Peartree Hill Solar Farm

Habitats Regulations Assessment – Information to Inform Appropriate Assessment

Revision 45 (tracked)

Planning Act 2008

Infrastructure Planning

(Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(g)

Application Document Ref: EN010157/APP/5.3

~~October~~December 2025

Prepared by RSK on behalf of RWE Renewables UK Solar and Storage LTD

Contents

Executive Summary

This Information to inform the Appropriate Assessment report has been prepared by RSK on behalf of RWE Renewables UK Solar and Storage Ltd (hereafter 'the Applicant').

The report is required as part of the application for a proposed solar photovoltaic (PV) electricity generating and storage facility at the proposed Peartree Hill Solar Farm site, east of Beverley, East Riding of Yorkshire (centred on Ordnance Survey Grid Reference: TA 090 419), hereafter referred to as the 'Proposed Development'.

Under the Conservation of Habitats and Species Regulations 2017 (as amended[1]) (more commonly referred to as the Habitats Regulations), all competent authorities must consider whether any plan or project could affect a European site[2] before it can be authorised or carried out. Where the potential for likely significant effects cannot be excluded, the competent authority must make an appropriate assessment decision of the implications of the plan or project for the European site. This process is known as Habitats Regulations Assessment.

The purpose of this report is to provide evidence to determine the potential for the proposed development to impact on European sites. This will enable the competent authority to make the appropriate assessment decision in accordance with UK legislation.

The Stage 1 screening of the Habitats Regulations Assessment process considered each of the five European sites identified within 10km of the Proposed Development, to determine the potential for likely significant effects. The screening assessment concluded that for four of the European sites (Hornsea Mere Special Protection Area (SPA) and the Humber Estuary Special Area of Conservation (SAC)/SPA/Ramsar site) the potential for likely significant effects could not be ruled out (either alone or in combination). Further Appropriate Assessment was therefore required of these four sites in relation to the following:

- Loss of functionally linked land for qualifying bird species.
- Disturbance/ displacement of qualifying bird species using functionally linked land during the construction phase.
- Vibration/ noise disturbance of river lamprey.
- Disturbance of river lamprey as a result of electromagnetic fields.
- Degradation of habitats as a result of changes in water quality/ hydrology during the construction/decommissioning phase.

[1]Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.
[2] Within this report, the term European site comprises Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) (which form part of the National Site Network in the UK) and Ramsar sites.

- Disruption of flight paths of qualifying bird species as a result of glint and glare.

The Stage 2 Appropriate Assessment of the Habitats Regulations Assessment process concluded that with the implementation of mitigation measures in place secured through the **Outline Construction Environmental Management Plan (Outline CEMP) [EN010157/APP/7.2]**, **Outline Decommissioning Environmental Management Plan (Outline DEMP) [EN010157/APP/7.4]** and set out within the **Outline Landscape and Ecological Management Plan (Outline LEMP) [EN010157/APP/7.5]** there would be no adverse effects (alone or in-combination) on the integrity of the European sites as a result of the Proposed Development.

1 Introduction

1.1 Purpose of this report

1.1.1 This Information to Inform Appropriate Assessment report has been produced by RSK on behalf of the Applicant.

1.1.2 The report is required as part of the application for a proposed solar photovoltaic (PV) electricity generating and storage facility at the proposed Peartree Hill Solar Farm site, hereafter referred to as the 'Proposed Development'. The Proposed Development is located within the 'Order Limits' on land to the east of Beverley, East Riding of Yorkshire (the 'Site'), as shown on **ES Volume 3: Figure 1.1: Order Limits and Administrative Boundaries [EN010157/APP/6.3]**.

1.1.3 Under the Conservation of Habitats and Species Regulations 2017 (as amended1), hereafter referred to as the 'Habitats Regulations', all competent authorities must consider whether any plan or project could affect a European site1 before it can be authorised or carried out. Where the potential for likely significant effects cannot be excluded, the competent authority must make an appropriate assessment decision of the implications of the plan or project for the European site. This process is known as Habitats Regulations Assessment (HRA). The purpose of this report is to provide evidence to determine the potential for the Proposed Development to impact on European sites. This will enable the competent authority to make the appropriate assessment decision in accordance with UK legislation (refer to **Section 3** for further details).

1.1.4 The construction, operation (including maintenance) and decommissioning of the Proposed Development is classified as a Nationally Significant Infrastructure Project (NSIP), as the capacity exceeds 50MW and will require an order granting development consent order (DCO) under the Planning Act 2008.

1.1.5 A separate Environmental Impact Assessment (EIA) will also be submitted as part of the DCO. The Environmental Statement (ES) presents the main findings of the EIA; the following **ES Volume 1 [EN010157/APP/6.1]** and **ES Volume 2 [EN010157/APP/6.2]** chapters and associated figures in **ES Volume 3 [EN010157/APP/6.3]** have informed this report:

- **Chapter 1: Background and Context**;
- **Chapter 2: Location of the Proposed Development**;
- **Chapter 3: Proposed Development Description**;
- **Chapter 6: Air Quality**;

- **Chapter 7: Biodiversity**;
- **Chapter 10: Land, Soil and Groundwater**;
- **Chapter 12: Noise and Vibration**; and
- **Chapter 15: Cumulative Effects**.

1.1.6 This report is also supported by the following figures presented in **ES Volume 3 [EN010157/APP/6.3]**:

- **Figure 7.1: Designated Sites and Ecological Mitigation and Enhancement Areas**; and
- **Figure 7.2: Biodiversity Study Areas**.

1.1.7 This report is also supported by the following appendices presented in **ES Volume 4 [EN010157/APP/6.4]**:

- **Appendix 7.1: Preliminary Ecological Appraisal Report**;
- **Appendix 7.3: Breeding Bird Survey Report**;
- **Appendix 7.4: Wintering Bird Survey Report**;
- **Appendix 7.5: Ornithological Survey Report**;
- **Appendix 7.8: Aquatic Walkover Report**; **Appendix 7.9: Passage Bird Survey Report**; and
- **Grid Connection Cable Route Bird Survey Report [EN010157/APP/8.4]**.

2 Proposed Development

2.1 The Site

2.1.1 The Site encompasses approximately 893 hectares (ha) of land. This comprises several smaller parcels of land ('Land Areas'), within which the solar PV module areas and all associated infrastructure will be located, identified as follows:

- Land Area B: Land north-west of Long Riston.
- Land Area C: Land west of Arnold.
- Land Area D: Land south of the A1035.
- Land Area E: Land east of Weel.
- Land Area F: Land north of Wawne.

2.1.2 Each Land Area is made up of a number of referenced fields (e.g. Field B1), as shown on **ES Volume 3, Figure 1.2: Land Areas and Cable Routes Plan with Field Numbering System [EN010157/APP/6.3]**. Most of these areas are arable fields. However, there are also some fields of grazed grassland, and relatively small areas of neutral grassland, broadleaved woodland and scrub in some of these parcels. The fields are interspersed with hedgerows, small woodland blocks, farm access tracks, wet ditches and some of the many major drains and dikes in the area.

2.1.3 The Land Areas will be connected by a series of interconnecting underground cable routes (labelled Cable B-B, Cable C-D, Cable E-E and Cable E-F). To facilitate the export and import of electricity, the Proposed Development will connect to the National Grid Creyke Beck Substation via the grid connection cable route from Fields E16/E17, as shown on **ES Volume 3, Figure 1.2: Land Areas and Cable Routes Plan with Field Numbering System [EN010157/APP/6.3]**.

2.2 Landscape context

2.2.1 The Site is located to the east of the town of Beverley, close to the hamlet of Meaux and villages of Routh, and Long Riston. The surrounding area is dominated by agricultural land, farmsteads and minor settlements with a complex network of drains and dikes. The main group of land parcels has few roads other than Meaux Lane which cuts through the centre of Land Areas D and F. The easternmost Fields B5 and B6 within Land Area B are separated from the rest of the Land Areas by the A165 road. The River Hull flows close to the western edge of Land Area E and crosses the Order Limits at the grid

connection cable route. The North Sea and the Humber Estuary lie to the east and south respectively.

2.3 Development proposals

2.3.1 The Proposed Development is a proposed solar photovoltaic electricity generating and storage facility with an export capacity of 320 megawatts and associated infrastructure. The main elements of the Proposed Development comprise:

- Solar photovoltaic (PV) modules and associated mounting structures;
- On-site supporting equipment including inverters, transformers, direct current (DC)-DC converters and switchgear;
- A battery energy storage system (BESS) including batteries and associated enclosures, monitoring systems, air conditioning, electrical cables and fire safety infrastructure;
- Two on-site 132kV substations, including transformers, switchgear, circuit breakers, control equipment buildings, control functions, material storage, parking, as well as wider monitoring and maintenance equipment;
- Low voltage and 33 kV interconnecting cabling within the Land Areas to connect the solar PV modules together and to transmit electricity from the solar PV modules and BESS to one of the two on-site 132 kV substations;
- 132 kV underground cables (two 132 kV export cables) connecting the on-site substations to the National Grid Creyke Beck Substation;
- Works at the National Grid Creyke Beck Substation to facilitate the connection of the 132 kV underground cabling into the substation;
- Associated infrastructure including access tracks, parking, security measures, gates and fencing, lighting, drainage infrastructure, storage containers, earthworks, surface water management, maintenance and welfare facilities, security cabins and any other works identified as necessary to enable the developments;
- Highways works to facilitate access for construction vehicles, comprising passing places where necessary to ensure that heavy goods vehicles (HGVs) can be safely accommodated amongst existing traffic, new or improved site accesses and visibility splays;
- A series of new permissive paths connecting to the existing public right of way network;

- Environmental mitigation and enhancement measures, including landscaping, habitat management, biodiversity enhancement and amenity improvements; and
- Temporary development during the construction phase of the Proposed Development including construction compounds, parking and laydown areas.

2.4 Construction

2.4.1 An overview of construction activities is provided below, with additional detail provided regarding the installation of solar PV modules, underground cables and culverts.

Overview

2.4.2 Preparatory works:

- Establishment of and/or works to site access points.
- Installation of any temporary/permanent culverts under watercourses/drainage ditches.
- Installation of span bridges.
- Stripping of topsoil, trenching (if required), storage and capping of soil.
- Construction of any access tracks and laydown areas within the Site.
- Establishment of construction compounds.
- Establishment of mobilisation areas, running tracks and temporary construction compounds for cable installation.
- Erection of security fencing around the Site perimeter, as well as access gates.
- Installation of security measures such as CCTV.
- Delivery of plant and machinery to the Site.
- Delivery of materials to enable the first phases of construction.

2.4.3 Construction of Proposed Development infrastructure:

- Solar PV module installation.
- Installation of solar PV module support structures.
- Mounting of solar PV modules.
- Installation of supporting infrastructure, including inverters, transformers, DC-DC converters and switchgear.

- Installation of the BESS.
- Construction of the two on-site substations, including groundworks, foundations and installation of electrical components.
- Installation of storage containers.
- Installation of construction drainage with pumping (if required).
- Site establishment and habitat creation.

2.4.4 Cable installation:

- Site preparation.
- Set up of temporary construction compounds.
- Stripping of topsoil in sections.
- Trenching and installation of cabling.
- Cable joint installation.
- Implementation of crossing methodologies for watercourses, roads and railway, where required (e.g. Horizontal Directional Drilling).
- Reinstatement works where necessary.

Solar PV modules

- A push press piling rig would be used to install the piles for solar PV module support structures (apart from in areas where further work identifies the need for archaeological protection; where an alternative mounting structure would be proposed, in the form of ballast slabs which sit on the surface rather than penetrating the ground).
- Solar PV modules would be up to 3m in height.
- The solar PV modules would be installed either as fixed arrays or as tracking arrays (which adjust the position of the solar PV modules to track the sun throughout the day).
- Solar PV modules are fixed to mounting structures in groups known as ‘strings’. The exact number and arrangement of modules within the five Land Areas depends on a range of factors including the size of the system, its location, and the direction in which the solar panels are installed. As technology and equipment are evolving, some flexibility in design would be required to accommodate technology advances.
- The solar PV modules would be separated with a minimum row separation space of 4m. The spacing between the rows would vary across the Land Areas to minimise effects of overshadowing and to ensure optimal efficiency.

- Solar PV modules will be grid-formed with anti-reflective films to increase the amount of light absorption.

Cabling

2.4.5 Cables would be required to connect the solar PV modules to the on-site transformers, switchgear, and BESS, as well as from the Land Areas to the two on-site substations, and onwards to the National Grid Creyke Beck Substation.

Interconnecting cables

2.4.6 Low voltage cabling within the Land Areas would be required to connect solar PV modules and the BESS to inverters where the voltage is transformed from the lower voltage to 33kV.

2.4.7 Cabling from the solar PV modules to the inverters would typically be installed above ground and fixed to the mounting structure of the modules, with a small section placed underground where it leaves the modules and connects to the inverters.

2.4.8 Higher voltage cables (33kV) are required to connect the inverters and switchgears, and to connect the switchgears to the two on-site substations. These cables would be buried underground.

2.4.9 There are several separate sections of underground cabling proposed between Land Areas, labelled as follows and shown on **ES Volume 3, Figure 3.4: Land Areas and Cable Routes Plan with Field Numbering System [EN010157/APP/6.3]**:

- Cable B-B;
- Cable C-D;
- Cable E-E; and
- Cable E-F.

2.4.10 Data cables (typically fibre optic) would be installed, typically alongside electrical cables in order to allow for monitoring during operation and maintenance, such as the collection of solar data from devices known as pyranometers.

2.4.11 The interconnecting cable trenches are expected to be up to 1.2m in width and up to 1.6m in depth. The construction working width for these would be up to 15m.

2.4.12 Cable ploughing will be used where ground conditions and other site factors allow; however, some open cut trenching may also take place. In instances where open cut or cable plough cannot be used, for example when crossing a public road or large drainage ditch, alternative methods, such as Horizontal Directional Drilling, would be used. The indicative areas where Horizontal Directional Drilling would be required are identified on **ES Volume 3, Figure 3.3: Indicative HDD Crossing Points [EN010157/APP/6.3]**.

Grid connection cable to National Grid Creyke Beck Substation

2.4.13 The Proposed Development would connect to the National Grid Creyke Beck Substation, located approximately 5.6km south-west of the southern extent of the Land Areas by underground cabling. The cable route is set out in **ES Volume 3, Figure 1.2: Land Areas and Cable Routes Plan with Field Numbering System [EN010157/APP/6.3]**. The underground cabling would comprise of 132kV cables. The maximum dimension of the cable trench required to install the cabling would be 1.6m deep by 1.5m wide. The maximum working width for the grid connection cabling route is 30m.

2.4.14 As noted above, cable ploughing will be used where ground conditions and other site factors allow; however, some open cut trenching may also take place. Horizontal Directional Drilling would be used where appropriate (as identified on **ES Volume 3, Figure 3.3: Indicative HDD Crossing Points [EN010157/APP/6.3]**, for example where the grid connection cable route crosses the River Hull.

Horizontal Directional Drilling

2.4.15 The dimensions of the Horizontal Directional Drilling launch and receptor pits for the River Hull crossing are anticipated to be approximately 7m × 3m in size. For Horizontal Directional Drillings of roads and ditches these will be smaller, approximately 3m × 2m.

2.4.16 The anticipated Horizontal Directional Drilling depths for the River Hull are between a minimum of 7m below the riverbed, with a potential maximum depth of 20m below the riverbed. For roads/ditches/hedgerows this would be a depth of 5m or less below ground level.

2.4.17 During the Horizontal Directional Drilling, no water will be abstracted from the River Hull or its tributaries. Water will be brought to the construction site and stored in water bowsers. Wastewater from the HDD wastewater (including bentonite) will be incarcerated within the launch pit and transported to a specialised local facility for disposal.

Culverts and bridges

2.4.18 A number of the proposed access tracks within the Land Areas will utilise existing culvert crossings and/or bridge structures. 2~~2~~3 locations are assumed to require either the installation of a span bridge or reinforcement or widening of the existing culvert/bridge structure. The specific need, location, type and dimensions of each crossing is subject to detailed surveys and inspections. To promote a precautionary approach, it has been assumed that all existing crossings will require culverting with an extension to each existing structure. The crossings over minor watercourses, which are likely to be wet for much of the year, would be facilitated by span bridge or, where this is not possible, box culverts. These would be fitted with a mammal shelf, the invert of the culvert would be 300mm below the bed level and the bed substrate would match that of the watercourse within the vicinity of the crossing. The crossing of the Holderness Drain connecting Land Area E will require a span bridge to support the construction phase. All amended or new crossings would be designed in consultation with the Environment Agency and Beverley and North Holderness Internal Drainage Board.

2.4.19 Further detail on watercourse crossings is contained within **ES Volume 4, Appendix 5.6: Flood Risk Assessment [EN010157/APP/6.4]**.

2.4.20 **ES Volume 3, Figure 3.6: Indicative Culvert Crossing Points [EN010157/APP/6.3]** identifies each of the proposed indicative culvert locations.

Working hours

2.4.21 Working hours on-site would be from 07:00 until 19:00 Monday to Friday and 07:00 until 12:00 on Saturday. No working would take place on Sundays or Bank Holidays unless particularly necessary.

2.4.22 It is anticipated that a maximum of 350 workers would be on-site during the peak construction period.

Timings

2.4.23 Subject to development consent being granted, the earliest construction could start is in 2026. Operation in 2028 is the earliest date that the Proposed Development could be connected to the National Grid.

2.4.24 Construction would require an estimated 24 months, with peak construction activity anticipated during 2027. This assumes commencement of construction in quarter 3 2026, with completion by quarter 3 2028.

Phasing

2.4.25 Works within each of the five Land Areas (B to F) would be phased over the anticipated 24-month construction period. Works on each Land Area are anticipated to take up to eight months each. Based on the indicative phasing plan, there would be a series of overlaps where works would be taking place in two Land Areas simultaneously. Works on the cable route connecting the on-site substations to the National Grid Creyke Beck Substation are anticipated to take up to ten months, and are likely to be undertaken at the same time as some or all of construction activities within Land Areas D, E and F.

Construction Environmental Management Plan

2.4.26 An **Outline Construction Environmental Management Plan (Outline CEMP) [EN010157/APP/7.2]** has been produced as part of the DCO Application, which sets out best-practice construction methods to minimise potential effects on protected species, retained habitats and nearby protected sites.

2.5 Operation

Personnel

2.5.1 It is anticipated that there would approximately four full-time equivalent jobs created while the Proposed Development is operational, including for maintenance and security of the Site.

Maintenance

2.5.2 During the operation (including maintenance) phase of the Proposed Development, on-site activities would be limited and restricted to maintenance activities and grazing. Maintenance activities would include:

- Regular visual inspection of all infrastructure;
- Regular scheduled inspections and testing of equipment;
- Replacement of consumable items (e.g., inverter filters);
- Cleaning of solar PV modules if required (cleaning would be carried out using deionised water only, thereby avoiding potential impacts on water quality);
- Repair or replacement of solar modules or other components, if damaged;

- Delivery of spare parts, replacement equipment items and consumables;
- Water management (e.g., clearing of drainage ditches); and
- Vegetation management (e.g., cut back of grass, hedges, trees).

2.5.3 The traffic generated by the Proposed Development during the operation (including maintenance) phase is considered to be less than during the construction phase. There will be a small number of vehicles required to access the Site for maintenance and other tasks, such as replacement of equipment and management of vegetation and habitat creation.

Lighting

2.5.4 No areas of the Proposed Development would be continuously lit; however, infrared sensor triggered security lighting would be required around key electrical infrastructure. The lighting design would seek to limit any impact on sensitive receptors.

Outline Battery Storage Management Plan

2.5.5 The BESS will be designed in accordance with the UK and internationally recognised good practice guidance and standards available at the time of writing and take into account any advancements in technology.

2.5.6 An **Outline Battery Storage Management Plan [APP-157]** has been produced in order to respond to the risks and concerns around the potential for a battery fire event in the BESS. It identifies the key standards, guidelines, and principals the Applicant will adhere to during the detailed design and operation of the BESS within the Proposed Development. It sets out proposals for:

- Minimising the chances of a battery fire event through design measures;
- Minimising the chances of fire spread in the event of a fire through design and operational measures; and
- Setting out the proposed operational response to a fire event.

2.5.7 Details of the above are summarised below, for full information refer to the **Outline Battery Storage Management Plan [APP-157].**

Battery Management System and fire detection

2.5.8 All BESS units are equipped with a Battery Management Systems (BMS), which monitors and manages operational and safety parameters. This

ensures that quick and effective remedial action can be taken automatically if an issue is identified even at the individual cell level.

2.5.9 The BMS continuously monitors all essential data associated with each sub-component of the BESS, including current, voltage and temperature. The Applicant will review data from the BMS system. The Applicant will ensure that the fire detection system provided by the BESS supplier will be certified to the relevant industry standards.

Fire suppression

2.5.10 If a fire occurs within a container, an automated fire suppression system is triggered. The Applicant will use an automatic clean agent (aerosol and/or gas), rather than water-based system for the Proposed Development as this is regarded as good practice for a number of reasons, including to avoid contamination of water. If a container is flooded, there is a risk for contaminated water to leak into the surrounding area and cause contamination, this requires specific fire water containment to be installed and leads to increased costs and design complexities.

2.5.11 Emergency response personnel will be appropriately trained to handle containers that use clean agent fire suppression.

2.5.12 At the entrance to the Proposed Development there will be an information box which contains details of each battery on site and its exact location, its chemical make-up, and any details from the manufacturer about how to tackle a fire from the unit, as well as information about the fire suppression systems installed.

2.5.13 The layout of BESS will take vegetation (both proposed and existing) into consideration to ensure there is no additional fire risk. Areas within 10 m of BESS units will be cleared of combustible vegetation. The BESS will be positioned on concrete plinths and the land between impermeable and laid out to a gravel covering.

Contamination and avoidance of water suppression

2.5.14 Water would be used only to cool areas adjacent to a BESS container to prevent fire spread, water will not be used to suppress a battery fire within a BESS container which will be suppressed using an aerosol-based fire suppression (see above). This approach will avoid the risk of firewater runoff becoming contaminated with chemical substances contained in the batteries.

Operational Environmental Management Plan

2.5.15 The operational activities will be undertaken in accordance with the **Outline Operational Environmental Management Plan (Outline OEMP) [EN010157/APP/7.3]**. This sets out the measures that will be employed during the operation of the Proposed Development to control and minimise impacts on the environment, including lighting, vegetation management, and noise limits.

Landscape and Ecological Management Plan

2.5.16 The anticipated operational life of the Proposed Development is 40 years. An **Outline Landscape and Ecological Management Plan (Outline LEMP) [EN010157/APP/7.5]** has been produced as part of the DCO Application, which sets details of mitigation, management and monitoring of landscape and ecological features for 40 years duration in compliance with the DCO.

2.6 Decommissioning

2.6.1 The operational life of the Proposed Development is proposed to be 40 years, after which the Proposed Development will require decommissioning. The process of decommissioning would involve the removal of all solar infrastructure, including the solar PV modules and on-site supporting equipment, to be recycled or disposed of in accordance with industry best practices at that time. Any requirements to leave certain infrastructure, for example the on-site substations and access tracks, would be discussed and agreed with landowners as part of the decommissioning process. It is anticipated at this stage that underground cabling would be left in-situ to avoid unnecessary ground disturbance.

2.6.2 The effects of decommissioning are often similar to, or less impactful than, the construction effects. The assessment in this report has been based on assumptions as to how decommissioning would take place; these assumptions may change over time as practices for decommissioning evolve. See **ES Volume 1, Chapter 3: Proposed Development Description [EN010157/APP/6.1]** for more details relating to decommissioning.

Decommissioning Environmental Management Plan

2.6.3 At the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. A Decommissioning Environmental Management Plan would be secured pursuant to the DCO as a requirement, to be prepared in advance of the commencement of decommissioning works and in accordance with the **Outline Decommissioning Environmental Management Plan (Outline DEMP) [EN010157/APP/7.4]**.

2.6.4 The **Outline DEMP [EN010157/APP/7.4]** sets out the principles to be followed in the decommissioning phase of the Proposed Development, taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements. It includes details of measures to mitigate and manage decommissioning related effects on biodiversity, including measures to prevent air, water, light and noise pollution and avoid disturbance to sensitive species.

3 Methodology

3.1 Legislative Context for Habitats Regulations Assessment

3.1.1 Under the Habitats Regulations, a network of sites has been designated across the UK and the surrounding marine environment. These sites form a network of areas designated to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the European Community. This includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) which form part of the UK 'National Site Network'.

3.1.2 SACs are designated for the protection of habitats and non-avian animal species of conservation concern. SPAs are designated to protect rare or vulnerable species of bird, as well as all regularly occurring migratory bird species. In addition to fully designated SPAs/SACs, the Habitats Regulations also apply to those sites in the earlier stages of the designation process, including Sites of Community Interest, Candidate SACs, possible/proposed SACs; and potential/proposed SPAs. As a matter of UK Government policy, Habitats Regulations Assessment also needs to include consideration of Wetlands of International Importance, designated under the 1971 Ramsar Convention, more commonly known as 'Ramsar sites'. Within this report, the term 'European site' has been used to refer to SPAs, SACs and Ramsar sites.

3.1.3 The Habitats Regulations require that any plan or project which is not directly connected with or necessary to the conservation of a European site, and which is likely to have a significant effect on such a site, must be subject to an 'appropriate assessment' of the implications for the conservation objectives of that site. The whole process of such assessment is known as a Habitats Regulations Assessment. Generally, such plans or projects may only be approved if the 'competent authority' has ascertained, by means of an Appropriate Assessment, that there will be no adverse effect on the integrity of the European site(s).

3.2 Habitats Regulations Assessment guidance

3.2.1 This report has been undertaken in accordance with the following guidance:

- European Commission, Directorate-General for Environment, Assessment of plans and projects significantly affecting Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC – November 2001, Publications Office, 2002.

- European Commission, Directorate-General for Environment, Guidance document on assessment of plans and projects in relation to Natura 2000 sites – A summary, Publications Office of the European Union, 2022.
- UK Government. Habitats regulations assessments: protecting a European site. How a competent authority must decide if a plan or project proposal that affects a European site can go ahead. Published 24th February 2021. Last updated 6th December 2023. https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site
- Tyldesley, D., and Chapman C., (2013) The Habitats Regulations Assessment Handbook. July 2024 edition UK: DTA Publications Limited.

3.2.2 In addition, the Overarching National Policy Statement for Energy (NPS EN-1) (2023) (designated in January 2024) **[Ref. 1]** provides guidance related to HRA, including recommendations for early engagement with key stakeholders (in particular statutory consultees), and how residual impacts (if identified) will be considered.

3.3 Habitats Regulations Assessment stages

3.3.1 The aim of a Habitats Regulations Assessment is to determine, in view of a European site's conservation objectives and qualifying features, whether a project (either alone and/or in combination), would have a significant adverse effect on the European site. As per the Habitats Regulations Assessment Handbook **[Ref. 2]**, there are four distinct stages of the Habitats Regulations Assessment process, summarised below:

- **Stage 1 Screening:** is the first stage of the process and identifies the likely impacts upon a European site of a project (either alone or in-combination). Following the 'Eco Advocacy CLG judgement' in 2023 (case C-721/21), measures that may mitigate a harmful effect on a protected site may be taken into account at the screening stage, where those measures would have been incorporated into the project design as standard features irrespective of any effect on the protected site concerned. As per the Habitats Regulations Assessment handbook **[Ref. 2]**, these measures can be referred to as 'standard or essential features and characteristics of the project'. If the screening exercise concludes that likely significant effects cannot be ruled out, then Appropriate Assessment (stage 2 of the process) must be undertaken. It is important to note that the burden of evidence is to demonstrate, on the basis of objective information,

that there will be no significant effect; if the effect may be significant, or is not known, that would trigger the need for an Appropriate Assessment.

- **Stage 2 Appropriate Assessment:** considers the implications of the effects of the proposals for the site's conservation objectives (alone and in-combination). At this stage, it needs to be determined, beyond reasonable scientific doubt, whether or not there will be adverse effects on the integrity of the site. This stage also includes the development of mitigation measures to avoid or reduce any possible impacts.
- **Stage 3 Assessment of alternative solutions:** is the process which examines alternative ways of achieving the objectives of the project that would avoid adverse impacts on the integrity of a European site, should the avoidance or mitigation measures detailed at the Appropriate Assessment stage be insufficient to cancel out adverse effects.
- **Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain:** an assessment is made as to whether or not the development is necessary for Imperative Reasons of Overriding Public Interest (IROPI). If it is, this stage also involves detailed assessment of the compensatory measures needed to protect and maintain the overall coherence of the Natura 2000 network.

3.4 In-combination effects

3.4.1 The Habitats Regulations also require consideration of the potential for in-combination effects with any other plans or projects. As per the Habitats Regulations Assessment handbook **[Ref. 2]**, the plans/ projects considered in this assessment include:

- Projects under construction.
- Permitted application(s) not yet implemented.
- Submitted application(s) not yet determined.
- Projects on the National Infrastructure's programme of projects.
- Projects identified in the relevant development/local plans.

3.4.2 The plans and other existing and/or approved developments included in the in-combination assessment for the Habitats Regulations Assessment are listed in **Section 8**. The other existing and/or approved developments list has been taken from **ES Volume 2, Chapter 15: Cumulative Effects**

[EN010157/APP/6.2]. The plans include those which are either side of the Humber Estuary.

3.5 Mitigation

3.5.1 As noted above, following the 'Eco Advocacy CLG judgement' in 2023 (case C-721/21), measures that may inadvertently mitigate a harmful effect on a European site, may be able to be taken into account at the screening stage. These 'standard or essential features and characteristics of the project' are those which are inherent in the Proposed Development. These features may incidentally have the effect of avoiding or reducing some or all of the potentially adverse effects of a proposal on a European site but is not their specific intention **[Ref. 2]**. These mitigation measures have been taken into consideration in the screening assessment in **Section 4**.

3.5.2 On the authority of the 'People over Wind' judgement in 2018 (case C-323/17), specific mitigation measures which are intended to avoid/reduce harmful effects of the Proposed Development on European sites, cannot be taken into consideration at the screening stage **[Ref. 2]**.

4 Habitats Regulations Assessment Screening

4.1 Introduction

4.1.1 Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the Habitats Regulations, that is:

- whether a plan or project is directly connected to or necessary for the management of the European site; and
- whether a plan or project, alone or in-combination with other plans and projects, is likely to have significant effects on a European site in view of its conservation objectives.

4.1.2 Under the first test, the purpose of the Proposed Development is not directly connected with or necessary to the management of a European site. Therefore, the second test needs to be undertaken to determine whether the Proposed Development has the potential to have likely significant effects on a European site.

4.1.3 Throughout this report, species names follow British (English) vernacular names.

4.2 Consultation

4.2.1 A project account has been set up with Natural England's Discretionary Advice Service to gain advice on the scope and method of surveys to inform the EIA. Consultation responses relevant to the Habitats Regulations Assessment are summarised in **Appendix A**.

4.3 Identification of European Sites

4.3.1 For this assessment, the zone of influence (ZoI) of the Proposed Development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the qualifying features of a European site. Based on consideration of the potential effects which could arise from the Proposed Development, a ZoI of 10km from the Order Limits has been used to identify European sites. These are summarised in **Table 4-1** and shown on **Figure 4.1**.

Table 4-1: European sites within 10km

European site	Approximate distance and orientation from the Order Limits at closest point
Hornsea Mere SPA	5,815m east
Humber Estuary SPA	8,500m south
Humber Estuary Ramsar site	8,500m south
Humber Estuary SAC	8,500m south
Greater Wash SPA	9,560m east

European site information

4.3.2 **Tables 4-2** to **4-6** provide a list of the qualifying features for each of the European sites identified within the ZoI. The citation information has been accessed via the Natural England Designated Sites View website **[Ref. 3]**. The tables also list the relevant pressures/threats (as identified in the Site Improvement Plans) and the conservation objectives for each site.

4.3.3 Site-specific conservation objectives are prepared for all European sites. They aim to define the favourable conservation condition for a particular habitat or species at that site. The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Site-specific conservation objectives specify whether the objective is to maintain or to restore favourable conservation condition of the habitat or species, and they set out attributes and targets that define the objectives.

4.3.4 It should also be noted that site-specific conservation objectives for Ramsar sites have not been published. Ramsar sites are nevertheless afforded the same level of protection as SACs/ SPAs and therefore the same conservation objectives would apply.

Natural England guidance on the Humber Estuary SPA

4.3.5 During consultation (refer to **Appendix A**), Natural England provided their guidance document on the main component species of the SPA non-breeding waterbird assemblage 'Annex B: Humber Estuary Special Protection Area: Non-breeding waterbird assemblage (V1.1 June 2023)' (presented in **Appendix B**). This sets out which species should be considered when assessing the non-breeding waterbird assemblage feature of the Humber

Estuary SPA. Natural England recommend focusing on what are referred to as the 'main component species' of the assemblage, categorised as:

a) All species listed individually under the assemblage feature on the SPA citation (i.e. the species that qualified in 2007 when the site was designated).

b) Species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population according to the most recent Humber Estuary Wetland Bird Survey (Wetland Bird Survey) 5-year average count (currently 2018/19 - 2022/23).

c) Species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count.

4.3.6 The guidance provides a species list, but notes that the assemblage qualification is subject to change as species' populations change; therefore, the appropriate British Trust for Ornithology (British Trust for Ornithology) Wetland Bird Survey data should be considered in any assessment and the list should be used as a guide only.

4.3.7 This assessment has considered all the species listed in the Annex B document (refer to **Appendix B**), as listed in **Table 4-3**. Throughout the document, these species are referred to as 'Natural England Annex B species' with the category (a to c) noted where relevant.

