to give a measure of predicted flight activity per season.
- Non-breeding Species (Curlew, Dunlin, Lapwing, Short-eared Owl, Snipe, Teal, White-fronted Goose): In the course of the winter and passage periods when winter migrants are present (September – April (eight months)) there is an average of 10.4 hours per day of time between sunrise and sunset. The sample of flight activity has been scaled up by the factor of 10.6 X 238 / 48 to give a measure of predicted flight activity per season.
- Passage Migrant Species (Whimbrel): In the course of the spring and autumn passage periods when passage migrants are present (August – October and April - June (six months)) there is an average of 13.9 hours per day of time between sunrise and sunset. The sample of flight activity has been scaled up by the factor of 13.9 X 183 / 36 to give a measure of predicted flight activity per season.

C.2.3 The use of the full period between sunrise and sunset is a precautionary approach because no allowance is made for periods of bad weather, particularly heavy rain, when bird activity is likely to be reduced.

C.2.4 Appendix Table C.4 sets out the estimated numbers of individuals potentially transiting through the proposed OHL route at risk height annually. These figures solely provide the number of individuals potentially at risk, with no accounting for avoidance or other factors which may result in a collision not occurring. Equally, in many cases the transits made could be attributed to the same individuals and no differentiation is made in the extrapolation to account for this.

Appendix Table C.4 Number of individuals making transits at risk height annually through the proposed OHL route, extrapolated from VP survey observations

Species	Number of flights recorded during surveys at risk height and with the potential to interact with the OHL route	Number of individuals recorded during surveys at risk height and with the potential to interact with the OHL route	Number of individuals transiting through the area annually
Cormorant	74	562	Breeding – 1,429 Non-breeding – 26,628
Curlew	3	5	263

Species	Number of flights recorded during surveys at risk height and with the potential to interact with the OHL route	Number of individuals recorded during surveys at risk height and with the potential to interact with the OHL route	Number of individuals transiting through the area annually
Dunlin	1	5	263
Little Egret	9	9	Breeding – 677 Non-breeding – 0
Gadwall	5	40	2,494
Greylag Goose	5	238	14,840
Grey Heron	22	23	1,434
Hobby	8	8	579
Lapwing	1	7	368
Mallard	65	214	13,344
Marsh Harrier	30	31	368
Mute Swan	3	9	561
Mediterranean Gull	0	0	0
Peregrine	11	12	748
Short-eared Owl	1	1	53
Shelduck	5	6	374
Teal	2	45	2,365
White-fronted Goose	0	0	0
Whimbrel	1	2	141

Avoidance and other factors reducing the likelihood of collision

C.2.5 Appendix Table C.4 presents an extrapolated number of individuals potentially transiting through the proposed OHL route at risk height annually. As there is no statistical model available to calculate how many of these individuals will actually collide with the OHL, no attempt at quantifying that is provided here. Therefore, these figures are highly precautionary.

C.2.6 In addition to calculating actual collisions, consideration has to be given to avoidance of the OHL in generating these annual rates of activity. In many cases avoidance behaviour is likely to occur, i.e., birds will see the OHL wires and take avoiding action to prevent collision or the profile of the flight taken by a particular species greatly reduces

the likelihood of collision, e.g., meandering (quartering) flights by species such as Marsh Harrier are far less likely to result in interaction with wires than faster direct flights made by large waterbird species. Indeed, many of the individuals involved in these flights are already having to navigate the existing 400kV OHL further east along the River Stour, which connects into the Richborough substation and to the west where it crosses again over the River Stour. Similarly, it may be the case that birds are displaced by the presence of new structures in the environment and avoid the site.

C.2.7 The vulnerability of bird species to collision is a combination of the exposure to collision risk, e.g., time spent flying at vulnerable heights and location of key sites in relation to the OHL, and the susceptibility of the species to collision, e.g., behavioural and morphological features and population abundance and density. Species with high manoeuvrability, low wing loading, good forward vision and generally don't fly in large flocks are at lower risk to collision. Therefore, larger waterbirds, e.g., swans and geese and larger raptors, e.g., eagles and vultures, are more likely to be at increased risk of collision. This risk can be increased further if OHL cross migration routes or flightpaths between roosting, foraging and breeding sites.

C.2.8 The corpse searches recorded nine fatalities attributed to collision with the existing OHL network within the Survey Area. This consisted of four Mute Swan, two Mallard, two Herring Gull and one unidentified large water bird (likely swan). The estimated mortality for the entire OHL route for a six-month winter and passage route is 34.375 birds (see **Application Document 6.2.3.2.G Appendix 3.2.G OHL Mortality Monitoring Survey Report**).

C.2.9 As there are no formally agreed avoidance rates for use of power lines a range of avoidance rates have been provided, starting with avoidance rates developed for estimating avoidance of wind turbines, e.g., (Scottish Natural Heritage, 2018). For the Richborough Connection Project a range of avoidance rates were considered, with a worst-case 98% being applied for swans and geese, although this was acknowledged in the assessment as being overly precautionary and therefore, too low (SNH 2018 consider a 99.5% avoidance rate appropriate). It is considered, based on the observations of birds in the field and presence of existing OHL in the immediate landscape that an avoidance rate of 99.9% may be more realistic for the majority of species. Given, these collision rates are derived for windfarms where there is a greater risk of collision for many species from the moving turbine blades in a 'swept area' which creates a relatively large area of airspace where collision could occur, as opposed to the static lines which occupy are very narrow area of airspace. This is supported by the corpse search results, which recorded a limited number of species involved in mortality events arising from collision with the existing network of OHL. Mute Swan appears to be the species which may be more susceptible to collision in the Survey Area and this reflects observations at other sites around the United Kingdom, where swan species have been found to be prone to collision with OHL where they are located in or close to wetlands/waterbodies. However, for completeness and taking a precautionary approach, a range of avoidance rates are considered.

C.2.10 Appendix Table C.5 Number of individuals potentially transiting through the proposed OHL route, different avoidance rate scenarios and designated site and regional populations

C.2.11 sets out the potential number of individuals transiting through the proposed OHL route with a number of different avoidance rate scenarios. Designated sites and regional population figures are also provided. Note, that no modelling of actual collisions has been attempted.

Appendix Table C.5 Number of individuals potentially transiting through the proposed OHL route, different avoidance rate scenarios and designated site and regional populations

Species	Number of individuals potentially transiting through the proposed OHL route	98% Avoidance rate	99% avoidance rate	99.5% avoidance rate	99.9% avoidance rate15	Thanet Coast SPA/Ramsar site qualifying species	Stodmarsh SPA/Ramsar site qualifying species16	Sandwich Bay and Hackling e Marshes SSSI17	Kent Breeding Populations 18	National non-breeding populations 19
Cormorant	Breeding – 1,429	28.58 532.56	14.29 266.28	7.15 133.14	1.43 26.63	846[20]	2,300[21]	-	200-250 prs	62,000

[15] Current populations for waterbirds are taken from WeBS data for Pegwell Bay. These totals don't provide complete coverage of the SPA/Ramsar, but represent the key qualifying species for the designated sites relevant to the scheme and survey area.

[16] Current populations for waterbirds are taken from WeBS data for Pegwell Bay. These totals don't provide complete coverage of the SSSI, but represent the key qualifying species for the designated site relevant to the scheme and survey area.

[17] Current populations for waterbirds are taken from WeBS data for Pegwell Bay. These totals don't provide complete coverage of the SSSI, but represent the key qualifying species for the designated site relevant to the scheme and survey area.

[18] As presented in Kent Ornithological Society (2015) Kent Breeding Bird Atlas 2008-13.

[19] Population estimates for non-breeding birds in Kent are not available so national (Great Britain) non-breeding populations as provided in Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. British Birds 113: 69-104, are presented.

[20] Although not a qualifying species the current population occurring in Pegwell Bay exceeds the 1% threshold for national importance based on current 5 year peak mean 2018/19-2022/23 given by WeBS.

[21] Although not a qualifying species the current population occurring at Stodmarsh exceeds the 1% threshold for international importance.

