



**RWE Renewables UK Dogger Bank
South (West) Limited**

**RWE Renewables UK Dogger Bank
South (East) Limited**

Dogger Bank South Offshore Wind Farms

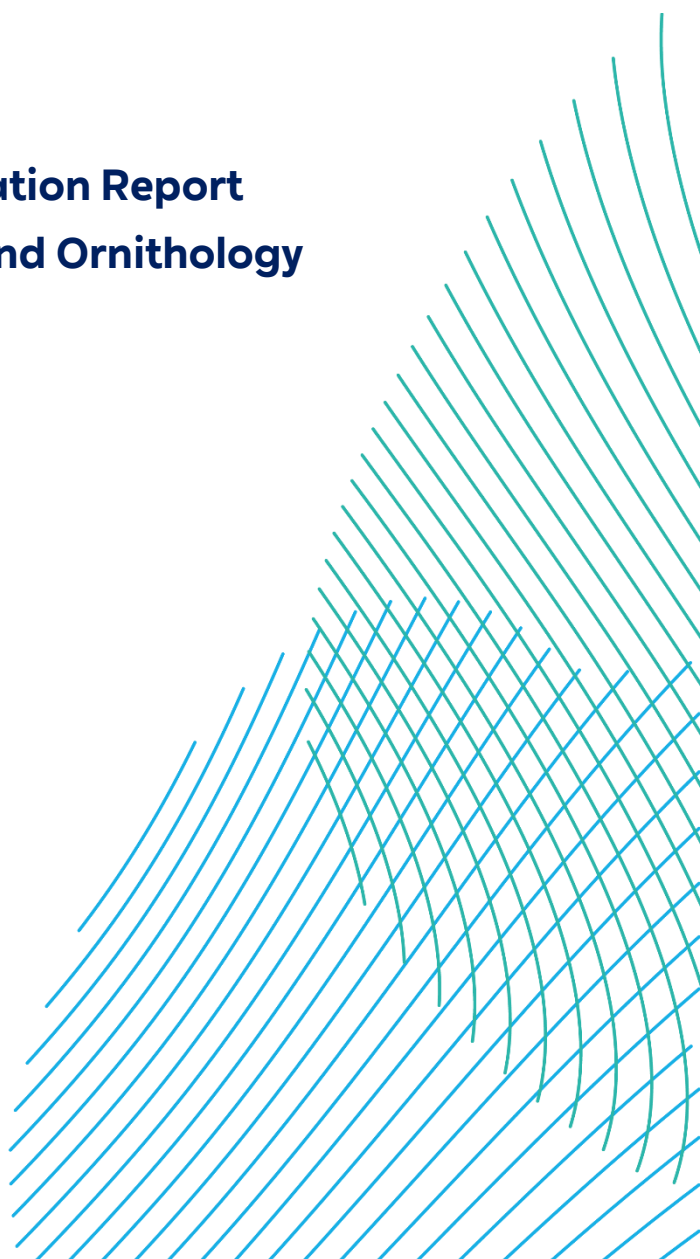
**Preliminary Environmental Information Report
Chapter 18 – Terrestrial Ecology and Ornithology**

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Appendix 18-1 Habitat Survey Report

Appendix 18-2 Desk Study Report

Appendix 18-3 Great Crested Newt eDNA Survey Report

Appendix 18-4 Bat Transects and Static Monitoring Report

Appendix 18-5 Over-wintering Bird Survey Report

Appendix 18-6 Breeding Bird Survey Report

Glossary

Term	Definition
Haul Road	The track used by traffic to access different sections of the onshore export cable corridor for construction.
Horizontal Directional Drill (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.
Jointing bays	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The point on the coastline at which the offshore export cables are brought onshore, connecting to the onshore export cables at the Transition Joint Bay.
Link Boxes	Below ground structures housing cable equipment, located along the onshore export cable corridor alongside the jointing bays.
Onshore Development Area	The Onshore Development Area for PEIR is the boundary within which all onshore infrastructure required for the Projects will be located including landfall, onshore export cable route, accesses, construction compounds and onshore substations. The Onshore Development Area is to be refined through the consultation and engineering review process.
Onshore export cable corridor	This is the area which includes cable trenches, haul roads, spoil storage areas, and limits of deviation for micro-siting. For assessment purposes, the cable corridor does not include the onshore substations, Transition Joint Bays or temporary access routes; but includes construction compounds (purely for the cable route).
Onshore export cables	Onshore export cables take the electricity from the Transition Joint Bay to the onshore substations.
Onshore Study Area	The area considered in the Scoping Report.

Term	Definition
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network. There will be one onshore substation for each Project.
Onshore Substation Zones	Parcels of land within the Onshore Development Area where the onshore substation infrastructure (including the haul roads, temporary construction compounds and associated cable routeing) may be located.
Target Note	A numbered point taken in the Habitat Survey which provides information on any points of interest such as designated or invasive species or habitats too small to map.
The Applicant	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited as the owners of DBS West and DBS East respectively are the named undertakers that will have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms)
Transition Joint Bay (TJB)	The Transition Joint Bay (TJB) is an underground structure at the landfall that houses the joint between the offshore export cables and the onshore export cables.

Acronyms

Term	Definition
BAP	Biodiversity Action Plan
BNG	Biodiversity Net Gain
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
BoCC	Birds of Conservation Concern
CEA	Cumulative Effect Assessment
cSAC	Candidate Special Area of Conservation
DBS	Dogger Bank South
DCO	Development Consent Order
DLL	District Level Licencing
eDNA	Environmental DNA
ECoW	Ecological Clerk of Works
EIA	Environmental impact assessment
ES	Environmental statement
GB	Great Britain
GCN	Great crested newt <i>Triturus cristatus</i>
GLTA	Ground Level Tree Assessment
HA	Hectare
HDD	Horizontal Direction Drill
HRA	Habitats Regulations Assessment

Term	Definition
HSI	Habitat Suitability Index
HPI	Habitat of Principal Importance
INNS	Invasive non-native species
IPC	Infrastructure Planning Commission (now the secretary of state)
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographical Information for the Countryside
NERC	Natural Environment and Rural Communities
NEYEDC	North & East Yorkshire Ecological Data Centre
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statements
OLEMP	Outline Landscape and Environment Management Plan
PBRA	Preliminary Bat Roost Assessment
PRoW	Public Rights of Way
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

Term	Definition
T	Transect
PEIR	Preliminary Environmental Information Report
WCA	Wildlife and Countryside Act 1981

18 Terrestrial Ecology and Ornithology

18.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects of the Projects on terrestrial ecology and ornithology. The chapter provides an overview of the existing environment for the proposed Onshore Development Area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Projects.
2. The effects on benthic habitats are considered in **Chapter 9 Benthic Habitats**, offshore ecology in, **Chapter 10 Fish and Shellfish Ecology**, **Chapter 11 Marine Mammals**, and **Chapter 12 Offshore Ornithology**. Habitats Regulations Assessment (HRA) matters are addressed as part of the HRA process, for which the screening stage has been completed to date (RWE Renewables, 2022a).
3. The assessment should be read in conjunction with the following linked chapters:
 - **Chapter 8 Marine Physical Environment;**
 - **Chapter 12 Offshore Ornithology;**
 - **Chapter 19 Geology and Land Quality;**
 - **Chapter 20 Flood Risk and Hydrology;**
 - **Chapter 23 Landscape and Visual Impact Assessment;**
 - **Chapter 25 Noise;**
 - **Chapter 26 Air Quality;** and
 - **Chapter 30 Climate Change.**
4. Additional information to support the terrestrial ecology assessment includes:
 - **Appendix 18-1 Habitat Survey Report;**
 - **Appendix 18-2 Desk Study Report;**
 - **Appendix 18-3 Great Crested Newt eDNA Survey Report;**
 - **Appendix 18-4 Bat Transects and Static Monitoring Report;**
 - **Appendix 18-5 Over-wintering Bird Survey Report;** and
 - **Appendix 18-6 Breeding Bird Survey Report.**