Table 4-2: Summary of qualifying features, pressures/ threats and Conservation Objectives of the Hornsea Mere SPA

European site: Hornsea Mere SPA		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
SPA Citation Article 4.2 of the EC Birds Directive: Regularly supporting an internationally important wintering population of gadwall with an average peak count of 210 (five-year period 1987/88 -1991/92). • The site also supports nationally important wintering populations of four other species: • Goldeneye 240 (five-year period 1987/88 -1991/92). • Pochard 760 (five-year period 1987/88 -1991/92). • Shoveler 100 (five-year period 1987/88 -1991/92). • Tufted duck 640 (five-year period 1987/88 -1991/92). The site also qualifies by supporting a nationally important post-breeding and moulting population of mute swan, 189 (five-year period 1988 -1992). **[Ref. 4]** **Standard Data Form** • Gadwall 300 (five-year period 1991/92 -1995/96) • Mute swan 189 (five-year period 1988 -1992) **[Ref. 6]**	• Water pollution. • Siltation. • Inappropriate water levels. • Public access/ disturbance. **[Ref. 5]**	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species. • The structure and function of the habitats of qualifying species. • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely. • The populations of qualifying species, • The distribution of qualifying species within the site. **[Ref. 4]**

Table 4-3: Summary of qualifying features, pressures/ threats and Conservation Objectives of the Humber Estuary SPA

European site: Humber Estuary SPA		
Qualifying features	**Pressures/threats**	**Conservation objectives**
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: • Avocet (wintering and breeding) • Bittern (wintering and breeding) • Hen harrier (wintering) • Golden plover (wintering) • Bar-tailed godwit (wintering) • Ruff (passage) • Marsh harrier (breeding) • Little tern (breeding) The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season: • Shelduck (wintering) • Knot (wintering and passage) • Dunlin (wintering and passage)	• Water pollution. • Coastal squeeze. • Changes in species distributions. • Undergrazing. • Invasive species. • Natural changes to site conditions. • Public Access/ disturbance. • Fisheries: Fish Stocking. • Fisheries: Commercial marine and Estuarine. • Direct land take from development.	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species. • The structure and function of the habitats of qualifying species. • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely. • The populations of qualifying species, • The distribution of qualifying species within the site. **[Ref. 7]**

European site: Humber Estuary SPA		
Qualifying features	**Pressures/threats**	**Conservation objectives**
• Black-tailed godwit (wintering and passage) • Redshank (wintering and passage) The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season: In the non-breeding season, the area regularly supports 153,934 individual waterbirds (five-year peak mean 1996/97 – 2000/01). **[Ref. 7]** **Natural England Annex B Species List (refer to Appendix B):** Category a) Species listed individually under the assemblage feature on the SPA citation: Avocet, bar-tailed godwit, bittern, black-tailed godwit, brent goose, curlew, dunlin, golden plover, goldeneye, greenshank, grey plover, knot, lapwing, mallard, oystercatcher, pochard, redshank, ringed plover, ruff, sanderling, scaup, shelduck, teal, turnstone, whimbrel, wigeon. Category b) Species which are not listed on the SPA citation but occur at site levels of more than 1% of the national population according to the most recent Humber Estuary Wetland Bird Survey (Wetland Bird Survey) five-year average count: Green sandpiper, greylag goose, little egret, pink-footed goose, shoveler, crane.	• Air pollution: impact of atmospheric nitrogen deposition. • Shooting scaring. **[Ref. 9]**	

European site: Humber Estuary SPA		
Qualifying features	**Pressures/threats**	**Conservation objectives**
Category c) Species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count. Natural England Annex B also notes the need to consider species which are not considered to be non-breeding waterbirds but are listed on the citation qualifying under article 4.1 and 4.2 of the Directive: Hen harrier (non-breeding); and breeding marsh harrier, little tern, avocet, bittern.		

Table 4-4: Summary of qualifying features, pressures/ threats and Conservation Objectives of the Humber Estuary Ramsar site

European site: Humber Estuary Ramsar site		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
Ramsar criterion 1 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at	• Disturbance to vegetation through cutting/ clearing • Vegetation succession • Water diversion for irrigation/ domestic/ industrial use	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species. • The structure and function of the habitats of qualifying species.

European site: Humber Estuary Ramsar site		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad. **Ramsar criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (five-year peak mean 1996/97-2000/2001). Ramsar criterion 6 – species/populations occurring at levels of international importance: • Golden plover (passage and wintering) • Knot (passage and wintering) • Dunlin (passage and wintering) • Black-tailed godwit (passage and wintering) • Redshank (passage and wintering) • Shelduck (wintering) • Bar-tailed godwit (wintering) **Ramsar criterion 8** The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas. **[Ref. 8]**	• Overfishing • Pollution – domestic sewage • Pollution – agricultural fertilisers • Recreational/ tourism disturbance (unspecified) • Other - Coastal squeeze **[Ref. 9]**	• The supporting processes on which qualifying natural habitats and habitats of qualifying species rely. • The populations of qualifying species, • The distribution of qualifying species within the site. **[Ref. 7]**

Table 4-5: Summary of qualifying features, pressures/ threats and Conservation Objectives of the Humber Estuary SAC

European site: Humber Estuary SAC		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
Qualifying habitats: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: • Atlantic salt meadows • Coastal lagoons* • Dunes with *Hippophae rhamnoides* • Embryonic shifting dunes • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Fixed dunes with herbaceous vegetation (`grey dunes`) * • Salicornia and other annuals colonising mud and sand • Sandbanks which are slightly covered by sea water all the time • Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes') Qualifying species: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:	• Water pollution. • Coastal squeeze. • Changes in species distributions. • Undergrazing. • Invasive species. • Natural changes to site conditions. • Public Access/ disturbance. • Fisherise: Fish Stocking. • Fisheries: Commercial marine and Estuarine. • Direct land take from development.	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species. • The structure and function (including typical species) of qualifying natural habitats. • The structure and function of the habitats of qualifying species. • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely. • The populations of qualifying species, • The distribution of qualifying species within the site. **[Ref. 10]**

European site: Humber Estuary SAC		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
• Grey seal • River lamprey • Sea lamprey Annex I priority habitats are denoted by an asterisk (*) **[Ref. 10]**	• Air pollution: impact of atmospheric nitrogen deposition. • Shooting/ scaring. **[Ref. 9]**	

Table 4-6: Summary of qualifying features, pressures/ threats and Conservation Objectives of the Greater Wash SPA

European site: Greater Wash SPA		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the Annex I species: • Red-throated diver (non-breeding) • Little gull (non-breeding) • Sandwich tern (breeding) • Common tern (breeding) • Little tern (breeding) In addition, the site qualifies under Article 4.2 of the Directive 2009/147/EC by regularly supporting a population of international importance of the migratory species:	• Outdoor sports and leisure activities, recreational activities • Shipping lanes, ports, marine constructions • Renewable abiotic energy use	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species. • The structure and function of the habitats of qualifying species.

European site: Greater Wash SPA		
Qualifying features	**Pressures/threats**	**Conservation Objectives**
• Common scoter **[Ref. 11]**	• Marine water pollution • Fishing and harvesting aquatic resources **[Ref. 12]**	• The supporting processes on which qualifying natural habitats and habitats of qualifying species rely. • The populations of qualifying species, • The distribution of qualifying species within the site. **[Ref. 11]**

4.4 Conservation status

4.4.1 The conservation status of the European sites has been reviewed. Where information is not in place for the SAC, SPA, Ramsar site feature condition, the condition assessment information for the SSSIs which underpin the European site has been used to indicate conservation status **[Ref. 3]**. In some cases there are multiple SSSIs within the European site boundary supporting the same designated features, but with a different conservation status. In addition there are some designated features which do not have conservation status information available.

Hornsea Mere SPA

4.4.2 The conservation status for the qualifying features of Hornsea Mere SPA has been taken from the information available for Hornsea Mere SSSI. As shown in **Table 4-7**, the SSSI is in favourable conservation status for all the features reported, with the exception of mute swan, for which populations have not been recorded.

Table 4-7: Hornsea Mere conservation status of qualifying features [Ref.3]

SPA qualifying features	Conservation status (from SSSI)
Gadwall, goldeneye, pochard, shoveler, tufted duck	Favourable: Hornsea Mere SSSI
Mute swan	Not Recorded: Hornsea Mere SSSI

Humber Estuary SAC

4.4.3 The conservation status for the qualifying features of the Humber Estuary SAC has been taken from the information available within the Humber Management Scheme Action Plan **[Ref.46]**. As shown in **Table 4-8**, the Humber Estuary SAC has qualifying features that are in both favourable and unfavourable condition.

Table 4-8: Humber Estuary SAC conservation status [Ref.46]

SAC qualifying features	Conservation status (from Humber Management Scheme Action Plan)
Estuary	SAC feature in unfavourable recovering condition
Mud and sand flats	SAC feature in unfavourable recovering condition
Saline lagoons	SAC feature in favourable condition

SAC qualifying features	Conservation status (from Humber Management Scheme Action Plan)
Saltmarsh – Atlantic salt meadow and pioneer saltmarsh	Annex 1 (Habitats Directive) feature assessment not recorded at site level
Sub-tidal sandbanks	SAC feature in favourable condition
Grey seal	SAC feature in favourable condition
Sea and river lamprey	Sea and river lamprey are Annex 1 (Habitats Directive) features and the assessment on conservation status is not recorded at site level

Humber Estuary SPA

4.4.4 The Humber Estuary Management Scheme Action Plan **[Ref.46]** notes that the conservation status of the Humber Estuary SPA has not been assessed. However, the document notes that the Humber Estuary SSSI breeding bird qualifying feature has been assessed as being in favourable condition and that the SSSI wintering and passage bird qualifying feature has been assessed as being in unfavourable recovering condition. **Table 4-9** provides the conservation status for each qualifying species of the SPA, based on information for the underlying SSSIs. The Humber Estuary SPA has qualifying features that are in both favourable and unfavourable condition.

Table 4-9: Humber Estuary SPA conservation status [Ref.3]

SPA qualifying features	Conservation status (from SSSI)
Avocet	Favorable: Humber Estuary SSSI
Bar-tailed godwit	Unfavourable - Declining: Humber Estuary SSSI
Bittern	Favorable: Humber Estuary SSSI
Black-headed gull	No information
Black-tailed godwit	Favorable: Humber Estuary SSSI, and North Killingholme Haven Pits SSSI
Brent goose	Favorable: Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby - Theddlethorpe Dunes SSSI
Crane	No information
Curlew	Unfavourable - Declining: Humber Estuary SSSI
Dunlin	Unfavourable - No change: Humber Estuary - 2000480 SSSI Favorable: Saltfleetby - Theddlethorpe Dunes SSSI

SPA qualifying features	Conservation status (from SSSI)
Golden plover	Favorable: Humber Estuary SSSI
Goldeneye	Unfavourable - Declining: Humber Estuary SSSI
Green sandpiper	No information
Greenshank	Unfavourable- No change: Humber Estuary SSSI
Grey plover	Favorable: Humber Estuary SSSI
Greylag goose	No information
Hen harrier	Non-recorded: Humber Estuary SSSI
Knot	Favorable: Saltfleetby - Theddlethorpe Dunes SSSI
Lapwing	Unfavourable - No change: Humber Estuary SSSI
Little egret	No information
Little tern	Favorable: Saltfleetby - Theddlethorpe Dunes SSSI Unfavourable - No change: The Lagoons SSSI
Mallard	No information
Marsh harrier	Not recorded
Oystercatcher	Favorable: Humber Estuary SSSI
Pink-footed goose	No information
Pochard	Unfavourable - Declining: Humber Estuary SSSI
Redshank	Unfavourable - Declining: Humber Estuary SSSI. Favorable: Saltfleetby - Theddlethorpe Dunes SSSI
Ringed plover	No information
Ruff	Unfavourable - No change: Humber Estuary SSSI
Sanderling	Unfavourable - No change: Humber Estuary SSSI/ Favorable: Saltfleetby - Theddlethorpe Dunes SSSI
Scaup	Unfavourable - Recovering: Humber Estuary SSSI
Shelduck	Favorable: Humber Estuary SSSI
Shoveler	No information
Teal	Favorable: Humber Estuary SSSI
Turnstone	Unfavourable - Declining: Humber Estuary SSSI
Whimbrel	Favorable: Humber Estuary - 2000480 SSSI
Wigeon	Unfavourable - Declining: Humber Estuary SSSI/ Favorable: Saltfleetby - Theddlethorpe Dunes SSSI
Wintering bird assemblage	No information

Humber Estuary Ramsar Site

4.4.5 The conservation status for the Humber Estuary Ramsar site has been assessed based on information taken from the Humber Management Scheme Action Plan **[Ref.46]** in relation to qualifying features which are also included on the SAC designation. For the remaining qualifying features, information has been taken from the associated underlying SSSIs [Ref.3]. The Humber Estuary Ramsar site has qualifying features that are in both favourable and unfavourable condition.

Table 4-10: Summary of conservation status of Humber Estuary Ramsar site

Qualifying features	Conservation Status (from Humber Management Scheme Action Plan or SSSI)
Near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.	Various features: unfavorable to favorable: Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby - Theddlethorpe Dunes SSSI, The Lagoons SSSI
Grey seal	Feature in favourable condition
Natterjack toad	Unfavourable - Recovering: Saltfleetby - Theddlethorpe Dunes SSSI
Non-breeding waterbird assemblage	No information
Golden plover	Favourable: Humber Estuary SSSI
Knot	Favourable: Saltfleetby - Theddlethorpe Dunes SSSI
Dunlin	Unfavourable - No change: Humber Estuary SSSI Favourable: Saltfleetby - Theddlethorpe Dunes SSSI
Black-tailed godwit	Favorable: Humber Estuary SSSI, North Killingholme Haven Pits SSSI
Redshank	Unfavourable - Declining: Humber Estuary SSSI Favourable: Saltfleetby - Theddlethorpe Dunes SSSI
Shelduck	Favorable: Humber Estuary SSSI
Bar-tailed godwit	Unfavourable - Declining: Humber Estuary SSSI
River lamprey	No information
Sea lamprey	No information

Greater Wash SPA

4.4.6 The conservation status of the Greater Wash SPA has been assessed based on information for the associated underling SSSIs. The SPA has qualifying features that are in both favourable and unfavourable condition.

Table 4-11: Summary of conservation status of the Greater Wash SPA [Ref.3]

Qualifying features	Conservation Status (from SSSI)
Red-throated diver	No information
Little gull	No information
Sandwich tern	Favourable: North Norfolk Coast SSSI
Common tern	Unfavourable - Declining: North Norfolk Coast SSSI
Little tern	Favourable: Gibraltar Point SSSI, Saltfleetby - Theddlethorpe Dunes SSSI/ Unfavourable - No change: North Norfolk Coast SSSI, The Lagoons SSSI, Winterton-Horsey Dunes SSSI
Common scoter	Favourable: The Wash SSSI

4.5 Source-Pathway-Receptor

4.5.1 Likely significant effects on a European site will only exist where there is a source-pathway-receptor link.

4.5.2 The Proposed Development would be the potential source/cause of effects (if any) on the European site. Identifying potential impact pathways to qualifying features of the European sites (receptors) is part of the screening process. If there is no link or causal connection between the actions likely to result from the Proposed Development and the qualifying features of any European sites, there is no potential for impacts and likely significant effects can be screened out.

4.5.3 Taking into consideration the development proposals, **Section 4.6** sets out the potential impact pathways (to qualifying habitats and/or species associated with the European sites) which have been identified for the construction, operational and decommissioning phases. Decommissioning impacts are considered likely to be similar to or less than those identified for the construction phase. Environmental conditions change over time, and there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies will evolve over the operational life of the Proposed Development. Assumptions have therefore been made, where appropriate.

4.6 Identification of potential impacts

Loss of functionally linked land for qualifying bird species

4.6.1 Construction activities would not result in direct loss of habitats within the European sites, the closest of which is Hornsea Mere SPA, located approximately 5,815m east of the Order Limits. However, land within and adjacent to the Order Limits has the potential to constitute 'functionally linked land'[3] for qualifying bird species for which the European sites are designated. As such, within the Order Limits there would be potential for temporary loss of functionally linked land associated with construction activities, such as laydown areas, site compounds, haul routes, installation of inter-connecting cable routes, and the grid connection cable route. The construction of the solar PV modules and associated above ground infrastructure has the potential to result in long-term loss of functionally linked land.

Disturbance/ displacement of qualifying bird species using functionally linked land

4.6.2 There is potential for disturbance/ displacement of SPA/Ramsar site qualifying bird species using functionally linked land within and adjacent to the Order Limits during the construction and decommissioning phases. This could reduce feeding efficiency and/or lead to changes in species distribution with potential consequential effects on survival rates and, ultimately, prevent the conservation objectives of the SPA/ Ramsar site from being met.

4.6.3 As noted in **Section 2**, hours of work will be between Monday to Friday 07:00 until 19:00, and 07:00 until 12:00 on Saturdays, with no working on Sundays. There will also be no nighttime working. Activities which could result in visual/ noise related disturbance/displacement include:

- Presence/ movement of construction vehicles.
- Increased human presence.
- Noise generating activities, such as piling and other earthworks.
- Light spillage from within the construction footprint onto immediately adjacent areas.

[3] functionally linked land describes areas of land or sea occurring outside a designated site, which is considered to be critical to, or necessary for, the ecological or behavioural functions in a relevant season of a qualifying feature for which a SAC/ SPA/ Ramsar site has been designated. These habitats are frequently used by qualifying species and support the functionality and integrity of the designated sites for these features **[Ref. 13]**. The loss of functionally linked land or disturbance/displacement of qualifying species within functionally linked land has the potential to lead to changes in species distribution and, ultimately, prevent the conservation objectives of a SAC/ SPA/ Ramsar site from being met.

4.6.4 During the operation (including maintenance) phase, disturbance/ displacement could occur as a result of vehicle and human presence.

Disruption of flight paths of qualifying bird species as a result of glint and glare

4.6.5 During the operation (including maintenance) phase there is potential for glint and glare from the solar panels to affect the flight paths of qualifying bird species of the European sites.

Vibration/noise disturbance of river lamprey

4.6.6 River lamprey and sea lamprey are a qualifying species of the Humber Estuary SAC and Ramsar site.

4.6.7 Sea lamprey are understood to be restricted to rivers within the Ouse catchment and are unlikely to be present in the River Hull. River lamprey are known to be present within the River Hull, therefore the river is considered to be functionally linked land for this qualifying species of the Humber Estuary SAC and Ramsar site. While the Proposed Development does not involve works within the European sites themselves, there is potential for disturbance of river lamprey within the River Hull as a result of vibration/noise from Horizontal Directional Drilling during the construction phase. Both species are considered unlikely to be present within the drainage ditch system (refer to **Section 6**).

Disturbance of river lamprey as a result of electromagnetic fields

4.6.8 Electromagnetic fields from buried cables have the potential to disturb fish through changes in behaviour, and the development of fish eggs and fry. As noted above, the River Hull is considered to be functionally linked land for river lamprey. Therefore, there is potential for disturbance of river lamprey within the River Hull as a result electromagnetic fields from cables under the river during the operation (including maintenance) phase of the Proposed Development.

Degradation of habitats as a result of changes in water quality/ hydrology

4.6.9 Changes in water quality/ hydrology have the potential to lead to degradation of qualifying habitats within the European sites and habitats identified as having potential to be functionally linked land for qualifying bird and fish species.

4.6.10 As explained in **ES Volume 1, Chapter 5: Approach to the EIA [EN010157/APP/6.1]** and in agreement with the Environment Agency, water has been scoped out of the assessment presented in the ES. In relation to this Information to Inform Appropriate Assessment report, this includes changes in water quality as a result of release of sediment from construction/decommissioning activities (such as installation of culverts) and from spillage of chemicals or contaminants. Therefore, these impacts are not considered further in the assessment.

4.6.11 During the construction phase, there is the potential for impacts on sensitive habitats from changes in water quality/hydrology as a result of potential release of breakout contaminants (particularly bentonite) during the Horizontal Directional Drilling works.

4.6.12 During the operational phase, a clean agent (non-water-based, aerosol and/or gas) would be used in the event of a fire within the BESS, which has the potential to lead to contamination of adjacent habitats. Due to the passive nature of the Proposed Development no other water quality impacts are anticipated during operation.

4.6.13 The changes in agricultural activities within the Order Limits would have beneficial effects in terms of runoff rates and water quality. Year-round grass cover and reduced machinery use would lead to less compaction. The reduction in the application of herbicides and fertilisers, as well as riparian planting, would also result in a reduction of pollution of surface water resources. As such, the potential improvements in water quality/hydrology during the operation (including maintenance) phase could result in beneficial effects on habitats for qualifying bird and fish species.

4.6.14 During decommissioning there is a risk that if land within the Order Limits is returned to intensively farmed arable land, the benefits of the solar farm would be reversed.

Degradation of habitats as a result of changes in air quality

4.6.15 Where construction and decommissioning phase traffic routes are within 200m of a European site and/or habitats with the potential to be functionally linked land for qualifying bird and fish species, there is potential for impacts on sensitive habitats from changes in air quality as a result of:

- Road traffic emissions;
- Exhaust emissions from construction equipment and machinery; and/or
- Ammonia emitted from vehicle exhaust emissions as a by-produce of the catalytic conversion process designed to reduce emissions of nitrogen oxide.

4.6.16 There is also the potential for impacts on sensitive habitats as a result of dust and fine particulate matter during construction and decommissioning.

4.6.17 Impacts on air quality are not anticipated during the operation (including maintenance) phase due to the passive nature of the Proposed Development and the low number of vehicle movements required for maintenance purposes.

4.7 Screening assessment tables

4.7.1 **Tables 4-12** to **4-18** below show the results of the screening assessment. For the purpose of the assessment, it has been assumed that decommissioning phase impacts would be similar to or less than those identified for the construction phase.

Table 4-12: Screening – Loss of functionally linked land for qualifying bird species

European site	Potential construction phase impacts
• Hornsea Mere SPA • Humber Estuary SPA • Humber Estuary Ramsar site • Greater Wash SPA	**Hornsea Mere SPA and the Humber Estuary SPA/Ramsar site** Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species associated with Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site, which include waterfowl and waders which make use of inland habitats for foraging and roosting. During construction there is therefore potential for temporary loss of functionally linked land in relation to laydown areas, construction compounds, installation of the interconnecting cable routes and the gird connection cable routes. There is also potential for temporary long-term loss of functionally linked land under the footprint of the Proposed Development. Potential for likely significant effects cannot be ruled out in relation to Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required. **Greater Wash SPA** Land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for the qualifying bird species of the Greater Wash SPA. This site is designated for supporting populations of red-throated diver (wintering), sandwich tern, common tern, little tern (breeding) and common scoter (on passage) which are considered unlikely to use land within/ adjacent to the Order Limits **[Ref. 14]**. Consultation with Natural England (July 2024, refer to Appendix A) confirmed that these species can be ruled out: 'We advise that likely significant effects on other species associated with the Greater Wash SPA (common scoter, common tern, little tern, red-throated diver, sandwich tern) can be ruled out due to distance and lack of habitat suitability within the DCO boundary and adjacent areas.' In their consultation response to the Preliminary Environmental Information Report, East Riding of Yorkshire Council also concurred with this. Potential for likely significant effects can be ruled out in relation to loss of functionally linked land for qualifying bird species of the Greater Wash SPA.

European site	Potential construction phase impacts
Overall Conclusion: Likely significant effects as a result of loss of functionally linked land for qualifying bird species during the construction phase of the Proposed Development cannot be ruled out (alone or in-combination) in relation to Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site, and therefore Appropriate Assessment of this impact for these sites is required. Likely significant effects as a result of loss of functionally linked land for qualifying bird species during the construction phase of the Proposed Development can be ruled out (alone or in-combination) in relation to the Greater Wash SPA and therefore no further assessment of this impact for this site is required.	

Table 4-13: Screening – Disturbance/ displacement of qualifying bird species using functionally linked land

European site	Potential construction/ decommissioning phase impacts
• Hornsea Mere SPA • Humber Estuary SPA • Humber Estuary Ramsar site • Greater Wash SPA	**Hornsea Mere SPA and the Humber Estuary SPA/Ramsar site** Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species associated with Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site. Therefore, during the construction/decommissioning phases there is the potential for disturbance/ displacement of qualifying bird species using functionally linked land as a result of noise/vibration, lighting and presence of people and construction vehicles. Potential for likely significant effects cannot be ruled out in relation to Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required. **Greater Wash SPA** Land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for the qualifying bird species of the Greater Wash SPA. As such, potential for likely significant effects can be ruled out in relation to disturbance/ displacement of qualifying bird species of the Greater Wash SPA.

	Potential operation (including maintenance) phase impacts
	Hornsea Mere SPA and the Humber Estuary SPA/Ramsar site Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species associated with Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site. Therefore, during the operation (including maintenance) phase there is the potential for disturbance/displacement of qualifying bird species using functionally linked land as a result of presence of people during routine maintenance. Given the passive nature of the operational solar farm, and that visits for maintenance are anticipated to only occur occasionally (anticipated to be up to 26 visits a year), disturbance/displacement as a result of people and vehicle presence would be minimal. In addition, birds are likely to be habituated to some level of noise and visual disturbance, given the agricultural nature of the landscape and exposure to existing disturbance from farming activities. Furthermore, the Proposed Development would be screened from adjacent habitats by the existing hedgerows which will be retained, and many of the existing ditches have steep, high sides which provide visual screening for birds using them. Potential for likely significant effects can therefore be ruled out in relation to Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will not be required. **Greater Wash SPA** Land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for the qualifying bird species of the Greater Wash SPA. As such, potential for likely significant effects can be ruled out in relation to disturbance/ displacement of qualifying bird species of the Greater Wash SPA.

Overall Conclusion: Likely significant effects as a result of disturbance/displacement of qualifying bird species using functionally linked land during the construction/decommissioning phase of the Proposed Development cannot be ruled out (alone or in-combination) in relation to Hornsea Mere SPA and the Humber Estuary SPA/Ramsar site, and therefore Appropriate Assessment of this impact for these sites is required. Likely significant effects as a result of disturbance/displacement of qualifying bird species using functionally linked land during the operation (including maintenance) phase of the Proposed Development can be ruled out (alone or in-combination) in relation to Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site, and therefore Appropriate Assessment of this impact for these sites is not required. Likely significant effects as a result of disturbance/displacement of qualifying bird species using functionally linked land during the construction/decommissioning and operation (including maintenance) phases of the Proposed Development can be ruled out (alone or in-combination) in relation to the Greater Wash SPA and therefore no further assessment of this impact for this site is required.

Table 4-14: Screening – Disruption of flight paths of qualifying bird species as a result of glint and glare

European site	Potential operation (including maintenance) phase impacts
• Hornsea Mere SPA • Humber Estuary SPA • Humber Estuary Ramsar site • Greater Wash SPA	**Hornsea Mere SPA and the Humber Estuary SPA/ Ramsar site** During the operation (including maintenance) phase there is potential for glint and glare from the solar PV modules to affect the flight paths of qualifying bird species associated with these European sites, this impact would not occur until the panels are in place. Potential for likely significant effects cannot be ruled out in relation to Hornsea Mere SPA and the Humber Estuary SPA/Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required. **Greater Wash SPA** Qualifying species associated with the Greater Wash SPA are predominantly seabirds, typically breeding, wintering and/or migrating along the coast and out to sea. As such, potential for likely significant effects on the qualifying bird species of the Greater Wash SPA can be ruled out in relation to this impact.

European site	Potential operation (including maintenance) phase impacts
Overall Conclusion: Likely significant effects of disruption of flight paths of qualifying bird species as a result of glint and glare during the operation (including maintenance) phase of the Proposed Development cannot be ruled out (alone or in-combination) in relation to Hornsea Mere SPA and the Humber Estuary SPA/Ramsar site, and therefore Appropriate Assessment of this impact for these sites is required. Likely significant effects of disruption of flight paths of qualifying bird species as a result of glint and glare during the operation (including maintenance) phase of the Proposed Development can be ruled out (alone or in-combination) in relation to the Greater Wash SPA and therefore no further assessment of this impact for this site is required.	

Table 4-15: Screening – Vibration/ noise disturbance of river lamprey

European site	Potential construction phase impacts
• Humber Estuary Ramsar site • Humber Estuary SAC	**Humber Estuary SAC/Ramsar site** The grid connection cable route will involve Horizontal Directional Drilling under the River Hull, which is known to support migrating, spawning and juvenile river lamprey and therefore is functionally linked land for the qualifying population of the Humber Estuary SAC/Ramsar site. There is potential for vibrations from Horizontal Directional Drilling to result in disturbance of river lamprey within the River Hull. Potential for likely significant effects cannot be ruled out in relation to the Humber Estuary SAC/Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required.
Overall Conclusion: Likely significant effects as a result of vibration/ noise disturbance of river lamprey during the construction phase of the Proposed Development cannot be ruled out (alone or in-combination), and therefore Appropriate Assessment of this impact is required.	

Table 4-16: Screening – Disturbance of river lamprey as a result of EMF

European site	Potential operation (including maintenance) phase impacts
• Humber Estuary Ramsar site • Humber Estuary SAC	**Humber Estuary SAC/Ramsar site** The grid connection cable route will pass under the River Hull, which is known to support migrating, spawning and juvenile river lamprey and therefore is functionally linked land for the qualifying population of the Humber Estuary SAC/Ramsar site. There is potential for EMFs from the cable buried under the River Hull to result in disturbance of river lamprey. Potential for likely significant effects cannot be ruled out in relation to the Humber Estuary SAC/Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required.
Overall Conclusion: Likely significant effects as a result of disturbance from EMF of river lamprey during the operation (including maintenance) phase of the Proposed Development cannot be ruled out (alone or in-combination), and therefore Appropriate Assessment of this impact is required.	

Table 4-17: Screening – Degradation of habitats as a result of changes in water quality/ hydrology

European site	Potential construction phase impacts
• Hornsea Mere SPA • Humber Estuary SPA • Humber Estuary Ramsar site • Humber Estuary SAC • Greater Wash SPA	During the construction phase the potential for impacts on sensitive habitats from changes in water quality/hydrology have been identified as a result of Horizontal Directional Drilling works to facilitate crossings of drainage ditches and the River Hull for cables in relation to release of breakout contaminants, particularly bentonite. **Greater Wash SPA** The Proposed Development is hydrologically linked to the SPA. Given the large hydrological distance, likely significant effects on the site itself can be ruled out in relation to changes in water quality and hydrology. Land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for the qualifying bird species of the Greater Wash SPA. As such, potential

	for likely significant effects on qualifying bird species of the Greater Wash SPA can be ruled out in relation to this impact. **Hornsea Mere SPA** The Proposed Development is not hydrologically linked to Hornsea Mere SPA. As such, likely significant effects on the site itself can be ruled out in relation to changes in water quality and hydrology. However, the land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species of the SPA. Changes in water quality have the potential to lead to degradation of supporting habitats; therefore, the potential for likely significant effects cannot be ruled out in relation to Hornsea Mere SPA. Appropriate Assessment (alone and in-combination) of this impact will be required. **Humber Estuary SPA** The Proposed Development is hydrologically linked to the SPA. Given the large hydrological distance, likely significant effects on the site itself can be ruled out in relation to changes in water quality and hydrology. However, the site and adjacent habitats have the potential to be functionally linked land for the qualifying bird species associated with the SPA. Changes in water quality have the potential to lead to degradation of supporting habitats; therefore, the potential for likely significant effects cannot be ruled out in relation to Humber Estuary SPA. Appropriate Assessment (alone and in-combination) of this impact will be required. **Humber Estuary Ramsar site** The Proposed Development is hydrologically linked to the Ramsar site. Given the large hydrological distance, likely significant effects in relation to the habitats, grey seal and natterjack toad population for which the site is designated can be ruled out in relation to changes in water quality and hydrology. However, the land within and adjacent to Order Limits has the potential to be functionally linked land for the qualifying bird species of the Ramsar site. In addition, the River Hull and drainage ditches have the potential to be functionally linked land for river lamprey populations for which the site is designated. Changes in water quality have the potential to lead to degradation of supporting habitats; therefore, the potential for likely significant effects cannot be ruled out in relation to the Humber Estuary Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required.

	Humber Estuary SAC The Proposed Development is hydrologically linked to the SAC. Given the large hydrological distance, likely significant effects in relation to the habitats for which the site is designated are considered unlikely. However, the River Hull and drainage ditches have the potential to be functionally linked land for lamprey populations associated with the SAC. Changes in water quality have the potential to lead to degradation of supporting habitats; therefore, the potential for likely significant effects cannot be ruled out in relation to the Humber Estuary SAC. Appropriate Assessment (alone and in-combination) of this impact will be required.
	Potential operational phase impacts
	During the operational phase the potential for impacts on qualifying features of the European designated sites from changes in water quality/hydrology have been identified as a result of potential contamination from the release of clean agents (aerosol and/or gas), which may be used in the event of a fire within the BESS. **Greater Wash SPA** The Proposed Development is hydrologically linked to the SPA. Given the large hydrological distance, likely significant effects on the site itself can be ruled out in relation to changes in water quality and hydrology. Land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for the qualifying bird species of the Greater Wash SPA. As such, potential for likely significant effects on qualifying bird species of the Greater Wash SPA can be ruled out in relation to this impact. **Hornsea Mere SPA** The Proposed Development is not hydrologically linked to Hornsea Mere SPA. As such, likely significant effects on the site itself can be ruled out in relation to changes in water quality and hydrology. Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species of the SPA. However, the potential for likely significant effects

	on qualifying species can be ruled out in relation to Hornsea Mere SPA based on the following factors: • The design of the BESS will adhere to the required standards, guidelines, and principles (as set out in the **Outline Battery Safety Management Plan [APP-157]**) to minimise the likelihood of a fire. • The intention is to use an automatic clean agent (aerosol and/or gas) for fire suppression rather than a water-based system, as it is considered more appropriate for combatting electrical fires, reduces the need for large amounts of on-site water, and reduces the risk of contamination from firewater. A 'let it burn' approach will be taken; if water were required, it would only be used to cool areas adjacent to the BESS to prevent fire spread, rather than being used to attempt to directly fight fire within a battery storage container. The water would therefore not contain any chemicals or fire-fighting compounds after use. Refer to the **Outline Battery Safety Management Plan [APP-157]**) which gives full details of safe design, operation, and the strategy for firefighting. • The BESS have been located strategically to minimise impacts on adjacent habitats (including a 10m buffer between the BESS and adjacent vegetation). **Humber Estuary SPA** The Proposed Development is hydrologically linked to the SPA. Given the large hydrological distance, likely significant effects on the Site itself can be ruled out in relation to changes in water quality and hydrology. The site and adjacent habitats have the potential to be functionally linked land for the qualifying bird species associated with the SPA. However, for the reasons outlined above in relation to Hornsea Mere SPA, the potential for likely significant effects on qualifying species as a result of changes in water quality can be ruled out. **Humber Estuary Ramsar site** The Proposed Development is hydrologically linked to the Ramsar site. Given the large hydrological distance, likely significant effects in relation to the habitats, grey seal and natterjack toad population for which the Site is designated can be ruled out in relation to changes in water quality and hydrology. The land within and adjacent to Order Limits has the potential to be functionally linked land for the qualifying bird species of the Ramsar site. In addition, the River Hull

	and drainage ditches have the potential to be functionally linked land for river and sea lamprey populations for which the site is designated. However, for the reasons outlined above in relation to Hornsea Mere SPA, the potential for likely significant effects on qualifying species as a result of changes in water quality can be ruled out. **Humber Estuary SAC** The Proposed Development is hydrologically linked to the SAC. Given the large hydrological distance, likely significant effects in relation to the habitats for which the site is designated are considered unlikely. The River Hull and drainage ditches have the potential to be functionally linked land for lamprey populations associated with the SAC. However, for the reasons outlined above in relation to Hornsea Mere SPA, the potential for likely significant effects on qualifying species can be ruled out.
	Potential decommissioning phase impacts
	During decommissioning there is a risk that if land within the Order Limits is returned to intensively farmed arable land, the benefits of the solar farm in relation to water quality (reduction in the application of herbicides and fertilisers) would be reversed. Changes in water quality have the potential to lead to degradation of supporting habitats; therefore, the potential for likely significant effects cannot be ruled out in relation to Hornsea Mere SPA and the Humber Estuary SAC/SPA and Ramsar site. Appropriate Assessment (alone and in-combination) of this impact will be required.