Species	Number of individuals potentially transiting through the proposed OHL route	98% Avoidance rate	99% avoidance rate	99.5% avoidance rate	99.9% avoidance rate15	Thanet Coast SPA/Ramsar site qualifying species	Stodmarsh SPA/Ramsar site qualifying species16	Sandwich Bay and Hackling e Marshes SSSI17	Kent Breeding Populations 18	National non-breeding populations 19
	Non-breeding – 26,628									
Curlew	263	5.26	2.63	1.32	0.26	-	-	450	-	120,000
Dunlin	263	5.26	2.63	1.32	0.26	-	-	848	-	345,000
Little Egret	Breeding – 677 Non-breeding – 0	13.54 N/A	6.77	3.39	0.68	-	-	-	100-150 prs	11,500
Gadwall	2,494	49.88	24.94	12.47	2.49	-	102	-	150-200 prs	31,000
Greylag Goose	14,840	296.8	148.4	74.2	14.84	-	-	-	700-1,000 prs	230,000
Grey Heron	1,434	28.68	14.34	7.17	1.43	-	-	-	250-320 prs	45,000
Hobby	579	11.58	5.79	2.90	0.58	-	-	-	250-350 prs	-
Lapwing	368	7.36	3.68	1.84	0.37	-	378	-	980-1,200 prs	620,000

Species	Number of individuals potentially transiting through the proposed OHL route	98% Avoidance rate	99% avoidance rate	99.5% avoidance rate	99.9% avoidance rate15	Thanet Coast SPA/Ramsar site qualifying species	Stodmarsh SPA/Ramsar site qualifying species16	Sandwich Bay and Hackling e Marshes SSSI17	Kent Breeding Populations 18	National non-breeding populations 19
Mallard	13,344	266.88	133.44	66.72	13.34	-	290	77	3,000-5,000 prs	665,000
Marsh Harrier	Breeding – 1,129 Non-breeding – 785	22.58 15.7	11.29 7.85	5.65 3.93	1.13 0.79	-	-	-	80-100 breeding females	-
Mute Swan	561	11.22	5.61	2.81	0.56	-	-	-	300-400 prs	50,500
Mediterranean Gull	0	N/A	N/A	N/A	N/A	142[22]	-	-	300-500 prs	4,000
Peregrine	748	14.96	7.48	3.74	0.75	-	-	-	30-40 prs	-
Short-eared Owl	53	1.06	0.53	0.27	0.05	-	-	-	0-5 prs	-
Shelduck	374	7.48	3.74	1.87	0.37	-	-	145	300-450 prs	47,000
Teal	2,365	47.3	23.65	11.83	2.37	-	-	-	0-10 prs	430,000

[22] Although not a qualifying species the current population occurring in Pegwell Bay exceeds the 1% threshold for national importance based on current 5 year peak mean 2018/19-2022/23 given by WeBS.

Species	Number of individuals potentially transiting through the proposed OHL route	98% Avoidance rate	99% avoidance rate	99.5% avoidance rate	99.9% avoidance rate15	Thanet Coast SPA/Ramsar site qualifying species	Stodmarsh SPA/Ramsar site qualifying species16	Sandwich Bay and Hackling e Marshes SSSI17	Kent Breeding Populations 18	National non-breeding populations 19
White-fronted Goose	0	N/A	N/A	N/A	N/A	-	2	-		13,500
Whimbrel	141	2.82	1.41	0.71	0.14	-	-	-		38

Assessment of Collision Risk

C.2.12 For the majority of the species listed in Appendix Table C.5, when applying an avoidance rate of 99.9%, which is supported by the results of corpse searches along the existing OHL network, this results in fewer than one individual potentially colliding with the proposed OHL annually. Even for species where the extrapolated number of transits through the at risk zone generates a potential collision event that exceeds one individual per year, such as Cormorant, Greylag Goose and Mallard, given the caveats in generating the extrapolated annual transits and absence of modelling for predicted collisions, these annual figures are low in comparison to regional populations. Obviously, if more precautionary collision rates are considered the potential number of individuals at risk increases. However, it is important to note that for the following reasons, even using a more precautionary avoidance rate factor, this do not mean that each of these individuals will actually make direct contact with the wire and the actual number of collisions resulting in mortality is likely to be far lower:

- No modelling of actual collisions has been undertaken, therefore, this assessment has been made on the assumption that all the airspace within the risk height zone will result in a potential collision. However, when consideration is given to the substantial spacing between the wires (at least 8m) (wider than the wing span of the larger species, e.g., Mute Swan (up to 2.4m) and Cormorant (up to 1.6m)), the allowance made for sag in the central portion of the risk height zone and the precautionary use of a 15m to 50m at risk height recording band, of the numbers of individuals transiting through the at risk zone as presented in Appendix Table C.5, the proportion which will actually make contact with a wire, is far lower than that presented in Appendix Table C.5. Therefore, it is reasonable to assume that for all species, the annual risk of actual collision (and subsequent mortality) will be far fewer than annual figures presented against all avoidance rates.
- The avoidance rates presented in Appendix Table C.5 are based on collision with onshore wind farms. The risk profile associated with OHL differs from that of turbine blades. There are no moving parts (resulting in a relatively large ‘swept area’ or potential collision zone) associated with OHL and so the window of risk for collision is a lot narrower. Again, this factor is likely to reduce the actual number of potential collisions resulting in mortality presented in Appendix Table C.5further. As a result of this the range of species potentially at elevated risk from collision is reduced, with only species with poor manoeuvrability, high wing loading and poor forward vision likely to be susceptible. This significantly reduces the risk for species such as Marsh Harrier and Peregrine, which are both highly manoeuvrable and/or make meandering flights.
- Field based observations from surveys on site also suggest that for many species, e.g., Marsh Harrier and Peregrine, that regularly forage within the Survey Area and in the vicinity of the existing OHL, there is a level of habituation to existing structures, with Peregrine regularly recorded on the pylon towers and making flights in and around the existing lines and Marsh Harrier regularly making flights through fields containing both tower and overhead wires. In addition, it is also worth noting that birds making flights through the proposed OHL route already have to interact with and amend their flight behaviour to avoid existing OHL both to the south of the River Stour corridor and east along the River Stour where the existing 400kV OHL connects into the Richborough substation and to west along the River Stour. Indeed, for species such as Cormorant, observations of flights regularly recorded the species passing over the existing OHL.

- Recorded mortality from corpse searches along the existing OHL network in the Survey Area was only noted for a limited number of species. Notably, many of the species recorded as making a large number of flights through the risk zone, where not among those species recorded as collision events, e.g., Cormorant, Greylag Goose and other duck species, beyond Mallard. There were also no corpses found of raptors such as Marsh Harrier and Peregrine, which supports the conclusion that collisions are rare for these species.

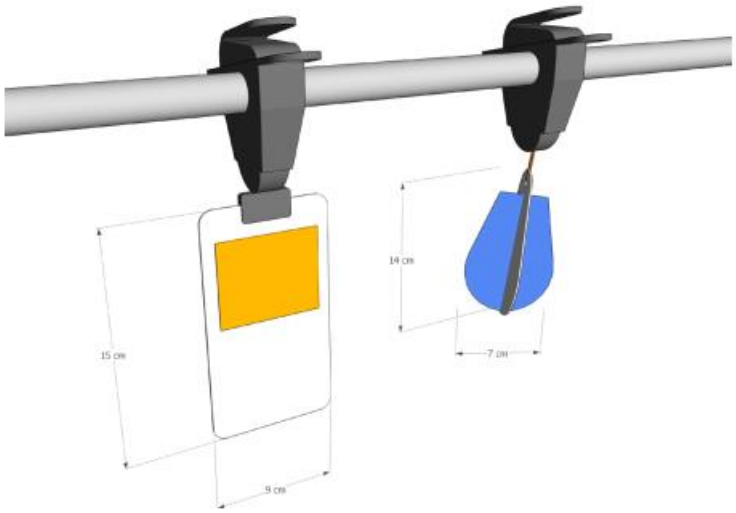
C.2.13 Irrespective of the highly precautionary figures set out in Appendix Table C.5, for the reasons set out above, collision is likely to be a rare event which does not pose a significant risk to populations either associated with designated sites or important at a regional level (i.e., in Kent).