18.2 Consultation

5. Consultation regarding terrestrial ecology has been undertaken in line with the general process described in **Chapter 6 EIA Methodology**. The key elements of consultation to date have included scoping. The feedback received has been considered in preparing the PEIR. **Table 18-1** provides a summary of how the consultation responses received to date have influenced the approach that has been taken.
6. The Scoping Opinion response from the Environment Agency identified a lack of chalk stream data. However, the information presented in the Multi-Agency Geographical Information for the Countryside (MAGIC) website (MAGIC, 2022) has no watercourses identified as chalk streams in the Onshore Study Area. Therefore, chalk streams have not been addressed within the PEIR.
7. The Scoping Opinion response from Natural England requested that Hornsea Mere Special Protection Area (SPA) & Site of Special Scientific Interest (SSSI), Skipsea Bail Mere SSSI, Leven Canal SSSI, and Pulfin Bog SSSI were also to be included. All of these apart from Hornsea Mere SPA & SSSI fall within 2km of the Onshore Study Area and have therefore been included within the PEIR.
8. This chapter will be updated following consultation on PEIR in order to produce the final assessment that will be submitted with the Development Consent Order (DCO) application. Full details of the consultation process will also be presented in the Consultation Report alongside the DCO application.

Table 18-1 Consultation Responses

Comment	Project Response
Planning Inspectorate/Scoping Responses 02/09/2022	
No matters are proposed to be scoped out of the assessment. Table 3-4 presents matters to be scoped in or out.'	Following the collection of additional baseline information since the publication of the Scoping Opinion, hazel dormouse and white-clawed crayfish, have been scoped out of the assessment, as discussed in section 18.6.
Paragraph 559 indicates that the Scoping Report considers that statutory and non-statutory designated sites for nature conservation have been avoided, and as such direct impacts are not predicted. This is not reflected in Figure 3-1, which shows a number of designated sites within the study area with no defined cable routes shown to avoid these. In addition, Table 3-4 proposes to scope in impacts, without specifying if these are direct or indirect. For clarity, the Inspectorate considers that direct impacts to designated sites must be assessed in the ES.'	The Onshore Development Area has reduced in size since the Scoping Opinion. No statutory designated sites designated for ecology are located within the Onshore Development Area. See Figures 18.2, 18.3 and 18.4 . Impacts to non-statutory sites are considered in section 18.6

Comment	Project Response
The Scoping report notes the potential for noise and dust emissions to affect designated sites. The Inspectorate considers that the potential effects on designated and valuable habitats due to increased emissions from construction plant and vehicles should also be assessed in the ES. It is noted that Section 3.9 of the Scoping Report refers to this potential impact, however the Inspectorate advises that this is subject to specialist ecological assessment and is included in the terrestrial ecology chapter of the ES.'	The effects of noise and dust have been considered in section 18.6.
Public bodies have a responsibility to avoid releasing environmental information that could bring about harm to sensitive or vulnerable ecological features. Specific survey and assessment data relating to the presence and locations of species such as badgers, rare birds and plants that could be subject to disturbance, damage, persecution, or commercial exploitation resulting from publication of the information, should be provided in the ES as a confidential annex. All other assessment information should be included in an ES chapter, as normal, with a placeholder explaining that a confidential annex has been submitted to the Inspectorate and may be made available subject to request.'	No details of sensitive records such as locations of setts or protected species have been included within the PEIR chapter.
Natural England Review of Onshore Ecology Survey Methodology and Programme 16/03/2022	
Natural England agreed with the scope and methodologies for the proposed ecological surveys.	Details of the surveys undertaken to date are outlined in section 18.4.2.1.

18.3 Scope

18.3.1 Study Area

9. The terrestrial ecology study area has been defined on the basis of a 2km buffer around the Onshore Development Area (**Figure 18-1**). The Onshore Development Area covers approximately 80km² of land located within the East Riding of Yorkshire. It has been dictated by the potential location of the onshore grid connection points provided by National Grid ESO and site selection work undertaken to date for the Projects.
10. The majority of field surveys have been undertaken based on the Onshore Study Area that was presented in the Scoping Report. This is mainly due to the Onshore Development Area being refined during the course of the ecological surveys and engineering feasibility studies. Refinements of the Onshore Development Area during the course of the ecological field surveys has resulted in some surveys being undertaken within areas that are now excluded from the Onshore Development Area, and a small number of areas have either not been surveyed or have not been fully surveyed. Additional field surveys will be undertaken in 2023 to address any gaps in the data collected to date and the results will be presented in the ES as outlined in section 18.4.6.

18.3.2 Realistic Worst Case Scenario

18.3.2.1 General Approach

11. The realistic worst case design parameters for likely significant effects scoped into the EIA for the terrestrial ecology assessment are summarised in **Table 18-2**. These are based on the project parameters described in **Chapter 5 Project Description**, which provides further details regarding specific activities and their durations.
12. In addition to the design parameters set out in **Table 18-2** consideration is also given to the different development scenarios still under consideration and the possible phasing of the construction as set out in sections 18.3.2.2 to 18.3.2.5.

Table 18-2 Realistic Worst Case Design Parameters

	DBS East or DBS West in isolation	DBS East and DBS West concurrently	DBS East and DBS West sequentially
Construction			
Landfall	- Horizontal Direction Drilling (HDD) horizontal length: 1400m - Number of Horizontal Directional Drills (HDDs): 5 (4x HVAC plus 1 spare) - Transition joint bay size: 5 x 20m - Number of transition joint bays: 5 (4x power cables plus 1x spare) - HDD compound area: 230 x 75m (for four HVAC) - Total works area: 582,661m² - Duration: 18 months	- HDD horizontal length: 1400m - Number of HDDs: 9 (6 x power cables, 1x fibre optic cable plus 2 spare) - Transition joint bay size: 5 x 20m - Number of transition joint bays: 6 (4x HVAC, 2x HVDC) - HDD compound area: 310 x 75m (for four HVAC, two HVDC) - Total works area: 602,661m² - Duration: 18 months	- HDD horizontal length: 1400m - Number of HDDs: 7 (1 spare) - Transition joint bay size: 5 x 20m - Number of transition joint bays: 9 (6 x power cables, 1 x fibre optic cable plus 2 spare) - HDD compound area: 310 x 75m (for four HVAC, two HVDC) - Total works area: 602,661m² - Duration: 42 months
Onshore export cable route	Cable corridor construction physical parameters: - Working width: 50m (up to 125, at trenchless crossings) - Corridor length: 39km - Total onshore cable corridor works area (est.): 4,504,535m² - Cable duct trench width: 10m (4x HVAC circuits) - No. of trenches: 5 - Maximum cable burial depth: 2m - Indicative cable burial depth: 1.6m - Haul road width: 7m (increasing to 11m at passing places) - Jointing bays: every 0.75 – 1.5km - Jointing bay construction footprint (per bay): 10 x 25m - Jointing bay depth: 2.2m	Cable corridors construction physical parameters: - Working width: 100m (up to 250m at trenchless crossings) - Corridor length: 39km - Total onshore cable corridor works area (est.): 8,228,754m² - Cable duct trench width: 15m (4x HVAC plus 2x HVDC) - No. of trenches: 7 - Maximum cable burial depth: 2m - Indicative cable burial depth: 1.6m - Haul road width: 7m (increasing to 11m at passing places) - Jointing bays: every 0.75 – 1.5km - Jointing bay construction footprint (per bay): 10 x 25m	Cable corridors construction physical parameters: - Working width: 100m (up to 250m at trenchless crossings) - Corridor length: 39km - Total onshore cable corridor works area (est.): 8,228,754m² - Cable duct trench width: 15m (4x HVAC plus 2x HVDC) - No. of trenches: 7 - Maximum cable burial depth: 2m - Indicative cable burial depth: 1.6m - Haul road width: 7m (increasing to 11m at passing places) - Jointing bays: every 0.75 – 1.5km - Jointing bay construction footprint (per bay): 10 x 25m