Overall Conclusion:
Likely significant effects as a result of degradation of habitats as a result of changes in water quality/hydrology during the construction, operational and decommissioning phases of the Proposed Development can be ruled out (alone or in-combination) in relation to the Greater Wash SPA and therefore no further assessment of this impact for this site is required.

Likely significant effects as a result of degradation of habitats as a result of changes in water quality/hydrology during the operational phase of the Proposed Development can be ruled out (alone or in-combination) in relation to Hornsea Mere SPA and the Humber Estuary SAC/SPA/Ramsar site, and therefore no further assessment of this impact for this site is required.

Likely significant effects as a result of degradation of habitats as a result of changes in water quality/hydrology during the construction and decommissioning phases of the Proposed Development cannot be ruled out (alone or in-combination) in relation to Hornsea Mere SPA and the Humber Estuary SAC/SPA/Ramsar site, and therefore Appropriate Assessment of this impact for these sites is required.

Table 4-18: Screening – Degradation of habitats as a result of changes in air quality

European site	Potential construction/decommissioning phase impacts
• Hornsea Mere SPA • Humber Estuary SPA • Humber Estuary Ramsar site • Humber Estuary SAC • Greater Wash SPA	Potential impacts from traffic during the construction/decommissioning phases of the Proposed Development have been included in the air quality assessment in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2]**. The Proposed Development is not expected to generate traffic exceeding the National Highways Design Manual for Roads and Bridges LA 105 Air Quality **[Ref. 15]** screening criteria during construction and decommissioning phases. Therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, all of the European sites identified are beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary). Furthermore, the habitats (agricultural fields, drainage ditch system and River Hull) identified as having potential to comprise functionally linked land for SPA/Ramsar bird and fish species, are not typically sensitive to changes in air quality. Therefore, likely significant effects from changes in air quality as a result of dust can be ruled out.

European site	Potential construction/decommissioning phase impacts
	As such, changes in air quality are considered unlikely to have a significant effect on habitats within the European sites, or functionally linked land. Potential for likely significant effects (alone and in-combination) can be ruled out and therefore Appropriate Assessment of this impact will not be required.
Overall Conclusion: Likely significant effects as a result of changes in air quality during the construction/ decommissioning phases of the Proposed Development can be ruled out (alone or in-combination), and therefore Appropriate Assessment of this impact is not required.	

4.8 Screening conclusion

4.8.1 **Table 4-19** provides a summary of the screening assessment. On completion of the screening assessment, it has been concluded that the potential for likely significant effects can be ruled out (alone and in combination) in relation to:

- Habitat degradation as a result of changes in air quality.
- Degradation of habitats as a result of changes in water quality/ hydrology during the operational (including maintenance) phase.
- Disturbance/ displacement of qualifying bird species using functionally linked land during the operational (including maintenance) phase.

4.8.2 No Appropriate Assessment of the above is required.

4.8.3 The potential for likely significant effects cannot be ruled out at this stage of the assessment (either alone or in combination) in relation to:

- Loss of functionally linked land for qualifying bird species.
- Disturbance/ displacement of qualifying bird species using functionally linked land during the construction phase.
- Disruption of flight paths of qualifying bird species as a result of glint and glare.
- Vibration/ noise disturbance of river lamprey.
- Disturbance of river lamprey as a result of EMF.
- Habitat degradation as a result of changes in water quality/ hydrology during the construction/decommissioning phase.

4.8.4 Further Appropriate Assessment of these impacts is required, refer to **Sections 7 and 8**.

Table 4-19: Summary of screening assessment

European site	Construction phase		Construction/decommissioning phases			Operation (including maintenance) phase			
	Loss of functionally linked land for qualifying bird species	Vibration/noise disturbance of river lamprey	Disturbance/ displacement of qualifying bird species using functionally linked land	Degradation of habitats as a result of changes in water quality/ hydrology	Degradation of habitats as a result of changes in air quality	Disruption of flight paths of qualifying bird species as a result of glint and glare	Disturbance/ displacement of qualifying bird species using functionally linked land	Disturbance of river lamprey as a result of EMF	Degradation of habitats as a result of changes in water quality/ hydrology
Hornsea Mere SPA	Screened in	N/A	Screened in	Screened in	Screened out	Screened in	Screened out	N/A	Screened out
Humber Estuary SPA	Screened in	N/A	Screened in	Screened in	Screened out	Screened in	Screened out	N/A	Screened out
Humber Estuary Ramsar site	Screened in	Screened in	Screened in	Screened in	Screened out	Screened in	Screened out	Screened in	Screened out
Humber Estuary SAC	N/A	Screened in	N/A	Screened in	Screened out	N/A	N/A	Screened in	Screened out
Greater Wash SPA	Screened out	N/A	Screened out	Screened out	Screened out	Screened out	Screened out	N/A	Screened out

5 Ornithology Baseline Summary

5.1 Introduction

5.1.1 **Table 5-1** provides a summary of the bird surveys which have been carried out to inform the Proposed Development. The survey methodology and survey results of relevance to this report are summarised below, with full reports presented in **ES Volume 4, Appendix 7.3: Breeding Bird Survey Report [EN010157/APP/6.4]**; **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**; **ES Volume 4, Appendix 7.5: Ornithological Survey Report [EN010157/APP/6.4]**; **ES Volume 4, Appendix 7.9: Passage Bird Survey Report [EN010157/APP/6.4]**; and **Grid Connection Cable Route Bird Survey Report [EN010157/APP/8.4].**

Table 5-1: Summary of ornithological surveys

Survey type (year)	Survey frequency
Wintering bird surveys (2021/22)	One survey per month from December to March (inclusive).
Breeding bird surveys (2022)	One survey per month from April to June (inclusive).
Wintering bird surveys (2022/23)	One survey per month from December to March (inclusive).
Wintering bird surveys and nocturnal bird surveys (2023/24)	One daytime and one nocturnal survey per month from November to February (inclusive).
Breeding bird surveys (2024)	One survey per month from March to July (inclusive).
Autumn passage surveys and nocturnal bird surveys (2024)	One daytime and one nocturnal survey per month in August and September.
Wintering and passage bird surveys (2024/25) – Grid connection cable route only	One survey per month September 2024 and April 2025 (inclusive).

5.2 Survey area

5.2.1 The extent of the survey area for the bird surveys has changed in each survey year, reflecting the changes in the Order Limits during the design phase of the Proposed Development. This has not affected the assessment. The survey areas are shown in each of the bird survey reports (**ES Volume 4, Appendix 7.3:**

Breeding Bird Survey Report [EN010157/APP/6.4]; **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**; **ES Volume 4, Appendix 7.5: Ornithological Survey Report [EN010157/APP/6.4]**; **ES Volume 4, Appendix 7.9: Passage Bird Survey Report [EN010157/APP/6.4]** and **Grid Connection Cable Route Bird Survey Report [EN010157/APP/8.4]**.

5.3 Survey methodology

Winter bird surveys

5.3.1 Three years of wintering bird surveys have been carried out during 2021/22, 2022/23 and 2023/24. The surveys involved walking daytime transect routes within the survey area, mapping birds using standard British Trust for Ornithology species codes and behaviour notation **[Ref. 16]**. The transects were interspersed with stops to enable the surveyor to scan for birds[4]. Survey visits were undertaken in suitable weather conditions and at a range of times of day. During the winter 2023/24 surveys, where visibility allowed, flocks of waders, assemblages of feeding and/or roosting birds observed adjacent to the survey area (within 100 m) were also recorded.

5.3.2 During the 2021/22 and 2022/23 surveys, due to access restrictions some of the surveys were undertaken from public rights of way. Full access to the whole survey area was available during the surveys undertaken between November 2023 and February 2024.

Autumn passage surveys

5.3.3 Autumn passage surveys were carried out in August and September 2024, following the same survey methodology and covering the same survey area as the winter 2023/24 surveys.

5.3.4 During the winter 2023/24 and 2024 autumn passage surveys, nocturnal surveys were also carried out. These surveys focussed on Land Areas B, E and F, where previous surveys recorded waders such as golden plover. The surveys were carried out using thermal cameras to locate feeding and/ or roosting birds.

Breeding bird surveys

5.3.5 Breeding bird surveys were undertaken in 2022 and 2024. The 2022 surveys followed an adaptation of the British Trust for Ornithology Common Bird Census **[Ref. 17]** which comprised three visits undertaken at least seven days apart. Due

[4] The survey area primarily comprised large arable fields bordered by hedgerows, set in an almost entirely flat landscape; therefore, VP surveys, typically used for observing wintering wetland birds, were not possible.

to the size of the survey area, each survey was completed over a number of days. Each visit was carried out between dawn and 10am and in suitable weather conditions. All birds (including those in flight) were recorded using standard British Trust for Ornithology species codes and behaviour notations **[Ref.16]**.

5.3.6 The 2024 surveys were undertaken in accordance with the Bird Survey Guidelines for Assessing Ecological Impacts **[Ref. 18]**. These comprised six visits, with a minimum of 14 days between visits. Due to the large size of the survey area, the surveys were carried out across multiple mornings per visit. Birds observed up to a distance of 50 m beyond the survey area were also recorded, where visibility allowed. Each visit was undertaken between dawn and 11am and in suitable weather conditions. During each visit, a pre-determined transect route was walked, recording all bird species using standard British Trust for Ornithology species codes and behaviour notation **[Ref. 16]**.

Winter and passage bird surveys of the grid connection cable route

5.3.7 Wintering and passage bird surveys of the grid connection cable route were carried out between September 2024 and April 2025. These surveys used the same methodology as those used for the wintering bird surveys undertaken in 2023/24 (see **Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**).

5.4 Species vulnerability and functionally linked land

5.4.1 The results of the bird surveys have been reviewed to determine whether the habitats within and adjacent to the Order Limits constitute functionally linked land for qualifying bird species associated with Hornsea Mere SPA and/or the Humber Estuary SPA/Ramsar site. Consideration of functionally linked land (**Sections 5.5 and 5.6** below) has been based on professional judgement, taking into account the numbers of birds recorded, regularity and species vulnerability.

5.4.2 The information used to inform vulnerability of the species recorded included the following (as advised by Natural England (**Appendix A**)):

- British Trust for Ornithology Wetland Bird Survey Alerts for the Humber Estuary **[Ref. 19]**.
- Trends in species numbers in the Humber and regionally/nationally **[Ref. 3** and **Ref. 20]**.
- Current condition of the Humber Estuary SSSI which underpins the Humber Estuary SPA designations **[Ref. 21]**.
- Supplementary Advice for the Humber Estuary SPA to identify pressures/threats and targets for supporting habitats (accessed via the Natural England Designated Sites View website **[Ref. 3]**).

5.5 Results – Land Areas B to F

5.5.1 The following section presents the survey results for qualifying bird species associated with the Hornsea Mere SPA and/or the Humber Estuary SPA/Ramsar site recorded within and adjacent[5] to Land Areas B to F. Note that when referring to winter surveys, this includes surveys carried out between November and March. The 2023/24 breeding bird surveys began in March and therefore the March data from those surveys has also been included in the winter data analysis.

Hornsea Mere SPA

5.5.2 A small flock of mute swan (an individual qualifying species during the breeding/ post-breeding season) were recorded on one occasion flying over Land Area D in June 2024 during the breeding bird surveys. A single pair of gadwall (an individual winter qualifying species of Hornsea Mere SPA) were recorded adjacent to Land Areas B to F, in November 2023 during the winter surveys. No other individual qualifying species of Hornsea Mere SPA were recorded during the surveys. Due to the small numbers of mute swan and gadwall recorded, land within and adjacent to Land Areas B to F is not considered to constitute functionally linked land for these species.

Humber Estuary SPA/ Ramsar site

5.5.3 As per the Natural England consultation (Humber Estuary SPA Annex B guidance, presented in **Appendix B**), for the purposes of this assessment the count data for wader and waterfowl species have been compared to the most recent British Trust for Ornithology Wetland Bird Survey 5-year mean of peaks data (2018/19 to 2022/23).

Individual wintering/ passage and breeding species

5.5.4 Three individual qualifying species were recorded during the surveys; golden plover (an individual winter qualifying species of the Humber Estuary SPA and an individual winter/passage qualifying species of the Humber Estuary Ramsar site), hen harrier (an individual winter qualifying species of the Humber Estuary SPA) and marsh harrier (an individual breeding qualifying species of the Humber Estuary SPA). These are considered in further detail below.

Golden plover

[5] As noted in **Section 5.3**, birds using land adjacent to survey area were recorded during the surveys where visibility allowed. In addition, as noted above and shown on **ES Volume 4, Appendix 7.5: Ornithological Survey Report [EN010157/APP/6.4]**, the Avian Ecology surveys covered a larger survey area which included land further beyond the Order Limits. These records are referred to collectively as 'adjacent to Land Areas B to F'.

5.5.5 Golden plover were recorded within and adjacent to Land Areas B to F during the winter/ passage surveys, as shown in **Table 5-2** and **Table 5-3**. The field numbers[6] where birds were recorded are noted and the numbers of birds are presented as a percentage of the most recent Humber Estuary Wetland Bird Survey population for golden plover (2018/19 to 2022/23).

Table 5-2: Golden plover (within Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
Winter 2021/22 (Feb)	D2 (130)	In the field	800	21,160	3.78%
Winter 2022/23 (Jan)	E12 (114)	In the field	2	21,160	0.01%
Autumn passage (Aug)	E8	Flying	1	21,160	0.01%

Table 5-3: Golden plover (adjacent to Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
Winter 2021/2022 (Jan)	51		46	21,160	0.22%
Winter 2021/2022 (Feb)	35		60	21,160	0.28%
Winter 2023/2024 (Feb)	Field not numbered	Loafing	14	21,160	0.07%

[6] Field numbering has changed during the design process. Therefore, the field numbers referred to in the Avian Ecology bird survey report differ from those referred to in the RSK bird reports. Where a field has two numbers, the most up to date field number is given first (denoted by a letter for the Land Area, and a number), followed by the previous field number in brackets. Note that fields which are located outside the Order Limits do not have a current number.

5.5.6 Golden plover were recorded on three occasions within Land Areas D and E. The 800 golden plover recorded in 2021/22 represented 3.78% of the Humber Estuary Wetland Bird Survey population, with the other sightings of one and two individuals equating to 0.01% of the population. Golden plover were also recorded adjacent to Land Areas B to F on three occasions, with the highest peak count of 60 birds representing 0.28% of the Humber Estuary Wetland Bird Survey population. Although one bird was seen during the Autumn passage surveys, no flocks of golden plover were recorded moving through during Spring/Autumn migration.

5.5.7 Numbers of golden plover within the region and wider UK have fluctuated in recent years; however, a British Trust for Ornithology Wetland Bird Survey Amber Alert has been triggered for this species on the Humber Estuary due to medium-term declines within the estuary. The site condition assessment for golden plover for the Humber Estuary SSSI shows that golden plover are in 'favourable' condition. Although golden plover were only recorded on a small number of occasions across the three years of surveys, given the Wetland Bird Survey Amber Alert and fluctuating population trends, on a precautionary basis land within and adjacent to Land Areas B to F is considered to constitute functionally linked land for this species.

5.5.8 The suitability of agricultural fields within Land Areas B to F for golden plover would change depending on the cropping regimes in place from year to year, with birds moving between fields as suitable food sources become available. Therefore, the proportion of Land Areas B to F which would be suitable for this species will also change during any given winter period.

Hen harrier

5.5.9 Hen harrier were recorded within Land Areas B to F during the winter surveys, as shown in **Table 5-4**. The field numbers where birds were recorded are noted and the numbers of birds are presented as a percentage of the Humber Estuary citation population.

Table 5-4: Hen harrier (within Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds	Humber Estuary SPA citation pop. 1997/98 – 2001/02[7]	% of citation pop.
Winter 2023/24 (Jan)	C3/C4 (56/55)	Hunting (juvenile) Flying over	1	8	12.5%
Winter 2023/24 (Feb)	D9/D10 (187/ 189/ 190)	Hunting (juvenile) Flying over	1	8	12.5%
Winter 2023/24 (Feb)	F4 (45)	Hunting (juvenile)	1	8	12.5%

5.5.10 Single sightings of foraging hen harrier were recorded within Land Areas C, D and F during January and February 2024. A single bird represents 12.5% of the Humber Estuary SPA citation population. The birds were thought to be juveniles (possibly the same bird during both survey visits). The numbers of hen harrier wintering in the UK is generally increasing. As part of the condition assessment of the Humber Estuary SSSI, Natural England commissioned a wintering hen harrier survey in 2022/23. A total of 19 individual hen harriers were recorded, which exceeds the 1997/98 – 2001/02 citation population of eight birds. Condition assessments are normally based on more than one year of data as hen harrier numbers can fluctuate quite widely; however, Natural England's review of counts since 2005 indicated that the feature can be assessed as 'favourable'. Although more than 1% of the SPA population has been recorded within Land Areas B to F, given the small number of records of hen harrier during the surveys and the general trend towards an increase in numbers of this species, land within and adjacent to Land Areas B to F is not considered to constitute functionally linked land for this species.

Marsh harrier

5.5.11 Marsh harrier was the only individual breeding qualifying species of the Humber Estuary SPA recorded during the breeding bird surveys. A single sighting of a male was recorded flying carrying prey north over Land Area D during the July 2024 breeding bird survey. Up to two pairs of marsh harriers are known to nest at Tophill Low (north of the Order Limits), and it is considered possible that the male, could be related to one of those pairs. Given that marsh harrier were only

[7] Raptors are not included within the Humber Estuary SPA British Trust for Ornithology Wetland Bird Survey population, therefore in this instance the SPA citation population has been used.

recorded once during the two breeding bird survey seasons, land within and adjacent to Land Areas B to F is not considered to constitute functionally linked land for this species.

Humber Estuary SPA (Natural England Annex B category a) - all species listed individually under the assemblage feature on the SPA citation

5.5.12 Four Humber Estuary SPA (Natural England Annex B category a) species were recorded during the surveys; lapwing, mallard, teal and curlew.

Lapwing

5.5.13 Lapwing were recorded within and adjacent to Land Areas B to F during the winter surveys. **Table 5-5** and **Table 5-6** show the number of lapwing recorded in each field per visit, as well as the total number of birds during each visit. These numbers are also shown as percentages of the most recent Humber Estuary Wetland Bird Survey population for lapwing (2018/19 to 2022/23).

Table 5-5: Lapwing (within Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds/% of Wetland Bird Survey pop. 15,951 birds	Total No. of birds per survey visit/% of Wetland Bird Survey pop. 15,951 birds
Winter 2021/22 (Feb)	D12 (103)		22 0.14%	82 0.51%
	E6 (110, ditch)		1 0.01%	
	F15 (130)		59 0.37%	
Winter 2021/22 (Dec)	F6 (117)		48 0.30%	50 0.31%
	E13/14 (23)		2 0.01%	
Winter 2022/23 (Jan)	E12 (114)		8 0.05%	8 0.05%
Winter 2022/23 (Feb)	E10 (113)		33 0.21%	37 0.23%
	C7 (204)		4 0.03%	
Winter 2022/23 (Mar)	F1 (40)		2 0.01%	12 0.08%

Survey (month)	Field number	Notes	No. of birds/% of Wetland Bird Survey pop. 15,951 birds	Total No. of birds per survey visit/% of Wetland Bird Survey pop. 15,951 birds
	C7 (204)		1 0.01%	
	C9 (206)		9 0.06%	
BBS 2024 (Mar)	F6 (117)	Courtship behaviour	6 0.04%	9 0.06%
	E10 (113)	Loafing	3 0.02%	
Winter 2023/24 (Dec)	E11 (179)	Feeding	2 0.01%	57 0.36%
	E12 (114)	Feeding	23 0.14%	
	F10 (118)	Feeding	32 0.20%	
Autumn passage (Aug)	D12	Flying	1 0.01%	1 0.01%

Table 5-6: Lapwing (adjacent to Land Areas B to F)

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 15,951 birds	Total No. of birds per survey visit/ % of Wetland Bird Survey pop. 15,951 birds
Winter 2021/2022	35		5 0.03%	66 0.41%
	124		42 0.26%	
	155		19 0.12%	
Winter 2021/2022 (Mar)	31		2 0.01%	25 0.16%
	32		5 0.03%	
	34		16 0.1%	
	158		2 0.01%	

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 15,951 birds	Total No. of birds per survey visit/ % of Wetland Bird Survey pop. 15,951 birds
Winter 2022/2023 (Dec/Jan)	29		2 0.01%	18 0.11%
	30		16 0.1%	
Winter 2022/2023 (Jan)	197		246 1.54%	246 1.54%
Winter 2023/2024 (Nov)	Field not numbered	Feeding	30 0.19%	30 0.19%
Winter 2023/2024 (Feb)	Field not numbered	Loafing	1 0.01%	131 0.82%
	Field not numbered	Loafing	130 0.81%	
Autumn passage (Sep)	Field not numbered	Feeding	41 0.26%	41 0.26%

5.5.14 Lapwing were regularly recorded throughout the winter surveys, in particular within the agricultural fields within Land Areas C, E and F. The highest total peak count of 82 birds represented 0.51% of the Humber Estuary population. No large flocks of lapwing were recorded flying across the Land Areas, with a single lapwing recorded flying over during the autumn passage surveys.

5.5.15 Lapwing were also recorded during all three years of the winter bird surveys adjacent to Land Areas B to F, and once during the autumn passage surveys. The highest total peak count of 246 birds represented 1.54% of the Humber Estuary Wetland Bird Survey population, although this was the only occasion where more than 1% of the population was recorded.

5.5.16 A British Trust for Ornithology Wetland Bird Survey red alert has been triggered for lapwing on the Humber Estuary due to long- and medium-term declines of this species within the estuary, which follows the wider declines in the species across England. The site condition assessment for lapwing for the Humber Estuary SSSI shows that lapwing continue to be in 'unfavourable' condition. Therefore, taking this into consideration, land within and adjacent to Land Areas B to F is considered to constitute functionally linked land for this species.

5.5.17 The suitability of agricultural fields within Land Areas B to F for lapwing would change depending on the cropping regimes in place from year to year, with birds

moving between fields as suitable food sources become available. Therefore, the proportion of Land Areas B to F which would be suitable for this species will also change during any given winter period.

Mallard

5.5.18 Mallard were recorded within and adjacent to Land Areas B to F during the winter surveys, and during the autumn passage surveys on one occasion. **Table 5-7** and **Table 5-8** show the number of mallard recorded per visit in each field, as well as the total number of birds recorded during each visit. These numbers are also shown as percentages of the most recent Humber Estuary Wetland Bird Survey population for mallard (2018/19 to 2022/23).

Table 5-7: Mallard (within Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 1,236 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 1,236 birds
Winter 2021/22 (Feb)	E17 (28)		2 0.16%	2 0.16%
Winter 2021/22 (Mar)	E17 (28)		2 0.16%	2 0.16%
Winter 2022/23 (Dec/Jan)	B3 (65, ditch)		2 0.16%	2 0.16%
Winter 2022/23 (Jan)	F5 (46, ditch)		4 0.32%	16 1.29%
	B4 (67)		4 0.32%	
	C5 (89, ditch)		8 0.65%	
Winter 2022/23 (Feb)	F5 (46, ditch)		2 0.16%	14 1.13%
	B7 (59)		2 0.16%	
	E10 (113)		2 0.16%	
	C8 (205)		2 0.16%	
	C1 (58, ditch)		6 0.49%	
BBS 2024 (Mar)	F10/F11 (118/47,48)	Flight. Calling	3 0.24%	3 0.24%

Survey (month)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 1,236 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 1,236 birds
Winter 2023/24 (Dec)	E16 (143)	Feeding	2 0.16%	2 0.16%
Winter 2023/24 (Jan)	B6 (203)	Loafing	4 0.32%	4 0.32%
Winter 2023/24 (Feb)	B6 (203)	Feeding	4 0.32%	8 0.65%
	B6 (203)	Loafing	2 0.16%	
	B1 (63)	Loafing	2 0.16%	
Autumn passage (Sep)	C8 (ditch)	Loafing	2 0.16%	2 0.16%

Table 5-8: Mallard (adjacent to Land Areas B to F)

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 1,236 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 1,236 birds
Winter 2021/22 (Dec)	115 (ditch)		3 0.24%	3 0.24%
Winter 2021/22 (Jan)	20 (ditch)		2 0.16%	2 0.16%
Winter 2021/22 (Feb)	30 (ditch)		2 0.16%	2 0.16%
Winter 2021/22 Mar)	25		2 0.16%	2 0.16%
Winter 2022/23 (Dec/Jan)	90 (ditch)		18 1.46%	18 1.46%
Winter 2022/23 (Feb)	193		3 0.24%	3 0.24%
Winter 2022/23 (Mar)	29		2 0.16%	10 0.81%
	32		2 0.16%	

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 1,236 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 1,236 birds
	108 (ditch)		2 0.16%	
	193		4 0.32%	
Winter 2023/24 (Nov)	Field not numbered	Pair. Feeding	2 0.16%	2 0.16%
Winter 2023/24 (Dec)	Field not numbered	Pair. Loafing	2 0.16%	2 0.16%
Winter 2023/24 (Feb)	Field not numbered	Loafing	2 0.16%	2 0.16%

5.5.19 Mallard were recorded throughout the winter period within Land Areas B to F. Birds were recorded using the agricultural fields, but were mostly associated with the ditch system in Land Areas B, C, E and F. All of the records were of less than ten birds, with the exception of the highest total count of 16 mallard in January 2023, which represented 1.29% of the Humber Estuary population. No large flocks of mallard were recorded flying across the Land Areas.

5.5.20 Mallard were also recorded during all three years of the winter bird surveys adjacent to Land Areas B to F and were also mostly associated with the ditch systems. The highest total peak count of 18 birds represented 1.46% of the Humber Estuary population.

5.5.21 A British Trust for Ornithology Wetland Bird Survey amber alert has been triggered for mallard on the Humber Estuary due to long- and medium-term declines of this species within the estuary and a red alert in the short-term. These declines follow the recent declines in the species across England. There is no site condition assessment for mallard for the Humber Estuary SSSI. Therefore, although the numbers of mallard recorded were low, given the vulnerability of the species due to population declines, on a precautionary basis land within and adjacent to Land Areas B to F is considered to constitute functionally linked land for this species.

Teal

5.5.22 Teal were recorded within and adjacent to Land Areas B to F during the winter surveys. **Table 5-9** and **Table 5-10** show the number of teal recorded in each field during each visit, as well as the total number of birds recorded during each

visit. These numbers are also shown as percentages of the most recent Humber Estuary Wetland Bird Survey population for teal (2018/19 to 2022/23).

Table 5-9: Teal (within Land Areas B to F)

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 5,710 birds)	Total No. of birds per visit / % of Wetland Bird Survey pop. 5,710 birds
Winter 2021/22 (Jan)	D5 (18)		30 0.53%	36 0.63%
	C1 (58, ditch)		6 0.11%	
Winter 2021/22 (Feb)	C2 (57, ditch)		64 1.12%	64 1.12%
Winter 2022/23 (Jan)	C5 (89, ditch)		18 0.32%	18 0.32%
Winter 2023/24 (Feb)	B6 (203)	Loafing. Nocturnal survey	7 0.12%	7 0.12%
Autumn passage (Aug)	B3 (ditch)	Feeding	43 0.75%	43 0.75%

Table 5-10: Teal (adjacent to Land Areas B to F)

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 5,710 birds)	Total No. of birds per visit / % of Wetland Bird Survey pop. 5,710 birds
Winter 2022/23 (Dec/Jan)	90 (ditch)		13 0.23%	13 0.23%
Winter 2023/24 (Nov)	Field not numbered	Feeding	22 0.39%	162 2.8%
	Field not numbered	Feeding	140 2.45%	
Winter 2023/24 (Dec)	Field not numbered	Feeding	168 2.94%	298 5.22%
	Field not numbered	Feeding	130 2.28%	
Winter 2023/24 (Jan)	Field not numbered	Feeding	10 0.18%	169 2.96%

Survey (visit)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 5,710 birds)	Total No. of birds per visit / % of Wetland Bird Survey pop. 5,710 birds
	Field not numbered	Feeding	159 2.78%	
Winter 2023/24 (Feb)	Field not numbered	Feeding	13 0.23%	47 0.82%
	Field not numbered	Feeding	34 0.60%	

5.5.23 Teal were recorded during the winter period within Land Areas B to F, and during the autumn passage surveys on one occasion. Birds were recorded using the agricultural fields, but similarly to mallard, flocks of wintering teal were predominately recorded within the ditch system, particularly around Land Area B and C. The majority of sightings were of less than 43 birds, with the highest total peak count of 64 birds in February 2024 representing 1.12% of the Humber Estuary population. No large flocks of teal were recorded flying across the Land Areas.

5.5.24 Teal were recorded during two of the three years (2022/23 and 2023/24) surveys adjacent to Land Areas B to F. The teal were mostly associated with the ditch systems within and adjacent to Land Areas B to F, with high numbers of teal (more than 100 birds) regularly recorded within Monk Dike. More than 1% of the Humber Estuary population was recorded during the November, December and January 2023/24 surveys, with the highest total peak count of 168 birds representing 2.94% of the Humber Estuary Wetland Bird Survey population.

5.5.25 No British Trust for Ornithology Wetland Bird Survey alerts have been triggered for teal on the Humber Estuary as the numbers within the site have been increasing, which follows the wider increases in the species across the UK. The site condition assessment for teal for the Humber Estuary SSSI shows that teal are in a 'favourable' condition.

5.5.26 Although teal are increasing in numbers (within the Humber Estuary and UK), given that more than 1% of the Humber Estuary Wetland Bird Survey population has been recorded on several occasions, land within and adjacent to Land Areas B to F is considered to constitute functionally linked land for this species.

Curlew

5.5.27 Curlew were recorded within Land Areas B to F during the winter surveys. **Table 5-11** show the number of curlew recorded in each field during each visit, as well as the total number of birds recorded during each visit. These numbers are also

shown as percentages of the most recent Humber Estuary Wetland Bird Survey population for teal (2018/19 to 2022/23).

Table 5-11: Curlew (within Land Areas B to F)

Survey (month)	Location	Notes	No. of birds/ % of Wetland Bird Survey pop. 2,291 birds)	Total No. of birds per visit / % of Wetland Bird Survey pop. 2,291 birds
Winter 2023/24 (Nov)	B6	Feeding	1 0.04%	1 0.04%
Autumn passage (Aug)	E13	Roosting	46 2.00%	57 2.49%
	E15	Feeding	11 0.48%	

5.5.28 Curlew have only been recorded during two survey visits, with more than 1% of the Humber Estuary population present on one of those occasions. Although this species is declining within the region, given the small number of records during the three years of surveys, the land within and adjacent to Land Areas B to F is not considered to constitute functionally linked land for curlew.

Humber Estuary SPA (Natural England Annex B category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population

5.5.29 Four Humber Estuary SPA (Natural England Annex B category b) species were recorded within and adjacent to Land Areas B to F during the surveys; little egret, greylag goose and pink-footed goose. **Table 5-12** and **Table 5-13** show the number of birds recorded, and as percentages of the most recent Humber Estuary Wetland Bird Survey populations (2018/19 to 2022/23).

Table 5-12: Humber Estuary SPA (Natural England Annex B category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population within Land Areas B to F

Species	Survey (visit)	Field number	Notes	No. of birds	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of pop.
Green sandpiper	Winter 2023/24 (Nov)	B6	Feeding	1	14	7.14%

Species	Survey (visit)	Field number	Notes	No. of birds	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of pop.
	Autumn passage (Sep)	B4 (ditch)	Feeding	3	14	21.42%
Little egret	Winter 2023/24 (Jan)	C7 (204)		1	215	0.47%
	Autumn passage (Aug)	B2 (ditch)	Feeding	1	215	0.47%
	Autumn passage (Sep)	C1 (ditch)	Feeding	2	215	0.93%
Greylag goose	Winter 2021/22 (Feb)	C1 (58)		2	2,154	0.09%
Pink-footed goose	Winter 2023/24 (Nov)	F2 – F6 (41 – 117)	Flight. Calling	27	16,147	0.17%
	Winter 2023/24 (Dec)	D17-D18 (184-185)	Flight. Calling	45	16,147	0.28%

Table 5-13: Humber Estuary SPA (Natural England Annex B category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population within Land Areas B to F

Species	Survey (visit)	Field number	Notes	No. of birds	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of pop.
Little egret	Winter 2021/22 (Dec)	9		1	215	0.47%
Greylag goose	Winter 2022/23 (Mar)	102		2	2,154	0.09%
Pink-footed goose	Winter 2022/23 (Mar)	52		6	16,147	0.04%

5.5.30 Green sandpiper have been recorded twice during the surveys. Although both records were of more than 1% of the Humber Estuary population; given the small number of records over the three survey years and that the green sandpiper population around the Humber is stable/ increasing (following national trends),

the land within and adjacent to Land Areas B to F is not considered to constitute functionally linked land for this species.