Additional Mitigation Options

C.2.14 Irrespective of the above conclusions and notwithstanding the risk of collision being negligible, where the proposed OHL route crosses the River Stour, the deployment of bird deflectors will provide an extra layer of visibility, particularly in poor weather conditions. This commitment is secured through **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**.

C.2.15 Fitting power lines with devices to make them more visible to flying birds is widely used to mitigate bird collisions. A wide range of wire marking devices has been used, generally falling into three basic designs: spiral devices which wrap around the wire (and may act to reduce line vibration as well as making power lines more visible to birds), hanging devices which are suspended from the wire with fixed or swinging plates or flappers; and spheres (also known as aviation balls).

C.2.16 It is considered that in the context of the Proposed Project and species involved, that hanging deflectors, especially those with fluorescent markings offer the best solution, to making the lines visible in adverse weather or low light conditions.



Appendix Plate C.1 Example of hanging bird deflectors (EirGrid, 2016)

Appendix D Documentation of Responses to Natural England Review of draft Report to Inform Habitats Regulations Assessment prior to DCO submission

Appendix Table D.1 Responses to Natural England Review of draft Report to Inform Habitats Regulations Assessment prior to DCO submission

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
1	Contents	The contents pages are not reflective of the contents of the HRA.	The contents page needs updating to ensure all numbered sections within the HRA are correct and in the correct numerical sequence	General	Updated in final report formatting
2	1.1.9	This paragraph states there are three distinct components to the offshore works, however only one is listed.	Please amend to detail the three distinct components.	Offshore	Updated to add the other two components
Section 3: European sites					
3	Section 3.5.4	For Minsmere-Walberswick Ramsar, the reasons for the site qualifying as a Ramsar site under Ramsar criterion 2 should also include: "An important assemblage of rare breeding birds associated with marshland and reedbeds including: *Botaurus*	Please ensure the correct features have been assessed appropriately.	Onshore	Reasons for designation updated

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		stellaris, Anas strepera, Anas crecca, Anas clypeata, Circus aeruginosus, Recurvirostra avosetta, Panurus biarmicus"			
4	Section 3.15.2	For The Wash & North Norfolk Coast SAC, Grey Seal has been screened and assessed at the Appropriate Assessment stage, but it is not a designated feature of the site. Common/Harbour Seal is a designated feature, and this species should be assessed instead.	Please ensure the correct features have been assessed appropriately.	Offshore	Updated to reflect the correct designated feature (harbour seal)
Section 4: Stage 1 Screening: Likely Significant Effect – Offshore Scheme					
5	4.3.33	The text states the offshore scheme will pass through approx. 1.9km of saltmarsh & mudflats, but it has been stated previously that the trenchless technique in Kent will completely avoid saltmarsh.	Clarity is needed on this section in relation to the Offshore Scheme passing through saltmarsh.	Offshore	Text updated to clarify that trenchless techniques will be used at this location to avoid impact to saltmarsh, and will instead exit within intertidal mudflat.
6	4.3.39	Numerical order of paragraphs jumps from 4.3.39 to 4.3.1.	Sections need updating with correct numerical order.	Offshore	Paragraph numbers amended

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
Section 4: Stage 1 Screening: Likely Significant Effect – Kent Onshore Scheme					
7	4.4.4	No in-combination assessment has been made of traffic-related air quality impacts.	Please complete an in-combination assessment of air quality impacts, considering any relevant plans and projects that may cause a likely significant effect in-combination.	Onshore	Text has been updated to include a discussion of air quality modelling results.
8	4.4.12	This paragraph states that 'it has been agreed with Natural England regarding this application that a 3dB change in noise levels compared to the baseline constitutes a likely significant effect' however the noise contours provided only show a 60dB threshold and a 70dB threshold.	While Natural England recognises that we do not currently have access to the full noise chapter of the Environmental Statement which may provide further context to this paragraph, it would be beneficial to clarify where any noise disturbance >3dB is expected to occur in relation to the SPA/Ramsar site. If any noise disturbance >3dB is expected, this should be taken forward for Appropriate Assessment.	Onshore	It is confirmed that the 3dB contour does not reach the SPA/Ramsar site because the SPA/Ramsar site is approximately 470m from the trenchless installation pit (the nearest surface works in the Kent Onshore Scheme). Maps have now been added to the report (Figure 6.4.6.6.2 Map of 3 dB change contour at Suffolk and Figure 6.4.6.6.4 Map of 3dB change contour at Kent).
9	4.4.15	The 'Disturbance' section concludes by stating that 'noise and visual disturbance of Thanet	Natural England are currently unable to agree with this statement	Onshore	Has been addressed by resolving (8)

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		Coast & Sandwich Bay SPA/Ramsar can be screened out'.	due to issues raised above around the >3dB threshold.		
10	4.4.21	'LSE can therefore be screened out for all European Sites through this impact pathway. However, risk of frac out is covered in the appropriate assessment.' This section is unclear, as it suggests that pollution impacts can be screened out but then takes forward 'risk of frac out' to Appropriate Assessment.	Natural England suggests that this is re-phrased, for example: '*As such, it is considered that new infrastructure can be constructed in a way to prevent pollution to the water environment to ensure no adverse effects from water pollution on any European Site. However, there is a risk of frac out from the Horizontal Directional Drilling (HDD) and therefore pollution impacts should be taken forward to Appropriate Assessment'*	Onshore	Change made by adopting part of the suggested wording and rewording the remainder of the sentence.
11	4.4.26	Natural England agrees with the assessments conclusion that there is unlikely to be a significant effect on Thanet Coast & Sandwich Bay SPA and Ramsar site as a result of bird collision with proposed pylons, as the only designated bird feature recorded in broad proximity of the	This part of the Appropriate Assessment will be supported by a collision risk assessment, which has not yet been provided to Natural England. We advise that the collision risk assessment include consideration of risk in poor weather conditions where there is lower	Onshore	It was confirmed to Natural England in December 2024 that a first draft of the collision risk assessment was provided in June 2024, on which they commented in July 2024, and a revised draft was submitted in December 2024. The