	DBS East or DBS West in isolation	DBS East and DBS West concurrently	DBS East and DBS West sequentially
	- Main construction compound: 100 x 100m - Secondary construction compounds: 75 x 75m No. of compounds (est.): - Main compounds: 2 - Minor compounds: 15 - HDD compounds: 70 Trenchless crossings physical parameters: - Maximum width of buried cable: 60m - Maximum trenchless crossing depth: 20m - Trenchless crossing compound dimensions: 50 x 50m - No. of trenchless crossing: 35 Durations: - Overall duration: 33 months	- Jointing bay depth: 2.2m - Main construction compound: 100 x 100m - Secondary construction compounds: 75 x 75m No. of compounds (est.): - Main compounds: 4 - Minor compounds: 30 - HDD compounds: 140 Trenchless crossings physical parameters: - Maximum width of buried cable: 227m - Maximum trenchless crossing depth: 20m - Trenchless crossing compound dimensions: 50 x 50m - No. of trenchless crossing: 35 Durations: - Overall duration: 33 months	- Jointing bay depth: 2.2m - Main construction compound: 100 x 100m - Secondary construction compounds: 75 x 75m No. of compounds (est.): - Main compounds: 4 - Minor compounds: 30 - HDD compounds: 140 Trenchless crossings physical parameters: - Maximum width of buried cable: 227m - Maximum trenchless crossing depth: 20m - Trenchless crossing compound dimensions: 50 x 50m - No. of trenchless crossing: 35 Durations: - Overall duration: 57 months
Onshore substations	- Permeant area: 135,000m² (based on one HVAC substation) - Total construction area: 180,000m² (based on one HVAC substation + temporary construction compound) - Duration: 4 years	- Permeant area: 199,416m² (based on one HVAC substation + one HVDC substation) - Total construction area: 274,416m² (based on one HVAC substation + temporary construction compound, and one HVDC substation + temporary construction compound) - Duration: 4 years	- Permeant area: 199,416m² (based on one HVAC substation + one HVDC substation) - Total construction area: 274,416m² (based on one HVAC substation + temporary construction compound, and one HVDC substation + temporary construction compound) - Duration: 6 years
Operation			
Onshore export cable route	- Permanent easement: 20m - No. of link boxes: 229 - Link box footprint (per box): 3 x 8m	- Permanent easement: 35m - No. of link boxes: 343 - Link box footprint (per box): 3 x 8m	- Permanent easement: 35m - No. of link boxes: 343 - Link box footprint (per box): 3 x 8m

	DBS East or DBS West in isolation	DBS East and DBS West concurrently	DBS East and DBS West sequentially
Onshore substations	- Permanent substation area: 135,000m² (based on one HVAC substation) - Tallest building: 24m - Tallest structure: 27m - Duration: 30 years	- Permanent substation area: 199,416m² (based on one HVAC and one HVDC substation) - Tallest building: 24m - Tallest structure: 27m - Duration: 30 years	- Permanent substation area: 199,416m² (based on one HVAC and one HVDC substation) - Tallest building: 24m - Tallest structure: 27m - Duration: 30 years
Decommissioning			
No final decision regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable route and onshore substation has yet been made. It is also recognised that legislation and industry best practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused or recycled wherever possible and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst case scenario, the impacts will be no greater than those identified for the construction phase.			

18.3.2.2 Development Scenarios

13. There are currently two possible electrical solutions being considered for DBS West, HVAC or HVDC. Due to the distance of the array area offshore DBS East will be an HVDC project. Therefore, there are two possible electrical solutions for the Projects:
 - One HVDC project and one HVAC project; or
 - Two HVDC projects.
14. There are different parameters required for the onshore substations depending on which electrical solution is selected. Therefore, there are four possible development scenarios within the onshore substation zones that could be taken forward:
 - Two HVDC substations in Substation Zone 4;
 - One HVDC substation in Substation Zone 1 and one HVAC substation in Substation Zone 4;
 - One HVDC substation in Substation Zone 4 and one HVAC substation in Substation Zone 1; or
 - One HVDC substation in Substation Zone 1 and one HVDC substation in Substation Zone 4.
15. In order to ensure that a robust assessment has been undertaken, all development scenarios and options have been considered to ensure the realistic worst case scenario for each topic has been assessed. Further details are provided in **Chapter 5 Project Description**.

18.3.2.3 Construction Scenarios

16. The following principles set out the framework for how the Projects may be constructed (relating to both onshore and offshore works):
 - DBS east and DBS west may be constructed at the same time, or at different times;
 - If built concurrently, both Projects could be constructed in five years;
 - If built non-concurrently, either Project could be built first;
 - If built non-concurrently, each Project would require a five year period of construction;
 - If built non-concurrently, it is anticipated that there would be up to a two year lag between the start of construction for the first project and the start of construction for the second project; and
 - Assuming a maximum construction period per Project of five years, and taking the above into account, the maximum construction period over which the construction of both Projects could take place is seven years.
17. In order to determine which construction scenario presents the realistic worst case for each receptor and impact, the assessment considers both maximum duration effects and maximum peak effects, in addition to each Project being developed in isolation, drawing out any differences between each of the two Projects.
18. The three construction scenarios considered by the terrestrial ecology assessment are therefore:
 - Build DBS East or build DBS West in isolation;
 - Build DBS East and DBS West concurrently – reflecting the maximum peak effects; and
 - Build the Projects sequentially with a lag of up to two years – reflecting the maximum duration of effects.
19. The individual, concurrent and sequential construction scenarios all allow for flexibility to build out the Projects using a phased approach. This will allow the Projects to adapt to National Grid Electricity Transmission Operator's development plans for the onshore grid connection points. Under a phased approach the maximum timescales for individual elements of the construction have been assessed.

20. Any differences between the Projects, or differences that could result from the manner in which the first and the second Projects are built (concurrent or sequential and the length of any gap) are identified and discussed where relevant in section 18.6. For each potential impact, only the worst case construction scenario for two Projects is presented, i.e. either concurrent or sequential. The justification for what constitutes the worst case is provided, where necessary, in section 18.6.

18.3.2.4 Operation Scenarios

21. Operation scenarios are described in detail in **Chapter 5 Project Description**. The assessment considers the following scenarios:
- Only DBS East in operation;
 - Only DBS West in operation; and
 - The two Projects operating concurrently, with or without a lag of up to two years between each Project commencing operation.
22. If the Projects are built out using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phase for the Projects has been assessed. See section 5.1.1 of **Chapter 5 Project Description** for further information.
23. The operations lifetime of each Project is expected to be 30 years.

18.3.2.5 Decommissioning Scenarios

24. Decommissioning scenarios are described in **Chapter 5 Project Description**. Decommissioning arrangements will be agreed through the submission of a Decommissioning Programme prior to construction, however for the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

18.3.3 Mitigation Embedded in the Design

25. This section outlines the embedded mitigation relevant to the terrestrial ecology assessment, which has been incorporated into the design of the Projects (**Table 18-3**). Where other mitigation measures are proposed, these are detailed in the impact assessment (section 18.6).