5.5.31 Small numbers (less than two birds) of little egret and two greylag geese (highest peak counts representing 0.93% and 0.09% of the Humber Estuary populations respectively) were recorded foraging within Land Areas B to F. Pink-footed geese were recorded flying over on two occasions but were not recorded foraging or roosting.

5.5.32 Little egret, greylag goose and pink-footed goose were also recorded adjacent to Land Areas B to F. The highest peak counts of little egret (one bird), greylag goose (two birds) and pink-footed goose (six birds) represented 0.47%, 0.09% and 0.04% of the Humber Estuary populations respectively.

5.5.33 No Wetland Bird Survey alerts have been triggered for little egret, greylag goose or pink-footed goose on the Humber Estuary. In addition, the numbers of all three species within the Humber have shown increases in their populations in recent years, which follows the national increase in population trends for these species.

5.5.34 Given the small number of records of these species across the three years of surveys and recent increases in their populations, the land within and adjacent to Land Areas B to F is not considered to constitute functionally linked land for little egret, greylag goose or pink-footed goose.

Humber Estuary SPA Natural England (Annex B category c) - species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count

5.5.35 One Natural England Annex B category c species was recorded within and adjacent to Land Areas B to F during the winter surveys; black-headed gull. **Table 5-14** and **Table 5-15** show all black-headed gull recorded per visit, and the total number of birds during each visit. These numbers are also shown as percentages of the Humber Estuary Wetland Bird Survey population for black-headed gull (2018/19 to 2022/23).

Table 5-14: Black-headed gull (within Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 13,889 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 13,889 birds
Winter 2021/22 (Dec)	E17 (28)		11 0.08%	11 0.08%

Survey (month)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 13,889 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 13,889 birds
Winter 2021/22 (Jan)	D12 (103)		12 0.09%	12 0.09%
Winter 2021/22 (Feb)	D2 (130)		36 0.26%	36 0.26%
Winter 2021/22 (Mar)	E17 (28)		4 0.03%	6 0.04%
	D12 (103)		2 0.01%	
Winter 2022/23 (Jan)	D12/ (103/104)		13 0.09%	13 0.09%
Winter 2022/23 (Feb)	D5 (18)		110 0.79%	110 0.79%
Winter 2022/23 (Mar)	B5 (202)		8 0.06%	8 0.06%
Winter 2023/24 (Nov)	B6 (203)	Feeding	10 0.07%	31 0.22%
	E15 (27)	Loafing	1 0.01%	
	F10 (118)	Feeding	8 0.06%	
	D5 (18)	Loafing	2 0.01%	
	C5 (89)	Feeding	10 0.07%	
Winter 2023/24 (Dec)	D5 (18)	Loafing	4 0.03%	4 0.03%
Winter 2023/24 (Jan)	C5 (89)	Feeding	1 0.01%	1 0.01%
Winter 2023/24 (Feb)	F10 (118)	Feeding	4 0.03%	22 0.16%
	B6 (203)	Feeding	13 0.09%	
	B4 (67)	Loafing	5 0.04%	
Autumn passage (Aug)	B1	Loafing	1 0.01%	1 0.01%

Survey (month)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 13,889 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 13,889 birds
Autumn passage (Sep)	F10	Feeding	13 0.09%	13 0.09%

Table 5-15: Black-headed gull (adjacent to Land Areas B to F)

Survey (month)	Field number	Notes	No. of birds/ % of Wetland Bird Survey pop. 13,889 birds	Total No. of birds per visit/ % of Wetland Bird Survey pop. 13,889 birds
Winter 2021/22 (Jan)	19		10 0.07%	85 0.61%
	97		41 0.30%	
	102		34 0.24%	
Winter 2021/22 (Mar)	94		9 0.06%	9 0.06%
Winter 2022/23 (Dec/Jan)	30		53 0.38%	53 0.38%
Winter 2022/23 (Mar)	197		29 0.21%	35 0.25%
	198		6 0.04%	

5.5.36 Black-headed gull were regularly recorded foraging within Land Areas B to F. The highest peak count of 110 birds represented 0.79% of the Humber Estuary population. No large flocks of black-headed gull were recorded flying across the Land Areas.

5.5.37 Black-headed gull were also recorded adjacent to Land Areas B to F. The highest peak counts of 85 birds represented 0.61% of the Humber Estuary population.

5.5.38 No Wetland Bird Survey alerts have been triggered for black-headed gull on the Humber Estuary. In addition, the numbers of wintering black-headed gull on the Humber is generally decreasing which follows the national trend for this species. There is no site condition assessment for black-headed gull for the Humber Estuary SSSI.

5.5.39 Given that black-headed gull have been regularly recorded, and that their populations have declined in recent years, the land within and adjacent to Land Areas B to F is considered to constitute functionally linked land for this species.

5.6 Results – Grid connection cable route

5.6.1 The proposed cable route to connect the Proposed Development (from Land Area D) to National Grid Creyke Beck Substation was not subject to bird surveys at the same time as Land Areas B to F, as the cable route option had not been determined when the bird surveys were undertaken (although some areas surveyed between 2021/22 and 2023/24 were within the Order Limits of the northern end of the grid connection cable route and have therefore been included below). Wintering and passage bird surveys of the grid connection cable route were subsequently carried out in 2024/25 (see **Grid Connection Cable Route Bird Survey Report [EN010157/APP/8.4]**).

5.6.2 In addition, a habitat suitability assessment and desk study were also carried out to determine the suitability of the habitats along the grid connection cable route for SPA/Ramsar site qualifying bird species.

Habitat sustainability assessment

5.6.3 A habitat suitability assessment has been carried out, as detailed in **Table 5-16**. The assessment included a review of aerial photography and the results of **ES Volume 4, Appendix 7.1: Preliminary Ecological Appraisal Report [EN010157/APP/6.4]** to determine the potential for SPA/ Ramsar site qualifying bird species to use the habitats along the grid connection cable route.

Table 5-16: Habitat suitability assessment of the grid connection cable route

Location	Suitability for SPA/Ramsar site qualifying bird species
Fields east of the River Hull	This area comprised two large sheep and cow grazed fields near the River Hull. The fields are known to hold water during the winter and provided high suitability for waders including golden plover and lapwing and waterfowl, such as mallard and teal. The wintering bird surveys undertaken in 2021/22 and 2022/23 covered this small section of the northern end of the grid connection cable route, as detailed below.

Location	Suitability for SPA/Ramsar site qualifying bird species
Weel Borrow Pit	The Borrow Pit comprised two small fishing lakes adjacent to the River Hull. The lakes were considered suitable for SPA duck species, such as mallard, gadwall, pochard, shoveler, tufted duck and wigeon; but the minimal vegetation cover made it less suitable for teal and waders. The lakes were disturbed by the presence of anglers and therefore were considered unlikely to support large numbers of birds. The most recent British Trust for Ornithology Wetland Bird Survey data for the Weel Borrow Pit is presented below.
River Hull	The section of the River Hull along the grid connection cable route was considered largely unsuitable for SPA/Ramsar site bird species. There were no areas of mud or other features exposed at low tide suitable for foraging or roosting SPA/Ramsar site bird species due to the minimal tidal influence along the River Hull at this distance upstream of the Humber Estuary. The banks of the river on both sides were shallow with some marginal vegetation but were considered largely unsuitable for SPA/Ramsar site bird species. The water within the river was also deep and fast flowing, further reducing its suitability for SPA/Ramsar site bird species.
Figham Pastures Local Wildlife Site (LWS)	Figham Pastures LWS is designated for its mosaic of habitats with high botanical diversity within the drains and dikes. The southern section of the LWS, along the grid connection cable route, comprised a large area of neutral grassland on common land with areas of wet ground. The LWS provided some suitable foraging habitat for SPA duck species, such as mallard and teal, but due to the small areas of wet ground and lack of open water, was only considered likely to support small numbers of these species. Although there was some suitable foraging habitat for SPA/ Ramsar site wader species, such as lapwing and golden plover within the areas of wet ground, the tall vegetation made it less suitable for roosting wader species.
Field between Hull Road and Figham Pastures LWS	This large field comprised an area of grassland with mostly short vegetation as a result of horse grazing. Although these fields could provide some suitability for roosting birds, due to its proximity to an industrial estate and other buildings, the field was considered to provide low suitability for SPA/ Ramsar site bird species.

Location	Suitability for SPA/Ramsar site qualifying bird species
Areas south of A1174 (Hull Road)	This section of the grid connection cable route comprised a series of medium-sized fields, mostly consisting of arable land. These fields were located close to existing housing/buildings and several roads. Due to the smaller field sizes and more urban location, the fields in this section were considered to have low suitability for SPA/Ramsar bird species. The southern end of the grid connection route passed through the construction area for the Dogger Bank substation and was therefore unsuitable for SPA/Ramsar site bird species.

5.6.4 Based on the habitat suitability assessment, it was considered likely that the habitats at the northern end of the grid connection cable route, north of A1174 (Hull Road), would provide the most suitable foraging/roosting for SPA/Ramsar site species, in particular habitats around Weel Borrow Pit, Figham Pastures LWS and adjacent larger fields and the drainage ditch system.

Bird survey data

5.6.5 The wintering bird surveys undertaken in 2021/22 and 2022/23 covered a small section of the northern end of the grid connection cable route. Following confirmation of the route of the grid connection cable, wintering and passage bird surveys were also carried out in 2024/25. Several Humber Estuary SPA/Ramsar site qualifying species were recorded during these surveys, as shown in **Table 5-17**.

5.6.6 Note that when referring to winter surveys from 2021/22 and 2022/23, this includes surveys carried out between November and March. The 2023/24 breeding bird surveys began in March and therefore the March data from those surveys has also been included in the winter data analysis.

Table 5-17: Humber Estuary SPA/Ramsar site species recorded during wintering bird surveys 2021/22 and 2022/23 and wintering/passage bird surveys 2024/25

Species	Survey visit	No. of birds	Field number/notes	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
Humber Estuary SPA/ Ramsar site - individual wintering and breeding species					
Golden Plover	BBS 2022 (Mar)	62	140	21,160	0.29%
	Winter 2024/25 (Oct)	160	Flying over	21,160	0.76%

Species	Survey visit	No. of birds	Field number/notes	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
	Winter 2024/25 (Nov)	119	Flying over	21,160	0.56%
	Winter 2024/25 (Jan)	3	Flying over	21,160	0.01%
	Winter 2024/25 (Feb)	41	Outside Order Limits	21,160	0.19%
Dunlin	Winter 2024/25 (Feb)	22	Outside Order Limits	22,346	0.01%
Humber Estuary SPA (Natural England Annex B Category a) - all species listed individually under the assemblage feature on the SPA citation					
Lapwing	BBS 2022 (Mar)	28	140	15,951	0.18%
	Winter 2024/25 (Sep)	44	Flying over	15,951	0.28%
	Winter 2024/25 (Oct)	11	Flying over	15,951	0.07%
	Winter 2024/25 (Oct)	34	Flying over	15,951	0.21%
	Winter 2024/25 (Nov)	12	Within Order Limits	15,951	0.08%
	Winter 2024/25 (Jan)	155	Flying over	15,951	0.97%
	Winter 2024/25 (Feb)	303	Outside Order Limits	15,951	1.90%
	Winter 2024/25 (Mar)	12	Outside Order Limits	15,951	0.08%
	Winter 2024/25 (Apr)	13	Outside Order Limits	15,951	0.08%
Mallard	Winter 2024/25 (Sep)	3	Within Order Limits	1,236	0.24%
	Winter 2024/25 (Sep)	1	Within Order Limits	1,236	0.08%
	Winter 2024/25 (Oct)	2	Within Order Limits	1,236	0.16%
	Winter 2024/25 (Nov)	6	Within Order Limits	1,236	0.49%
	Winter 2024/25 (Dec)	29	Within Order Limits	1,236	2.35%
	Winter 2024/25 (Jan)	2	Within Order Limits	1,236	0.16%
	Winter 2024/25 (Feb)	9	Within Order Limits	1,236	0.73%

Species	Survey visit	No. of birds	Field number/notes	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
	Winter 2024/25 (Mar)	1	Within Order Limits	1,236	0.08%
	Winter 2024/25 (Apr)	3	Within Order Limits	1,236	0.24%
	Winter 2024/25 (Mar)	3	Flying over	1,236	0.24%
	Winter 2024/25 (Apr)	6	Within Order Limits	1,236	0.49%
	Winter 2024/25 (Apr)	4	Within Order Limits	1,236	0.32%
Teal	Winter 2024/25 (Feb)	2	Within Order Limits	5,710	0.04%
Humber Estuary SPA (Natural England Annex B Category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population					
Little egret	Winter 2024/25 (Sep)	1	Within Order Limits	215	0.47%
	Winter 2024/25 (Oct)	1	Flying over	215	0.47%
	Winter 2024/25 (Dec)	2	Within Order Limits	215	0.93%
	Winter 2024/25 (Feb)	1	Within Order Limits	215	0.47%
Pink-footed goose	Winter 2024/25 (Sep)	56	Flying over	16,147	0.35%
	Winter 2024/25 (Oct)	130	Flying over	16,147	0.81%
	Winter 2024/25 (Nov)	14	Flying over	16,147	0.09%
	Winter 2024/25 (Dec)	25	Flying over	16,147	0.15%
	Winter 2024/25 (Jan)	267	Within Order Limits	16,147	1.65%
	Winter 2024/25 (Feb)	910	Within Order Limits	16,147	5.64%
Greylag goose	Winter 2022/23 (Jan)	12	141	2,154	0.56%
	Winter 2022/23 (Dec/Jan)	52	141	2,154	2.41%
	BBS 2022 (Mar)	1	141	2,154	0.05%

Species	Survey visit	No. of birds	Field number/notes	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
	Winter 2024/25 (Jan)	3	Flying over	2,154	0.14%
	Winter 2024/25 (Jan)	12	Flying over	2,154	0.56%
	Winter 2024/25 (Jan)	2	Outside Order Limits	2,154	0.09%
	Winter 2024/25 (Mar)	2	Within Order Limits	2,154	0.09%
Humber Estuary SPA (Natural England Annex B Category c) - species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count					
Black-headed gull	Winter 2021/22 (Feb)	2	141	13,889	0.01%
		4	140	13,889	0.03%
	Winter 2022/23 (Dec)	19	141	13,889	0.14%
		21	141	13,889	0.15%
	Winter 2024/25 (Sep)	2	Within Order Limits	13,889	0.01%
	Winter 2024/25 (Oct)	35	Within Order Limits	13,889	0.25%
	Winter 2024/25 (Nov)	11	Outside Order Limits	13,889	0.08%
	Winter 2024/25 (Nov)	3	Within Order Limits	13,889	0.02%
	Winter 2024/25 (Nov)	2	Within Order Limits	13,889	0.01%
	Winter 2024/25 (Dec)	6	Within Order Limits	13,889	0.04%
	Winter 2024/25 (Dec)	9	Outside Order Limits	13,889	0.06%
	Winter 2024/25 (Dec)	16	Outside Order Limits	13,889	0.12%
	Winter 2024/25 (Dec)	5	Within Order Limits	13,889	0.04%
	Winter 2024/25 (Jan)	28	Outside Order Limits	13,889	0.20%
	Winter 2024/25 (Jan)	11	Outside Order Limits	13,889	0.08%
	Winter 2024/25 (Feb)	14	Outside Order Limits	13,889	0.10%
	Winter 2024/25 (Feb)	17	Within Order Limits	13,889	0.12%

Species	Survey visit	No. of birds	Field number/notes	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of Wetland Bird Survey pop.
	Winter 2024/25 (Mar)	1	Outside Order Limits	13,889	0.01%

5.6.7 Nine SPA/Ramsar site and/or Natural England Annex B category species were recorded during the bird surveys, comprising: golden plover, lapwing, mallard, teal, greylag goose, mute swan, pink-footed goose, little egret and black-headed gull were within the Order Limits/grid connection cable route. All of these species were also recorded within Land Areas B to F (refer to **Section 5.5**). One additional qualifying species (dunlin), not recorded within or adjacent to Land Areas B to F, was seen on one occasion outside the Order Limits in a field adjacent to Figham Pasture.

5.6.8 In addition, barnacle goose, white-fronted goose, grey heron, cormorant, moorhen, snipe, woodcock, common gull, herring gull and lesser black-backed gull were also recorded during the 2024/25 non-breeding bird surveys, however. none of these are qualifying species the Humber SPA/Ramsar site or Hornsea Mere SPA, and do not meet any of the criteria set out in the Natural England Annex B guidance, refer to **Appendix B**.

5.6.9 During the 2024/25 bird surveys, the majority of birds were recorded at the northern end of the grid connection cable route in and around Figham Pastures. Birds were also regularly recorded in fields to the north of the A1079.

Desk study information

5.6.10 As part of a desk study undertaken in May 2024 to inform the options appraisal for the grid connection cable route, winter, passage and breeding bird records were requested from the British Trust for Ornithology. This included bird records (2020 to 2024) within the 2km grid squares within which the grid connection cable route is located. Data from the Weel Borrow Pit British Trust for Ornithology Wetland Bird Survey count sector (located at the northern end of the grid connection cable route) was also obtained. These are presented below.

5.6.11 North and East Yorkshire Ecological Data Centre were also consulted as part of the desk study; however, there were no records of SPA/Ramsar site qualifying bird species identified within the most recent years of data (2016 to 2019).

British Trust for Ornithology winter, passage and breeding bird records

5.6.12 **Table 5-18** and **Table 5-19** show the Hornsea Mere SPA and Humber Estuary SPA/Ramsar site qualifying species present within one or more of the 2km grid squares requested from the British Trust for Ornithology[8]. The tables include records of species within the season in which they are a qualifying species for the SPAs/ Ramsar site.

Table 5-18: British Trust for Ornithology records (2020-2024) of Hornsea Mere SPA species present within one or more of the 2km grid squares in which the grid connection cable route was located

Hornsea Mere SPA species	Winter/Autumn passage	Breeding/Spring passage
Gadwall	X	
Tufted duck	X	
Mute swan		X

Table 5-19: British Trust for Ornithology records (2020-2024) of Humber Estuary SPA/ Ramsar site species present within one or more of the 2km grid squares in which the grid connection cable route was located

Humber SPA/Ramsar site species	Winter/Autumn passage	Breeding/Spring passage
Humber Estuary SPA/Ramsar site – individual qualifying wintering and breeding species		
Golden plover	X	
Avocet		X
Marsh harrier		X
Little tern		X
Humber Estuary SPA Natural England Annex B Category a) - all species listed individually under the assemblage feature on the SPA citation		
Lapwing	X	
Mallard	X	
Teal	X	
Oystercatcher	X	

[8] Note that the British Trust for Ornithology data considered the winter season to comprise August to February and the breeding season March to July. These seasons therefore encompass both the autumn and spring migration periods.

Humber SPA/Ramsar site species	Winter/Autumn passage	Breeding/Spring passage
Greenshank	X	
Humber Estuary SPA Natural England Annex B Category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population		
Greylag goose	X	
Little egret	X	
Pink-footed goose	X	
Humber Estuary SPA (Natural England Annex B Category c) - species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count		
Black-headed gull	X	

5.6.13 As set out in the habitat suitability assessment (refer to **Table 5-16**), fields along the grid connection cable route provided suitable habitat for SPA/Ramsar site qualifying species, which were generally similar to those within Land Areas B to F, in particular the northern end of the grid connection cable route.

5.6.14 The gadwall, tufted duck and mute swan British Trust for Ornithology records shown in **Table 5-18** were most likely to be associated with wetter areas at the northern end of the cable route, in particular Weel Borrow Pit where gadwall and tufted duck have been recorded during British Trust for Ornithology Wetland Bird Survey, refer to **Table 5-20** below.

5.6.15 **Table 5-19** shows British Trust for Ornithology records of golden plover, lapwing, mallard, teal, greylag goose, little egret, pink-footed goose and black-headed gull; these species were all recorded within Land Areas B to F (refer to **Section 5.5**), and it is considered likely that similar habitats along the grid connection cable route would support similar numbers of these species. Based on the habitat suitability assessment, it is possible that small numbers of oystercatcher and greenshank could also be present along the grid connection cable route. Although these species were not recorded within Land Area B to F.

5.6.16 Although avocet and little tern have been recorded within the British Trust for Ornithology 2 km grid squares, there are no suitable breeding sites for these species in the habitats along the grid connection cable route. In addition, while there is the potential for marsh harrier to forage along the grid connection cable route, the habitats are unlikely to be suitable for breeding.

Weel Borrow Pit British Trust for Ornithology Wetland Bird Survey count sector data

5.6.17 British Trust for Ornithology Wetland Bird Survey data for the Weel Borrow Pit count sector was obtained from the British Trust for Ornithology website **[Ref. 22]**. The Borrow Pit has not been surveyed in the last 15 years, with the most recent 5-year mean of peaks between 2004/05 and 2008/09. **Table 5-20** and **Table 5-21** show the Hornsea Mere SPA and Humber Estuary SPA/Ramsar site qualifying species recorded at the Borrow Pit. Note that no Humber Estuary SPA (Natural England Annex B Category c) species were recorded at Weel Borrow Pit count sector during the British Trust for Ornithology Wetland Bird Survey surveys.

Table 5-20: Hornsea Mere SPA qualifying species recorded within Weel Borrow Pit British Trust for Ornithology Wetland Bird Survey count sector

Species	5-year British Trust for Ornithology Wetland Bird Survey mean of peaks 2004/05 to 2008/09	Hornsea Mere SPA citation pop. 2018/19 to 2022/23	% of pop.
Gadwall	1	280	0.36%
Pochard	1	245	0.41%
Shoveler	1	98	1.02%
Tufted duck	12	541	2.22%

Table 5-21: Humber Estuary SPA/ Ramsar site species recorded within Weel Borrow Pit British Trust for Ornithology Wetland Bird Survey count sector

Species	5-year British Trust for Ornithology Wetland Bird Survey mean of peaks 2004/05 to 2008/09	Humber Estuary Wetland Bird Survey pop. 2018/19 to 2022/23	% of pop.
Humber Estuary SPA/ Ramsar site - individual qualifying wintering and breeding species			
Redshank	0	2,570	0.00%
Humber Estuary SPA (Natural England Annex B Category a) - all species listed individually under the assemblage feature on the SPA citation			
Mallard	13	1,236	1.05%
Pochard	1	52	1.92%
Wigeon	42	6,452	0.65%

Humber Estuary SPA (Natural England Annex B Category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population			
Shoveler	1	315	0.32%

5.6.18 As set out in the habitat suitability assessment (refer to **Table 5-16**), Weel Borrow Pit comprised two small angling lakes. Pochard, shoveler, tufted duck and wigeon have been recorded using these lakes, however, there are no other open waterbodies/ similar habitats along the grid connection cable route suitable for these species.

Conclusion

5.6.19 Based on the habitat assessment, bird survey results and British Trust for Ornithology data, it is considered likely that the habitats at the northern end of the grid connection cable route, north of A1174 (Hull Road), would provide the most suitable foraging/roosting land for SPA/Ramsar site species, in particular habitats around Weel Borrow Pit, Figham Pastures LWS and adjacent larger fields and the drainage ditch system. The southern end of grid connection cable route comprises some suitable foraging/roosting habitat; however, due to the smaller field sizes and more urban location, these are considered less likely to support SPA/Ramsar bird species.

5.6.20 Given the similarities in habitats and bird species recorded along the grid connection cable route and Land Areas B to F, on a precautionary basis the land along the grid connection cable route would also constitute functionally linked land for the same species; golden plover, lapwing, mallard, teal and black-headed gull. However, it should be noted that as the agricultural fields change based on the cropping regimes in place from year to year. Therefore, not all the grid connection cable route would be functionally linked land in any given winter period.

5.6.21 During the 2024/25 bird surveys, pink-footed goose were seen flying over on four occasions and were only recorded twice within the Order Limits. Although the numbers recorded within the Order Limits were more than 1% of the SPA population, the grid connection cable route is not considered to constitute functionally linked land for pink-footed goose given they were not regularly recorded, no Wetland Bird Survey alerts have been triggered for this species on the Humber Estuary, and their numbers within the Humber have shown increases in recent years (following the national trend).

5.6.22 Greylag goose were regularly recorded during the 2024/25 bird surveys, most of the records were of birds flying over the Order Limits. Given that no Wetland Bird Survey alerts have been triggered for this species on the Humber Estuary and their numbers within the Humber have shown increases in populations in recent

years (following national trends); the grid connection cable route is therefore not considered to constitute functionally linked land for greylag goose.

6 Lamprey Baseline Summary

6.1 Introduction

6.1.1 An aquatic habitat walkover assessment was undertaken in August 2024. The full details of which are reported in **ES Volume 4, Appendix 7.8: Aquatic Walkover Report [EN010157/APP/6.4]**. The results relating to river and sea lamprey, which are of relevance to the assessment in this report are summarised below.

6.2 Survey area

6.2.1 The survey area included any proposed culvert crossing or Horizontal Directional Drilling locations within the Order Limits. At each survey location, 300m of watercourse was assessed (150m either side of the proposed crossing or Horizontal Directional Drilling location).

6.3 Desk study

6.3.1 A desk study was carried out in July 2023 (and updated in 2024 to account for a change to the Order Limits) for reference materials relating to aquatic habitats and species from local data centres, Natural England and Joint Nature Conservation Committee and other government websites. In addition, freely available Environment Agency fisheries data was reviewed for the Lower Hull and Upper Hull operational catchments.

6.4 Survey methodology

6.4.1 Proposed culvert crossing or Horizontal Directional Drilling locations were assessed using a bespoke habitat survey method based upon Hendry & Cragg-Hine **[Ref. 23]**. The method incorporated habitat types for all species of fish, including lamprey and provided a concise overview of the aquatic habitats present.

6.4.2 Habitat features recorded during the walkover survey included:

- flow type (e.g. glide, run, riffle, cascade, pool and rapid);
- substrate type (e.g. boulder, cobble, pebble, gravel, sand, silt as defined using the Wentworth scale);
- macrophyte presence / type (e.g. emergent linear, emergent broad-leaved, submerged linear, submerged broad-leaved, floating linear, floating broad-leaved); and

- other key features (e.g. side bar, mid-stream bar, man-made dams, weirs, large woody debris, coarse woody debris, spawning area, fry / juvenile fish refuge area).

6.4.3 Habitat suitability was assessed based on recorded habitat characteristics, background data and perceived connectivity to the wider drainage network. Note that connectivity was estimated based upon site observations, mapping and aerial imagery of the drain network. For lamprey, suitability was assessed using the following criteria: silt substrate with connectivity to spawning habitat.

6.5 Results

Sea lamprey

6.5.1 No records of sea lamprey were found within the River Hull catchment and Environment Agency records of 'lamprey sp.' ammocoetes recorded in Watton Beck and Arram Beck are considered likely to refer to juvenile brook or river lamprey, rather than juvenile sea lamprey. Sea lamprey within the Humber are thought to be restricted solely to the Ouse catchment.

River lamprey

6.5.2 River lamprey records were confined to tributaries of the River Hull, namely the Arram, Scorborugh and Watton Beck's, north of the Order Limits. Small numbers of juvenile lamprey were recorded between 2016 and 2023. No recent (< 10 years old) Environment Agency fisheries data was available for the River Hull; however, a single record of river lamprey was present from a 2007 survey at Weel Bridge, approximately 2.1km upstream. A single record of a juvenile river lamprey was also recorded further upstream at Hull Bridge in 2005. Environment Agency data has records of lamprey ammocoetes further upstream in the Hull catchment within the smaller becks and tributaries. These have not been identified to species; however, it is considered likely, given the location that at least some of these would be river lamprey.

6.5.3 It has therefore been concluded that river lamprey are considered likely to be restricted to the River Hull (being confirmed as present in the upper reaches and tributaries) and likely absent from the drainage ditch system of the Holderness Drain, which encompasses much of the area east of the river, and the Beverley and Barmston Drain, to the west of the river. Both drainage catchments are intentionally isolated from the River Hull for flood alleviation purposes.

6.5.4 The proposed Horizontal Directional Drilling location for the River Hull was the only survey location considered suitable to support lamprey. The river is tidal and deep at the proposed Horizontal Directional Drilling location, making it likely

suitable for a range of coarse fish species and estuarine / marine species, including small numbers of juvenile river lamprey, and adult lamprey as they migrate to freshwater spawning habitats.

7 Appropriate Assessment

7.1 Introduction

7.1.1 **Sections 7 and 8** comprise Stage 2 of the Habitats Regulations Assessment process, Appropriate Assessment. The assessment will determine whether there is any potential for adverse effects on the integrity of the European sites screened into the assessment, as a result of the Proposed Development (alone and in-combination).

7.2 Assessment of effects: Loss of functionally linked land for qualifying bird species

7.2.1 The potential for loss of functionally linked land for qualifying bird species recorded using habitats within the Order Limits during the construction phase has been considered in relation to the following European sites:

- Hornsea Mere SPA.
- Humber Estuary SPA.
- Humber Estuary Ramsar site.

7.2.2 There would be temporary loss of agricultural land, suitable for foraging and roosting birds associated with the European sites during the 24-month construction period. This would be associated with construction activities, such as laydown areas, site compounds, haul routes, installation of inter-connecting cable routes, and the grid connection cable route. These habitats would be reinstated following completion of the Proposed Development.

7.2.3 There would also be long-term temporary loss of agricultural land during the lifetime of the Proposed Development (40 years), under the footprint of the solar PV modules and associated above ground infrastructure. The drainage ditch system has been largely retained as part of the Proposed Development design, with culverting of small sections to facilitate access and cable routes (c. 4m width). These culverts would remain in place following decommissioning.

7.2.4 Loss of functionally linked land could reduce feeding opportunities and/or lead to changes in species distribution with potential consequential effects on survival rates, which could make it more difficult to meet the conservation objectives of the SPA/Ramsar site. Supplementary Advice for the Humber Estuary **[Ref. 3]** includes targets for individual qualifying species and the waterbird assemblage, the most relevant relating to loss of functionally linked land includes reference to ‘restoring the extent, distribution and availability of suitable habitat (either within

or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) to an unknown extent, based on restoring natural estuarine functioning'. The loss of functionally linked land may make reaching this target more difficult.

Hornsea Mere SPA

7.2.5 As detailed in **Sections 5.5 and 5.6**, the land within and adjacent to the Order Limits was not considered to constitute functionally linked land for the qualifying bird species of Hornsea Mere SPA. Therefore, there would be no adverse effects on the integrity of the populations of these species associated with the Hornsea Mere SPA in relation to loss of functionally linked land.

Humber Estuary SPA/Ramsar site

Individual wintering/passage and breeding species

7.2.6 As detailed in **Sections 5.5 and 5.6**, agricultural land within and adjacent to the Order Limits was considered to constitute functionally linked land for golden plover (an individual wintering/passage qualifying species of the SPA/Ramsar site). As the agricultural fields change based on the cropping regimes in place from year to year, it should be noted that not all of agricultural land would be functionally linked land for wintering golden plover in any given winter period. In addition, there are large areas of similar habitat suitable in the wider landscape.

7.2.7 As set out in the **Outline LEMP [EN010157/APP/7.5]**, during the operation (including maintenance) phase there would be a change in agricultural use to grassed fields. All panelled areas will have the opportunity to be potentially grazed by sheep, if grazing is not possible then a hay cutting and collect regime will be implemented however, this will be determined by individual landowners and grass will be cut periodically nonetheless. These habitats would be less suitable for use by golden plover, and the presence of solar modules may reduce sightlines making the habitat suboptimal. Therefore, there would be potential for adverse effects on the golden plover population associated with the Humber Estuary SPA/ Ramsar site, and mitigation would be required.

Humber Estuary SPA (Natural England Annex B category a) - all species listed individually under the assemblage feature on the SPA citation)

7.2.8 As detailed in **Sections 5.5 and 5.6**, the agricultural land within and adjacent to the Order Limits was considered to constitute functionally linked land for lapwing, mallard and teal. The drainage ditch system was also considered to comprise functionally linked land for mallard and teal. As the agricultural fields change based on the cropping regimes in place from year to year, it should be noted that

not all the agricultural land would be functionally linked land in any given winter period. In addition, there are large areas of similar habitats suitable in the wider landscape.

7.2.9 The majority of the records of both mallard and teal were of birds using the drainage ditch system; these habitats will be largely retained as part of the design of the Proposed Development. As noted above, during the operation (including maintenance) phase there would be a change in agricultural use to grassed fields. All panelled areas will have the opportunity to be grazed by sheep; however, this will be determined by individual landowners and grass will be cut periodically nonetheless. These habitats would be less suitable for use by lapwing, mallard and teal and the presence of solar modules may reduce sightlines making the habitat suboptimal. Therefore, there would be potential for adverse effects on the wintering waterbird assemblages of the Humber Estuary SPA/Ramsar site, of which lapwing, mallard and teal are main component species, and mitigation would be required.

Humber Estuary SPA (Natural England Annex B Category b) - species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population

7.2.10 As detailed in **Sections 5.5 and 5.6**, the land within and adjacent to the Order Limits was not considered to constitute functionally linked land for any Humber Estuary SPA (Natural England Annex B category b) species; therefore, there would be no adverse effects on these species in relation to loss of functionally linked land.

Humber Estuary SPA (Natural England Annex B Category c) - species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count

7.2.11 As detailed in **Sections 5.5 and 5.6**, the agricultural land and drainage ditch system within and adjacent to the Order Limits was considered to constitute functionally linked land for black-headed gull. As the agricultural fields change based on the cropping regimes in place from year to year, it should be noted that not all agricultural land would be functionally linked land in any given winter period.