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		pylons (golden plover) is at inherently lower risk of collision given its size and manoeuvrability. We also agree that there is a potential likely significant effect upon designated bird features of Stodmarsh SPA and Ramsar site, given that the River Stour is being crossed by powerlines which could increase collision risk for migrating species.	visibility and therefore greater risk of collision.		collision risk assessment did include consideration of the risk in poor weather conditions, as does the type of diverter included as mitigation. Natural England provided comments on the revised collision risk assessment, which are included at the end of this table as they were received subsequently to other comments (on 07 February 2025).
12	4.4.27	'Operational noise has been modelled and it has been determined that the disturbance threshold of 60dB LAmax would only be exceeded 10m from the Converter Station and Substation, which does not intersect with any EU sites or functionally linked land'.	It appears that there has been some confusion over what has been agreed with regard to noise thresholds. At Appropriate Assessment stage, Natural England are happy for modelling of noise contours in 5dB increments to be used (55dB, 60dB etc.) but when determining a likely significant effect, we ask that any changes >3dB in comparison to the baseline	Onshore	Amended wording to confirm the 3dB change contour will not be exceeded more than 10m from the Converter Station. Therefore it will not affect Thanet Coast & Sandwich Bay SPA or functionally-linked land.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
			noise level be modelled and then looked at in relation to the designated sites/functionally linked land. If there are no changes in noise levels greater than 3dB within designated sites/functionally linked land, then a conclusion of no likely significant effect can be drawn.		
13	4.4.28	Natural England are currently unable to agree with the conclusion that a likely significant effect can be ruled out in relation to operational disturbance, given the conflicting figures used in noise modelling.	See above.	Onshore	Has been addressed by resolving (12)
14	4.4.30	'As such, it is considered that maintenance of the new infrastructure (where required) can be designed in a way to prevent pollution to the water environment to ensure no adverse effect from water pollution on any European	Following the People Over Wind ruling by the Court of Justice of the European Union, any measures intended to avoid or reduce the likely harmful effects on European sites which cannot be taken into account when determining whether or not a plan or project is likely to have a significant effect on a site,	Onshore	The applicant considers measures to protect water quality don't need taking forward to AA as these are required to comply with other legislation whether or not European sites are present.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		Site. LSE can therefore be screened out…'	should be considered at Appropriate Assessment stage. Should it be determined that, when following the People Over Wind ruling, you need to consider this issue at Appropriate Assessment additional information should be provided on the measures taken to avoid or reduce pollution impacts.		However, further text has been added to expand on the measures that would be implemented. Given the distance of the Kent Converter Station (and Suffolk Converter Station) from the nearest European sites, these measures are not specifically required to protect European sites but are introduced to protect water quality generally.
Section 5: Other Plans and Projects					
15	Section 5	Section 5: Other Plans and Projects are not referenced in the contents page.	The contents page needs updating to ensure all numbered sections within the HRA are correct and in the correct numerical sequence.	Onshore	Updated in final report formatting
Section 5: Other Plans & Projects – Suffolk Onshore Scheme					
16	5.2	Nautilus Interconnector is no longer making landfall in Suffolk. It will now make landfall at the Isle of Grain in	Please update the HRA accordingly.	Onshore	In combination assessment updated to remove references to Nautilus.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		Kent.			
17	5.3.21 5.3.22	See comment above.	In combination assessments will need to be updated including potential for additional cable crossings.	Onshore	Addressing (16) will address (17)
Section 5: Other Plans & Projects – Kent Onshore Scheme					
18	5.4	The HRA has only identified five projects which could lead to in-combination impacts occurring which are: Manston Airport, Canterbury Road Residential Development, Stonelees Golf Course Expansion, Richborough Energy Park and Goshall Valley Solar Farm.	Natural England recommends that some narrative is provided around how/why the in-combination projects have been selected. The in-combination assessment should consider all planned development in an area, whether this be allocated in a development plan or currently moving through the planning system.	Onshore	Added cross reference to the cumulative effects assessment methodology and updated to add new projects within 5km of the Thanet Coast & Sandwich Bay SPA based on that methodology.
19	5.4	The in-combination assessment appears to have been undertaken incorrectly at this stage.	At the screening stage of a HRA, where a likely significant effect has been identified resulting from the project alone, the relevant impact	Onshore	Extensive new text has now been added to the in combination effects sections for the Suffolk Onshore Scheme and Kent Onshore Scheme to consider all

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
			pathway should be taken through to the appropriate assessment stage. Where a likely significant effect has been ruled out from the project alone, an in-combination assessment should then be undertaken to determine if there is a likely significant effect in-combination. Where a likely significant effect is identified in-combination, it should then be taken through to appropriate assessment. If there are no likely significant effects either alone or in- combination, then we would not expect the relevant impact pathway to be considered as part of an appropriate assessment.		impacts discussed alone (including those where LSE alone has been screened out) and whether they would result in LSE in combination.
Section 6: Conclusion of Likely Significant Effects					
20	Section 6	Section 6: Conclusion of Likely Significant Effects is not	The contents page needs updating to ensure all numbered sections	General	Updated in final report formatting

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		referenced in the contents page.	within the HRA are correct and in the correct numerical sequence.		
Section 6: Conclusion of Likely Significant Effects – Offshore					
21	6.3.1	This list has permanent loss of benthic habitats and species included twice. Natural England suggests separating the two and listing loss of species as loss of individuals.	Please amend text as appropriate.	Offshore	This impact pathway was previously included for its indirect effects to species reliant on potentially affected benthic habitats/species. This is now separated out as a separate impact pathway (i.e. indirect effects from impacts to prey species) and no LSE has been concluded for permanent loss to benthic habitats or species.
22	6.3.3	This lists permanent loss impacts. This might be misread as permanent loss of feature, when it is permanent loss of supporting habitats.	Natural England advises this is amended to make it clear that it is loss of supporting habitat	Offshore	Amended as above
Section 6: Conclusion of Likely Significant Effects – Kent Onshore Scheme					
23	6.4.1	'The following impact pathways have been screened in	Natural England understand that 'Direct Habitat Loss' has also been taken through to Appropriate	Onshore	Updated text to include direct habitat loss.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		for appropriate assessment: loss of functionally linked land and collision risk'.	Assessment, therefore the conclusion should reflect this. In addition, any additional impact pathways considered as having a likely significant effect following a complete in-combination assessment should also be included in this section.		
Section 7: Appropriate Assessment					
24	Section 7.1.13	Regarding the statement "Works that can be scheduled to take place between September and February inclusive would therefore not result in disturbance of nesting nightjar or woodlark" we advise that the breeding season for Woodlark should be considered to be 01 February to 31 August (in line with our advice for East Anglia One and Two).	Natural England advises amending the text to reference the breeding season restriction.	Onshore	Updated text from February to January

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		We would agree with this statement if it read "September to January inclusive".			
25	Table 7.1	Red Throated Diver are missing from this table and from the consideration of impact within the airborne sounds and visual disturbance section of the Appropriate Assessment. Details on the restriction period for RTD should be included and discussed in this section. Natural England would potentially be able to support a conclusion of No AEoI, however, as the landfall works only have a partial restriction there is still potential for LSE and therefore, they should be included.	Update the HRA to include RTD in table 7.1 and further discussion including the use of a restriction period.	Offshore	Updated Table 7.1 and text in relevant cumulative assessments.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
Section 7: Appropriate Assessment – Offshore Scheme					
26	7.2.2	Text states 'In Kent, the trenchless solution will completely avoid saltmarsh habitat, exiting approximately 105-140 down shore of this habitat,'	Pleases provide the unit of measurement. Refer also to point NE point 5 above	Offshore	This portion of text has been updated to reflect units and moved to a new impact pathway, 'potential for indirect effects through impacts to prey species'
27	7.2.17	Text states 'Dispersion processes will act to dilute the concentration of fine sand…'	Clarity is needed on the dispersion process described.	Offshore	Text updated to better summarise relevant information from the physical environment and benthic ecology chapters to provide clarity on the sediment dispersion processes, with appropriate references to main chapters included where relevant
28	7.2.17	Further information on the justification around why sediment dispersion monitoring shows no AEoI is required.	Natural England cannot provide further comments at this stage before reviewing the application document referenced.	Offshore	Noted

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
29	7.2.28	Grey seal is not a designated feature of The Wash & North Norfolk Coast SAC. The harbour (common) seal should be assessed for underwater noise as a designated feature of The Wash & North Norfolk Coast.	Please ensure the correct feature have been assessed appropriately.	Offshore	Updated to reflect the correct designated feature of this site
30	7.2.35	In line with guidance there should be a dedicated marine mammal observer present during pre-SBP activities.	Additional text on JNCC guidelines that are being followed would be a useful addition to supporting documents	Offshore	Included in paragraph 7.3.20
31	7.2.35	The HRA document should state which JNCC guideline documents will be used	Please ensure JNCC guidelines are provided in supporting documents.	Offshore	As above
32	7.2.51	There has been evidence of recreational disturbance to both golden plover and turnstone in Pegwell Bay, both species are designated under Thanet Coast & Sandwich	Airbourne sounds and visual disturbance should be considered in-combination with further disturbance incidents that are noted to impact the designated site.	Offshore	The Applicant has assumed that existing levels of recreational disturbance and the influence that has on existing bird occurrence and distribution has been accounted for in the baseline conditions as identified