Table 18-3 Embedded Mitigation Measures

Parameter	Mitigation Measures Embedded into the Project Design
Designated sites	Statutory designated sites for nature conservation have been avoided wherever possible as part of the site selection and route planning process. Multiple non-statutory sites do lie wholly or partially within the Onshore Study Area and trenchless crossings such as HDD will be employed to avoid direct disturbance to these sites.
Habitat loss	Permanent habitat loss will be minimised during the site selection and route refinement process of the Projects, with the most sensitive habitats (if identified) being avoided where possible. Sensitive habitats are defined as those listed as high or very high distinctiveness in the Biodiversity Metric 3.1 (Natural England, 2022) as they are the most difficult to create or restore.
Watercourses	Trenchless crossing such as HDD will be employed under Main Rivers including Catfoss Drain, Stream Dyke, Monk Dyke, Meaux and Routh East Drain, Holderness Drain, River Hull, Beverley and Barnston Drain and Catchwater Drain. This methodology will also be applied to LWS and woodlands within the Onshore Development Area.

18.4 Assessment Methodology

18.4.1 Policy, Legislation and Guidance

18.4.1.1 National Policy Statements

26. The assessment of potential impacts upon terrestrial ecology has been made with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for terrestrial ecology, as detailed in the NPS, are summarised in **Table 18-4** together with an indication of the section of this chapter where each is addressed.
27. It is noted that the NPS for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Network Infrastructure (EN-5) are in the process of being revised. Draft versions were published for consultation in September 2021 by the Department for Business, Energy and Industrial Strategy. A review of these draft versions has been undertaken in the context of the PEIR chapter. No material changes were noted, however any further changes to these draft revisions resulting from the consultation process will be considered in the ES.
28. Following the consultation in 2021 on the draft energy NPS, a new consultation opened on the 30 March 2023 on revised drafts of the energy NPSs, including EN-1, EN-3 and EN-5. Due to the timing of this consultation, and finalisation of this PEIR we have been unable to review and take these revised draft NPS into account within these documents. However, these will be reviewed and incorporated into the final ES where relevant.

Table 18-4 NPS Assessment Requirements

NPS Requirement	NPS Reference	PEIR Section Reference
EN-1 NPS for Energy		
<i>'Where the development is subject to EIA [Environmental Impact Assessment] the applicant should ensure that the ES [Environmental Statement] clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the IPC [Infrastructure Planning Commission][now the Secretary of State] consider thoroughly the potential effects of a proposed project.'</i>	Paragraph 5.3.3	Potential impacts on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity are considered in section 18.6.1.1.
<i>'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'</i>	Paragraph 5.3.4	Embedded mitigation measures are provided in section 18.3.3 and where applicable, further mitigation measures are outlined in section 18.6. Geology is addressed in Chapter 19 Geology and Land Quality .
<i>'The Government's biodiversity strategy is set out in 'Working with the grain of nature'. Its aim</i>	Paragraph 5.3.5 –	Site selection decisions and embedded mitigation measures have sought to minimise

NPS Requirement	NPS Reference	PEIR Section Reference
<i>is to ensure: a halting, and if possible a reversal, of declines in priority habitats and species, with wild species and habitats as part of healthy, functioning ecosystems; and the general acceptance of biodiversity's essential role in enhancing the quality of life, with its conservation becoming a natural consideration in all relevant public, private and non-governmental decisions and policies'.</i> <i>'As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives (as set out in section 4.4 above); where significant harm cannot be avoided, then appropriate compensation measures should be sought.'</i> <i>'In taking decisions, the IPC [now the Secretary of State] should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; habitats and other species of principal importance</i>	Paragraph 5.3.8	impacts to features of biodiversity. Embedded mitigation measures are provided in section 18.3.3 and where applicable, further mitigation measures are outlined in section 18.6. Site selection decisions and embedded mitigation measures have sought to minimise impacts to features of geological interest are addressed in Chapter 19 Geology and Land Quality.

NPS Requirement	NPS Reference	PEIR Section Reference
<i>for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment.'</i>		
<i>'For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes potential Special Protection Areas (pSPAs) to be considered in the same way as if they had already been classified. Listed Ramsar sites should, also as a matter of policy, receive the same protection.'</i>	Paragraph 5.3.9	Designated sites are presented in section 18.5.2. and in the HRA (RWE Renewables, 2022a). Site selection decisions have sought to minimise impacts to interest features within designated sites.
<i>'Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection.'</i>	Paragraph 5.3.10	Designated sites are presented in section 18.5.2. Site selection decisions have sought to minimise impacts to interest features within designated sites.
<i>'Where a proposed development on land within or outside a SSSI is likely to have an adverse effect on a SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made</i>	Paragraph 5.3.11	The Projects are not expected to affect SSSIs once mitigation is in place, as discussed in section 18.6.1.1.

NPS Requirement	NPS Reference	PEIR Section Reference
<i>where the benefits (including need) of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.'</i>		
<i>'Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a fundamental role to play in meeting overall national biodiversity targets; contributing to the quality of life and the well-being of the community; and in supporting research and education. The IPC should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent.'</i>	Paragraph 5.3.13	Designated sites are presented in section 18.5.2. Site selection decisions have sought to minimise impacts to interest features within designated sites. Geology impacts are discussed in Chapter 19 Geology and Land Quality .
<i>'Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The IPC [now the Secretary of State] should not grant development consent for any development</i>	Paragraph 5.3.14	Ancient woodland is not present in the Onshore Development Area. Impact to Ancient Woodland located adjacent to the Onshore Development Area are assessed in section 18.6.

NPS Requirement	NPS Reference	PEIR Section Reference
<i>that would result in its loss or deterioration unless the benefits (including need) of the development, in that location outweigh the loss of the woodland habitat. Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why.'</i>		
<i>'The IPC [now the Secretary of State] will aim to maximise opportunities to build in beneficial biodiversity features when considering proposals as part of good design.'</i>	Paragraph 5.3.15	Biodiversity Net Gain (BNG) is discussed in section 18.4.7.
<i>'The IPC [now the Secretary of State] shall have regard to the protection of legally protected species and habitats and species of principal importance for nature conservation.</i> <i>'The IPC [now the Secretary of State] should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the</i>	Paragraph 5.3.17	Information on habitats is provided in section 18.5.1 and protected species in section 18.5.4. The outcome of the assessment process is provided in section 18.6.

NPS Requirement	NPS Reference	PEIR Section Reference
<i>development outweigh that harm. In this context, the IPC should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development.'</i>		
<i>'The applicant should include appropriate mitigation measures as an integral part of the proposed development and demonstrate that: During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; During construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements; Habitats will, where practicable, be restored after construction works have finished; and Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.'</i>	Paragraph 5.3.18	Embedded mitigation measures are presented in section 18.3.3. Mitigation measures associated with potential impacts are presented in section 18.6.
<i>'The IPC [now the Secretary of State] will need to take account of what mitigation measures may have been agreed between</i>	Paragraph 5.3.20	The potential requirement for mitigation licensing for badgers <i>Meles meles</i> , bats, otter <i>Lutra lutra</i> , and great crested newts

NPS Requirement	NPS Reference	PEIR Section Reference
<i>the applicant and whether Natural England... has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'</i>		(GCN) <i>Triturus cristatus</i> is presented in section 18.6 and is used as a worst case scenario.
EN-3 NPS for Renewable Energy Infrastructure		
<i>'Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.'</i>	Paragraph 2.4.2	Project design has avoided sensitive features where possible. Embedded mitigation measures are presented in section 18.3.3 and where applicable, further mitigation measures are outlined in section 18.6.
<i>'Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that, where appropriate, adverse effects can then be mitigated and to enable further useful information to be published relevant to future projects.'</i>	Paragraph 2.6.71	Monitoring requirements are set out in section 18.8.
<i>'There may be some instances where it would be more harmful to the ecology of the site to remove elements of the development, such as the access tracks or underground cabling, than to retain them.'</i>	Paragraph 2.7.15	Decommissioning is discussed in section 18.6.3.