7.2.12 The drainage ditch system will be largely retained as part of the design of the Proposed Development. As noted above, during the operation (including maintenance) phase there would be a change in agricultural use to grassed fields. All panelled areas will have the opportunity to be grazed by sheep; however, this will be determined by individual landowners and grass will be cut periodically nonetheless. These habitats would remain suitable for use by black-headed gull.

Black-headed gull are known to make use of a wide variety of habitats for foraging, and there are large areas of suitable habitats in the wider landscape for this species. Nevertheless, the potential for adverse effects on the wintering waterbird assemblages of the Humber Estuary SPA/Ramsar site, of which black-headed gull are a main component species cannot be ruled out, and mitigation would be required.

Mitigation

7.2.13 Mitigation for loss of functionally linked land for golden plover, lapwing, teal, mallard and black-headed gull has been set out and will be secured in the **Outline LEMP [EN010157/APP/7.5]** and is summarised below.

7.2.14 The mitigation will include the creation of a series of shallow wader scrapes in flat arable fields (Mitigation Areas 11 and 13) surrounded by flower rich neutral grassland, as well as flower rich neutral grassland creation within Mitigation Area 9 (refer to **ES Volume 3, Figure 7.1: Designated Sites and Ecological Mitigation and Enhancement Areas [EN010157/APP/6.3]**). The mitigation areas are strategically located on the western side of the Order Limits, close to other suitable features such as Holderness Drain and the River Hull. Although Mitigation Area 11 is directly adjacent to the proposed solar panels for Carr Farm Solar Farm, tall hedgerows either side of Holderness drain provide screening. Furthermore, the existing hedgerow will be allowed to grow tall as part of the Proposed Development, which will provide greater screening.

7.2.15 Wader scrapes are shallow depressions that are constructed in fields to benefit wildfowl and wading birds. They are designed so that they hold water for only part of the year and benefit wintering birds. Hydrological information regarding the hydrological status of Mitigation Areas 11 (Field E6) and 13 (Fields E13/E14) has confirmed that both areas are likely to be suitable for scrape creation. Further details of the suitability and the capacity of Mitigation Areas to deliver for the intended species are provided within the **Outline LEMP [EN010157/APP/7.5].** The creation of scrapes and grassland will provide suitable permanent roosting and foraging opportunities for waders, waterfowl and gulls, thus mitigating for the loss of land for these species. In addition, the measures to mitigate for loss of farmland bird habitat (as set out in **ES Volume 2, Chapter 7: Biodiversity [EN010157/APP/6.2]**) would also be suitable for foraging and roosting SPA/Ramsar site species.

7.2.16 The wintering bird habitat within the mitigation areas will be created sufficiently in advance of infrastructure work to ensure appropriate habitat is available prior to the beginning of any construction activity. Details of the design, management and monitoring of the mitigation areas are provided in the **Outline LEMP [EN010157/APP/7.5]**.

Assessment conclusion

7.2.17 It can be concluded that there would be no adverse effects (alone) on the integrity of Hornsea Mere SPA in relation to loss of functionally linked land.

7.2.18 With mitigation measures set out and secured within the **Outline LEMP [EN010157/APP/7.5]** in place, it can be concluded that there would be no adverse effects (alone) on the qualifying bird species/ assemblage populations associated with the Humber Estuary SPA/ Ramsar site, in relation to loss of functionally linked land.

7.3 Assessment of effects: Disturbance/displacement of qualifying bird species using functionally linked land

7.3.1 The potential for disturbance/displacement of qualifying bird species using functionally linked land within and adjacent to the Order Limits during the construction/decommissioning phases has been considered in relation to the following European sites:

- Hornsea Mere SPA.
- Humber Estuary SPA.
- Humber Estuary Ramsar site.

7.3.2 As detailed in **Section 2**, the construction works will be phased over a 24-month period, starting with Land Area B, working progressively south to Land Area F. Works in each Land Area are anticipated to take up to eight months to complete, with a series of overlaps where works would be taking place in two Land Areas simultaneously. Works along the grid connection cable route are anticipated to take up to ten months, and would be undertaken at the same time as some or all of construction activities within Land Areas D, E and F.

7.3.3 The activities most likely to disturb birds are those that involve irregular, infrequent, unpredictable loud noise events and movement or vibration of long duration. The activities generating the loudest noises (**ES Volume 2, Chapter 12: Noise and Vibration [EN010157/APP/6.2]**) are anticipated to be from lorries, tracked excavators and bulldozers associated with earthworks and deliveries. A push press piling rig would be used to install the majority of piles for solar PV module support structures. While the noise levels from this are likely to be lower than from other piling construction methods, they still have the potential to disturb/displace birds due to the irregular, unpredictable nature of the sounds generated.

7.3.4 The Waterbird Disturbance and Mitigation Toolkit **[Ref. 24]** (based on research undertaken on the Humber Estuary) is a tool for assessing the potential disturbance effects on waterbirds as a result of construction activities. It outlines the predicted likely disturbance distances for waterbirds caused by different noise levels, with an 'acceptable dose' considered to be noise levels below 70 dB(A) and resulting in either no response, or low-level behavioural responses, such as birds raising their heads. The toolkit notes that noise levels of between 71 dB(A) and 84 dB(A) are likely to generate a response, but that mitigation may be effective in reducing the disturbance risk. Noise levels above 85dB(A) are identified as 'almost certain' to result in a flight response and difficult to mitigate through screening.

7.3.5 The predicted noise levels from construction activities for the Proposed Development range between 101.9 dB(A) to 124.3 dB(A) at source (refer to **ES Volume 2, Chapter 12: Noise and Vibration [EN010157/APP/6.2]**). Note that these are unweighted figures appropriate for ecological receptors rather than the human hearing response numbers presented in Chapter 12. Based on the predicted decay rates for noise presented in **ES Volume 2, Chapter 12: Noise and Vibration [EN010157/APP/6.2]**), and the Waterbird Disturbance and Mitigation Toolkit, a noise of 101.9 dB(A) would be expected to dissipate to an 'acceptable dose' level of 70 dB(A) or below at a distance of approximately 20-25m. A noise of 124.3 dB(A) would be expected to dissipate to an 'acceptable dose' level of 70 dB(A) or below at a distance of approximately 150-200m. Therefore, behavioural responses in relation to construction noise would not be expected beyond 200m.

7.3.6 Disturbance/displacement of birds using functionally linked land could reduce feeding efficiency and/or lead to changes in species distribution with potential consequential effects on survival rates, which could make it more difficult to meet the conservation objectives of the SPA/Ramsar site. Supplementary Advice for the Humber Estuary SPA **[Ref. 3]** includes targets for individual qualifying species and the waterbird assemblage. The most relevant target relating to disturbance/displacement includes reference to 'reducing the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed'. The potential for disturbance/displacement of these species during the construction/ decommissioning phase may make reaching this target more difficult.

Hornsea Mere SPA

7.3.7 As detailed in **Sections 5.5 and 5.6**, the land within and adjacent to the Order Limits was not considered to constitute functionally linked land for the qualifying bird species of Hornsea Mere SPA. Therefore, there would be no adverse effects on the populations of these species associated with the Hornsea Mere SPA in

relation to disturbance/ displacement of qualifying bird species using functionally linked land.

Humber Estuary SPA/Ramsar site

Individual wintering/passage and breeding species

7.3.8 As detailed in **Sections 5.5 and 5.6**, agricultural land within and adjacent to the Order Limits, including the grid connection cable route was considered to constitute functionally linked land for golden plover (an individual wintering/passage qualifying species of the SPA/ Ramsar site). As the agricultural fields change based on the cropping regimes in place from year to year, it should be noted that not all of agricultural land would be functionally linked land for wintering golden plover in any given winter period.

7.3.9 Birds using habitats within and adjacent to the Order Limits are likely to be habituated to some level of noise and visual disturbance, given the agricultural nature of the landscape and exposure to existing disturbance from farming activities. In addition, based on the indicative construction period and phased approach, approximately half of the works will be taking place during April to September, when most wintering qualifying bird species will not be present, or are present in lower numbers and thus are less likely to be disturbed. However, where works are scheduled to take place during the winter period, there is potential for visual and noise related disturbance/ displacement of wintering golden plover. Disturbance/ displacement would be temporary and relatively short term, and there are large areas of similar less disturbed habitat suitable for use by golden plover in the wider landscape. Nevertheless, taking a precautionary approach, the potential for adverse effects on the golden plover population associated with the Humber Estuary SPA/ Ramsar site in relation to disturbance/ displacement cannot be ruled out, and mitigation would be required.

Humber Estuary SPA (Natural England Annex B Category a) All species listed individually under the assemblage feature on the SPA citation)

7.3.10 As detailed in **Sections 5.5 and 5.6**, the agricultural land within and adjacent to the Order Limits, and the grid connection cable route were considered to constitute functionally linked land for lapwing, mallard and teal. As the agricultural fields change based on the cropping regimes in place from year to year, it should be noted that not all of agricultural land would be functionally linked land in any given winter period. In addition, the drainage ditch system was also considered to comprise functionally linked land for mallard and teal.

7.3.11 As noted above, birds using habitats within and adjacent to the Order Limits are likely to be habituated to some level of noise and visual disturbance. In addition,

approximately half of the works will be taking place during April to September, when most wintering qualifying bird species will not be present or are present in lower numbers and thus are less likely to be disturbed. However, where works are scheduled to take place during the winter period, there is potential for visual and noise related disturbance/ displacement of wintering lapwing, mallard and teal. Disturbance/ displacement would be temporary and relatively short term, and there are large areas of similar less disturbed habitat suitable for use by these species in the wider landscape. Furthermore, the majority of mallard and teal were recorded using the retained drainage ditch system, which would be less disturbed due to the high, steep banks. Nevertheless, the potential for adverse effects on the wintering waterbird assemblages of the Humber Estuary SPA/ Ramsar site, of which lapwing, mallard and teal are main component species cannot be ruled out, and mitigation would be required.

Humber Estuary SPA (Natural England Annex B Category b) Species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population)

7.3.12 As detailed in **Sections 5.5 and 5.6**, the land within and adjacent to the Order Limits was not considered to constitute functionally linked land for any Humber Estuary SPA (Natural England Annex B category b) species; therefore, there would be no adverse effects on these species in relation to disturbance/ displacement of qualifying bird species using functionally linked land.

Humber Estuary SPA (Natural England Annex B Category c) - species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count

7.3.13 As detailed in **Sections 5.5 and 5.6**, the agricultural land and drainage ditch system within and adjacent to the Order Limits, including the grid connection cable route, was considered to constitute functionally linked land for black-headed gull. As the agricultural fields change based on the cropping regimes in place from year to year, it should be noted that not all of agricultural land would be functionally linked land in any given winter period.

7.3.14 As noted above, birds using habitats within and adjacent to the Order Limits are likely to be habituated to some level of noise and visual disturbance. In addition, approximately half of the works will be taking place during April to September, when most wintering qualifying bird species will not be present or are present in lower numbers and thus are less likely to be disturbed. However, where works are scheduled to take place during the winter period, there is potential for visual and noise related disturbance/ displacement of wintering black-headed gull. Disturbance/displacement would be temporary and relatively short term, and there are large areas of similar less disturbed habitat suitable for use by this

species in the wider landscape. Nevertheless, the potential for adverse effects on the wintering waterbird assemblages of the Humber Estuary SPA/ Ramsar site, of which black-headed gull are a main component species cannot be ruled out, and mitigation would be required.

Mitigation

7.3.15 To mitigate the effect of visual and noise disturbance on golden plover, lapwing, mallard, teal, and black-headed gull within and adjacent to the Order Limits, including the grid connection cable route, the following measures are included within the **Outline CEMP [EN010157/APP/7.2]**:

- Creation of habitats suitable for golden plover, lapwing, mallard, teal, and black-headed gull, which would be established prior to the start of construction and would be available for use by birds which may be displaced.
- Adherence to the guidelines set out in The Code of Practice for Noise and Vibration Control on Construction and Open Sites, 2009 **[Ref. 25]** and subsequent updates.
- The use of push-press piling methods, where practicable.
- Selection of quietest working equipment available.
- Visual and acoustic barriers (typically 3m high) will be installed around all Horizontal Directional Drilling launch and reception pits, substation work sites, compounds, noisy equipment etc.
- Visual and acoustic barriers (typically 3m high) will be installed between bird mitigation areas and the working areas, if needed.
- Provision of lined and sealed acoustic covers for noisy equipment, such as generators and static pumps.
- Directing noise from machinery, including exhausts or engines, away from sensitive locations.
- Ensuring that regularly maintained and appropriately silenced equipment is used.
- Maintaining a no idling policy.
- There will be no night-time working unless agreed with the Local Planning Authority, and any artificial lighting will be kept to a minimum and not directed towards habitat suitable for SPA/Ramsar site qualifying bird species.
- The Grid Connection Cable Route will be installed using Horizontal Directional Drilling underneath the majority of Figham Pastures LWS.

- Vehicle movements will be kept to a minimum within the LWS and, where reasonably, practicable works will not be undertaken between October and March.

7.3.16 As noted above and detailed in **Section 7.2** of the **Outline LEMP [EN010157/APP/7.5]**, habitats suitable for golden plover, lapwing, mallard, teal, and black-headed gull would be established prior to the start of construction. These mitigation areas (shown on **ES Volume 3, Figure 7.1: Designated Sites and Ecological Mitigation and Enhancement Areas [EN010157/APP/6.3]**) may be subject to short-term (up to four months), temporary disturbance from construction activities in adjacent fields within Land Areas D and E; however, the mitigation areas would be undisturbed by construction activities for the remainder of the construction phase.

7.3.17 To avoid the potential for disturbance of wintering birds within the mitigation areas (Mitigation Areas 9 (Field D18), 11 (Field E6) and 13 (Fields E13/14)), completion of the activities most likely to disturb birds (e.g. piling, installing tracks, laying cables etc.) will be avoided during winter (October to March) within the adjacent fields to the mitigation areas (Fields E4, E5 and E15, E17 and D17). Only activities less likely to disturb birds (e.g. commissioning works including panel installation) would potentially take place in these fields during winter, if necessary. Should this not be possible, and as set out above, acoustic barriers would be installed for the construction period to provide a noise and visual barrier, in addition to any hedgerow screening already in place. Mitigation is secured by the **Outline CEMP [EN010157/APP/7.2]**.

Assessment conclusion

7.3.18 It can be concluded that there would be no adverse effects (alone) on the integrity of the Hornsea Mere SPA in relation to disturbance/ displacement of qualifying bird species using functionally linked land.

7.3.19 With mitigation measures in place secured through the **Outline CEMP [EN010157/APP/7.2]** and set out within the **Outline LEMP [EN010157/APP/7.5]**, it can be concluded that there would be no adverse effects (alone) on the qualifying bird species/ assemblage populations associated with the Humber Estuary SPA/ Ramsar site in relation to disturbance/ displacement of qualifying bird species using functionally linked land.

7.4 Assessment of Effects: Vibration/ noise disturbance of river lamprey

7.4.1 The potential for vibration/ noise disturbance of river lamprey during the construction phase of the grid connection cable route has been considered in relation to the following European sites:

- Humber Estuary Ramsar site.
- Humber Estuary SAC.

7.4.2 Works associated with crossing the River Hull would be undertaken using Horizontal Directional Drilling. Receptor pits would be located approximately 50m either side of the River Hull and will take place at a minimum depth of 7m below the riverbed, potentially up to a maximum of 20m. The duration of the Horizontal Directional Drilling depends on many variables and is not yet known, but is estimated to take approximately two to three weeks in total, with the drilling under the River Hull anticipated to take up to a maximum of 24 hours. The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to September), when the ground conditions would be drier. These measures are secured through the **Design Parameters Document [EN010157/APP/5.8]** and the **Outline CEMP [EN010157/APP/7.2]**.

7.4.3 Supplementary Advice for the Humber Estuary SAC **[Ref. 3]** includes targets for river lamprey. The most relevant target relating to disturbance includes reference to '*maintaining the presence and spatial distribution of the species and their ability to undertake key life cycle stages and behaviours'*. The potential for disturbance of this species from Horizontal Directional Drilling vibration/ noise during the construction phase may make reaching this target more difficult. The Supplementary Advice recommends consideration of the key life stages and behaviours of a species, as this may influence its distribution and ultimately population abundance. It also notes that '*Disturbance, including noise, caused by human activities should not adversely affect the species'*.

Humber Estuary SAC/Ramsar Site

7.4.4 As set out in **Section 6**, the River Hull is considered functionally linked land for river lamprey associated with the Humber Estuary SAC/ Ramsar site. The aquatic habitat assessment surveys did not identify any suitable lamprey spawning habitat (shallow gravels in flowing water) in the section of the River Hull to be crossed by Horizontal Directional Drilling; with spawning habitats considered likely to be located further upstream in the catchment, in more natural, less managed becks that feed into the River Hull. As such, no adverse effects are anticipated in relation to spawning river lamprey.

7.4.5 River lamprey are known to migrate up the River Hull to upstream spawning habitats and therefore the potential for disturbance of migration as a result of Horizontal Directional Drilling vibration/ noise has been considered. Mature river lamprey usually migrate from estuaries into fresh water from October to December. During winter and early spring, they continue to migrate upstream (typically at night) when conditions are suitable, often hiding under stones and vegetation during the day. Adults require a migration route free of obstacles to reach their spawning grounds with minimum effort and delay **[Ref. 26]**.

7.4.6 The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to September), when the ground conditions would be drier. This would avoid the peak lamprey migration period. As such, no adverse effects are anticipated in relation to disturbance of migrating river lamprey.

7.4.7 In the unlikely event that works cannot be undertaken during April to September, while drilling may extend into the night when lamprey could be migrating, the works under the River Hull itself would be very short-term and temporary (estimated to take a maximum of 24 hours). Furthermore, guidelines from the Acoustical Society of America in relation to sound exposure for fish and sea turtles **[Ref. 27]** indicates that fish without a swim bladder (which includes lamprey) have the lowest sensitivity to noise/vibration. This accords with the Supplementary Advice (see above) which notes that disturbance, including noise, caused by human activities should not adversely affect lamprey. As such, no adverse effects are anticipated in relation to disturbance of migrating river lamprey.

7.4.8 Juvenile river lamprey may make use of silty habitats within this section of the River Hull. However, given the small-scale of the area potentially affected, temporary nature of the potential disturbance, and the abundance of suitable available habitats downstream of the Horizontal Directional Drilling crossing, even if juveniles were disturbed to the extent that they moved from the area, it is considered unlikely to have an adverse effect on lamprey populations associated with the European sites. As such, no adverse effects are anticipated in relation to juvenile river lamprey.

Assessment conclusion

7.4.9 It can be concluded that there would be no adverse effects (alone) on the integrity of the Humber Estuary SAC/ Ramsar site in relation to vibration/ noise disturbance of river lamprey.

7.5 Assessment of Effects: Disturbance of river lamprey as a result of electromagnetic fields

7.5.1 The potential for electromagnetic fields to result in disturbance of river lamprey during the operation (including maintenance) phase of the Proposed Development has been considered in relation to the following European sites:

- Humber Estuary Ramsar site.
- Humber Estuary SAC.

7.5.2 Once operational, the buried cable will produce electric and magnetic fields. Electric fields are produced by voltage (voltage is the pressure behind the flow of electricity) **[Ref. 28]**, they are easily blocked for example by fences, shrubs and buildings **[Ref. 29]**. Magnetic fields are produced by the current, which is the flow of electricity along the cable **[Ref. 28]**, unlike electric fields, most materials do not readily block magnetic fields **[Ref.29]**. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source **[Ref. 29]**. The OES Environmental Tethys Management Measures Tool for Marine Energy provides a useful resource for mitigation and management of electromagnetic fields. The design of the cabling for the Proposed Development accords with the appropriate measures recommended by the tool in relation to electromagnetic fields and migratory fish to minimise electromagnetic fields **[Ref. 30]**. These measures include burying the cable more than 1m underground (as magnetic fields diminish rapidly with distance from the cable), using AC rather than DC, installing cables with an insulating layer (for example, made of XLPE, also known as cross-linked polyethylene), and bundling cables within ducting (which reduces electromagnetic vectors).

7.5.3 Supplementary Advice for the Humber Estuary SAC **[Ref. 3]** includes targets for river lamprey. The most relevant target relating to this type of disturbance includes reference to '*maintaining the presence and spatial distribution of the species and their ability to undertake key life cycle stages and behaviours'*. The Supplementary Advice also recommends consideration of the key life stages and behaviours of a species, as this may influence its distribution and ultimately population abundance. The potential for disturbance of river lamprey from electromagnetic fields during the operation (including maintenance) phase may make reaching the targets within the Supplementary Advice more difficult.

Humber Estuary SAC/Ramsar Site

7.5.4 As set out in **Section 6**, the River Hull is considered functionally linked land for river lamprey associated with the Humber Estuary SAC/ Ramsar site. The aquatic habitat assessment surveys did not identify any suitable lamprey spawning habitat (shallow gravels in flowing water) in the section of the River Hull where

cables will be located; with spawning habitats considered likely to be located further upstream in the catchment, in more natural, less managed becks that feed into the River Hull. As such, no adverse effects are anticipated in relation to electromagnetic fields and spawning river lamprey or their eggs.

7.5.5 River lamprey are known to migrate up the River Hull to upstream spawning habitats and juvenile river lamprey may make use of silty habitats within the section of the River Hull where the cable crossing will be located. Therefore, the potential for disturbance of migratory adult river lamprey and juveniles as a result of electromagnetic fields has been considered.

Electric fields

7.5.6 Studies show that river lamprey are sensitive to electric fields **[Ref. 31]**. However, the cable will have an insulating layer (made of XLPE, also known as cross-linked polyethylene, or similar), which would eliminate the electric field **[Ref. 32]**. Furthermore, burying the cable between 7 to 20m below the river bed would further ensure the electric field does not reach the water column. Therefore, there would be no potential adverse effects on migrating adult river lamprey or juveniles from electric fields.

Magnetic fields

7.5.7 Magnetic fields occur naturally; the Earth's magnetic field, which is caused mainly by currents circulating in the outer layer of the Earth's core, is approximately 50 microTeslas (μT) in the UK. Unlike electric fields, the magnetic field produced by an underground cable is not shielded by the cable insulation and can move through substrates, extending directly above the cable and to either side, with the strongest magnetic field detected directly above the cable location **[Ref. 28]**. The underground cable design will influence the magnetic field produced, depending on the capacity of a design and the depth of the cable underground. Increasing the separation distance between the source of the magnetic field (the cable) and potential receptors is recognised as an important way of minimising potential impacts **[Ref. 30]**. Government planning policy set out within Section 2.8.264 of the National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) **[Ref. 42]** does not provide a recommended burial depth, but notes that 'burial of the cable increases the physical distance between the maximum EMF intensity and sensitive species'. As noted above, the OES Environmental Tethys Management Measures Tool for Marine Energy **[Ref. 30]** recommends burying cables at a minimum depth of 1m to minimise potential effects from magnetic fields. The cables for the Proposed Development will be a minimum of 7m below the river, potentially up to 20m; much greater than the minimum recommended depth of 1m.

7.5.8 There appear to be few studies on the sensitivity of lamprey to magnetic fields and their potential impacts. A literature review undertaken for the NorthConnect project (providing an electrical link between Scotland and Norway) **[Ref. 31]**, which considered the sensitivity of various species (including lamprey) to magnetic fields in the marine environment, also noted that the highest magnetic field levels are closest to the cable, reducing quickly with distance. The review noted that lamprey typically make use of different depths within the water column; and while they may therefore come into contact with higher magnetic fields, any behavioural changes (such as altered swimming direction or speed) would be anticipated to be highly localised closest to the near-bed area, with individuals moving freely above the cable in the rest of the water column (note that marine cables are typically laid on the sea bed or buried at shallow depths). The review concluded that these behavioural changes were not anticipated to result in any effects to the population.

7.5.9 **Table 7-1** below shows typical magnetic fields (from National Grid monitoring and information produced for the Hinkley Connection project in relation to EMF) generated from different cable types, compared with natural background levels. National Grid guidance notes that cables are typically installed 1m below ground **[Ref. 43]**.

Table 7-1: Typical magnetic fields from buried cables

Source of magnetic field		Magnetic Field (microTeslas μT)
Government Guidelines – maximum permitted (Permitted Public Exposure Limit - ICNIRP 1998 exposure limits in the terms of the 1999 EU Recommendation) **[Ref. 44]**		360
Natural background levels of the earth (UK) **[Ref. 44]**		50
TV, washing machine, microwave **[Ref. 44]**	Close to appliance	50
	1m away	0.2
Typical 400kv underground cable, buried at 0.9m depth **[Ref. 43]**	At cable (0m from centreline)	24
	5m from centre line	3
	10m from centre line	0.9
Typical 132kV underground cable **[Ref. 45]**	Normal conditions	4.1
	Maximum capacity	54

7.5.10 This shows that directly above the cable (where the magnetic field generated is greatest), the level of magnetic field is typically approximately 24 μT for a 400 kV cable and 4.1 μT for a 132 kV underground cable (under normal conditions). Both

of these magnetic fields are far less than natural background levels. The magnetic field reduces to even lower levels with distance from the centre line of the cable; for example, for a 400 kV cable buried at 0.9 m, at 5 m from the cable centre line the approximate magnetic field would be 3 μT. As the 132 kV cables for the Proposed Development will be buried a minimum of seven times deeper than the typical installation depth of 1m, and that magnetic field is known to reduce with separation distance, it can reasonably be assumed that the resultant magnetic field would be even lower than the levels presented in **Table 7-1**. It is therefore anticipated that the magnetic field generated as a result of the Proposed Development would be much lower than natural background levels. As such, no adverse effects are anticipated in relation to migrating river lamprey.

7.5.11 As noted above, juvenile river lamprey may make use of silty habitats within this section of the River Hull. However, based on the depth of burial and that magnetic fields are anticipated to be lower than those which occur naturally, no adverse effects are anticipated in relation to juvenile river lamprey.

Assessment conclusion

7.5.12 It can be concluded that there would be no adverse effects on the integrity of the Humber Estuary SAC/ Ramsar site in relation to disturbance of river lamprey from electromagnetic fields.

7.6 Assessment of effects: Degradation of habitats as a result of changes in water quality/hydrology

7.6.1 The potential for degradation of habitats as a result of changes in water quality/ hydrology during the construction and decommissioning phases has been considered in relation to the following European sites:

- Hornsea Mere SPA.
- Humber Estuary SPA.
- Humber Estuary SAC.
- Humber Estuary Ramsar site.

7.6.2 Although the potential for likely significant effects on the European sites themselves as a result of changes in water quality has been screened out, there is potential for degradation of habitats within the River Hull and drainage ditch system which have been identified as functionally linked land for qualifying bird and fish species, as detailed below.

7.6.3 Works associated with crossing up to 1~~6~~5 drainage ditches and watercourses (including the River Hull) would be undertaken using Horizontal Directional Drilling. Receptor pits would be located approximately 20 to 30m either side, 50m

for the River Hull. The duration of the Horizontal Directional Drilling under the River Hull depends on many variables and is not yet known, but is estimated to take approximately 2 to 3 weeks. Drainage ditch crossings would be anticipated to take less than this.

7.6.4 During the operation (including maintenance) phase there would be a change in agricultural use to grassed fields. All panelled areas will have the opportunity to be grazed by sheep; however, this will be determined by individual landowners and grass will be cut periodically nonetheless.

7.6.5 Supplementary Advice for the Humber Estuary SAC **[Ref. 3]** includes targets for river lamprey and the Supplementary Advice for the Humber Estuary SPA includes targets for individual qualifying species and the waterbird assemblage. The most relevant target relating to changes in water quality in relation to release of contaminants includes reference to '*Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environment Agency 2019 water body classifications data.'*. The potential for degradation of habitats as a result of changes in water quality/ hydrology during the construction/ decommissioning phase may make reaching this target more difficult.

Hornsea Mere SPA

7.6.6 As detailed in **Sections 5.5 and 5.6**, the land within and adjacent to the Order Limits was not considered to constitute functionally linked land for the qualifying species of Hornsea Mere SPA. Therefore, there would be no adverse effects on the populations of these species associated with the Hornsea Mere SPA in relation to degradation of habitats as a result of changes in water quality/ hydrology.

Humber Estuary SPA/ Ramsar site

Individual wintering/ passage and breeding species

7.6.7 As detailed in **Sections 5.5 and 5.6**, agricultural land within and adjacent to the Order Limits was considered to constitute functionally linked land for golden plover (an individual wintering/ passage qualifying species of the SPA/ Ramsar site).

7.6.8 During the construction phase there is potential for release of breakout contaminants, particularly bentonite during Horizontal Directional Drilling, which could lead to soil degradation and contamination of ground water and surface water within habitats used by golden plover.

7.6.9 During decommissioning, there is a risk that if land within the Order Limits is returned to intensively farmed arable land, certain ecological benefits of the solar farm would be reversed (i.e. reduction in the application of herbicides and fertilisers).

7.6.10 Therefore, there is potential for adverse effects on the golden plover population associated with the Humber Estuary SPA/ Ramsar site as a result of changes in water quality/ hydrology, and mitigation would be required.

Humber Estuary SPA (Natural England Annex B Category a) All species listed individually under the assemblage feature on the SPA citation)

7.6.11 As detailed in **Sections 5.5 and 5.6**, the agricultural land within and adjacent to the Order Limits was considered to constitute functionally linked land for lapwing, mallard and teal.

7.6.12 During the construction phase there is potential for release of breakout contaminants, particularly bentonite during Horizontal Directional Drilling, which could lead to soil degradation and contamination of ground water and surface water within habitats used by these species.

7.6.13 During decommissioning, there is a risk that if land within the Order Limits is returned to intensively farmed arable land, the benefits of the solar farm would be reversed (i.e. reduction in the application of herbicides and fertilisers).

7.6.14 Therefore, there would be potential for adverse effects on the wintering waterbird assemblages of the Humber Estuary SPA/ Ramsar site, of which lapwing, mallard and teal are main component species, and mitigation would be required.

Humber Estuary SPA (Annex B Category b) Species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population)

7.6.15 As detailed in **Sections 5.5 and 5.6**, the land within and adjacent to the Order Limits was not considered to constitute functionally linked land for any Humber Estuary SPA (Natural England Annex B category b) species; therefore, there would be no adverse effects on these species in relation to degradation of habitats as a result of changes in water quality/ hydrology.

Humber Estuary SPA (Natural England Annex B Category c) - species where more than 2,000 individuals are present according to the most recent Humber Estuary Wetland Bird Survey count

7.6.16 As detailed in **Sections 5.5 and 5.6**, the agricultural land and drainage ditch system within and adjacent to the Order Limits was considered to constitute functionally linked land for black-headed gull.

7.6.17 During the construction phase there is potential for release of breakout contaminants, particularly bentonite during Horizontal Directional Drilling, which could lead to soil degradation and contamination of ground water and surface water within habitats used by black-headed gull.

7.6.18 During decommissioning, there is a risk that if land within the Order Limits is returned to intensively farmed arable land, the benefits of the solar farm would be reversed (i.e. reduction in the application of herbicides and fertilisers).

7.6.19 Therefore, there would be potential for adverse effects on the wintering waterbird assemblages of the Humber Estuary SPA/Ramsar site, of which black-headed gull are a main component species, and mitigation would be required.

Humber Estuary SAC/Ramsar site

7.6.20 As set out in **Section 6**, the River Hull is considered to be functionally linked land for the river lamprey population associated with the Humber Estuary SAC and Ramsar site.

7.6.21 During the construction phase there is potential for release of breakout contaminants, particularly bentonite during Horizontal Directional Drilling, which could lead to contamination of the River Hull.

7.6.22 During decommissioning, there is a risk that if land within the Order Limits is returned to intensively farmed arable land the benefits of the solar farm would be reversed (i.e. reduction in the application of herbicides and fertilisers).

7.6.23 Therefore, there would be potential for adverse effects on the river lamprey populations associated with the Humber Estuary SAC/Ramsar site, and mitigation would be required.

Mitigation

7.6.24 The Construction Environmental Management Plan will secure any mitigation at the construction phase, including a specific Horizontal Directional Drilling methodology to manage the risk of bentonite breakout. This will cover the following, as secured in the **Outline CEMP** [**EN010157/APP/7.2]** (the Construction Environmental Management Plan will be made site-specific once the Principal Contractor has been appointed):

- Reflect known ground conditions to select a specific route and depth through the most homogeneous geological conditions possible.
- Casing of weaker un-cohesive layers to reduce bentonite breakout.
- Use as low a concentration of bentonite as possible.
- Operatives to monitor the drilling for evidence of breakout and cease drilling and seal fissures or voids if applicable, as required.
- Monitoring of drilling fluid returns and volumes to help identify losses.
- Retain a stock of sandbags and pumps on site to contain breakout and dis-pose accordingly.
- HDD wastewater (including bentonite) will be incarcerated within the launch pit and transported to a specialised local facility for disposal

7.6.25 The **Outline DEMP** [**EN010157/APP/7.4]** includes measures to mitigate the risk of reversing the benefits on water quality/ hydrology from the solar farm, should the habitats within the Order Limits be returned to intensively farmed arable land.

- Retain planted watercourse easements and buffers.
- Utilise good land management practices such as tillage, crop rotation and maximising grass cover to retain good soil health and percolation benefits.
- Minimise use of artificial fertilisers or pesticides.

Assessment conclusion

7.6.26 With mitigation measures secured through the **Outline CEMP** [**EN010157/APP/7.2]** and **Outline DEMP [EN010157/APP/7.4]** in place, it can be concluded that there would be no adverse effects (alone) on the integrity of the European sites in relation to degradation of habitats as a result of changes in water quality/ hydrology.

7.7 Assessment of effects: Disruption of flight paths of qualifying bird species as a result of glint and glare

7.7.1 The potential for disruption of flight paths of qualifying bird species as a result of glint and glare during the operation (including maintenance) phase has been considered in relation to the following European sites:

- Hornsea Mere SPA.
- Humber Estuary SPA.
- Humber Estuary Ramsar site.