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		Bay SPA.			through the ornithological surveys undertaken by the Applicant, i.e., that the distributions of birds is already influenced by existing disturbance. The assessment presented has therefore, considered impacts on qualifying features based on their recorded occurrences and distributions within Pegwell Bay. These distributions will be influenced by recreational disturbance, i.e., areas with more frequent disturbance events will support fewer birds. As such, the Applicant does not consider it necessary to consider disturbance generated by the installation of the Scheme in-combination with disturbance incidents from recreational use that may occur with the wider Pegwell Bay.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
33	7.2.60	Grey seals are a designated feature of Berwickshire and North Northumberland Coast SAC, not harbour (commons) seals.	Please ensure the correct feature have been assessed appropriately.	Offshore	Updated to reflect the correct designated feature
34	7.2.71	Natural England has previously requested further information to sufficiently assess the impacts of cable laying and rock protection on sensitive habitats.	Until we receive and review further information provided in associated application documents, we are unable to comment on the conclusion.	Offshore	Cable installation activities avoid interaction with sites designated for benthic habitats and species. Moreover, cable protection is not anticipated within any sites designated for benthic habitats or species. Therefore, no LSE has been concluded.
Section 7: Appropriate Assessment – Kent Onshore Scheme					
35	7.3.1	Paragraph 7.3.1 considers mitigation in the first instance (namely, HDD under the Thanet Coast & Sandwich Bay SPA/Ramsar sites), rather than setting out why impacts	Natural England views HDD as an embedded mitigation measure, and not wholly as an avoidance measure. Whilst Natural England acknowledges that the application is only seeking permission to cross the Thanet Coast & Sandwich Bay	Onshore	Added statement as to where the explanation of why HDD cannot be avoided can be found.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		cannot be avoided instead. Natural England suggests that this section would benefit from additional commentary outlining why impacts could not be avoided in the first instance, in line with the mitigation hierarchy.	SPA/Ramsar site via HDD. We advise that explanation should be provided as to why impacts could not be avoided in the first instance (as outlined within the mitigation hierarchy), before resorting to mitigation		
36	7.3.2	'Geotechnical investigations for the project have confirmed that HDD is feasible and therefore the DCO will not contain any provision for surface trenching through the saltmarsh of Thanet Coast & Sandwich Bay SPA/Ramsar or Sandwich Bay SAC…Therefore no adverse effect on the integrity of the SPA will arise through habitat loss'	Natural England are pleased that HDD is showing as feasible in this location, however we request to view the feasibility assessment to be able to understand the risks involved of HDD at this location.	Onshore	Reference to where landfall feasibility studies can be located in the DCO documentation added to the HRA.
37	7.3.3 & 7.3.4	While these paragraphs provide a helpful explanation of the measures that will be in place in order to minimise	Natural England recommends that more information is provided on what would happen if frac out was to occur at the European Sites (e.g. will works cease, will workers need to access the saltmarsh habitat,	Onshore	There is a high level of confidence there will be no frac out in the saltmarsh, which supports the conclusion of No Adverse Effect on Integrity of Thanet

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		and address the risk of frac out while undertaking HDD, there is limited information on what action would be taken if frac out was to occur and what the impacts of this will be.	what are potential impacts upon designated features etc.). Any additional mitigation measures required to address any risks associated with a potential frac out should be considered within the appropriate assessment also.		Coast & Sandwich Bay SPA/Ramsar and Sandwich Bay SAC. If HDD is used, the drill will be within the chalk beneath the saltmarsh. Overlying the chalk are layers of clays that prevent the groundwater in the chalk aquifer from reaching the surface and they will also prevent the drilling fluid reaching the surface. If the DirectPipe method is used instead of HDD, the fluid pressure at the cutting face is balanced against the groundwater pressure, so there is insufficient pressure to cause frac out. In the very unlikely event that a frac out in the saltmarsh does occur the standard approach that would be followed by drilling engineers is that:

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					• Drilling stops as soon as frac out is reported or suspected. This stops any further loss of fluid to the frac out location • The location of the frac out is established and based on advice from the ECOW, the most suitable remediation actions are determined. • If the frac out is small in size and is not smothering any vegetation or breeding sites it may be left in situ. Seawater at high tide will break down the bentonite into its constituent parts of water and clay. • If it is determined that it needs to be removed it can be

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					either washed using pumps and seawater or freshwater to a safe location, or a small sump (30cm x 30cm x 30cm) can be dug in a suitable location to allow a sump pump to remove the fluid. The pump and hoses can be hand carried to the location. Brushes or pumped water can be used to wash drilling fluid from the surrounding area into the sump.
38	7.3.6	As per comments on paragraph 7.3.1, this section jumps straight into the proposed mitigation (delivering wet grassland/management of arable land) but should begin by setting out why impacts could not be avoided in the	As mentioned above in point 36. Explanation/narrative should be provided as to why impacts could not be avoided in the first instance.	Onshore	Added statement as to where the explanation of why HDD cannot be avoided can be found.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		first instance, in line with the mitigation hierarchy.			
39	7.3.12	'The field(s) must be secured for the lifetime of the development or 'in perpetuity' (typically defined as 80 years), whichever is sooner. The lifetime of the Minster Converter Station and Substation is intended to be 40 years.' 'The management must minimise pesticide (herbicide and insecticide) use as much as possible'.	Natural England recommends that clarification is provided on what will happen to the built development once it reaches the end of its life. For example, will the buildings be demolished and the land reverted to its current state? If this is not the case then we recommend that the field(s) are secured in perpetuity. As per the DAS advice provided by Natural England (09/08/2024) Natural England reiterates that no pesticides should be used on the land to ensure that there are greater populations of soil invertebrates for foraging golden plover.	Onshore	Part 1 Chapter 4 states that the design life is 40 years but that it is likely refurbishment would extend the life (given future electricity needs) rather than decommissioning. However, if it was decommissioned then it would likely be restored to agricultural use. Given the potential for the Converter Station to not be decommissioned, 80 years is an appropriate period to secure the mitigation. Clarified reference to pesticide application. While a total ban on all pesticides may affect continued farming viability it is considered that a ban on soil applied insecticides (including seed treatments) would be

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					sufficient, as this will ensure no harm to the soil biota.
40	7.3.17	Natural England advises that there needs to be more information in this section to enable us to agree with the conclusion of no adverse effect. Whilst there are some indications as to how the mitigation land would be managed (Paragraph 7.3.12), there is limited information as to how this management would be secured in perpetuity, and how the continued suitability of the mitigation land will be monitored. We would also recommend that it should be set out how this would be secured within the DCO.	Natural England would suggest that detailed information be provided, outlining how the efficacy of the site will be maintained and monitored (including by who). We also suggest that greater clarification should be provided as to how this management/maintenance regime would be secured for an appropriate duration of time.	Onshore	Detailed information on maintenance and monitoring of the mitigation land, including responsibilities is set out within Application Document 7.5.7.2 Outline Landscape and Ecology Management Plan - Kent. In terms of securing land, this is via Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC). Compliance with the CEMP and oLEMP is secured by DCO Schedule 3, requirement 6.
41	7.3.18 – 7.3.24	It is difficult to review this section without cross referencing it with the prepared Collision Risk Assessment, which does not	-	Onshore	These comments relate to an earlier version of the collision risk assessment. It was confirmed to Natural

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		appear to be included within the shared documents. Natural England have the following general comments and will be able to provide a more comprehensive response once we have the Collision Risk Assessment: - Paragraph 7.2.20 states that an avoidance rate of 99.9% has been applied, however in our DAS advice dated 04 July 2024 we advised that there was not enough certainty in this figure to be used for all species in all conditions. It is not clear whether this comment has been addressed. - It is unclear whether consideration has been had of potential heightened risk to bird species during poor weather conditions where there is lower visibility. - It would be beneficial for this section to be tailored towards			England in December 2024 that a first draft of the collision risk assessment was provided in June 2024, on which they commented in July 2024, and a revised draft was submitted in December 2024. Natural England provided comments on the revised collision risk assessment, which are included at the end of this table as they were received subsequently to other comments (on 07 February 2025).