NPS Requirement	NPS Reference	PEIR Section Reference
EN-5 NPS for Electricity Networks Infrastructure		
<i>‘Negative effects on ecology can be reduced through careful planning and design, such as the selection of an appropriate route for transmission lines. The revised draft of EN-1 outlines a number of mitigation measures that will help to reduce the risk of the identified generic negative effects to ecology. This includes the requirement for applicants to show how the project has taken advantage of opportunities to conserve and enhance biodiversity.’</i>	Section 3.2	Biodiversity conservation and enhancement is discussed in section 18.4.7.
<i>‘Applicants will also be expected to have included appropriate mitigation measures as an integral part of the proposed development. Any large, proposed electricity networks infrastructure development will be subject to project level HRA and Environmental Impact Assessment (EIA).’</i>		Proposed mitigation is presented in sections 18.3.3 and 18.6. The project level HRA is being addressed separately, see the HRA Screening Report (RWE Renewables, 2022a).

18.4.1.2 Other

29. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of terrestrial ecology. These include:

18.4.1.2.1 Biodiversity Policy

30. The overarching policy guidance for terrestrial ecology and ornithology included within the National Planning Policy Framework (NPPF). Section 15 of the NPPF (Conserving and Enhancing the Natural Environment) outlines the approach that Local Authorities should adopt when considering ecological issues within the planning framework, including the principles of the Mitigation Hierarchy. This espouses that in addressing impacts on valued features, avoidance should be the first option considered, followed by mitigation (minimising negative impacts). Where avoidance and mitigation are not possible, compensation for loss of features can be used as a last resort.
31. The NPPF states that “*development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists*”.
32. The NPPF also states that development plans should “*promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity*”, and “*...opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.*” The Applicants’ approach to BNG is discussed in section 18.4.7.

18.4.1.2.2 International Site Designations

33. The European Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92 / 43 / EEC) (the Habitats Directive) directs the designation of important wildlife sites through the EU as Special Areas of Conservation (SACs) and gives statutory protection to habitats and species listed in the Directive as being threatened or of community interest. Sites identified as candidate SAC (cSAC) are provided with the same level of protection as SAC.

34. Annex I of the Habitats Directive lists habitat types which are regarded as being of European importance. Included within these are a number of 'priority habitat types' which are habitats regarded as being in danger of disappearance and whose natural range falls broadly within the EU. This European law was originally transposed into English and Welsh legislation by The Conservation (Natural Habitats & c.) Regulations 1994, later replaced by Conservation of Habitats and Species Regulations 2017.
35. Changes to the Conservation of Habitats and Species Regulations 2017 (as amended) have been implemented by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The key changes are the creation of a 'National Site Network' (NSN) (which no longer forms part of the EU Natura 2000 network) and the establishment of management objectives for the NSN. The network objectives are to:
- Maintain or, where appropriate, restore habitats and species listed in Annexes I and II of the Habitats Directive to a favourable conservation status; and,
 - Contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds and securing compliance with the overarching aims of the Wild Birds Directive.
36. Habitats of European-wide importance for birds are listed under the Birds Directive (Directive 2009 / 147 / ED). Habitats designated under this Directive are notified as SPAs and are identified for holding populations >1% of the reference population as defined in Appendix 4 of the SPA review of bird species listed in Annex 1 of the same Council Directive. Sites identified as potential SPA (pSPA) are provided with the same level of protection as SPA.
37. Wetlands of international importance (especially as waterfowl habitat) are designated under the Ramsar Convention, an intergovernmental treaty adopted in 1971 which provides a framework for 'the conservation and wise use of wetlands and their resources.'

18.4.1.2.3 National (UK) Site Designations

38. National ecological designations, such as SSSIs and National Nature Reserves (NNRs) are also afforded statutory protection. SSSIs are notified and protected under the jurisdiction of the Wildlife and Countryside Act 1981 (WCA). SSSIs are notified based on specific criteria, including the general condition and rarity of the site and of the species or habitats supported by it.

18.4.1.2.4 *Non-Statutory (County) Site Designations*

39. Local authorities may designate certain areas as being of local conservation interest. The criteria for inclusion may vary between areas. Most individual counties have a similar scheme; within the East Riding of Yorkshire such sites are designated as (LWSs or LNRs). Designation of such sites does not itself confer statutory protection.

18.4.1.2.5 *Species Designation and Protection*

40. The Protection of Badgers Act 1992 makes it unlawful to knowingly kill, capture, disturb or injure an individual badger or to intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers (i.e., a sett).
41. All bat species are listed under Annex IV (and certain species also under Annex II) of the Habitats Directive and are given UK protected status by Schedule 2 of the Conservation of Habitats and Species Regulations 2017. Bats and their roosts also receive protection from disturbance through the WCA. This protection extends to both the species and roost sites. It is an offence to kill, injure, capture, possess or otherwise disturb bats. Bat roosts are protected at all times of the year (making it an offence to damage, destroy or obstruct access to bat roosts), regardless of whether bats are present at the time.
42. All bird species are protected under the WCA. This prevents killing or injuring any bird or damaging or destroying nests and eggs. Certain species (including barn owl *Tyto alba*) are also listed under Schedule 1 of the WCA, which prohibits intentionally or recklessly disturbing the species at, on or near an 'active' nest.
43. All native reptiles are listed on Schedule 5 of the WCA and are afforded protection under Sections 9(1) and 9(5). For the reptile species adder *Vipera berus*, grass snake *Natrix helvetica* (previously *Natrix natrix*), slow-worm *Anguis fragilis* and common lizard *Zootoca vivipara*, this protection prohibits deliberate or reckless killing and injury but does not include habitat protection.

44. GCN are fully protected in accordance with both national and international legislation. The species is listed under Annexes IV and II of the Habitats Directive, and Schedule 2 of The Conservation of Habitats and Species Regulations 2017. The species is also protected by Sections 9(4) and 9(5) of the WCA. It is an offence to knowingly or recklessly kill, injure, disturb, handle or sell the animal, and this protection is afforded to all life stages. It is unlawful to deliberately or recklessly damage, destroy, or obstruct the access to any structure or place used for shelter or protection; this includes both the terrestrial and aquatic components of its habitat.
45. Otters are protected in accordance with Schedule 5 of the WCA. The otter is also a protected species included in Annex II of the Habitats Directive and is protected under Schedule 2 of the Conservation of Habitats and Species Regulations 2017. It is an offence to intentionally kill, injure or take an otter from the wild, or to intentionally or recklessly damage, destroy or obstruct access to any habitat used by otters or to disturb the otters which make use of those habitats.
46. The water vole *Arvicola amphibius* is protected in accordance with Schedule 5 of the WCA. It is an offence to intentionally damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection, or to disturb water voles whilst they are using such a place. It is also an offence to kill, injure, capture or possess water voles.
47. Schedule 8 of the WCA lists plant species which are afforded special protection. It is an offence to pick, uproot or destroy any species listed on Schedule 8 without prior authorisation, and all plants are protected from unauthorised uprooting (i.e., without the landowner's permission) under section 13 of the WCA.
48. A Vascular Plant Red List for England provides a measure of the current state of England's flora measured against standardised International Union for Conservation of Nature criteria. Any taxon that is threatened (Critically Endangered, Endangered, Vulnerable) or Near Threatened) does not have statutory protection but should be regarded as a priority for conservation in England. It should be noted that 'threat' is not synonymous with 'rarity'; some of the species concerned are relatively common and widespread.