7.7.2 As detailed in **Section 2**, the Proposed Development will include solar PV modules laid out across five Land Areas. The solar PV modules would be separated with a minimum row separation space of 4m. The spacing between the rows would vary across the Land Areas to minimise effects of overshadowing and to ensure optimal efficiency. They will be grid-formed with anti-reflective films to increase the amount of light absorption.

Hornsea Mere SPA, Humber Estuary SPA/Ramsar site

7.7.3 There is the potential for birds to perceive the reflective surfaces of solar PV modules as bodies of water from above, attracting them to land in the area and disrupting their flight paths. There is very limited research of this effect in the UK, with the main studies associated with very large solar farms in savanna or desert regions, which are not comparable with the UK due to the differences in solar farm scale, habitat types under the solar PV modules, climatic conditions and abundance/behaviour of the different bird species involved **[Ref. 33]**.

7.7.4 The configuration of the Land Areas and solar PV modules will help to substantially break up the reflective area of the solar farm and reduce the likelihood of birds perceiving them as waterbodies.

7.7.5 As set out in **Section 5**, no large flocks of SPA/Ramsar site qualifying bird species have been recorded moving across the Land Areas during the surveys. In addition, SPA/ Ramsar site qualifying bird species would be more likely to be moving through during the migration/winter period, when light levels would be lower and less likely to experience refection from the solar PV modules.

7.7.6 Based on the configuration of the solar PV modules and lack of large numbers of birds recorded moving through the Land Areas, it is considered that there would be no adverse effects on the integrity of the populations of the qualifying species of Hornsea Mere SPA or Humber Estuary SPA/ Ramsar sites in relation to disruption of flight paths as a result of glint and glare and no additional mitigation is required.

7.7.7 Following consultation with Natural England (refer to **Appendix A**), in order to help inform future assessments, post-consent monitoring will be carried out to monitor the potential disruption to flight pathways of SPA/ Ramsar site qualifying bird species as a result of glint and glare. Further details are provided within the **Outline LEMP [EN010157/APP/7.5]**.

Assessment conclusion

7.7.8 It can be concluded that there would be no adverse effects (alone) on the integrity of the Hornsea Mere SPA or the Humber Estuary SPA/ Ramsar sites in relation to disruption of flight paths of qualifying bird species as a result of glint and glare.

7.8 Appropriate Assessment conclusion (Proposed Development alone)

7.8.1 This Appropriate Assessment has considered the potential implications of the Proposed Development in relation to the European sites screened into the assessment.

7.8.2 The Appropriate Assessment determined that with the mitigation measures outlined above in place, there would be no adverse impacts (alone) on the integrity of the European sites as a result of the Proposed Development.

8 In-combination assessment

8.1 In-combination effects with plans

8.1.1 The potential for in-combination effects associated with the Local Plans either side of the Humber Estuary has been considered below. The in-combination assessment is based on the information within the Local Plans and the respective Habitats Regulations Assessments (where available).

East Riding Local Plan

8.1.2 The East Riding Local Plan 2012 to 2029 Strategy document **[Ref. 34]** sets out a commitment to protecting the integrity of the internationally important environmental and biodiversity designations around the Humber Estuary. The strategy document notes '*An Habitats Regulations Assessment Stage 1 Screening Report has considered whether the policies and proposals in the Strategy Document are likely to have significant effects upon European sites of nature conservation interest. This is complemented by a Stage 2 Appropriate Assessment that focuses on employment development at Hedon Haven. Where a potential impact has been identified, it specifies those mitigation measures that would need to be considered through the Local Plan. In addition, any development proposal that could have an adverse impact on a European site will need to comply with the requirements of the Habitats Regulations (Conservation of Habitats and Species Regulations 2010 as amended)*'.

8.1.3 A number of policies within the Local Plan also include a specific requirement to fully consider potential impacts on the Humber Estuary SAC, SPA and Ramsar site. For example, Policy S6(B) includes the requirement for the provision of at least 39 hectares of enhanced habitat to mitigate the impact of development on the adjacent Humber Estuary SPA and Ramsar site in relation to Hedon Haven employment development area. Policy ENV4: Conserving and enhancing biodiversity and geodiversity states that '*Proposals that are likely to have a significant effect on an International Site will be considered in the context of the statutory protection which is afforded to the site'*.

8.1.4 The Strategy document states that 'Any development that would have an adverse impact on a designated site, an important habitat or species, and/or a habitat network, should be avoided as far as possible'. Further to this, the Strategy states 'In the case of European designated sites, a Habitats Regulations Appropriate Assessment is required for any proposal likely to have significant effects on the site. Any development that cannot demonstrate it would not adversely affect the integrity of such a site will be refused' If this cannot be achieved, the adverse impacts must be adequately mitigated, or, as a last resort, compensated for. The

Strategy states 'If it is necessary to mitigate or, as a last resort, compensate for loss or damage, a mitigation/compensation plan should be prepared. The Plan should set out the mitigation/compensation objectives, monitoring and maintenance procedures, including the period for which monitoring and management should be undertaken, which should be built into the planning application and delivered through planning conditions. It should be agreed by all parties and, where required, it must be delivered prior to the commencement of the development'. In relation to impacts on functionally linked land, the Strategy states 'Development proposals will be considered under the statutory context afforded to them including the Habitats Regulations and SSSI legislation. This may require consideration of potential impacts from developments some distance away, which is based on the nature of the development and potential pathways for impact. This is a more effective approach than a line on a map which would not take these factors into account.'

8.1.5 In light of the above policy which provides the directive to prospective developers to avoid as far as possible adverse impacts on European sites, it is considered that the Local Plan would not give rise to adverse in-combination effects with the Proposed Development.

Hull Local Plan

8.1.6 The Habitats Regulations Assessment **[Ref. 35]** of the Hull Local Plan (2016 to 2032 adopted 2017) **[Ref. 36]** included consideration of potential effects on the Humber Estuary SAC, SPA and Ramsar site, and Hornsea Mere SPA. The potential for effects from habitat fragmentation, disturbance, changes to hydrological regime, changes to water quality and changes to air quality as a result of the local plan policies, site allocations and major projects in relation to the Humber Estuary SAC, SPA and Ramsar site were taken forward for Appropriate Assessment. Impacts on Hornsea Mere SPA were screened out.

8.1.7 The Appropriate Assessment noted that impacts on the Humber Estuary SAC, SPA and Ramsar site are mitigated through protective policy wording in the Local Plan. Policy 44 Biodiversity and Wildlife, states that '*Development that may affect an existing or proposed European or Ramsar site should demonstrate through a Habitats Regulations Assessment that any impact will be acceptable. This will need to consider the impact of the scheme both on its own and in combination with other schemes that already have planning permission. Development will not be permitted if it is likely to result in a significant adverse impact unless there is an imperative reason of over-riding public interest'.* A number of other policies within the Local Plan also include a specific requirement to fully consider potential impacts on the Humber Estuary SAC, SPA and Ramsar site, including habitat loss and disturbance of birds within and outside the designated site. For example, Policy 18 Renewable and Low Carbon Energy and Policy 35 Water Transport. These policies also note that where effects cannot be avoided, appropriate

mitigation measures should be provided to ensure no adverse effect to the Humber Estuary designated site. The Appropriate Assessment concluded that '*with mitigation, adverse effects from the policies and site allocations, including in-combination effects between plans and projects as described in the Hull Local Plan (2016) can be avoided for all designated sites'*.

8.1.8 In light of the above policy which provides the directive to prospective developers to avoid as far as possible adverse impacts on European sites, it is considered that the Local Plan would not give rise to adverse in-combination effects with the Proposed Development.

North Lincolnshire Local Plan

8.1.9 North Lincolnshire Council are in the process of preparing a new Local Plan but the emerging Local Plan was withdrawn from the examination in October 2024, therefore the policies within Core Strategy (adopted in 2011) **[Ref. 37]** have been included in the assessment.

8.1.10 A Habitats Regulations Assessment was carried out of the Core Strategy **[Ref. 38]** in 2010, the results of which show that there are no likely significant effects on the integrity of any of the European sites. However, the HRA recommended that '*further consideration and assessment will need to be made for relevant proposals at the development control stage. This will require the preparation of a thorough ecological assessment of the likely effects upon the relevant "European" site or sites. Any development that cannot demonstrate that it would not have a significant adverse effect upon the integrity of a site of European or international importance to nature conservation will be refused*'.

8.1.11 Policy CS17 Biodiversity of the Core Strategy states that the council will promote effective stewardship of North Lincolnshire's wildlife through '*Appropriate consideration being given to European and nationally important habitats and species*.' Policy CS17 also reinforces the need for HRA and states that: '*A Habitat Regulations Assessment under the Habitat Regulations will be made by the council to inform development control decisions. Where it cannot be demonstrated that a development proposal will not have an adverse effect on the integrity of a site of European or international importance to nature conservation, such development is not supported by this Plan and will not be permitted*.'

8.1.12 In light of the above policy which provides the directive to prospective developers to avoid as far as possible adverse impacts on European sites, it is considered that the Local Plan would not give rise to adverse in-combination effects with the Proposed Development.

North East Lincolnshire Local Plan

8.1.13 The North East Lincolnshire Local Plan Habitats Regulations Assessment **[Ref. 39]** screened in a number of impacts for further consideration at the Appropriate Assessment stage, including the potential for physical damage and loss (both onsite and offsite), non-physical disturbance and water quality and quantity, in relation to Humber Estuary SAC, SPA and Ramsar site. The Habitats Regulations Assessment concluded that the mitigation and avoidance safeguards built into the Local Plan (2013 to 2032) **[Ref. 40]** (including amendments to policy wording) were considered sufficiently robust to ensure that likely significant effects on the Humber Estuary SAC, SPA and Ramsar site would not occur.

8.1.14 Several of the Local Plan policies **[Ref. 40]** provide a level of protection for the natural environment. For example, Policy 41 Biodiversity and Geodiversity, notes that the Council will have regard to biodiversity when considering development, and states that 'Any development which would, either individually or cumulatively, result in significant harm to biodiversity which cannot be avoided, adequately mitigated or as a last resort compensated for, will be refused'. Policy 31 Renewable and Low Carbon Infrastructure, notes that assessment of developments will include consideration of 'biodiversity, geodiversity and nature conservation, with regard given to the findings of the site and project specific Habitats Regulations Assessment and potential impacts on SPA birds, where appropriate'. In relation to functionally linked land, the Local Plan identifies a Mitigation Zone identified on the Policies Map, within which proposals which adversely affect the Humber Estuary SPA/Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations.

8.1.15 In light of the above policy which provides the directive to prospective developers to avoid as far as possible adverse impacts on European sites, it is considered that the Local Plan would not give rise to adverse in-combination effects with the Proposed Development.

8.2 In-combination effects with other existing and/or approved developments

8.2.1 **Table 8-1** provides a summary of other existing and/or approved developments within 10km which have been included in the in-combination assessment (refer to **ES Volume 2, Chapter 15: Cumulative Effects [EN010157/APP/6.2]**). Where the other existing and/or approved developments considered have identified the same potential impact pathways as those identified for the Proposed Development, there is the potential for in-combination effects. **Table 8-1** also notes where a requirement for mitigation has been identified for the other existing and/or approved developments.

8.2.2 Based on the implementation of the mitigation measures set out in **Section 7** for the Proposed Development and the requirement for the other existing and/or approved developments to implement mitigation (where appropriate), it can be concluded that there would be no adverse in-combination effects on the integrity of the European sites.

Table 8-1: Other existing and/or approved developments considered within 10km in the in-combination effects assessment

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	Disturbance/ displacement of qualifying bird species using functionally linked land	Vibration/ noise disturbance of lamprey	Degradation of habitats as a result of changes in water quality/ hydrology	Disruption of flight paths of qualifying bird species as a result of glint and glare	Disturbance of lamprey as a result of EMF
22/03203/PLF Current application - under consideration	Residential housing (22 dwellings).	No impact pathways on European sites identified for this project.					
21/04438/STPLF Approved	Residential housing (195 dwellings) and infrastructure.	Impact pathway not identified for this project. There would be no in-combination effect with the Proposed Development for this impact.	Impact pathway not identified for this project. There would be no in-combination effect with the Proposed Development for this impact.	Impact pathway not identified for this project. There would be no in-combination effect with the Proposed Development for this impact.	Impact mitigated by measures in the Flood and Drainage Strategy for this project.	N/A	N/A
21/01492/STPLF Under construction	Residential housing (297 dwellings) and infrastructure.	No impact pathways on European sites identified for this project.			N/A		

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	**Disturbance/ displacement of qualifying bird species using functionally linked land**	**Vibration/ noise disturbance of lamprey**	**Degradation of habitats as a result of changes in water quality/ hydrology**	**Disruption of flight paths of qualifying bird species as a result of glint and glare**	**Disturbance of lamprey as a result of EMF**
18/02891/STPLF Under construction	Residential housing (349 dwellings) and infrastructure.	No impact pathways on European sites identified for this project.			N/A		
22/01208/STPLF Approved	Carr Plantation Solar farm and associated infrastructure.	**Impact mitigated through measures in CEMP for this project.**	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project. There would be no in-combination effect with the Proposed Development for this impact.	Impact pathway not identified for this project. There would be no in-combination effect with the Proposed Development for this impact.	Impact pathway not identified for this project. There would be no in-combination effect with the Proposed Development for this impact.	Impact pathway not identified for this project.
18/04095/STPLF Approved	Holiday park (55 lodges) and associated infrastructure.	No impact pathways on European sites identified for this project.					

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	**Disturbance/ displacement of qualifying bird species using functionally linked land**	**Vibration/ noise disturbance of lamprey**	**Degradation of habitats as a result of changes in water quality/ hydrology**	**Disruption of flight paths of qualifying bird species as a result of glint and glare**	**Disturbance of lamprey as a result of EMF**
19/03081/STOUT and 18/00195/STOUT Approved	Hotel (up to 70 rooms), extension to existing facilities and infrastructure.	No impact pathways on European sites identified for this project.					
19/04321/STPLF Approved	Solar farm and associated infrastructure.	No impact pathways on European sites identified for this project.					
20/01073/STPLF Approved	Road improvements between Beverley and Cottingham.	No impact pathways on European sites identified for this project.			N/A		
22/00824/STPLF Approved	Solar farm and associated infrastructure.	Impact pathway not identified for this project.	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project.	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project.	Impact pathway not identified for this project.

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	**Disturbance/ displacement of qualifying bird species using functionally linked land**	**Vibration/ noise disturbance of lamprey**	**Degradation of habitats as a result of changes in water quality/ hydrology**	**Disruption of flight paths of qualifying bird species as a result of glint and glare**	**Disturbance of lamprey as a result of EMF**
21/02335/STPLF Approved	Solar farm and associated infrastructure.	Impact pathway not identified for this project.	Impact pathway not identified.	Impact pathway not identified for this project.	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project.	Impact pathway not identified for this project.
22/01546/STPLF Approved	Vertical farm, wildlife park and associated infrastructure.	No impact pathways on European sites identified for this project.			N/A		
22/02775/STPLF Approved	Benningholme Grange Solar farm and associated infrastructure.	**Impact mitigated through measures in Wader Management and Monitoring Plan for this project.**	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project.	Impact pathway not identified for this project.	Impact pathway not identified for this project.	Impact pathway not identified for this project.

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	Disturbance/ displacement of qualifying bird species using functionally linked land	Vibration/ noise disturbance of lamprey	Degradation of habitats as a result of changes in water quality/ hydrology	Disruption of flight paths of qualifying bird species as a result of glint and glare	Disturbance of lamprey as a result of EMF
22/03648/STPLF and 22/01811/EIASCR Approved	Carr Farm Solar farm and associated infrastructure.	**Impact mitigated through measures in Habitat Enhancement Strategy for this project.**	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project.	Impact pathway not identified for this project.	Impact pathway not identified for this project.	Impact pathway not identified for this project.
23/00760/STPLFE Pending consideration	Froghall Farm Solar farm, battery storage and associated infrastructure	**Impact mitigated through the Habitat Management and Monitoring Plan for this project.**	**Impact mitigated through measures in CEMP for the project, including the provision of an Ecological Clerk of Works (ECoW).**	Impact pathway not identified for this project.	**Impact mitigated through measures in CEMP for this project.**	Impact pathway not identified for this project.	Impact pathway not identified for this project.

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	**Disturbance/ displacement of qualifying bird species using functionally linked land**	**Vibration/ noise disturbance of lamprey**	**Degradation of habitats as a result of changes in water quality/ hydrology**	**Disruption of flight paths of qualifying bird species as a result of glint and glare**	**Disturbance of lamprey as a result of EMF**
EN010125 Accepted for examination	Dogger Bank southwest/ Dogger Bank southeast and associated infrastructure.	**Impact mitigated through measures in the Landscape Management Plan for this project.**	**Mitigation set out in Outline Environmental Management Plan. EMP to be confirmed in CEMP for this project.**	Impact pathway not identified for this project.	**Mitigation set out in Outline Environmental Management Plan. EMP to be confirmed in the CEMP for this project.**	N/A	Impact pathway not identified for this project.
EN010098 Post-decision	Hornsea Project Four offshore wind farm.	All potential effects related to onshore ecology screened out, as confirmed with Natural England.	All potential effects related to onshore ecology screened out, as confirmed with Natural England.	Impact pathway not identified for this project.	All potential effects related to onshore ecology screened out, as confirmed with Natural England.	N/A	Impact pathway not identified for this project.

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	Disturbance/ displacement of qualifying bird species using functionally linked land	Vibration/ noise disturbance of lamprey	Degradation of habitats as a result of changes in water quality/ hydrology	Disruption of flight paths of qualifying bird species as a result of glint and glare	Disturbance of lamprey as a result of EMF
24/03819/STPLF[9]	Creyke Beck Substation extension (also known as Wanlass substation).	The extension to Creyke Beck Substation Extension (also known as Wanlass substation) substation development is linked to the Hornsea four offshore wind farm developments. The substation design has not yet been finalised. It is assumed the proposed mitigation for Birkhill Wood substation is the same as the Hornsea Four offshore wind farm development (see above).			Impact pathway not identified for this project.		
N/A	Proposed Birkhill Wood National Grid Substation	The new Birkhill Wood substation development is linked to the Dogger Bank offshore wind farm developments. The substation design has not yet been finalised. It is assumed the proposed mitigation for Birkhill Wood substation is the same as Dogger Bank southwest/ Dogger Bank southeast (see above).			Impact pathway not identified for this project.		

[9] The planning application for the Creyke Beck Substation extension was received by East Riding of Yorkshire Council on 31 December 2024. Therefore, the information within it was not available at the time this in-combination effects assessment was undertaken. The application will be monitored for any further information during the DCO Examination period for the Proposed Development

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	Disturbance/ displacement of qualifying bird species using functionally linked land	Vibration/ noise disturbance of lamprey	Degradation of habitats as a result of changes in water quality/ hydrology	Disruption of flight paths of qualifying bird species as a result of glint and glare	Disturbance of lamprey as a result of EMF
EN010144	Dogger Bank D (DBD) Offshore Wind Farm	The proposed wind farm is at the scoping stage. Potential impacts identified include loss of functionally linked land, disturbance/ displacement of qualifying species and hydrological effects. It is assumed that the development proposal will adequately mitigate for impacts.			Impact pathway not identified for this project.		

EN020034	North Humber to High Marnham - A proposal to reinforce the 400kV high voltage power network between North Humber and High Marnham.	The proposed project is at the scoping stage. Potential impacts identified include habitat loss, disturbance of qualifying bird species. It is assumed that the development proposal will adequately mitigate for impacts.	The project is at the scoping stage. The final grid connection route has not been finalised. Potential impacts on the Humber Estuary SAC/Ramsar site will be considered. It is assumed that the development proposal will adequately mitigate for impacts (if identified).	The project is at the scoping stage and the final grid connection route has not been finalised. This potential impact pathway has been identified. It is assumed that the development proposal will adequately mitigate for impacts.	N/A	The project is at the scoping stage. The final grid connection route has not been finalised. Potential impacts on the Humber Estuary SAC/Ramsar site will be considered. It is assumed that the development proposal will adequately mitigate for impacts (if identified).
N/A Pre-application.	Molescroft Solar Farm. Enray Power. Proposed 40MW solar	It does not appear that any application has been submitted to East Riding of Yorkshire Council to date. As the proposed solar farm is at a very early stage potential impacts have not yet been identified. It is assumed that the development proposed will provide adequate mitigation.				

Application reference/ Planning status	Brief description	Potential impacts considered in the in-combination effects assessment					
		Loss of functionally linked land for qualifying bird species	Disturbance/ displacement of qualifying bird species using functionally linked land	Vibration/ noise disturbance of lamprey	Degradation of habitats as a result of changes in water quality/ hydrology	Disruption of flight paths of qualifying bird species as a result of glint and glare	Disturbance of lamprey as a result of EMF
	farm to the north-east of Beverley.						
25/02275/STPLF Application received 05 August 2025. Under consideration	Drove Lane solar farm and associated infrastructure	This proposed solar farm is at a very early stage and there is insufficient information available to determine potential impacts to European designated sites. It is assumed that the development proposed will provide adequate mitigation.					

9 Overall conclusion

9.1.1 The Stage 1 Screening considered each of the European sites identified within 10km of the Order Limits to determine the potential for likely significant effects as a result of the Proposed Development. The screening assessment concluded likely significant effects (alone or in-combination) could not be ruled out and therefore further assessment was required.

9.1.2 The Appropriate Assessment determined that with the implementation of mitigation measures in place secured through the **Outline CEMP [EN010157/APP/7.2]**, **Outline DEMP [EN010157/APP/7.4]** and the **Outline LEMP [EN010157/APP/7.5]**, there would be no adverse effects (alone or in-combination) on the integrity of the European sites screened into the assessment, as a result of the Proposed Development.

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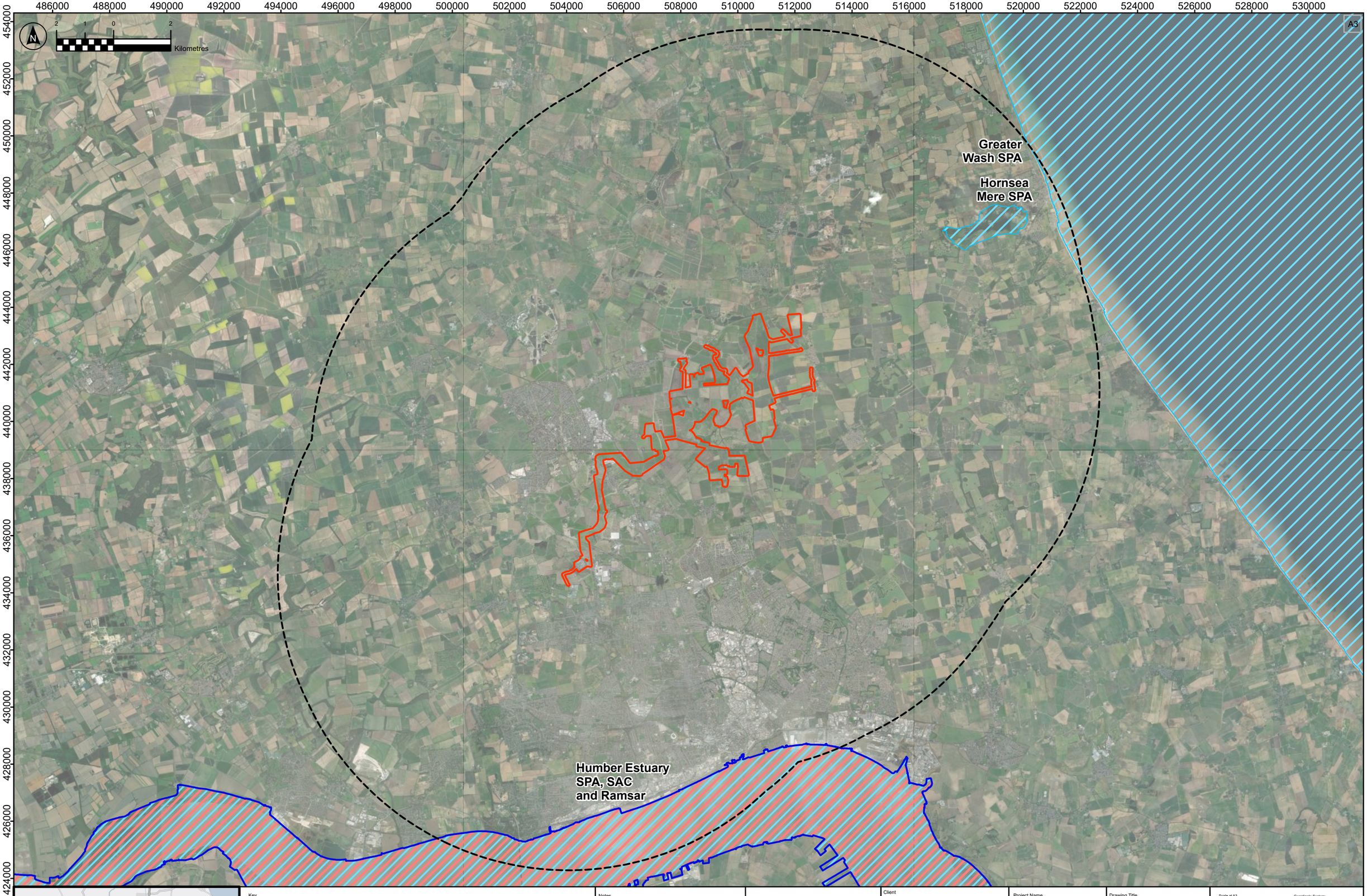
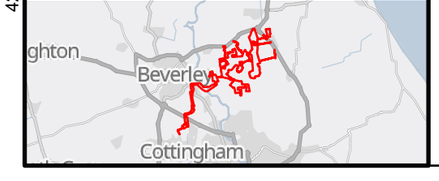
11 Figures

Figure 4.1: European sites





Key

- Order Limits
- 10km buffer
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar

Notes

Rev	Date	By	Chkd	Appd	Authd
P03	28/08/2025	RPH	RTJ	LW	BT

Client: RWE

Designer: RSK

Project Name: Peartree Hill Solar Farm

Drawing Title: Environmental Statement Volume 3, Figure 4.1: International Sites

Scale at A3	Coordinate System:
1:120,000	British National Grid

Status: DCO Application

PINS Number	Rev
EN010157/APP/5.3	P03

Appendix A – Consultation

Natural England and other relevant stakeholders have been consulted on a number of occasions regarding the assessment of potential ecological impacts resulting from the Proposed Development. **Table A1** below provide details of the Natural England consultation responses which are relevant to the Habitats Regulations Assessment.

Table A1: Summary of consultation responses relevant to the Habitats Regulations Assessment

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
East Riding of Yorkshire Council - 24/01/2024 The Applicant provided a brief overview of the Proposed Development including the location of the Land Areas, the grid connection cable route and the survey work carried out to date.	East Riding of Yorkshire Council suggested that survey methodology must be agreed with Natural England including daytime and nocturnal surveys to cover two hours either side of high tide of the Humber. East Riding of Yorkshire Council recommended reviewing the survey methodology of the sub 50 megawatt solar farms within proximity to the Proposed Development.	The design of ornithology survey work has had regard to the survey recommendations produced by Natural England and where methodology deviated from the recommendation justification has been provided within the bird reports (**ES Volume 4, Appendix 7.3: Breeding Bird Survey Report [EN010157/APP/6.4]** and **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**).
	East Riding of Yorkshire Council raised the importance of the assessment of in combination effects between the Proposed Development and other solar developments in the locality and functionally linked land between projects.	Refer to **Section 8** In-combination assessment of this report.
	East Riding of Yorkshire Council stated that other solar developments in the locality have provided 10-15% of the project land to mitigation areas for SPA qualifying birds.	**Sections 7 and 8** of this report present a detailed assessment of potential impacts in relation to SPA/ Ramsar site qualifying bird species, based on the baseline data presented in **Section 5**. The requirement for mitigation has been identified, which has informed the development of the measures set out in the **Outline LEMP [EN010157/APP/7.5]**.
Natural England Discretionary Advice Service	Overall, Natural England considers that the survey effort is likely to be acceptable to inform the assessments of impacts from loss of functionally linked land in this case, due factors such as the	The design of ornithology survey work has had regard to the survey recommendations produced by Natural England and where methodology deviated

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
response – 08/03/2024 In February 2024, a summary document outlining the bird survey methodologies undertaken to date, survey findings to date and proposed further bird surveys within the Land Areas was sent to Natural England. The summary document was provided to Natural England before the Wintering Bird Survey Report (**ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**) was produced. The summary document	number of surveys undertaken over the three-year period and the results obtained. However, Natural England advised that further justification should be provided in the relevant assessment to confirm this.	from the recommendation justification has been provided within the bird reports (**ES Volume 4, Appendix 7.3: Breeding Bird Survey Report [EN010157/APP/6.4]** and **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**).
	Natural England welcomes the commitment to 'outline mitigation recommendations to minimise impacts on wintering birds' in a 'singular wintering bird survey report'. Natural England would welcome future conversations around the suitability of proposed mitigation measures for non-breeding birds once the report is produced. The provision and management of suitable alternative habitat for the relevant species is generally required to mitigate for loss of functionally linked land.	**Section 5** of this report brings together the results from the four bird reports (**ES Volume 4, Appendix 7.3: Breeding Bird Survey Report [EN010157/APP/6.4]**, **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**, **ES Volume 4, Appendix 7.5: Ornithological Survey Report [EN010157/APP/6.4]** and **ES Volume 4, Appendix 7.9: Passage Bird Survey Report [EN010157/APP/6.4]**).
	Natural England highlights the proximity of the application site to Leven Carrs Landscape Recovery Area and recommends that the applicant considers existing projects and schemes in the area when designing any mitigation area and seeking opportunities for habitat enhancement.	During revisions to the design, Land Area A (close to Leven Carrs) was subsequently removed from the Order Limits.
	Natural England would welcome further discussions around proposed mitigation design and the opportunities for environmental enhancement in this area.	Noted.
	Natural England notes that the bird surveys undertaken do not cover the proposed cable routes. Natural England highlights that	In relation to the assessment of the grid connection cable route, **Section 5.6** of this report presents

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
set out the justification for not undertaking passage bird surveys, which stated there was only one recording of a Humber Estuary SPA passage bird qualifying species during the surveys undertaken to date and that the Land Areas do not contain suitable foraging or roosting habitat for the five passage bird species cited within the Humber Estuary SPA designation.	there should be an assessment of construction phase impacts on functionally linked land. It should be determined whether there is sufficient existing evidence to inform the assessment in these areas, including bird surveys and bird records to inform the assessment. In the absence of targeted bird surveys, a precautionary approach should be taken for the assessment of impacts and potential mitigation measures.	results of bird surveys, habitat suitability assessment and desk study information used. A precautionary approach has been taken in the assessment.
	Natural England advises that all relevant Humber Estuary SPA component species present in the passage period should be assessed, not just those set out in the designation as passage species.	This report has considered all species listed/described in Natural England guidance on the Humber Estuary SPA species as listed in Annex B of the response letter (refer to **Section 4.3, Section 5 and Section 7**).
	Natural England advises that further assessment of potential impacts on passage birds is required. Natural England recommends passage surveys are undertaken to inform the assessment. However, the assessment may be informed by other data, such as historical records and consideration of observations of wintering birds, if suitable justification is provided to support this approach. Targeted passage surveys in Land Area A may supplement this assessment.	Land Area A has been removed from the Order Limits.
	In the absence of passage surveys across the entire Site, Natural England advises that a precautionary approach is taken to the assessment. Consideration should be given to whether patterns of usage across the passage periods can be determined from existing data, and if peak counts of any of the	Potential impacts on passage birds have been considered within this report (refer to **Section 5 and Section 7**).

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	relevant Humber Estuary SPA species may have been missed in the absence of passage bird surveys.	
Natural England Discretionary Advice Service (25.04.2024) – Comments on wintering Bird Survey Report The wintering bird survey report was sent to Natural England for comments on 26 March 2024.	Natural England provided a number of comments about the layout of the report and the presentation of data to make their interpretation of data easier, and they also required a more detailed justification as to why transects were used for wintering bird surveys rather than a vantage point approach.	The wintering bird report (**ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**) was revised to address the comments raised regarding structure, content and presentation. The design of ornithology survey work has had regard to the survey recommendations produced by Natural England and where methodology deviated from the recommendation justification has been provided within the bird reports (**ES Volume 4, Appendix 7.3: Breeding Bird Survey Report [EN010157/APP/6.4]** and **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**).
	Natural England reiterated that results should be presented and assessed in the context of percentages of the Humber Estuary SPA population according to the most recent Humber Estuary Wetland Bird Survey 5-year average count (currently 2017/18-2021/22).	Numbers of each 'main component species' recorded have been presented as percentages of the recent Humber Estuary Wetland Bird Survey (Wetland Bird Survey) 5-year average count (2018/19- 2022/23) (refer to **Section 5**).
	Natural England has generally advised that if ≥1% of a Humber Estuary bird species population could be affected by a proposal, alone or in combination with other plans or projects, then further consideration is required. Where species are particularly vulnerable due to declines in the Humber population, then it may	**Section 5** of this report includes an assessment of species vulnerability to determine potential impacts, as recommended by Natural England (see comment below for further details of vulnerability criteria).