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		Stodmarsh SPA and Ramsar site, by discussing the level of risk of collision for each designated bird feature. Considering the above comments, we are unable to concur with a conclusion of no adverse effect on the integrity of the Stodmarsh SPA and Ramsar sites at this time.			
Section 8: In Combination Effects – Offshore Scheme					
42	8.3.18 & 8.3.38	The seasonal restriction related to installation activities to mitigate for the disturbance to red-throated diver should also include pre-sweeping cable installation activities as stated in Section 4.3.5.	Please update as appropriate	Offshore	The Applicant has not included the pre-installation activities within the seasonal restriction commitment for the Outer Thames Estuary SPA, as these activities have an even lower disturbance profile than the installation works themselves, i.e., fewer vessels, shorter working period. As such, significant disturbance to Red-throated Diver during pre-installation

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					activities, either from the Project in isolation or in-combination with other projects is not predicted.
43	8.3.31	As per comment on table 7.1 above the red-throated diver impact should be considered an LSE as the restriction is only partial for the landfall works. However, a conclusion of No AEoI could potentially be supported. This applies to all the in-combination considerations as the same text is repeated.	Please amend to make it clear.	Offshore	Text added to relevant cumulative schemes assessments.
Section 8: In Combination Effects – Kent Onshore Scheme					
44	8.4.3	The in-combination part of the Appropriate Assessment appears to have only considered loss of functionally linked land.	At this stage, any impact pathways taken forward to appropriate assessment owing to a likely significant effect alone and which have been mitigated, should also be reassessed to determine whether there will be a further impact when	Onshore	No other in combination effects are identified as requiring appropriate assessment given the distance of the nearest significant surface works in the Kent Onshore Scheme from the SPA/Ramsar site to

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			considered in-combination with other plans and/or projects.		the SPA (approximately 470m from the trenchless installation pit). This is also the case because of the distance of the Kent Onshore Scheme from Stodmarsh SPA/SAC/Ramsar and the absence of any other scheme including new overhead lines across the River Stour. This means, for example, that the SPA/Ramsar site is too far from the Kent Onshore Scheme to be affected by noise to discuss potential for in combination effects from other pathways. Since the loss of functionally-linked land for Sea Link alone has been mitigated it is considered that its contribution to 'in combination' losses of functionally-linked habitat

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					have been addressed to the extent that no residual effects remain. Other projects identified may themselves result in loss of functionally-linked habitat, but that is something for them to assess based on surveys for their applications and then mitigate as necessary.
Comments on December 2024 draft of Collision Risk Assessment, received February 2025					
45		There were some inconsistencies with the designated bird features included in the assessment… the HRA, once drafted, [should] include all designated features of Stodmarsh SPA and Ramsar site.	N/A	Onshore	The Applicant has reviewed the species and confirms all designated features of the Stodmarsh SPA and Ramsar site have been included.
46		With regard to the use of a 99.9% avoidance rate, I am content with the use of this rate for the majority of species as I agree that the OHL has a lower risk profile when compared with offshore wind proposals and because the spacing of the lines	N/A	Onshore	Noted. No change needed.

NE Ref	Section in reviewed version of HRA	Key matter	Natural England's advice to resolve issue	Scheme (general, offshore or onshore)	How addressed
		means that smaller bird species will be able to pass through without needing to take avoiding action.			
47		It is noted that the assessment states that the line spacing is large enough to accommodate the wingspan of larger species; however, these birds would need to be flying at exactly the right angle to fit through and may still be at a higher risk of collision. I note the corpse search data which suggests that the vast majority of birds avoid collision with the existing OHL and therefore there may not be as much of a risk as expected; however, the orientation of the proposed OHL differs and therefore this may not be a like-for-like comparison.	N/A	Onshore	The Applicant does accept that for larger birds such as Mute Swan (with a wing span of up to 2.4m), the area between line spacing is reduced. However, the OHL spacing would still be at least 8m, so the area for collision would still be relatively small. Further clarification has been provided in the Collision Risk Assessment.
48		In terms of collision risk potential, I do not completely agree with the reasoning given for the number of collisions being less	N/A		It is important to note that no modelling of collision has taken place in this assessment. Therefore, the

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		than predicted. It is stated that not all birds predicted to collide with the OHL will do so; however, this is what the avoidance rate assumes. For example, when using a 99.9% avoidance rate, 0.1% of birds flying through the area are assumed to collide. The factor that influences the number of collisions is the number of birds flying through the 'at risk' area, which has been calculated with precaution due to the sag in the OHL. Therefore, it is not that some birds will fly through the 'at risk' zone without colliding that results in a lower collision risk, but instead the fact that the number of birds used in the model is inherently precautionary.			figures presented in Table 6 represent all individuals potentially transiting through the proposed OHL route and not the predicted number of collisions, i.e., of the numbers of individuals transiting through the at risk area, no modelling has been undertaken to determine how many of these individuals will actually collide with a wire. The avoidance rates are provided to account for the fact that the majority of individuals will not fly 'blindly' into the wires, but will see them and take corrective action to avoid collision or they may be displaced from the area by the presence of new structures and not be present to make the flight in the first place. The addition of avoidance rates does not replace the aspect of modelling the actual

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					collisions from the predicted number of transits. As no model is available to provide a quantitative assessment of collisions, but for reasons outlined in the assessment, it is predicted that the collision risk would be lower than that modelled for an onshore windfarm and therefore, if modelling had been undertaken that predicted collisions, incorporating any of the avoidance rates provided, would be significantly lower than figures presented in Table 6. Further clarification has been provided in the Collision Risk Assessment.
49		I recognise that irrespective of the conclusions of the assessment, which find that collision is likely to	N/A		Noted. No changes needed.

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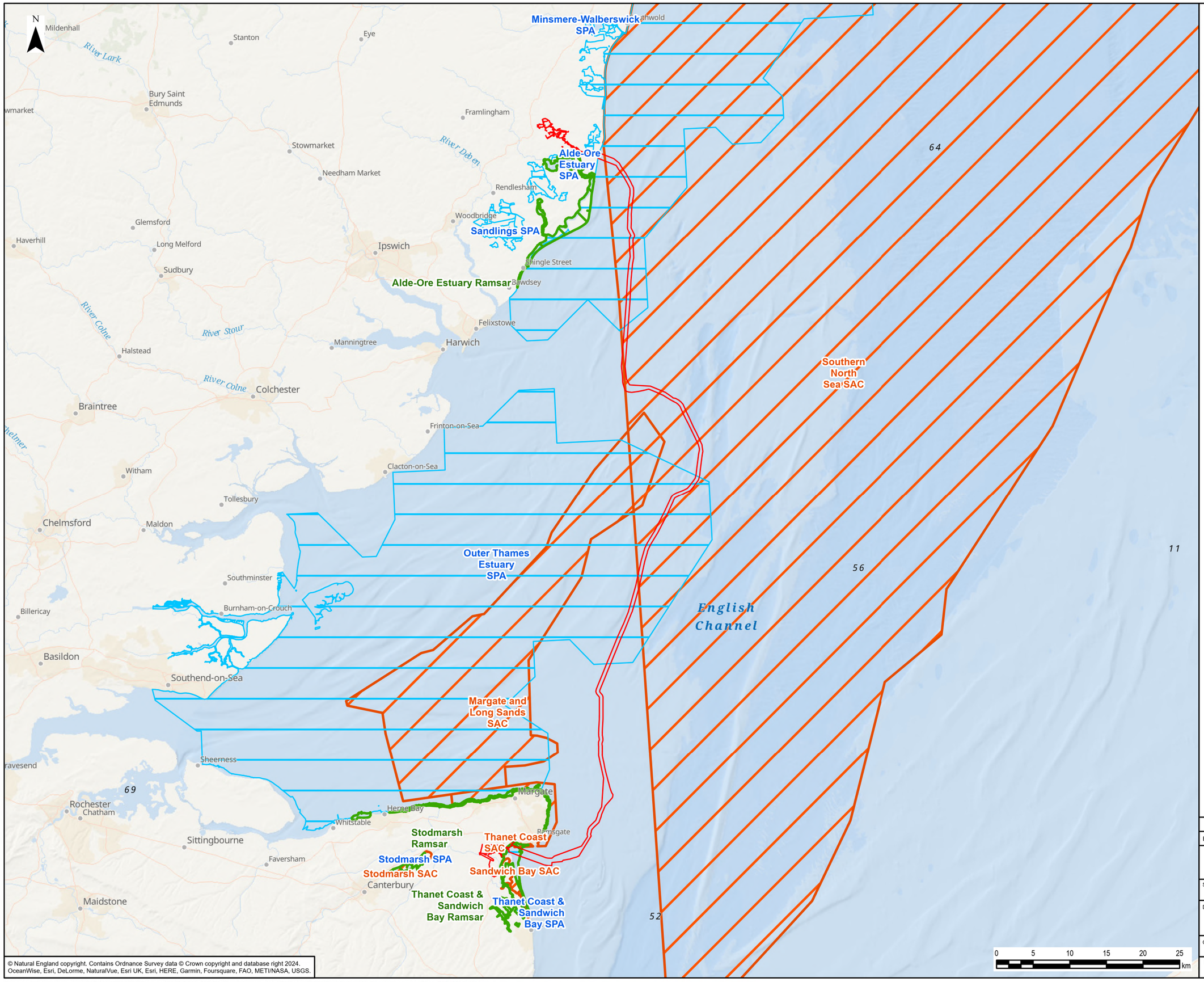
		be a rare event, the intention is to fit bird deflectors on to the new OHL to add an extra layer of visibility particularly in poor weather conditions. While I am supportive of this approach, I have no preference on the design of the deflectors and will leave this to National Grid to decide on.			