18.4.1.2.6 *Priority Species and Habitats*

49. Species and Habitats of Principal Importance (hereafter referred to as Priority Habitats and Priority Species) are a consideration under the NPPF, placing responsibility on Local Planning Authorities to aim to conserve and enhance biodiversity and to encourage biodiversity in and around developments. There is a general biodiversity duty in the Natural Environment and Rural Communities Act 2006 as amended (NERC Act) (Section 40). Biodiversity, as covered by the Section 40 duty, includes all biodiversity, not just Priority Habitats and Species.
50. Section 41 of the NERC Act places a duty on the Secretary of State to publish lists of Priority Species and Habitats. These are species / habitats in England which had been identified as requiring action under the UK Biodiversity Action Plan (BAP), and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework (Joint Nature Conservation Committee (JNCC), 2012). The protection of either Priority Species or Habitats is not statutory, but “*specific consideration*” should be afforded by Local Planning Authorities when dealing with them in relation to planning and development control. Also, there is an expectation that public bodies would refer to the Section 41 list when complying with the Section 40 duty.
51. Widespread Priority Habitats in East Riding of Yorkshire include, but are not limited to:
- Coastal and floodplain grazing marsh;
 - Lowland mixed deciduous woodland;
 - Maritime Cliffs and Slopes; and
 - Traditional Orchard.

52. Widespread Priority Species in East Riding of Yorkshire (which have no specific legal protection) include:
- Hedgehog *Erinaceus europaeus*;
 - Polecat *Mustela putorius*;
 - Brown hare *Lepus europaeus*;
 - Harvest mouse *Micromys minutus*;
 - Multiple Birds of Conservation Concern (BoCC) (e.g. song thrush *Turdus philomelos* and house sparrow *Passer domesticus*);
 - Common toad *Bufo bufo*;
 - European eel *Anguilla anguilla*;
 - Multiple invertebrate species; and
 - Multiple plant species.
53. This is not a complete list and relies on the submission of records to record centres, so there will be other widespread Priority Species present in the East Riding of Yorkshire that are not listed and / or recorded.

18.4.1.2.7 The Hedgerow Regulations

54. The Hedgerow Regulations 1997 make it an offence to remove or destroy certain hedgerows without permission from the local planning authority and the local planning authority is the enforcement body for such offences.

18.4.1.3 Local Planning Policy

55. In addition to the national and international policy, this chapter also takes into consideration the following local policies:
- East Riding of Yorkshire Local Plan 2012 – 2029; and
 - East Riding of Yorkshire Biodiversity Action Plan.

18.4.1.4 Guidance

56. The impact assessment has been based upon the following guidance and standards:
- Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal;
 - Construction Industry Research and Information Association (CIRIA) C648 (2006) Control of water pollution from linear construction projects (CIRIA, 2006); and
 - CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd Edition – CIRIA, 2010).

57. The following species-specific guidance and standards have been used during the assessment process:
- Standing advice on protected species (bats (all species), GCN, badger, water vole, otter, reptiles, protected plants, invertebrates, ancient woodlands and veteran trees) (Natural England, 2015);
 - British Standard 5837: 2012 – Trees in relation to design, demolition and construction;
 - Bat Conservation Trust and Institute of Lighting Engineers (2018) Bats and Artificial Lighting in the UK (ILE, 2018);
 - The Water Vole Mitigation Handbook (The Mammal Society Guidance Series) (Dean *et al.*, 2016);
 - Reptile Habitat Management Handbook (Edgar *et al.*, 2010);
 - Great Crested Newt Mitigation Guidelines (English Nature, 2001);
 - Herpetofauna Worker's Manual (JNCC, 2003);
 - Otters: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2014);
 - Badgers: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015);
 - Bats: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015); Badgers: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015);
 - Great crested newts: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015);
 - Invertebrates: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015);
 - Reptiles: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015);
 - Water voles: surveys and mitigation for development projects. Natural England Standing Advice (Natural England, 2015);
 - Water Vole Conservation Handbook, 3rd Edition (Strachan and Moorhouse, 2011); and
 - Great Britain (GB) Non-native Species Information (GB Non-native secretariat, 2015).
58. Further detail is provided in **Chapter 3 Policy and Legislative Context**.

18.4.2 Data and Information Sources

18.4.2.1 Site Specific Surveys

59. In order to provide site specific and up to date information on which to base the impact assessment, phase 1 habitat survey, bat, breeding bird, over-wintering bird, and GCN surveys were conducted
60. Full survey methodologies and results are presented in their respective technical appendices (**Appendix 18.1 – 18.6**), that support this chapter.

18.4.2.2 Other Available Sources

61. Other sources that have been used to inform the assessment are listed in **Table 18-5**.

Table 18-5 Other Available Data and Information Sources

Data Set	Spatial Coverage	Year
Desk study report	Onshore Study Area plus a 2km buffer	2022
Environmental Impact Assessment Scoping Report	Onshore Study Area plus a 2km buffer	2022
Scoping Opinion: Proposed Dogger Bank South Offshore Wind Farms	Onshore Study Area plus a 2km buffer	2022
Biological records data from North & East Yorkshire Ecological Data Centre (NEYEDC)	Onshore Study Area	2022

18.4.3 Future Survey Plan

62. Further species specific surveys for water vole, otter, badger, GCN environmental DNA (eDNA), bat Ground Level Tress Assessments (GLTA), reptiles, and terrestrial invertebrates are planned for 2023.

18.4.4 Impact Assessment Methodology

63. **Chapter 6 EIA Methodology** provides a summary of the general impact assessment methodology applied. The following sections describe the methods used to assess the likely significant effects on terrestrial ecology.

18.4.4.1 Definitions

64. For each potential impact, the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts (i.e. magnitude) on given receptors. The definitions of duration, importance, sensitivity and magnitude for the purpose of the terrestrial ecology assessment are provided in **Table 18-6, Table 18-7, Table 18-8** and **Table 18-9**.

Table 18-6 Definition of Duration for a Terrestrial Ecology Receptor

Duration	Definition
Short term	Effects which at most occur over a part of – or over a part of a key period of – a species’ active season or a habitat’s growing season, i.e. typically impacts which occur over a matter of days or weeks.
Medium term	Effects which at most occur over a part of – or over a part of a key period of – a species’ active season or a habitat’s growing season, i.e. typically impacts which occur over a matter of months or one year.
Long term	Effects which occur over the multiple active or growing seasons, i.e. typically impacts which occur over more than one year.

Table 18-7 Definition of Importance for a Terrestrial Ecology Receptor

Importance	Definition
High	Habitats or species that form part of the cited interest within an internationally or nationally protected site, such as those designated under the Habitats Directive (e.g. SACs) or other international convention (e.g. Ramsar site). A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in an international / national context, such that the site is likely to be designated as a site of European importance (e.g. SAC). Habitats or species that form part of the cited interest within a nationally designated site, such as a SSSI or an NNR. A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in a national context for which the site could potentially be designated as a SSSI. Presence of UKBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.
Medium	A feature (e.g. habitat or population), which is either unique or sufficiently unusual to be considered as being of nature conservation value from a county to regional level. Habitats or species that form part of the cited interest of an LNR, or some local-level designated sites, such as a Local Wildlife Site (LWS), also referred to as a non-statutory Site of Importance for Nature Conservation or the equivalent, e.g. Ancient Woodland designation. Presence of Local Biodiversity Action Plan (LBAP) habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.
Low	A feature of importance at district level. A feature (e.g. habitat or population) that is of nature conservation value in a local context only, with insufficient value to merit a formal nature conservation designation.
Negligible	A feature of importance at local level. Commonplace feature of little or no habitat / historical significance. Loss of such a feature would not be seen as detrimental to the ecology of the area.