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	not be appropriate to rely on the 1% of the estuary population as the critical threshold. Mitigation measures may be required where lower numbers of vulnerable species are using a site that is proposed for development.	
	Natural England welcomes 6.1.3 of Peartree Hill Solar Wintering Bird Survey Report (March 2024), and concurs with the conclusion that a 'detailed impact assessment should be undertaken to determine the potential impacts of the proposed development and identify any requirement for mitigation and enhancement measures'	**Sections 7 and 8** of this report present a detailed assessment of potential impacts in relation to SPA/ Ramsar site qualifying bird species, based on the baseline data presented in **Section 5**. The requirement for mitigation has been identified, which has informed the development of the measures set out in the **Outline LEMP [EN010157/APP/7.5]**.
Natural England (June 2024) – Statutory consultation response	Natural England noted that a Habitats Regulations Assessment had not been completed and advised that as the proposal is not directly connected with or necessary for the management of the European site. You should therefore determine whether the proposal is likely to have a significant effect on any European site, proceeding to the appropriate assessment stage where significant effects cannot be ruled out.	This Information to inform the Appropriate Assessment report represents stages 1 and 2 of the Habitats Regulations Assessment process and considers likely significant effects on European sites.
	The Habitats Regulations Assessment screening should consider potential likely significant effects on the European Sites specified above. Natural England recommend you consider potential likely significant effects on these sites arising from the impact pathways identified in Natural England's EIA Scoping response (dated 08 December 2023).	Impacts identified are set out in **Section 4** of this report.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	Potential impacts that may arise from the proposal relate to the presence of mobile SPA interest features both within and outside of the site boundary. Natural England advises that the potential for onsite and offsite impacts should be considered in assessing what, if any, potential impacts the proposal may have on European sites. Natural England advises the Habitats Regulations Assessment should consider: • any impacts due to potential direct loss of functionally linked feeding habitat for Humber Estuary SPA bird species; • the potential for loss of functionally linked land which is adjacent to the Proposed Development; and • the potential for noise and visual disturbance impacts (including lighting) on functionally linked land during construction and operation.	This report considers the potential for direct and indirect effects on European sites, and on habitats with the potential to be functionally linked land. The impact pathways identified by Natural England have been included in the assessment (refer to **Sections 4, 7 and 8**).
	Natural England notes that the bird surveys undertaken do not cover the proposed cable routes. There should be an assessment of construction phase impacts on functionally linked land. It should be determined whether there is sufficient existing evidence to inform the assessment in these areas, including bird surveys and bird records to inform the assessment. In the absence of targeted bird surveys, a precautionary approach should be taken for the assessment of impacts and potential mitigation measures.	**Section 5.6** sets out the results of bird surveys undertaken for the northern section of the grid cable connection route, a habitat suitability assessment and desk study information. On a precautionary basis the habitat within the grid cable connection route are considered to constitute functionally linked land for the same species as the Order Limits.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	Natural England advises that that Habitats Regulations Assessment should detail noise levels during both construction and decommissioning phases of the development; and should consider of the impact of the noise levels on birds utilising land functionally linked to the Humber Estuary SPA.	This report has considered the potential for disturbance/ displacement of birds using habitats within and adjacent to the Order Limits and the gird connection cable route (refer to **Sections 4, 7 and 8**).
	Natural England notes that 16.14.1 of Chapter 16: Glint and Glare of Volume 1: Main Report advises that 'a full glint and glare assessment will be undertaken and submitted in support of the DCO application'. The potential for impacts on birds, however, is not listed as a consideration. Natural England advise that the potential for solar panels to affect the flight paths of wintering and passage Humber Estuary SPA birds utilising functionally linked land should be assessed within the Habitats Regulations Assessment.	This report has considered the potential for impacts on birds from glint and glare (refer to **Sections 4, 7 and 8**).
	Natural England welcomes 7.9.13 of Chapter 7: Biodiversity of Volume 1: Main Report which states that 'the environmental mitigation and enhancement areas have the potential to significantly improve the area for designated site qualifying species, in particular wintering birds', with these measures to be set out in a Landscape and Ecological Management Plan. Natural England advises that further information should be provided regarding the habitats proposed for the 'mitigation and enhancement areas'. Natural England notes that any mitigation measures considered fundamental to the conclusions of the Habitats Regulations Assessment should be appropriately secured and strictly implemented.	Details of the proposed mitigation for SPA and Ramsar site qualifying bird species are set out in the **Outline LEMP [EN010157/APP/7.5]**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	Natural England notes that 7.9.1 of Chapter 7 Biodiversity of Volume 1: Main Report states that adverse effect resulting from the displacement of wintering birds is unlikely 'given the relatively low numbers of wintering birds recorded within the Land Area, suggesting no functionally linked land to the designated sites and the availability of alternative farmland habitat in the wider area'. Natural England advises that it appears from the data provided that SPA birds of a significant number are present on site.	This report has identified habitats within the Order Limits and the grid connection route as functionally linked land for several SPA/ Ramsar site species (refer to **Section 5**). The potential for disturbance/ displacement of these species has been assessed in **Section 7.3**.
	At this stage Natural England cannot assess the requirement for mitigation, however we advise that provision and management of suitable alternative habitat for the relevant species is generally required to mitigate for loss of functionally linked land and should be suitably secured. Details of the proposed mitigation for SPA and Ramsar site qualifying bird species are set out in the **Outline LEMP [EN010157/APP/7.5]**.	Details of the proposed mitigation for SPA and Ramsar site qualifying bird species are set out in the **Outline LEMP [EN010157/APP/7.5]**.
	Natural England advised that designated sites within 200m of a road which will experience a significant increase in traffic movements from the proposal should be assessed for impacts due to air pollution from traffic. Natural England welcomes that 'the route of construction traffic will be documented in the Construction Traffic Management Plan'. If it is determined that these routes will be within 200m of designated sites then an assessment of potential air quality impacts should be undertaken in the Habitats Regulations Assessment.	**Sections 4.5 and 4.6** of this report considers the potential for changes in air quality and references the results of the assessment presented in **ES Volume 2, Chapter 6: Air Quality [EN010157/APP/6.2]**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	Ammonia can be emitted from vehicle exhaust emissions as a by-produce of the catalytic conversion process designed to reduce emissions of nitrogen oxide. Advised that ammonia sourced from traffic emissions should be included for assessment within the Habitats Regulations Assessment.	
	Natural England notes that Figure 3.2: Proposed Operational Phase Layout Plan (from the Preliminary Environmental Information Report (PEIR)) indicates that the River Hull passes through areas of land within the site boundary, labelled as 'Cable Route Option 1' and 'Cable Route Option 2'. NE advises that the River Hull is a lamprey migration route. Advised that potential construction and operation impacts to lamprey migration routes should be assessed, including potential impacts resulting from noise and vibration and habitat loss/degradation.	This report includes consideration of potential disturbance to lamprey from Horizontal Directional Drilling vibration and habitat degradation as a result of changes in water quality/ hydrology. Refer to **Sections 4, 6 and 7**.
	Natural England notes that 3.6.13 of Chapter 3: What is Peartree Hill Solar Farm? of Volume 1: Main Report states that 'effluent from the operational substation facilities is anticipated to be routed to septic tanks, which would in turn feed into a filtration system that could be discharged to watercourses'. Advised that further information should be provided regarding the septic tanks proposed, including the watercourses to which discharges would occur, their hydrological connectivity to designated sites, and whether nutrients nitrogen and phosphates will be removed via the filtration system. Potential for water quality impacts should be considered in the Habitats Regulations Assessment.	The volumes and rates of discharges associated with the septic tank would be negligible in the context of the watercourses that they will discharge to and discharge will be required to comply with regulations for various parameters to prevent impacts on water quality. In addition, the European sites identified within 10 km of the Proposed Development are not included on Department for Environment Food and Rural Affairs' Notice of designation of sensitive catchment areas 2024 **[Ref. 41]** which lists sensitive catchments identified

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
		as being in unfavourable condition as a result of nutrient pollution damage.
	Natural England notes that 15.7.9 of Chapter 15: Water of Volume 1: Main Report states that 'where the cable route needs to cross watercourses, Horizontal Directional Drilling is proposed to minimise impacts on the watercourses'. Natural England advises that further information should be provided regarding the potential impact pathways occurring due to use of Horizontal Directional Drilling, including water supply impacts which may arise due to abstraction, and noise disturbance.	This report includes consideration of potential disturbance to lamprey from Horizontal Directional Drilling vibration/ noise. Refer to **Sections 4, 6 and 7**. No water will be abstracted from the River Hull or its tributaries for the Horizontal Directional Drilling. Refer to **Section 2.4.**
	Natural England highlights that the Habitats Regulations Assessment should include an in-combination assessment following the screening stage. The in-combination requirement makes sure that the effects of numerous proposals, which alone would not result in a significant effect, are assessed to determine whether their combined effect would be significant enough to require more detailed assessment. Therefore, where there are small effects which are not significant alone, these should be assessed alongside small effects of other projects which were not significant alone. A further in-combination assessment should be carried out following the appropriate assessment stage, to assess the residual effects of developments together. If mitigation or compensation has completely avoided or removed the effect that this would not act in-combination with other projects.	This report includes consideration of in-combination effects with other plans and projects, refer to **Sections 4 and Section 8**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	Advised that when considering in-combination impacts of loss of functionally linked land, the results of surveys undertaken for those developments should also be taken into account to understand whether there is a cumulative loss of land which can support wintering or passage birds.	This report includes consideration of in-combination effects in relation to functionally linked land with other plans and projects, refer to **Section 8**.
Natural England Discretionary Advice Service – Response to questions from meeting (2nd August 2024) During a meeting with Natural England on 15th July 2024 a number of questions relevant to the Habitats Regulations Assessment were raised, which were subsequently submitted by email for further consideration. Natural England provided a	Question from meeting: *Annex B includes species that are individual qualifying species of the Humber Estuary SPA, as well as those which are named assemblage species. Can we confirm if we are treating all of the species listed in Annex B as individual qualifying species. If we are not treating the named assemblage species as individual qualifying species, please can Natural England confirm that an assemblage calculation would be acceptable*. Natural England Response: As set out in Annex B, Natural England advises that the assessment of impacts on the non-breeding waterbird assemblage feature of the Humber Estuary SPA should focus on 'main component species' i.e. those species which make the greatest relative contribution to the non-breeding SPA assemblage. These species are not themselves individually qualifying features; however, where high numbers of these species are recorded within/in proximity to the development site boundary, further assessment should be provided, and mitigation may be required for these species. Consideration should also be given to the species' status (including trends) on the designated site (see below advice).	This report has considered all 'main component species' as listed in Natural England's Annex B guidance on the Humber Estuary SPA (refer to **Section 4.3**). A detailed assessment has been undertaken of potential impacts on any 'main component species' recorded within/ adjacent to the Order Limits (refer to **Sections 4 and 7**). Numbers of each 'main component species' recorded have been presented as percentages of the recent Humber Estuary Wetland Bird Survey (Wetland Bird Survey) 5-year average count (2018/19- 2022/23) (refer to **Section 5**).

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
written response on 2nd August 2024.	Further advice on the Humber Estuary SPA non-breeding waterbird assemblage feature can be found at: Marine site detail (naturalengland.org.uk). Therefore, provision of an 'assemblage calculation' would not be considered a sufficient approach to assessing impacts on the non-breeding waterbird assemblage feature in this context. Percentages of the recent Humber Estuary Wetland Bird Survey (Wetland Bird Survey) 5-year average count (2018/19- 2022/23) should instead be presented. We would expect to see a detailed assessment of potential impacts to any 'main component species' recorded in significant numbers within/in close proximity to the DCO boundary.	
	Question from meeting: *functionally linked land is typically defined as land where more than 1% of the European site population has been regularly recorded. Natural England consultation response (25th April) also states: 'Where species are particularly vulnerable due to declines in the Humber population, then it may not be appropriate to rely on the 1% of the estuary population as the critical threshold. Mitigation measures may be required where lower numbers of vulnerable species are using a site that is proposed for development.' How do Natural England determine which of the species are considered to be vulnerable, could we refer to Humber Estuary British Trust for Ornithology Wetland Bird Survey Alerts? or is it that Natural England define all of the species listed on Annex B*	To assess vulnerability of species (following advice from Natural England) consideration has been given to the following (refer to **Section 5**): • British Trust for Ornithology Wetland Bird Survey Alerts for the Humber Estuary **[Ref. 19]**. • Trends in species numbers in the Humber and regionally/ nationally **[Ref. 3 and Ref. 20]**. • Current condition of the Humber Estuary SSSI which underpins the Humber Estuary SPA designations **[Ref. 21]**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	as vulnerable? Once vulnerable species have been determined, how many and how regularly would the vulnerable bird species need to be present to trigger the need for mitigation? Natural England Response: Natural England do not have a definitive list of species which should be considered as more vulnerable in this context. However, consideration should be given to existing pressures and declines for relevant species. It may be helpful to refer to: • Trends in the Humber population of species (based on Wetland Bird Survey counts and trends since designation etc). • Wider UK declines in relevant species. For example, for curlew, the 2021 Wetland Bird Survey (Wetland Bird Survey) Report shows that there has been a long-term decline of 33% between 1993/94 and 2018/19 in the UK wintering population. • British Trust for Ornithology Wetland Bird Survey alerts (note that this only includes individually qualifying features, so it is not possible to rely on this for all species). • Current condition of SSSI features (which underpin the SPA): Site feature condition (naturalengland.org.uk).	• Supplementary Advice for the Humber Estuary SPA to identify pressures/ threats and targets for supporting habitats **[Ref. 3]**. The assessment (which included consideration of the bird survey results and the vulnerability of a species) concluded on a precautionary basis that the Order Limits, and adjacent habitats were functionally linked land for golden plover, lapwing, mallard, teal and black-headed gull. The **Outline LEMP [EN010157/APP/7.5]** has been developed which includes measures to mitigate for potential loss of functionally linked land for these species.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	• Supplementary Advice for Humber Estuary SPA: Designated Sites View (naturalengland.org.uk) to identify whether existing pressures have been identified for relevant species and if targets for supporting habitat are set to 'restore' or 'maintain'. For example, the target for golden plover supporting habitat is to 'Restore the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period.' Therefore, loss of functionally linked land may make reaching this target more difficult. In terms of assessing the potential impact on such species from the Proposed Development, Natural England does not consider it appropriate to determine an alternative 'threshold' for the peak count and/or regularity of species recorded. We advise that professional judgement should be used, informed by the survey data and other available information (such as the sources referred to above) to assess the ecological importance of the site. A number of parameters can be considered when assessing whether a site is functionally linked land. In this case, based on the number and diversity of species recorded in the surveys, size of the site, proximity to the Humber Estuary and habitat	

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	suitability, we would advise that the site does provide functionally linked land for species associated with the Humber Estuary designated sites. The assessment should therefore aim to determine the species for which mitigation for loss of functionally linked land is required and the appropriate type, extent and management of mitigation land for these species.	
	Question from meeting: *As per Annex B, we will use the most recent British Trust for Ornithology Wetland Bird Survey 5 year mean of peaks for the Humber Estuary population (British Trust for Ornithology Wetland Bird Survey online 2019/20 – 2022/23) to compare the bird data too. Can we confirm whether we also need to compare the highest peak counts with the populations on citations/standard data forms (numbers differ slightly), note that this could only be done for the individual qualifying species*. Natural England Response: The peak counts do not need to be presented in the context of the citation populations.	Noted. Numbers of each 'main component species' recorded have been presented as percentages of the recent Humber Estuary Wetland Bird Survey (Wetland Bird Survey) 5-year average count (2018/19- 2022/23) (refer to **Section 6**).
	Question from meeting: *Should Greater Wash and Hornsea Mere SPAs be considered as Natural England consultation responses only refer to the Humber Estuary SPA? We have not had any of the Greater Wash SPA species (seabirds). Re Hornsea Mere SPA we have only had small numbers of gadwall (2 birds in the winter) and mute swan occasionally recorded during the winter outside of the breeding season. Chris McGregor (Natural England) mentioned that it's probably minor but it might be good to look at data on Little Gull, as there are*	The screening assessment has considered potential for likely significant effects on the qualifying features of the Greater Wash and Hornsea Mere SPAs (refer to **Section 4**). Potential for likely significant effects has been ruled out in relation the Greater Wash SPA. Regarding the Natural England comment relating to little gull, no little gull have been recorded within or

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	small numbers (150) at Tophill Low associated with the roost at Hornsea. Natural England Response: The proposed DCO boundary is located outside Natural England's Impact Risk Zones (IRZ) for Greater Wash SPA and Hornsea Mere SPA, which is why it had not been flagged at an earlier stage. However, as highlighted by Chris McGregor in the call, there is local knowledge of connectivity between Tophill Low SSSI, Hornsea Mere SPA and Greater Wash SPA for little gull. Therefore, it may be beneficial to consider potential impacts on the relevant sites in the Habitats Regulations Assessment screening assessment. Details of Hornsea Mere SPA and Greater Wash SPA can be found at Designated Sites View (naturalengland.org.uk) and Designated Sites View (naturalengland.org.uk), respectively. We advise that likely significant effects on other species associated with the Greater Wash SPA (common scoter, common tern, little tern, red-throated diver, sandwich tern) can be ruled out due to distance and lack of habitat suitability within the DCO boundary and adjacent areas. Hornsea Mere SPA is designated for mute swan and gadwall. Due to the distance between the DCO boundary and Hornsea Mere SPA, it is likely that significant effects on these species can be ruled out; however, consideration should be given to the bird survey data to confirm this position.	adjacent to the Order Limits during the bird surveys (refer to **Section 5**).

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
East Riding of Yorkshire Council statutory consultation response (August 2024)	Much of the site lies within the zone of influence for the Humber Estuary Special Protection Area (SPA) Special Area of Conservation (SAC) Ramsar Site of Special Scientific Interest SSSI which lies 9.3km south. Hornsea Mere SPA (5.8km east) and Greater Wash SPA (9.5 km east). We support the production of a Habitats Regulation Assessment in support of the proposal. We concur that the Greater Wash may be screened out.	The screening assessment has considered potential for likely significant effects on the qualifying features of the Greater Wash SPA. Potential for likely significant effects has been ruled out in relation the Greater Wash SPA (refer to **Section 4**).
	Impacts in relation to loss of functionally linked land must be fully addressed. Surveys should be undertaken in accordance with Natural England's guidance for passage and wintering birds.	The potential for loss of functionally linked land has been considered in **Section 7** of this report. It includes consideration of Natural England guidance on the Humber Estuary SPA: Annex B: Humber Estuary Special Protection Area: Non-breeding waterbird assemblage (V1.1 June 2023).
	The proposal to assess temporary displacement during the construction (and decommissioning) phases is welcomed and should include the proposed cable route.	Disturbance/ displacement of birds (including within the grid connection cable route) during construction/ decommissioning has been considered in **Section 7**.
	East Riding of Yorkshire Council agrees that the large fields also have the potential to support significant numbers of wintering birds which use nearby protected sites, particularly along the east coast and Humber Estuary. It is noted that surveys in 2022/2023 (Avian Ecology, 2023) recorded 800 Golden Plover in Field F15, a qualifying species for Humber Estuary SPA. The Wintering Bird Survey Report details that small flocks of lapwing were recorded in Fields E11, E12 and F10 during a survey visit,	Maps showing the locations of the SPA/ Ramsar site species have been presented within the bird reports (**ES Volume 4, Appendix 7.3: Breeding Bird Survey Report [EN010157/APP/6.4]** and **ES Volume 4, Appendix 7.4: Wintering Bird Survey Report [EN010157/APP/6.4]**).

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	and a flock of up to 130 birds were recorded in a flooded field to the west of Field C5 during two survey visits. A single golden plover was observed in Field A6 during a nocturnal survey visit, and a flock of 14 birds were present in a flooded field to the west of Field C5 during another survey visit. Single marsh harrier was observed over the study area. Maps of locations of recorded SPA/Ramsar birds would be welcomed to help the LPA better understand in context.	
	East Riding of Yorkshire Council advises that the cumulative impacts of loss of potential Functionally Linked Land in the Hull valley is likely as a result of the scheme and a mitigation strategy should be prepared that offers alternate feeding, foraging and loafing resource during the passage and overwintering period. We recommend that the in-combination assessment should consider, but is not be limited to; Benningholme Grange Solar (22/02775/STPLF), Harbour Farm Solar (22/01545/EIASCO), Froghall Farm Solar, (23/00760/STPLFE), Bowmar Carr Solar (22/01199/PLF), Carr Farm Solar 22/03648/STPLF), and Carr Plantation Solar (22/01208/STPLF).	Mitigation for loss of functionally linked land for golden plover, lapwing, teal, mallard and black-headed gull has been set out in the **Outline LEMP [EN010157/APP/7.5]**. The in-combination assessment has considered other solar farms within 10km of the Draft Order Limits. As such, Harbour Farm Solar (22/01545/EIASCO) and Bowmar Carr Solar (22/01199/PLF) have not been included.
	Fish are ruled out from section 3.3.1 of the PEIR. Potential impact from the cable corridor, however, must be considered further and any dewatering requirements.	Potential impacts on river lamprey within the River Hull in relation to Horizontal Directional Drilling for the grid connection cable crossing have been assessed in **Section 7** of this report.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
Environment Agency (19 December 2024)	1.In regard to the comments made by RSK in their email dated 28th November 2024, specifically our previous concerns regarding impacts on fish, RSK have proposed to address these concerns with the provision of the HRA. We agree with the approach taken, but the HRA will require amendments specifically around impacts from Electromagnetic Fields (EMF). 2.We agree with the conclusion of the HRA regarding impacts on River Lamprey from Horizontal Directional Drilling (HDD). However, we advise that any mitigation measures put in place are rigorous and precautionary in order to be certain that river lamprey are not disturbed. Therefore, we advise that any HDD occurs outside of the sensitive river lamprey freshwater migration period, which normally occurs between October and March.	1. Consideration of EMF has been added to **Sections 4 and 7**. 2. Additional text added to **Section 7**. The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to September), when the ground conditions would be drier. This would avoid the peak lamprey migration period.
	Table 4-10 This table should refer to likely significant effects just on river lamprey, given the statement in paragraph 4.5.7, where sea lamprey is screened out of further assessment.	**Table 4-10** in this report has been amended to remove reference to sea lamprey.
	Section 7.4.5 We agree that lamprey do not have a swim bladder and therefore their ability to hear is limited. However, their hearing is limited to relatively lower frequency of 50-300Hz (Mickle et al, 2019). It would be useful to compare this frequency range to that produced by HDD. We agree with the conclusion of no adverse	Additional text added to **Section 7**. The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to September), when the ground conditions would be drier. This would avoid the peak lamprey migration period.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	effect on the integrity of river lamprey, given the small-scale area affected and available habitat downstream. It should be noted, that during the day lamprey will find sanctuary when not migrating. There is a risk that lamprey will be in the area of the river when HDD is taking place and thus could be disturbed. We advise to ensure further protection and applying the precautionary principle, that mitigation should involve avoiding sensitive times of year where peak lamprey migration takes place.	
	Electromagnetic Fields (EMF) Within Chapter 6, EMF from buried cables under main watercourses and the potential impacts on fish should be included in the HRA. EMF has the potential to impact on fish behaviour. There is evidence that EMF may also impact the development of fish eggs and fish fry. Given that the River Hull is functionally linked habitat for River Lamprey and the Humber Estuary SAC, the impacts should be screened at stage 1 of the HRA. Our position on EMF is that in the absence of conclusive evidence of no impact, we adopt the precautionary principle and require that appropriate measures are in place by the developer, and that no detectable EMFs result from the installation of underground cables within the wetted area of an inland waterbody.	Consideration of EMF has been added to **Sections 4 and 7**.
Natural England statutory	**Loss of functionally linked land for qualifying bird species** *Size of the proposed mitigation areas*	1.Details of amended mitigation areas are set out in the **Outline LEMP [EN010157/APP/7.5]**, this

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
consultation response (January 2025)	1. Natural England welcomes the commitment to provide mitigation areas for non-breeding birds associated with the Humber Estuary designated sites. However, based on the initial information provided in the Biodiversity Mitigation Strategy (November 2024), we advise that the currently proposed mitigation area is not sufficient to adequately mitigate for impacts to qualifying SPA bird species using functionally linked land. Based on the information provided, Natural England advise that a larger mitigation land parcel is required. Natural England note the use of the bird days calculation to calculate the amount mitigation in hectares required for wintering bird species. We advise that the figures calculated for lapwing and golden plover should be considered separately, with each figure added together to produce a combined total. Natural England acknowledges that golden plover and lapwing may occur in mixed flocks; however, the mitigation area should be sufficiently large enough to deliver for the combined number of both species recorded. Based on this approach, we note that the proposed mitigation areas fall below the amount detailed in bird days calculation by 11.36ha and are thus considered insufficient to mitigate for impacts to qualifying SPA bird species. Furthermore, as acknowledged in 2.1.12 of the Biodiversity Mitigation Strategy (November 2024) the currently proposed areas are below the requirement for golden plover alone.	includes re-calculating the number of bird days for lapwing and golden plover and increasing the size of the mitigation area specifically for SPA/ Ramsar site species.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	2. In addition, we advise that the ecological functioning of the proposed mitigation parcels should be assessed in more detail. The application site is described in the draft Habitat Regulations Assessment (HRA) (September 2024) as primarily comprising of 'large arable fields'. Golden plover and lapwing rely on open vistas to forage, and the mitigation areas should seek to deliver this site characteristic to ensure suitability for these species. Natural England advise that all core mitigation areas should be surrounded by a buffer of 150m, within which the land use is secured for a purpose which will not affect the integrity of the mitigation area. If a mitigation area is located along the redline boundary, and the 150m buffer encompasses an area not part of the proposed development site, there will need to be assurance that the area within the buffer will not be developed into something which could affect the integrity of the mitigation area. If solar PV panels are to be situated in the 150m buffer area, evidence should be presented to show that birds will not find the presence of the panels disturbing. If sufficient evidence is not available, we would continue to recommend that a 150m buffer free from solar infrastructure is used. The inclusion of buffering will likely necessitate the design of larger, more contiguous mitigation areas rather than more fragmented design. Fields E6 (Enhancement area 16) and E13-14 (Enhancement area 11) are not currently large enough to meet these requirements, and an extension to these mitigation areas should be considered. This may include creation of additional grassland	2.The mitigation areas have been amended to include larger fields, which are comparable to other fields of similar size used by SPA/ Ramsar site species in the area. Further details are set out in the **Outline LEMP [EN010157/APP/7.5]**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	areas or securing suitable arable management of the surrounding fields. Natural England note that the agricultural fields surrounding the proposed mitigation areas currently fall outside of the project red line boundary. Therefore, if securing wet grassland or arable management of these fields is not possible, then alternative mitigation areas should be identified, with these informed by the existing bird survey results and consideration of site connectivity. Natural England note that 2.1.12 of the Biodiversity Mitigation Strategy (November 2024) states that 'the mitigation is slightly short for golden plover' but that 'an additional 95ha of grassland is also being created to benefit ground-nesting birds and this grassland habitat is suitable to be used by lapwing and golden plover during the winter months'. Natural England welcome that new grassland will be created for ground-nesting farmland birds. We note, however, that these mitigation areas are relatively small in size, and fragmented throughout the site. We therefore advise that they will not adequately function as feeding areas for waders associated with the Humber Estuary designated sites and cannot be relied upon to adequately mitigate for impacts to qualifying SPA bird species using functionally linked land.	
	Management of the proposed mitigation areas More detail should be provided in the relevant documents regarding the habitats to be created, and the proposed management of the mitigation areas. Natural England advise that all mitigation areas should be adequately secured,	Further details of the management of the mitigation areas are provided in the **Outline LEMP [EN010157/APP/7.5]**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	managed and monitored in perpetuity, at least for the lifetime of the project. Details should be provided of water management for the mitigation areas. Whilst we welcome that the creation of scrapes is proposed, we advise that the existing drainage regime in the proposed mitigation areas should be considered to determine the ability of the fields to hold sufficient water. We note that the draft HRA (September 2024) states that the suitability of agricultural fields for golden plover changes depending on the 'cropping regimes in place from year to year' and advise that this should be considered further in the design of the mitigation scheme, should arable crop rotation be incorporated into the scheme. We note that crops below 8-10cm are generally most suitable for waders, such as wheat/barley during autumn/spring passage or fallow/newly tilled fields. Natural England note the commitment to incorporate the Biodiversity Mitigation Strategy into a Landscape and Ecological Management Plan. Natural England will review this document when provided and may have additional comments to make regarding its content. . Natural England advises that the Landscape and Ecological Management Plan should include the following: • Clear objectives.	

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	• Target/s for each objective, including SPA bird use targets and habitat targets. • Details of required management and monitoring (including who is responsible and when it will take place). • Details of limits of acceptable change. • Details of remedial actions, where appropriate	
	Disturbance/displacement of qualifying bird species using functionally linked land 1.Natural England advise that further assessment is needed regarding the predicted noise levels during construction and operation. Natural England advise that baseline noise levels should be established and compared to the predicted noise levels. The assessment should set the sensitive receptors in the context of the existing noise environment – i.e. how noise levels will change, including the type of noise, such as consistent or sudden loud bangs etc. Bird survey results in proximity to the works should be analysed in this context, including records of birds on adjacent land, who may be disturbed. 2.Natural England advise that it should be confirmed whether above ground cables are required for this project. If required, SPA bird flightlines should be considered in the HRA, including assessment of collision risk.	1. The assessment set out in **Section 7.3** of this report concluded that there was the potential for disturbance/ displacement of SPA/ Ramsar site species as a result of construction activities and mitigation had been proposed (as set out in the **Outline LEMP [EN010157/APP/7.5]**). However, further information has been added to **Section 7.6** in relation to the potential noise levels from construction activities and how far these could dissipate. 2. RWE has confirmed that no above ground cabling will be required for the project.
	Vibration/noise disturbance of lamprey Natural England welcome the commitment in the draft HRA (September 2024) that Horizontal Directional Drilling (HDD) will	Additional text added to **Section 7**. The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	take place at a minimum depth of 7m below the riverbed. We advise, however, that further justification should be projected regarding whether these distances will allow noise/vibration from HDD to attenuate to acceptable levels for lamprey species.	September), when the ground conditions would be drier. This would avoid the peak lamprey migration period.
	Degradation of habitats as a result of changes in water quality/hydrology Natural England note that the draft HRA (September 2024) states that 'there is potential for release of breakout contaminants, particularly bentonite during Horizontal Directional Drilling, which could lead to soil degradation and contamination of ground water and surface water' and 'the River Hull'. Natural England advise that further information is required regarding the mitigation measures that would be in place should a 'bentonite breakout occur'. We note the intention to secure any mitigation measures in the CEMP and will review this document when provided. Please note that we may have additional comments to make following review of this document.	Noted.
	Disruption of flight pathways of qualifying bird species as a result of glint and glare Natural England welcome that disruption to flight pathways of qualifying bird species as a result of glint and glare has been considered in the appropriate assessment. We advise that there is insufficient evidence available for us to provide detailed comments on this impact pathway and refer the applicant to our detailed comments regarding post-consent monitoring below.	Post-consent monitoring is set out in the **Outline LEMP [EN010157/APP/7.5]**, see below.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	Post-consent monitoring Natural England welcome that the Biodiversity Mitigation Strategy (November 2024) sets out an indicative monitoring strategy and indicative monitoring programme for the proposed mitigation. We concur that post-consent monitoring should occur for this project and advise that this should include monitoring of the potential disruption to flight pathways of qualifying bird species as a result of glint and glare, in order to help inform future assessments. We note that the final monitoring requirements and programme will be detailed within the detailed Landscape and Ecological Management Plan. Natural England will review this document when provided and may have additional comments to make regarding its content.	Post-consent monitoring of the potential disruption to flight pathways of qualifying bird species as a result of glint and glare (to help inform future assessments) is set out within the **Outline LEMP [EN010157/APP/7.5]**.
Natural England statutory consultation response (February 2025)	Following on from a query received during the meeting on 14 January 2025, regarding glint and glare, the Natural England Ornithology specialist has reviewed the available data and provided the following comments. Natural England advise that panels with a built-in white grid should be used, in order to deter birds from landing on them. As previously discussed, Natural England advise that post-consent monitoring should occur for this project. We recommend that this should include consideration of the potential disruption to flight pathways of qualifying bird species as a result of glint	The Applicant would welcome further discussion with Natural England on these matters before and/or during the DCO Examination. Post-consent monitoring of the potential disruption to flight pathways of qualifying bird species as a result of glint and glare (to help inform future assessments) forms part of the monitoring strategy outlined within the **Outline LEMP [EN010157/APP/7.5]**.

Consultee / Date / Background to consultation	Matter(s) raised	Response / Location where addressed
	and glare, in order to help inform future assessments. There is no established methodology for incorporating such impacts into the monitoring; however, we suggest that observing bird behaviour around the panels may be appropriate. Natural England are not aware of any monitoring that has previously been undertaken to study the effects of glint and glare on birds and are therefore unable to provide examples for reference.	

Appendix B – Natural England Annex B Supplementary Advice on Humber Estuary SPA Component Species

Annex B: Humber Estuary Special Protection Area: non-breeding waterbird assemblage (Version 1.2, June 2023)

The Humber Estuary Special Protection Area (SPA) qualifies under article 4.2 of the European Commission Bird Directive (79/409/EEC) in that it supports an internationally important assemblage of waterbirds. Confusion can arise concerning which species to consider when assessing the Humber Estuary SPA non-breeding, waterbird assemblage feature.

Natural England recommends focusing on what are referred to as the 'main component species' of the assemblage. Main component species are defined as:

a) All species listed individually under the assemblage feature on the SPA citation (i.e the species that qualified in 2007 when the site was designated).
b) Species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population according to the most recent Humber Estuary Wetland Bird Survey (WeBS) 5-year average count (currently 2017/18 - 2021/22).
c) Species where more than 2000 individuals are present according to the most recent Humber Estuary WeBS count.

The assemblage qualification is therefore subject to change as species' populations change. It should be noted that species listed on the citation under the assemblage features, whose populations have fallen to less than 1% of the national population, retain their status as a main component species and should be considered when assessing the impacts of a project or plan on the Humber Estuary SPA.