Appendix E Figures



Legend

- Order Limits
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Ramsar

Rev	Date	Description	GIS	Chk	App
0	19/02/2025	HABITAT REGULATIONS ASSESSMENT	EB	DF	AH

nationalgrid

Scheme: SEA LINK

Document Title: FIGURE 1 - EUROPEAN SITES

Creator:	Date:	Checker:	Date:	Approver:	Date:
EB	19/02/2025	DF	19/02/2025	AH	19/02/2025

Document Ref:	Scale:	Format:	Sheets:	Rev:
FIGURE 1	1:475,000	A3	1	0

Document Path: L:\Legacy\UKMCR1FP002-V1IE\Proposal\3512\SEAL GIS\02_Maps\Environmental Statement\HRA\Sea_Link_HRA_Fig_1_European_Sites_20250219_EB.aprx

Minsmere-Walberswick SPA

Minsmere-Walberswick Heaths and Marshes SSSI

Sizewell Marshes SSSI

Leiston - Aldeburgh SSSI

Sandlings SPA

Outer Thames Estuary SPA

Gromford Meadow SSSI

Snape Warren SSSI

Alde-Ore Estuary SSSI

Alde-Ore Estuary SPA

Crag Pit, Aldeburgh SSSI

Round Hill Pit, Aldeburgh SSSI

Aldeburgh Brick Pit SSSI

Blaxhall Heath SSSI

Iken Wood SSSI

Sandlings

Legend

- Order Limits
- 3dB Change Contour - Construction (Day)
- 3dB Change Contour - Construction (Night)
- 3dB Change Contour - Operational (Day)
- 3dB Change Contour - Operational (Night)
- Special Protection Areas (SPA)
- Site of Special Scientific Interest (SSSI)

0 0.5 1 1.5 2 2.5 km

Rev	Date	Description	GIS	Chk	App
0	19/02/2025	HABITAT REGULATIONS ASSESSMENT	EB	DF	JR

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Scheme: SEA LINK

Document Title:

FIGURE 2
MAP OF 3DB CHANGE CONTOUR AT SUFFOLK

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EB	19/02/2025	DF	19/02/2025	JR	19/02/2025

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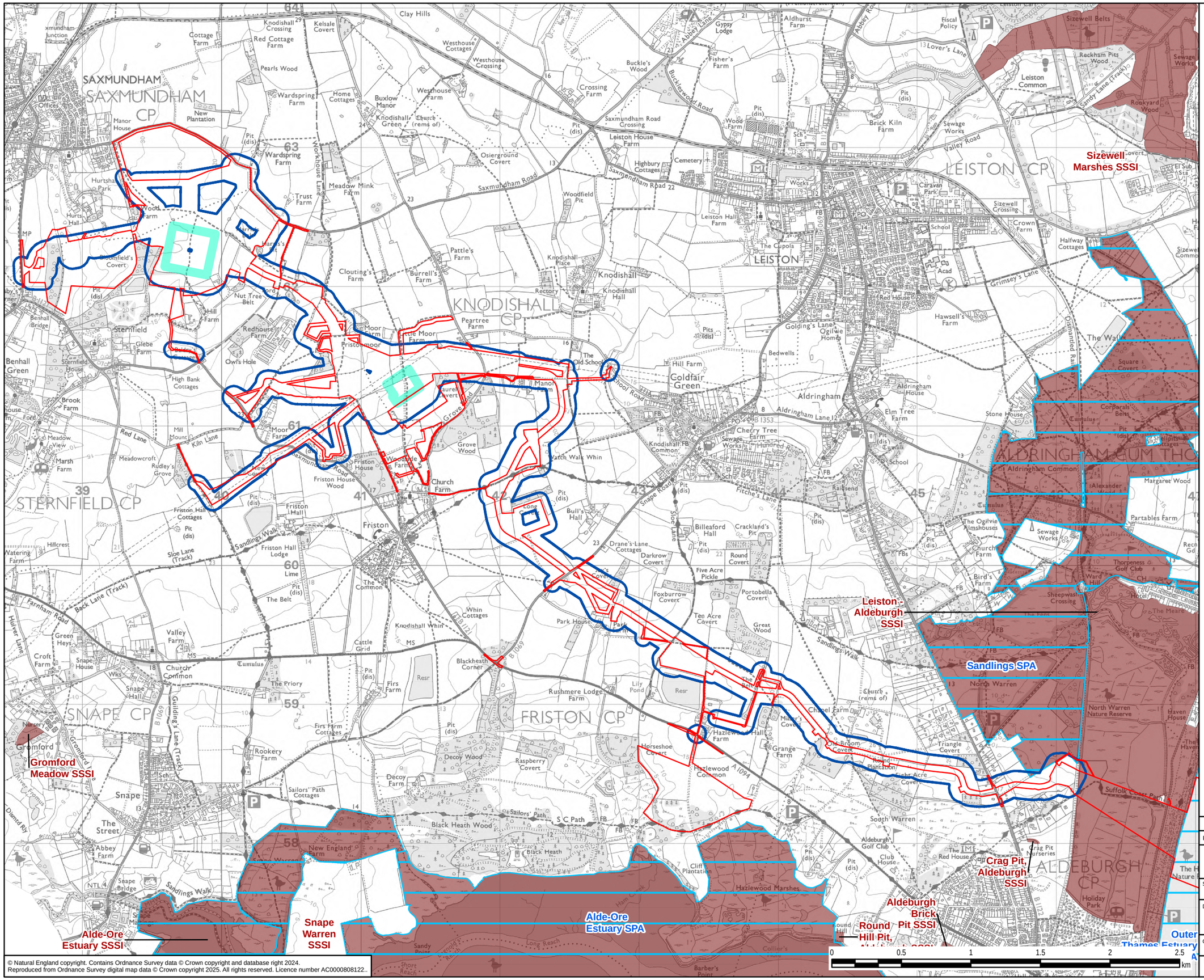
FIGURE 2	1:30,000	A3	1	0

Document Path: L:\Legacy\UKMCR1FP002-V1IE\Proposal\3512\SEAL GIS\02_Maps\Environmental Statement\HRA\Sea_Link_HRA_Fig_2_Map_3db_Change_Contour_Suffolk_20250219_EB.aprx



Legend

- Order Limits
- 60dB Average LAMax Contour - Operational
- 60dB Average LAMax Contour
- Special Protection Areas (SPA)
- Site of Special Scientific Interest (SSSI)

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Document Title: FIGURE 3 MAP OF 60DB AVERAGE LAMAX CONTOUR AT SUFFOLK