Table 18-8 Definition of Sensitivity for a Terrestrial Ecology Receptor

Sensitivity	Definition
High	The receptor is unable to tolerate effect resulting in permanent change in its abundance or quality. Receptor is unable to avoid impact and therefore unable to recover resulting in permanent or long-terms change (i.e. 10 years or more).
Medium	The receptor has some ability to tolerate this effect but does experience a detectable change. Receptor has some ability to avoid the most negative consequence of the impact and / or can partially adapt and therefore is able to recover to an acceptable status over the short to medium term (1-10 years).
Low	The receptor is unaffected and therefore the receptor can completely avoid the impact or adapt to it with no detectable change. Consequently, the receptor can recover fully within the short term (1 year).

Table 18-9 Definition of Magnitude of Impacts

Magnitude	Definition
High	The impact is likely to have an adverse effect on the integrity of a site or the conservation status of a species or species assemblage
Medium	The impact adversely affects an ecological receptor but is unlikely to adversely affect its integrity or conservation status.
Low	The impact adversely affects an ecological receptor but would not adversely affect its integrity or conservation status.
Negligible	There would be minimal effect on the ecological receptor.
No change	There would be no detectable change from the baseline condition of the ecological receptor.

18.4.4.2 Significance of Effect

65. The assessment of significance of an effect is informed by the sensitivity of the receptor and the magnitude of the impact. The determination of significance is guided by the use of an impact significance matrix presented in **Chapter 6 EIA Methodology (Table 18-10)**. Definitions of each level of significance are provided in **Table 18-11**. For the purposes of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that has a significance of minor or negligible is not significant.

Table 18-10 Terrestrial Ecology Significance of Effect Matrix

		Adverse Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Table 18-11 Definition of Effect Significance

Significance	Definition
Major	Very large or large change in receptor condition, which is likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which is likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore, no change in receptor condition.

18.4.5 Cumulative Effect Assessment Methodology

66. The cumulative effect assessment (CEA) considers other plans, projects and activities that may result in cumulation of effect with the Projects. **Chapter 6 EIA Methodology** provides further details of the general framework and approach to the CEA.
67. The final assessment of cumulative effects will be undertaken during the later stages of the EIA, once further information is available on a number of projects such as the Outer Dowsing Offshore Wind Farm, Hornsea Project Four decision and the Sheringham Shoal and Dudgeon Extension Projects examination. However, for the purposes of the PEIR, it is possible to identify a number of projects and plans which are likely to feature in that assessment and consider the extent to which cumulative effects might arise. Section 18.7 presents the following preliminary information regarding cumulative effects:
- Screening for cumulative effects; and
 - A preliminary short list of plans and projects considered for CEA, including a brief description as to how projects have been screened in and the initial tier level they have been assigned.

18.4.6 Assumptions and Limitations

68. This preliminary assessment is considered to be an interim stage in the EIA process. The results presented in the following sections are based on early design assumptions and initial assessments which will be refined and presented in the final ES to be submitted as part of the DCO application.
69. The biological records data from NEYEDC is generated from many sources and quality and accuracy cannot be guaranteed. This is not a definitive data set and a lack of data in any area does not necessarily denote an absence of species or habitats. Records tend to be concentrated around residential areas, wildlife sites and popular visitor locations.
70. Habitat survey data is limited due to lack of access permission from landowners. Surveys are ongoing into 2023. Areas surveyed to date can be seen on Figure 2 of the Habitat Survey 2022 report (**Appendix 18-1**). Where access has not been granted an assumption has been made using satellite imagery, but quantitative discussions of habitat cannot be confirmed at this stage.

71. There is no survey data available for the following species: roosting bats, otter, reptiles, water vole and invertebrates. This is a significant limitation, as a result the worst case scenario (assumption of presence for these species) is being used for assessment purposes. Full survey data will be available at for inclusion in the ES where a full assessment will be provided.
72. There were equipment failures for multiple bat activity surveys (**Appendix 18-4**). No surveys were undertaken in April 2022. This has created large gaps in activity data for bats. This is a significant limitation in being able to make an assessment for these species, as a result the worst case scenario (assumption of presence in all suitable habitats) is being used for assessment purposes. Full survey data will be available at for inclusion in the ES where a full assessment will be provided.
73. Sufficient access permission had not been gained for the 2022 breeding bird survey season; therefore, surveys could be undertaken by Public Rights of Way (PRoW) only. The PRoW network was only sufficiently extensive to create workable transects in three of the nine targeted survey areas, therefore these transects were surveyed in 2022. All nine survey surveys area are programmed for survey in 2023 where access is available. Whilst some additional land access was granted, this was not early enough in the season to pick up the key breeding periods and was not sufficiently extensive to create additional transects. Therefore, presence has been assumed and worst case scenario is being used for assessment purposes.
74. Within the GCN report of the 43 waterbodies identified, nine could not have eDNA analysis carried out on them due to landowner access issues (**Appendix 18-3**). This is a significant limitation to be able to make an assessment for GCN. Therefore, presence has been assumed and worst case scenario (assumption of presence in all suitable habitats) is being used for assessment purposes. Full survey data will be available at for inclusion in the ES where a full assessment will be provided.
75. Access for the 2023 survey programme has been secured and these surveys shall be completed in sufficient detail to inform the ES.

18.4.7 Biodiversity Net Gain

76. Biodiversity Net Gain (BNG) is an approach to development that leaves the natural environment in a measurably better state than it was before. BNG works with and does not replace the mitigation hierarchy. It does not replace existing legal requirements (e.g., in relation to protected species) and it should not be applied to compensate for impacts on irreplaceable habitats. The Applicant is cognisant of the good practice in respect of BNG and will align where practicable with the ten principles developed by CIEEM, IEMA and CIRIA (Baker, 2019) summarised below.

- Principle 1. Apply the Mitigation Hierarchy. Avoid and then minimise impacts on biodiversity. As a last resort, and in agreement with stakeholders and decision-makers, compensate for losses that cannot be avoided.
- Principle 2. Avoid losing biodiversity that cannot be offset by gains elsewhere. Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset.
- Principle 3. Be inclusive and equitable. Engage stakeholders in designing, implementing, monitoring and evaluating the approach to Net Gain. Share the benefits fairly among stakeholders.
- Principle 4. Address risks. Mitigate difficulty and/or uncertainty using well accepted ways to add contingency when calculating biodiversity losses and gains.
- Principle 5. Make a measurable Net Gain contribution. Achieve a measurable, overall gain for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.
- Principle 6. Achieve the best outcomes for biodiversity. Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge.
- Principle 7. Be additional. Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e., do not deliver something that would occur anyway).
- Principle 8. Create a Net Gain legacy. Ensure Net Gain generates long-term benefits.
- Principle 9. Optimise sustainability. Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.

- Principle 10. Be transparent. Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.
77. In respect of Principle 5, DBS will use the Defra 4.0 (or its successor) to demonstrate measurable Net Gain contribution. It is however worth highlighting here that since the metric is a proxy, it does not account for species-specific mitigation, compensation or enhancement. Loss/ gains in this respect will be measured against monitoring targets set out within the relevant European Protected Species Licence(s) (if applicable) and Outline Landscape and Environment Management Plan (OLEMP) that will be submitted alongside the ES.
78. A BNG assessment is not being submitted as part of the PEIR consultation. Habitat surveys are ongoing and the Onshore Development Area is still being refined. BNG will be addressed for the ES based upon the final Onshore Development Area. This will include pre- and post-project plans, a completed BNG Metric 4.0 spreadsheet and a Biodiversity Gain Plan.