Natural England advises that the main component species of the Humber Estuary SPA non-breeding waterbird assemblage include (June 2023):

a) Species listed individually under the assemblage feature on the SPA citation:

- Avocet, *Recurvirostra avosetta* (non-breeding)
- Bar-tailed godwit*, Limosa lapponica* (non-breeding)
- Bittern, *Botaurus stellaris* (non-breeding)
- **Black-tailed godwit*, Limosa limosa islandica* (non-breeding)[1]**
- **Brent goose, *Branta bernicla* (non-breeding)[1]**
- **Curlew, *N. arquata* (non-breeding)[1]**
- **Dunlin, *Calidris alpina alpina* (non-breeding)[1]**
- **Golden plover, *Pluvialis apricaria* (non-breeding)[1]**
- Goldeneye, *Bucephala clangula* (non-breeding)
- Greenshank, *T. nebularia* (non-breeding)
- Grey plover, *P. squatarola* (non-breeding)
- Knot, *Calidris canutus* (non-breeding)
- **Lapwing, *Vanellus vanellus* (non-breeding)[1]**
- **Mallard, *Anas platyrhynchos* (non-breeding[1]**
- Oystercatcher, *Haematopus ostralegus* (non-breeding)
- Pochard, *Aythya farina* (non-breeding)
- **Redshank, *Tringa totanus* (non-breeding[1]**
- Ringed plover, *Charadrius hiaticula* (non-breeding)
- **Ruff, *Philomachus pugnax* (non-breeding)[1]**
- Sanderling, *Calidris alba* (non-breeding)

[1] Species known to use off-site supporting habitat / functionally linked land (FLL) in the non-breeding season

- Scaup, *Aythya marila* (non-breeding)
- **Shelduck, *Tadorna tadorna* (non-breeding) [1]**
- **Teal, *Anas crecca* (non-breeding)[1]**
- Turnstone, *Arenaria interpres* (non-breeding)
- **Whimbrel, *Numenius phaeopus* (non-breeding)[1]**
- **Wigeon, *Anas Penelope* (non-breeding)[1]**

And

b) Species which are not listed on the SPA citation but occur at site levels of more than 1% of the national population according to the most recent Humber Estuary Wetland Bird Survey (WeBS) 5-year average count:

- Green sandpiper, *Tringa ochropus* (non-breeding)
- **Greylag goose, *Anser anser* (non-breeding)[1]**
- **Little egret, *Egretta garzetta* (non-breeding)[1]**
- **Pink-footed goose, *Anser brachyrhynchus* (non-breeding)[1]**
- Shoveler, *Anas clypeata* (non-breeding)
- **Crane, *Grus grus* (non-breeding)[1]**

As stated above, the assemblage qualification is subject to change as species' populations change; therefore, the appropriate WeBS data should be considered in any assessment and the above list should be used as a guide only.

Please note, the advice set out above should be considered when assessing potential impacts on the waterbird assemblage feature. You will also need to consider potential impacts on species which are not considered to be non-breeding waterbirds but are listed on the citation qualifying under article 4.1 and 4.2 of the Directive. These include:

- **Hen harrier, *Circus cyaneus* (non-breeding)[1]**
- **Marsh Harrier, *Circus aeruginosus* (breeding)[1]**
- Little tern, *Sterna albifrons* (breeding)
- Avocet*, Recurvirostra avosetta* (breeding)
- Bittern, *Botaurus stellaris* (breeding)

The species marked [1] **in bold text** are known to use off-site supporting habitat / functionally linked land (FLL) (e.g. arable farmland, grassland/pasture, and/or non-estuarine waterbodies) in the non-breeding season and may therefore be the most relevant for assessing potential impacts of a proposed plan/project on birds using FLL associated with the Humber Estuary SPA. However, please note that this list should be used as a guide only; usage may depend on factors such as the habitats available on the site and distance to the Humber Estuary etc. Therefore, assessments of potential impacts on birds using functionally linked land should consider all relevant species and clear justification should be provided if any species are excluded from the assessment.

[1] Species known to use off-site supporting habitat / functionally linked land (FLL) in the non-breeding season

Appendix C – Screening matrices and integrity matrices

Screening matrices

Potential impacts upon the European sites which are considered within this HRA report are provided in the table below.

Table C1: Designated sites and impacts considered within the HRA

European Site	Impacts considered in the matrices
Hornsea Mere SPA	• Loss of functionally linked land for qualifying bird species. • Disturbance/ displacement of qualifying bird species using functionally linked land. • Degradation of habitats as a result of changes in water quality/ hydrology. • Degradation of habitats as a result of changes in air quality. • Disruption of flight paths of qualifying bird species as a result of glint and glare.
Humber Estuary SPA	• Loss of functionally linked land for qualifying bird species. • Disturbance/ displacement of qualifying bird species using functionally linked land. • Degradation of habitats as a result of changes in water quality/ hydrology. • Degradation of habitats as a result of changes in air quality. • Disruption of flight paths of qualifying bird species as a result of glint and glare.
Humber Estuary Ramsar site	• Loss of functionally linked land for qualifying bird species. • Disturbance/ displacement of qualifying bird species using functionally linked land. • Degradation of habitats as a result of changes in water quality/ hydrology. • Degradation of habitats as a result of changes in air quality. • Disruption of flight paths of qualifying bird species as a result of glint and glare. • Vibration/noise disturbance of river lamprey. • Disturbance of river lamprey as a result of EMF.

Humber Estuary SAC	• Degradation of habitats as a result of changes in water quality/ hydrology. • Degradation of habitats as a result of changes in air quality. • Vibration/noise disturbance of river lamprey. • Disturbance of river lamprey as a result of EMF.
Greater Wash SPA	• Loss of functionally linked land for qualifying bird species. • Disturbance/ displacement of qualifying bird species using functionally linked land. • Degradation of habitats as a result of changes in water quality/ hydrology. • Degradation of habitats as a result of changes in air quality. • Disruption of flight paths of qualifying bird species as a result of glint and glare.

Evidence for, or against, likely significant effects on the European sites and its qualifying features is detailed within the footnotes to the screening matrices below.

Screening matrix key:

✓ = Likely significant effect cannot be excluded.

X = Likely significant effect can be excluded.

C = Construction.

O = Operation.

D = Decommissioning.

Grey shading indicates no impact pathway.

Table C2: Screening matrix Hornsea Mere SPA

Name of European site and designation: Hornsea Mere SPA																		
EU Code: UK9006171																		
Distance to Proposed Development: 5,815m east																		
European site features (Section 4.3, Table 4-2)	**Potential for likely significant effects**																	
Potential effect	Loss of functionally linked land for qualifying bird species			Disturbance/displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/hydrology			Degradation of habitats as a result of changes in air quality			Disruption of flight paths of qualifying bird species as a result of glint and glare			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Goldeneye	✓**a**			✓**a**	✖**g**	✓**a**	✓**b**	✖**c**	✓**b**	✖**d**		✖**d**		✓**e**		✓**f**	✓**f**	✓**f**
Pochard	✓**a**			✓**a**	✖**g**	✓**a**	✓**b**	✖**c**	✓**b**	✖**d**		✖**d**		✓**e**		✓**f**	✓**f**	✓**f**
Shoveler	✓**a**			✓**a**	✖**g**	✓**a**	✓**b**	✖**c**	✓**b**	✖**d**		✖**d**		✓**e**		✓**f**	✓**f**	✓**f**
Tufted duck	✓**a**			✓**a**	✖**g**	✓**a**	✓**b**	✖**c**	✓**b**	✖**d**		✖**d**		✓**e**		✓**f**	✓**f**	✓**f**
Gadwall	✓**a**			✓**a**	✖**g**	✓**a**	✓**b**	✖**c**	✓**b**	✖**d**		✖**d**		✓**e**		✓**f**	✓**f**	✓**f**
Mute swan	✓**a**			✓**a**	✖**g**	✓**a**	✓**b**	✖**c**	✓**b**	✖**d**		✖**d**		✓**e**		✓**f**	✓**f**	✓**f**

✓**a** = Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species associated with the SPA; therefore, likely significant effects cannot be ruled out and further assessment is required.

✓**b** = The Proposed Development is not hydrologically linked to the SPA, therefore likely significant effects on the SPA itself can be ruled out. However, the land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species of the SPA and therefore likely significant effects as a result of this impact cannot be ruled out and further assessment is required.

✖**c** = The Proposed Development is not hydrologically linked to the SPA, therefore likely significant effects on the SPA itself can be ruled out. However, the land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species of the SPA. Based on the measures set out in the **Outline Battery Safety Management Plan [APP-157]** likely significant effects can be ruled out and further assessment is not required.

✖**d =** Potential impacts from traffic have been included in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2].** The Proposed Development is not expected to generate traffic exceeding screening criteria; therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, the SPA is beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary) and habitats identified as having potential to comprise functionally linked land for SPA bird species are not typically sensitive to changes in air quality. Therefore, likely significant effects can be ruled out and further assessment is not required.

✓**e =** There is the potential for glint and glare from the solar PV modules to affect the flight paths of qualifying bird species associated with the SPA; therefore, likely significant effect cannot be ruled out, further assessment is required.

✓**f =** It is considered that where there is a potential for likely significant effects alone, there is a potential for likely significant effects in-combination; therefore, further assessment is required.

✖**g =** Given the passive nature of the operational solar farm, infrequent maintenance visits, likely habituation to noise/ visual disturbance from existing agricultural activities and screening from retained hedgerows, likely significant effects can be ruled out and further assessment is not required.

Table C3: Screening matrix Humber Estuary SPA

Name of European site and designation: Humber Estuary SPA																		
EU Code: UK9006111																		
Distance to Proposed Development: 8,500m south																		
European site features (Section 4.3, Table 4-3)	**Potential for likely significant effects**																	
Potential effect	Loss of functionally linked land for qualifying bird species			Disturbance/displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/hydrology			Degradation of habitats as a result of changes in air quality			Disruption of flight paths of qualifying bird species as a result of glint and glare			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Avocet	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Bar-tailed godwit	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Bittern	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Black-headed gull	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Black-tailed godwit	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Brent goose	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Crane	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Curlew	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Dunlin	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Golden plover	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Goldeneye	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Green sandpiper	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Greenshank	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Grey plover	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Greylag goose	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Hen harrier	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Knot	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Lapwing	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Little egret	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Little tern	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Mallard	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Marsh harrier	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Oystercatcher	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Pink-footed goose	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Pochard	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Redshank	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Ringed plover	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Ruff	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Sanderling	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Scaup	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Shelduck	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Shoveler	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Teal	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Turnstone	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Whimbrel	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Wigeon	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**
Wintering bird assemblage	✓**a**			✓**a**	✗**g**	✓**a**	✓**b**	✗**c**	✓**b**	✗**d**		✗**d**		✓**e**		✓**f**	✓**f**	✓**f**

✓**a** = Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species associated with the SPA; therefore, likely significant effects as a result of this potential impact cannot be ruled out and further assessment is required.

✓**b** = The Proposed Development is hydrologically linked to the SPA, given the large hydrological distance, likely significant effects on the SPA itself can be ruled out. However, the land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species of the SPA and therefore likely significant effects as a result of this impact cannot be ruled out and further assessment is required.

✗**c** = The Proposed Development is hydrologically linked to the SPA, given the large hydrological distance, likely significant effects on the SPA itself can be ruled out. However, the land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species of the SPA. Based on the measures set out in the **Outline Battery Safety Management Plan [APP-157]** likely significant effects can be ruled out and further assessment is not required.

✗**d =** Potential impacts from traffic have been included in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2].** The Proposed Development is not expected to generate traffic exceeding screening criteria; therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, the SPA is beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary) and habitats identified as having potential to comprise functionally linked land for SPA bird species, are not typically sensitive to changes in air quality. Therefore, likely significant effects can be ruled out and further assessment is not required.

✓**e =** There is the potential for glint and glare from the solar PV modules to affect the flight paths of qualifying bird species associated with the SPA; therefore, likely significant effect cannot be ruled out, further assessment is required.

✓**f =** It is considered that where there is a potential for likely significant effects alone, there is a potential for likely significant effects in-combination; therefore, further assessment is required.

✗**g =** Given the passive nature of the operational solar farm, infrequent maintenance visits, likely habituation to noise/ visual disturbance from existing agricultural activities and screening from retained hedgerows, likely significant effects can be ruled out and further assessment is not required.

Table C4: Screening matrix Humber Estuary Ramsar site

Name of European site and designation: Humber Estuary Ramsar site																								
EU Code: UK11031																								
Distance to Proposed Development: 8,500m south																								
European site features (Section 4.3, Table 4-4)	**Potential for likely significant effects**																							
Potential effect	Loss of functionally linked land for qualifying bird species			Disturbance/displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/hydrology			Degradation of habitats as a result of changes in air quality			Disruption of flight paths of qualifying bird species as a result of glint and glare			Vibration/noise disturbance of river lamprey			Disturbance of river lamprey as a result of EMF			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, salt-marshes, and coastal brackish/saline lagoons.							**✕a**	**✕a**	**✕a**	**✕b**		**✕b**										**✕k**	**✕k**	**✕k**
Grey seal							**✕a**	**✕a**	**✕a**													**✕k**	**✕k**	**✕k**
Natterjack toad							**✕a**	**✕a**	**✕a**	**✕b**		**✕b**										**✕k**	**✕k**	**✕k**
Non-breeding waterbird assemblage	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Golden plover	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Knot	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Dunlin	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Black-tailed godwit	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Redshank	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Shelduck	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
Bar-tailed godwit	**✓c**			**✓c**	**✕m**	**✓c**	**✓d**	**✕e**	**✓d**	**✕f**		**✕f**		**✓g**								**✓j**	**✓j**	**✓j**
River lamprey							**✓d**	**✕e**	**✓d**							**✓h**				**✓i**		**✓j**	**✓j**	**✓j**
Sea lamprey							**✕l**	**✕l**	**✕l**							**✕l**				**✕l**				

✕a = The Proposed Development is hydrologically linked to the Ramsar site, given the large hydrological distance, likely significant effects on the qualifying feature within the Ramsar site itself can be ruled out.

✕b = Potential impacts from traffic have been included in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2].** The Proposed Development is not expected to generate traffic exceeding screening criteria; therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, the Ramsar site is beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary). Therefore, likely significant effects can be ruled out and further assessment is not required.

✓c = Land within and adjacent to the Order Limits has the potential to be functionally linked land for the qualifying bird species associated with the Ramsar site; therefore, likely significant effects as a result of this potential impact cannot be ruled out and further assessment is required.

✓**d** = The Proposed Development is hydrologically linked to the Ramsar site, given the large hydrological distance, likely significant effects on the Ramsar site itself can be ruled out. However, the land within and adjacent to the Order Limits (including the drainage ditches and the River Hull) have the potential to be functionally linked land for qualifying bird species and river lamprey; therefore likely significant effects as a result of this impact cannot be ruled out and further assessment is required.

✗**e** = The Proposed Development is hydrologically linked to the Ramsar site, given the large hydrological distance, likely significant effects on the Ramsar site itself can be ruled out. However, the land within and adjacent to the Order Limits (including the drainage ditches and the River Hull) have the potential to be functionally linked land for qualifying bird species and river lamprey. Based on the measures set out in the **Outline Battery Safety Management Plan [APP-157]** likely significant effects can be ruled out and further assessment is not required.

✗**f =** Potential impacts from traffic have been included in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2].** The Proposed Development is not expected to generate traffic exceeding screening criteria; therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, the Ramsar site is beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary) and habitats identified as having potential to comprise functionally linked land for Ramsar site bird species, are not typically sensitive to changes in air quality. Therefore, likely significant effects can be ruled out and further assessment is not required.

✓**g =** There is the potential for glint and glare from the solar PV modules to affect the flight paths of qualifying bird species associated with the Ramsar site; therefore, likely significant effects cannot be ruled out, further assessment is required.

✓**h =** The grid connection cable route will involve Horizontal Directional Drilling under the River Hull, which is known to support migrating, spawning and juvenile river lamprey and therefore is functionally linked land for the qualifying population of the Ramsar site. Therefore, likely significant effects cannot be ruled out, further assessment is required.

✓**i =** The grid connection cable route will be under the River Hull, which is known to support migrating, spawning and juvenile river lamprey and therefore is functionally linked land for the qualifying population of the Ramsar site. Therefore, likely significant effects from this impact cannot be ruled out, further assessment is required

✓**j =** It is considered that where there is a potential for likely significant effects alone, there is a potential for likely significant effects in-combination; therefore, further assessment is required.

✗**k =** It is considered that there is no potential for likely significant effects in-combination; therefore, no further assessment is required.

✗**l** = Sea lamprey are understood to be restricted to rivers within the Ouse catchment and are unlikely to be present in the River Hull; therefore, likely significant effects can be ruled out, no further assessment is required.

✗**m** = Given the passive nature of the operational solar farm, infrequent maintenance visits, likely habituation to noise/ visual disturbance from existing agricultural activities and screening from retained hedgerows, likely significant effects can be ruled out and further assessment is not required.

Table C5: Screening matrix Humber Estuary SAC

Name of European site and designation: Humber Estuary SAC															
EU Code: UK00300170															
Distance to Proposed Development: 8,500m south															
European site features (Section 4.3, Table 4-5)	**Potential for likely significant effects**														
Potential effect	Degradation of habitats as a result of changes in water quality/hydrology			Degradation of habitats as a result of changes in air quality			Vibration/noise disturbance of river lamprey			Disturbance of river lamprey as a result of EMF			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Estuary	**✕a**	**✕a**	**✕a**	**✕d**		**✕d**							**✕h**	**✕h**	**✕h**
Mud and sand flats	**✕a**	**✕a**	**✕a**	**✕d**		**✕d**							**✕h**	**✕h**	**✕h**
Saline lagoons	**✕a**	**✕a**	**✕a**	**✕d**		**✕d**							**✕h**	**✕h**	**✕h**
Saltmarsh – Atlantic salt meadow, pioneer saltmarsh	**✕a**	**✕a**	**✕a**	**✕d**		**✕d**							**✕h**	**✕h**	**✕h**
Sub-tidal sandbanks	**✕a**	**✕a**	**✕a**	**✕d**		**✕d**							**✕h**	**✕h**	**✕h**
Grey seal	**✕a**	**✕a**	**✕a**										**✕h**	**✕h**	**✕h**
River lamprey	**✓b**	**✕c**	**✓b**				**✓e**				**✓f**		**✓g**	**✓g**	**✓g**
Sea lamprey	**✕i**	**✕i**	**✕i**				**✕i**				**✕i**				

✕a = The Proposed Development is hydrologically linked to the SAC, given the large hydrological distance, likely significant effects on the qualifying feature within the SAC itself can be ruled out.

✓b = The Proposed Development is hydrologically linked to the SAC, given the large hydrological distance, likely significant effects on the SAC itself can be ruled out. However, the drainage ditches and the River Hull have the potential to be functionally linked land for river lamprey; therefore likely significant effects as a result of this impact cannot be ruled out and further assessment is required.

✕c = The Proposed Development is hydrologically linked to the SAC, given the large hydrological distance, likely significant effects on the SAC itself can be ruled out. However, the drainage ditches and the River Hull have the potential to be functionally linked land for river lamprey. Based on the measures set out in the **Outline Battery Safety Management Plan [APP-157]** likely significant effects can be ruled out and further assessment is not required.

✕d = Potential impacts from traffic have been included in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2].** The Proposed Development is not expected to generate traffic exceeding screening criteria; therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, the SAC is beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary). Therefore, likely significant effects can be ruled out and further assessment is not required.

✓e = The grid connection cable route will involve Horizontal Directional Drilling under the River Hull, which is known to support migrating, spawning and juvenile river lamprey and therefore is functionally linked land for the qualifying population of the SAC. Therefore, likely significant effects cannot be ruled out, further assessment is required.

✓f = The grid connection cable route will be under the River Hull, which is known to support migrating, spawning and juvenile river lamprey and therefore is functionally linked land for the qualifying population of the SAC. Therefore, likely significant effects from this impact cannot be ruled out, further assessment is required.

✓g = It is considered that where there is a potential for likely significant effects alone, there is a potential for likely significant effects in-combination; therefore, further assessment is required.

✕h = It is considered that there is no potential for likely significant effects in-combination; therefore, no further assessment is required.

✖i = Sea lamprey are understood to be restricted to rivers within the Ouse catchment and are unlikely to be present in the River Hull; therefore, likely significant effects can be ruled out, no further assessment is required

Table C6: Screening matrix Greater Wash SPA

Name of European site and designation: Greater Wash SPA																		
EU Code: UK9020329																		
Distance to Proposed Development: 9,560m east																		
European site features (Section 4.3, Table 4-6)	**Potential for likely significant effects**																	
Potential effect	Loss of functionally linked land for qualifying bird species.			Disturbance/displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/hydrology			Degradation of habitats as a result of changes in air quality			Disruption of flight paths of qualifying bird species as a result of glint and glare			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Red-throated diver	**✕a**			**✕a**			**✕b**	**✕b**	**✕b**	**✕c**		**✕c**		**✕d**		**✕e**	**✕e**	**✕e**
Little gull	**✕a**			**✕a**			**✕b**	**✕b**	**✕b**	**✕c**		**✕c**		**✕d**		**✕e**	**✕e**	**✕e**
Sandwich tern	**✕a**			**✕a**			**✕b**	**✕b**	**✕b**	**✕c**		**✕c**		**✕d**		**✕e**	**✕e**	**✕e**
Common tern	**✕a**			**✕a**			**✕b**	**✕b**	**✕b**	**✕c**		**✕c**		**✕d**		**✕e**	**✕e**	**✕e**
Little tern	**✕a**			**✕a**			**✕b**	**✕b**	**✕b**	**✕c**		**✕c**		**✕d**		**✕e**	**✕e**	**✕e**
Common scoter	**✕a**			**✕a**			**✕b**	**✕b**	**✕b**	**✕c**		**✕c**		**✕d**		**✕e**	**✕e**	**✕e**

✕a = Land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for this qualifying bird species. Consultation with Natural England (July 2024, refer to Appendix A) confirmed that this species can be ruled out. Therefore, likely significant effects can be ruled out, no further assessment is required.

✕b = The Proposed Development is hydrologically linked to the SPA, given the large hydrological distance, likely significant effects on the SPA itself can be ruled out. In addition, the land within and adjacent to the Order Limits is considered unlikely to be functionally linked land for this qualifying bird species. Therefore, likely significant effects can be ruled out, no further assessment is required.

✕c = Potential impacts from traffic have been included in **ES Volume 2, Chapter 6: Air Quality [EN01057/APP/6.2].** The Proposed Development is not expected to generate traffic exceeding screening criteria; therefore, likely significant effects from changes in air quality as a result of traffic can be ruled out. In relation to potential for impacts on sensitive habitats from dust and fine particulate matter, the SPA is beyond the air quality assessment study area for dust (i.e. 50 m of the site boundary). Therefore, likely significant effects can be ruled out and further assessment is not required.

✕d = This is a seabird species typically breeding, wintering and/or migrating along the coast and out to sea. Therefore, likely significant effects can be ruled out, no further assessment is required.

✕e = It is considered that there is no potential for likely significant effects in-combination; therefore, no further assessment is required.

Integrity matrices

The potential for likely significant effects has been identified for the following sites:

- Hornsea Mere SPA.
- Humber Estuary SPA.
- Humber Estuary Ramsar site.
- Humber Estuary SAC.

These sites have been subject to further assessment in order to establish if the Proposed Development could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Integrity matrix key:

✓ = Adverse effect on integrity cannot be excluded.

X = Adverse effect on integrity can be excluded.

C = Construction

O = Operation

D = Decommissioning

Grey shading indicates no impact pathway.

Table C7: Integrity matrix Hornsea Mere SPA

Name of European site and designation: Hornsea Mere SPA															
EU Code: UK9006171															
Distance to Proposed Development: 5,815m east															
European site features (Section 4.3, Table 4-2)	**Adverse effect on integrity**														
Effect	Loss of functionally linked land for qualifying bird species.			Disturbance/ displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/ hydrology			Disruption of flight paths of qualifying bird species as a result of glint and glare			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Goldeneye	**×a**			**×a**		**×a**	**×a**		**×a**		**×b**		**×c**	**×c**	**×c**
Pochard	**×a**			**×a**		**×a**	**×a**		**×a**		**×b**		**×c**	**×c**	**×c**
Shoveler	**×a**			**×a**		**×a**	**×a**		**×a**		**×b**		**×c**	**×c**	**×c**
Tufted duck	**×a**			**×a**		**×a**	**×a**		**×a**		**×b**		**×c**	**×c**	**×c**
Gadwall	**×a**			**×a**		**×a**	**×a**		**×a**		**×b**		**×c**	**×c**	**×c**
Mute swan	**×a**			**×a**		**×a**	**×a**		**×a**		**×b**		**×c**	**×c**	**×c**

×a = The land within and adjacent to the Order Limits was not considered to constitute functionally linked land for this qualifying feature. Therefore, there would be no adverse effects on the integrity of the qualifying bird species populations and no additional mitigation is required.

×b = Based on the configuration of the solar PV modules and lack of large numbers of birds recorded moving through the Land Areas, it is considered that there would be no adverse effects on the integrity of the qualifying bird species populations and no additional mitigation is required.

×c = It can be concluded that there would be no adverse in-combination effects on the integrity of the European site.

Table C8: Integrity matrix Humber Estuary SPA

Name of European site and designation: Humber Estuary SPA															
EU Code: UK9006111															
Distance to Proposed Development: 8,500m south															
European site features (Section 4.3, Table 4-3)	**Adverse effect on integrity**														
Effect	Loss of functionally linked land for qualifying bird species			Disturbance/ displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/ hydrology			Disruption of flight paths of qualifying bird species as a result of glint and glare			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Avocet	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Bar-tailed godwit	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Bittern	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Black-headed gull	**×b**			**×b**		**×b**	**×c**		**×f**		**×d**		**×e**	**×e**	**×e**
Black-tailed godwit	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Brent goose	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Crane	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Curlew	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Dunlin	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Golden plover	**×b**			**×b**		**×b**	**×c**		**×f**		**×d**		**×e**	**×e**	**×e**
Goldeneye	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Green sandpiper	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Greenshank	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Grey plover	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Greylag goose	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Hen harrier	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Knot	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Lapwing	**×b**			**×b**		**×b**	**×c**		**×f**		**×d**		**×e**	**×e**	**×e**
Little egret	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Little tern	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Mallard	**×b**			**×b**		**×b**	**×c**		**×f**		**×d**		**×e**	**×e**	**×e**
Marsh harrier	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Oystercatcher	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Pink-footed goose	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Pochard	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Redshank	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Ringed plover	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Ruff	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Sanderling	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Scaup	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Shelduck	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Shoveler	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Teal	**×b**			**×b**		**×b**	**×c**		**×f**		**×d**		**×e**	**×e**	**×e**
Turnstone	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Whimbrel	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Wigeon	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**
Wintering bird assemblage	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**		**×e**	**×e**	**×e**

✕a = The land within and adjacent to the Order Limits was not considered to constitute functionally linked land for this qualifying feature. Therefore, there would be no adverse effects on the integrity of the qualifying bird species populations and no additional mitigation is required.

✕b = The land within and adjacent to the Order Limits was considered to constitute functionally linked land for this qualifying species. Therefore, mitigation was required as set out and secured in the **Outline LEMP [EN010157/APP/7.5]**, including the creation of three mitigation areas within the Order Limits; and the **Outline CEMP [EN010157/APP/7.2]** which included measures to mitigate the effect of visual and noise disturbance. With the mitigation measures in place, there would be no adverse effects on the integrity of the qualifying bird species populations of the SPA.

✕c = The land within and adjacent to the Order Limits was considered to constitute functionally linked land for this qualifying species. Therefore, mitigation was required as set out and secured in the **Outline LEMP [EN010157/APP/7.5]**, including a specific Horizontal Directional Drilling methodology, specifically to manage the risk of bentonite breakout. With the mitigation measures in place, there would be no adverse effects on the integrity of the qualifying bird species populations of the SPA.

✕d = Based on the configuration of the solar PV modules and lack of large numbers of birds recorded moving through the Land Areas, it is considered that there would be no adverse effects on the integrity of the qualifying bird species populations and no additional mitigation is required.

✕e = It can be concluded that there would be no adverse in-combination effects on the integrity of the European site.

✕f = The land within and adjacent to the Order Limits was considered to constitute functionally linked land for this qualifying feature. Therefore, mitigation was required as set out and secured in the **Outline DEMP [EN010157/APP/7.2]** to mitigate the risk of reversing the benefits on water quality/ hydrology from the solar farm, should the habitats within the Order Limits be returned to intensively farmed arable land. With the mitigation measures in place, there would be no adverse effects on the integrity of the qualifying species populations of the SAC.

Table C9: Integrity matrix Humber Estuary Ramsar site

Name of European site and designation: Humber Estuary Ramsar site																					
EU Code: UK11031																					
Distance to Proposed Development: 8,500m south																					
European site features (Section 4.3, Table 4-4)	**Adverse effect on integrity**																				
Effect	Loss of functionally linked land for qualifying bird species.			Disturbance/displacement of qualifying bird species using functionally linked land			Degradation of habitats as a result of changes in water quality/ hydrology			Disruption of flight paths of qualifying bird species as a result of glint and glare			Vibration/noise disturbance of river lamprey			Disturbance of river lamprey as a result of EMF			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Non-breeding waterbird assemblage	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
Golden plover	**×b**			**×b**		**×b**	**×c**		**×h**		**×d**								**×g**	**×g**	**×g**
Knot	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
Dunlin	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
Black-tailed godwit	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
Redshank	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
Shelduck	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
Bar-tailed godwit	**×a**			**×a**		**×a**	**×a**		**×a**		**×d**								**×g**	**×g**	**×g**
River lamprey							**×c**		**×h**				**×e**				**×f**		**×g**	**×g**	**×g**

×a = The land within and adjacent to the Order Limits was not considered to constitute functionally linked land for this qualifying feature. Therefore, there would be no adverse effects on the integrity of the qualifying bird species populations and no additional mitigation is required.

×b = The land within and adjacent to the Order Limits was considered to constitute functionally linked land for golden plover. Therefore, mitigation was required as set out and secured in the **Outline LEMP [EN010157/APP/7.5]**, including the creation of three mitigation areas within the Order Limits; and the **Outline CEMP [EN010157/APP/7.2]** which included measures to mitigate the effect of visual and noise disturbance. With the mitigation measures in place, there would be no adverse effects on the integrity of the golden plover population of the Ramsar site.

×c = The land within and adjacent to the Order Limits was considered to constitute functionally linked land for golden plover and the drainage ditches and the River Hull were considered to constitute functionally linked land for river lamprey. Therefore, mitigation was required as set out and secured in the **Outline CEMP [EN010157/APP/7.2]**, including a specific Horizontal Directional Drilling methodology, specifically to manage the risk of bentonite breakout. With the mitigation measures in place, there would be no adverse effects on the integrity of the golden plover and river lamprey populations of the Ramsar site.

×d = Based on the configuration of the solar PV modules and lack of large numbers of birds recorded moving through the Land Areas, it is considered that there would be no adverse effects on the integrity of the qualifying bird species populations and no additional mitigation is required.

×e = The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to September) which would avoid the peak lamprey migration period. In the unlikely event that works cannot be undertaken during this time, due to the very short-term and temporary (estimated to take a maximum of 24 hours) nature of the HDD works under the River Hull itself, it is still considered that there would be no adverse effects on the integrity of the qualifying river lamprey population.

×f = The cable will be insulated which would eliminate the electric field. This in addition to burying the cable between 7 to 20m below the river bed would ensure no adverse effects on the integrity of the river lamprey population from electric fields. In relation to magnetic fields, it is anticipated that the magnetic field generated from the buried cable would be much lower than natural

background levels, therefore, it is also considered that there would be no adverse effects on the integrity of the river lamprey population from magnetic fields and no additional mitigation is required.

✕g = It can be concluded that there would be no adverse in-combination effects on the integrity of the European site.

✕h = The land within and adjacent to the Order Limits was considered to constitute functionally linked land for golden plover and the drainage ditches and the River Hull were considered to constitute functionally linked land for river lamprey. Therefore, mitigation was required as set out and secured in the **Outline DEMP [EN010157/APP/7.2]** to mitigate the risk of reversing the benefits on water quality/ hydrology from the solar farm, should the habitats within the Order Limits be returned to intensively farmed arable land. With the mitigation measures in place, there would be no adverse effects on the integrity of the qualifying species populations of the SAC.

Table C10: Integrity matrix Humber Estuary SAC

Name of European site and designation: Humber Estuary SAC												
EU Code: UK00300170												
Distance to Proposed Development: 8,500m south												
European site features (Section 4.3, Table 4-5)	**Adverse effect on integrity**											
Effect	Degradation of habitats as a result of changes in water quality/ hydrology			Vibration/noise disturbance of river lamprey			Disturbance of river lamprey as a result of EMF			In-combination effects		
Development stage	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
River lamprey	**✕a**		**✕e**	**✕b**				**✕c**		**✕d**	**✕d**	**✕d**

✕a = The drainage ditches and the River Hull were considered to constitute functionally linked land for river lamprey. Therefore, mitigation was required as set out and secured in the **Outline CEMP [EN010157/APP/7.2]**, including a specific Horizontal Directional Drilling methodology, specifically to manage the risk of bentonite breakout. With the mitigation measures in place, there would be no adverse effects on the integrity of the qualifying species populations of the SAC.

✕b = The preferred timings to undertake the Horizontal Directional Drilling would be during spring/summer (April to September) which would avoid the peak lamprey migration period. In the unlikely event that works cannot be undertaken during this time, due to the very short-term and temporary (estimated to take a maximum of 24 hours) nature of the HDD works under the River Hull itself, it is still considered that there would be no adverse effects on the integrity of the river lamprey population.

✕c = The cable will be insulated which would eliminate the electric field. This in addition to burying the cable between 7 to 20m below the river bed would ensure no adverse effects on the integrity of the river lamprey population from electric fields. In relation to magnetic fields, it is anticipated that the magnetic field generated from the buried cable would be much lower than natural background levels, therefore, it is also considered that there would be no adverse effects on the integrity of the river lamprey population from magnetic fields and no additional mitigation is required.

✕d = It can be concluded that there would be no adverse in-combination effects on the integrity of the European site.

✕e = The drainage ditches and the River Hull were considered to constitute functionally linked land for river lamprey. Therefore, mitigation was required as set out and secured in the **Outline DEMP [EN010157/APP/7.2]** to mitigate the risk of reversing the benefits on water quality/ hydrology from the solar farm, should the habitats within the Order Limits be returned to intensively farmed arable land. With the mitigation measures in place, there would be no adverse effects on the integrity of the qualifying species populations of the SAC.

RWE Renewables UK Limited
Windmill Hill Business Park,
Whitehill Way,
Swindon,
Wiltshire,
England,
SN5 6PB
www.rwe.com