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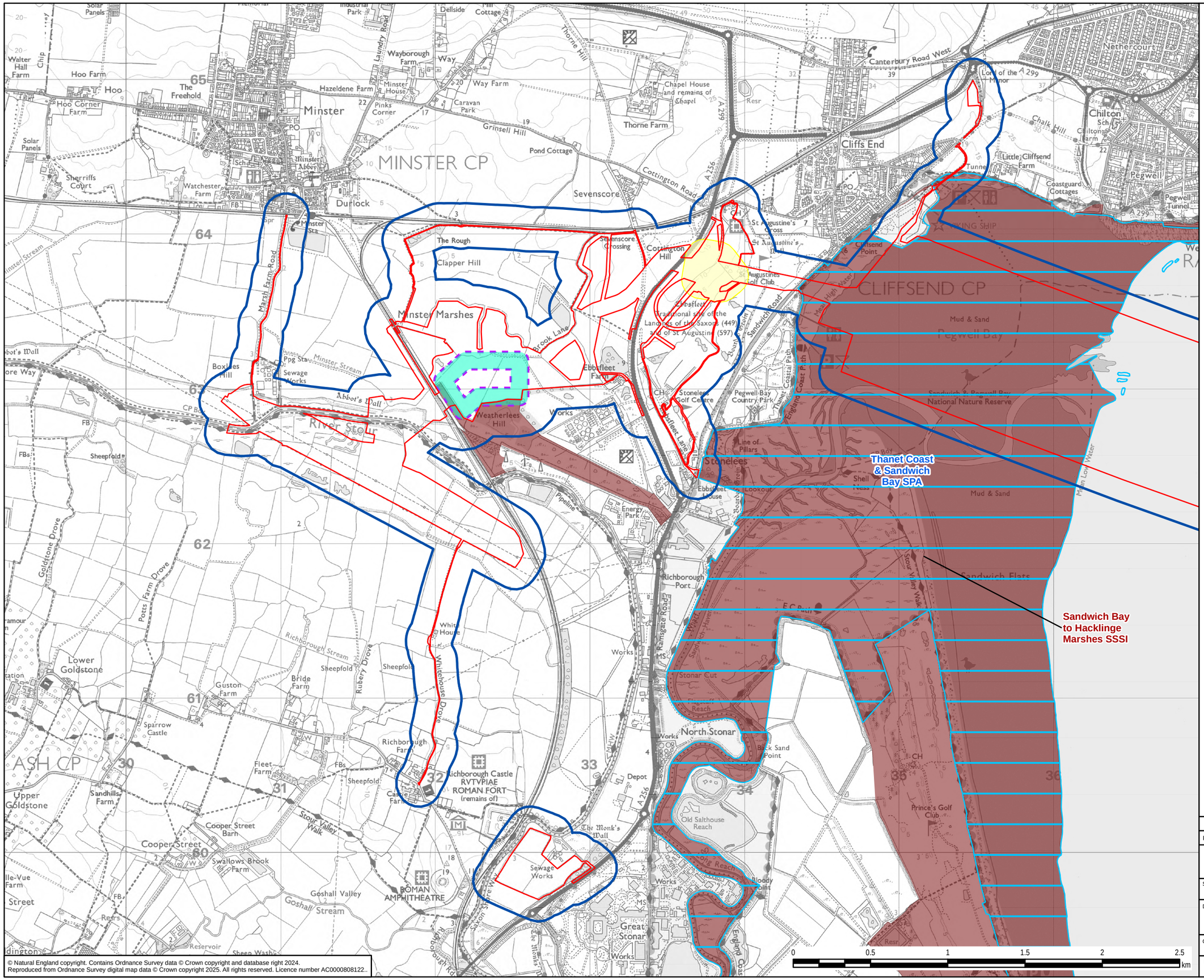
Document Ref:	Scale:	Format:	Sheets:	Rev:
FIGURE 3	1:25,000	A3	1	0

Document Path: L:\Legacy\UKMCR1FP002-V1IE\Proposal\3512\SEAL GIS\02_Maps\Environmental Statement\HRA\Sea_Link_HRA_Fig_3_Map_60db_Average_LAmax_Contour_Suffolk_20250219_EB.aprx



Legend

- Order Limits
- 3dB Change Contour - Construction (Day)
- 3dB Change Contour - Construction (Night)
- 3dB Change Contour - Operational (Day)
- 3dB Change Contour - Operational (Night)
- Special Protection Areas (SPA)
- Site of Special Scientific Interest (SSSI)

Rev	Date	Description	GIS	Chk	App
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Document Title: FIGURE 4
MAP OF 3DB CHANGE CONTOUR AT KENT

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EB	19/02/2025	DF	19/02/2025	JR	19/02/2025

Document Ref:	Scale:	Format:	Sheets:	Rev:
FIGURE 4	1:22,500	A3	1	0

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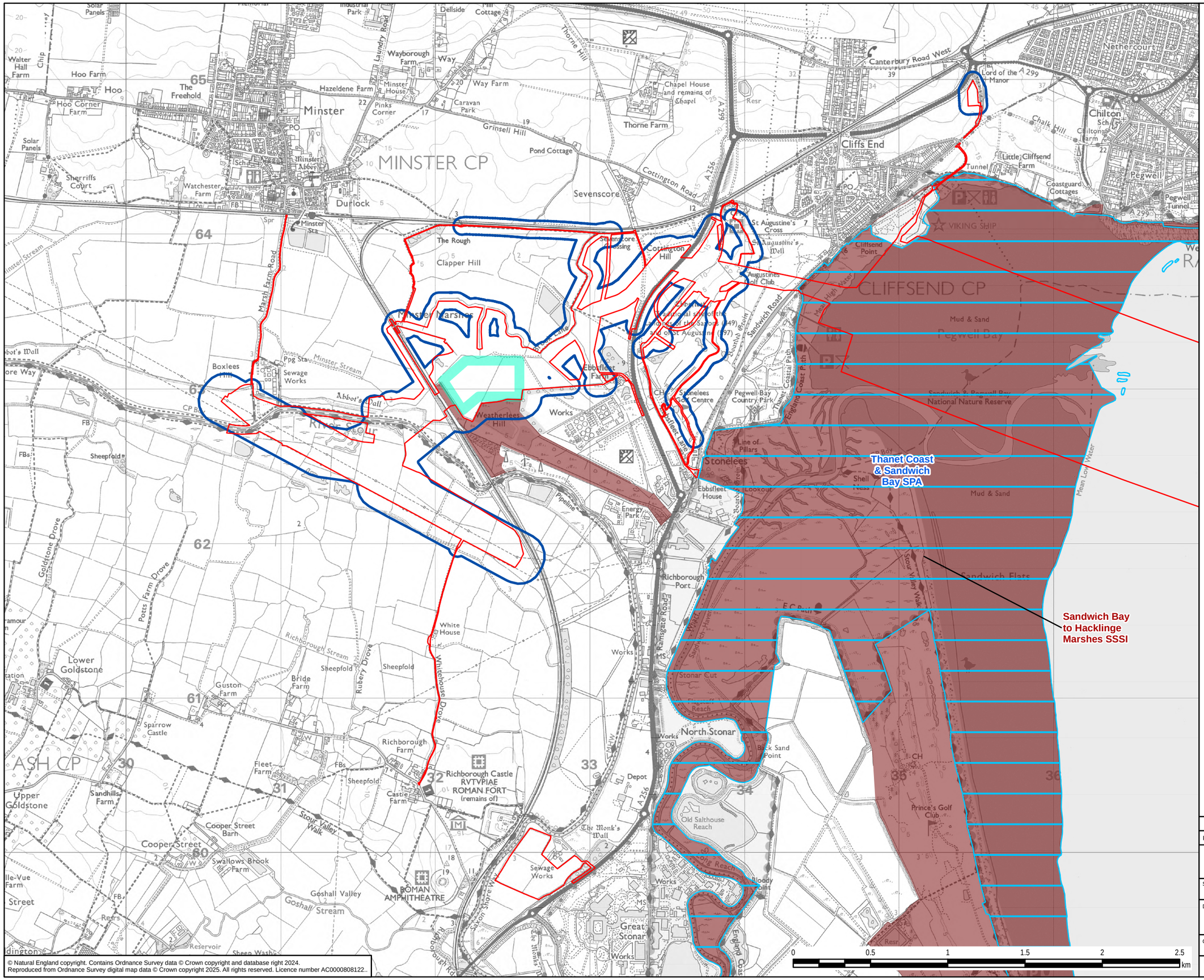

Rev	Date	Description	GIS	Chk	App
0	19/02/2025	HABITAT REGULATIONS ASSESSMENT	EB	DF	JR

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Scheme: SEA LINK

Document Title: FIGURE 5 MAP OF 60DB AVERAGE LAMAX CONTOUR AT KENT

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Document Ref:	Scale:	Format:	Sheets:	Rev:
FIGURE 5	1:22,500	A3	1	0

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