18.5 Existing Environment

18.5.1 Habitats

79. The baseline information presented in this section has been informed by the findings of the 2022 habitat surveys. Where habitats were not recorded during these survey efforts, due to landowner access restrictions, the habitat descriptions have been informed using the information obtained from the Living England habitat layer on MAGIC. Full details of the habitat surveys are provided in **Appendix 18.1**.
80. A total of 1,813 hectares (ha) of the Onshore Study Area has been mapped and surveyed. A total of 373 target notes were recorded.
81. Within the Onshore Study Area the following habitats were recorded:
- The vast majority of the area surveyed, 1,566.7ha (86.4%), was agricultural, including improved grassland;
 - Woodland amounted to 99.29ha (5.5%) and was generally dominated by mixed broad-leaved, although conifer made up 23.9% of the total woodland area;
 - Arable field margins made up 64.2ha (3.5%) of the survey area;
 - Grassland of varying types, excluding improved grassland, accounted for 50.4ha (2.8%) of the survey area. A very small area of acid grassland (0.08ha) was recorded;
 - Hedgerows, rivers and streams, line of trees, developed land sealed surface, dense scrub, bramble scrub, buildings, artificial unvegetated unsealed surface, other developed land, were also present.

82. The habitats recorded could meet the criteria for the following Priority Habitats:
- Wet woodland;
 - Lowland mixed deciduous woodland;
 - Arable field margins;
 - Ponds;
 - Rivers and streams;
 - Lowland dry acid grassland;
 - Hedgerows; and
 - Reedbed.
83. The Living England layer provided on MAGIC shows that most of the land that has not yet been surveyed is predominantly similar to the areas that have been surveyed.
84. The habitat surveys recorded that the Onshore Development Area runs through predominantly agricultural land, including improved grassland.
85. Arable fields are typically of low value and are suboptimal for use by protected and notable species. However, for ground-nesting birds such as skylark *Alauda arvensis*, arable fields do provide nesting habitat. Terrestrial mammals such as brown hare (a Priority Species) also use arable fields for foraging and shelter.

18.5.2 Statutory Designated Sites

18.5.2.1 International Statutory Designated Sites

86. The desk study report identified two SPAs and one SAC within the zone of influence of the Onshore Study Area (**Appendix 18-2**). They can be seen on **Figure 18-2**. As the sites have international protection, the sites are of international ecological importance.
87. In accordance with the criteria set out in **Table 18-7**, all international statutory designated sites for nature conservation are of high importance.
88. Likely significant effects to the onshore habitat sites have been considered in the HRA Screening Report (RWE Renewables, 2022a) and screened out of any further assessment. As such, they are not a receptor of the proposed works. And are scoped out of further assessment in this report.
89. The reasons for scoping out the Habitat Sites are listed below:
- As works within the export cable corridor will be undertaken to a shallow depth (approx. 1m), there will be no alterations to the groundwater/hydrology regime of the Hornsea Mere SPA or Humber Estuary SAC.
 - Due to the closest site of Hornsea Mere SPA being approximately 2km to the east, there will be no perceptible effects to air quality within the site as a result of the works within the onshore cable corridor.
 - Qualifying species of Hornsea Mere SPA are typically found in areas such as gravel pits, lakes, reservoirs, there will be no pathway for significant effects on functionally-linked land to the SPA from the Projects.
 - Given the built up nature of the land between the SPA and the export cable corridor and the limited physical area the construction works will encompass, there will be no pathway for significant effects from the Projects on any functionally linked land to the Humber Estuary SPA.

18.5.2.2 National and Local Statutory Designated Sites

90. The desk study report identified nine SSSIs within 2km of the Onshore Study Area (**Appendix 18-2**).
91. There are six designated sites within 2km of the Onshore Development Area. These are Withow Gap Skipsea SSSI, Skipsea Bail Mere SSSI, Leven Canal SSSI, Pulfin Bog SSSI, Burton Bushes SSSI and Beverley Parks Local Nature Reserve (LNR). They can be seen on **Figure 18-3**. Of these, Withow Gap Skipsea SSSI and Skipsea Bail Mere SSSI are designated for geological features only. Impacts to these sites are addressed in **Chapter 19 Geology and Land Quality**.
92. In accordance with the criteria set out in **Table 18-7**, SSSIs are of high importance and LNRs are of medium importance.
93. The full desk study report including the designations can be found in **Appendix 18-2**.

18.5.3 Non-statutory Designated Sites

94. The desk study report identified 82 non-statutory Local Wildlife Sites (LWSs) within 2km of the Onshore Study Area. The designated sites can be seen on **Figure 18-4**.
95. Non-statutory designated sites for nature conservation have been avoided where possible; however, there are 17 non-statutory designated nature conservation sites wholly or partially within or adjacent to the Onshore Development Area as presented in **Table 18-12** and shown on **Figure 18-4**.
96. In accordance with the criteria set out in **Table 18-7**, all non-statutory designated sites are of medium importance.

18.5.4 Protected and Notable Species

97. This section provides a summary of the key species recorded within the Onshore Study Area, drawing from information from the following sources:

- **Appendix 18-1 Habitat Survey Report;**
- **Appendix 18-2 Desk Study Report;**
- **Appendix 18-3 Great Crested Newt eDNA Survey Report;**
- **Appendix 18-4 Bat Transects and Static Monitoring Report;**
- **Appendix 18-5 Over-wintering Bird Survey Report;** and
- **Appendix 18-6 Breeding Bird Survey Report.**

18.5.4.1 Amphibians, Including Great Crested Newt

98. The desk study report identified 40 records of amphibians within 2km of the Onshore Study Area, 17 of which related to GCN (**Appendix 18-2**).
99. Within 2km of the Onshore Development Area there were 19 records of amphibians, nine of which relate to GCN.
100. The GCN survey report identified a total of 43 ponds within 2km of the Onshore Study Area (Peak Ecology 2022c; **Appendix 18-3**) which provide suitable habitat for GCN and other amphibians. 24 of these ponds lie within 250m of the Onshore Development Area (**Figure 18-5**).
101. Of the 43 Ponds originally identified within 2km of the Onshore Study Area, 31 were subject to Habitat Suitability Index (HSI) assessment in June 2022; the remaining 12 were not assessed due to landowner access limitations (**Appendix 18-3**). Of the 24 ponds that are within 250m of the Onshore Development Area, six had HSI assessments and eDNA surveys in 2022.
102. The HSI appraisals of the 31 ponds which were accessible and surveyed produced the following suitability classifications of the ponds as GCN breeding ponds:
- Excellent: two ponds;
 - Good: six ponds;
 - Average: three ponds;
 - Below average: 11 ponds; and
 - Poor: nine ponds.

103. The HSI appraisals of the six ponds surveyed within 250m of the Onshore Development Area produced the following suitability classifications of the ponds as GCN breeding ponds:
- Excellent: zero ponds;
 - Good: zero ponds;
 - Average: one pond;
 - Below average: two ponds; and
 - Poor: three ponds.
104. An eDNA survey of all accessible ponds was undertaken in June 2022. All water samples were collected in accordance with Natural England's WC1067 Advice Note for field and laboratory sampling of GCN eDNA (2014) and by GCN licensed ecologists.
105. Of the 29 ponds subject to eDNA analysis, five returned a positive result indicating GCN presence. The remaining ponds returned negative results indicating the likely absence of GCN. Two ponds were dry so could not be surveyed. Both the dry ponds have historical records of GCN. Two of the positive results are within 250m of the Onshore Development Area, the four other ponds within 250m of the Onshore Development Area tested were negative.
106. Suitable terrestrial habitat for supporting foraging and hibernating GCNs was observed within the Onshore Study Area. Part of the HSI assessment includes an assessment of the habitat surrounding a potential breeding pond for its suitability to support foraging and hibernating GCNs. Full survey results are provided in **Appendix 18-3**. Further surveys are proposed to be undertaken in 2023 on the remaining ponds within 250m of the Onshore Development Area where access is available.
107. Separately from the GCN surveys, the habitat surveys identified 17 ponds within the Onshore Study Area, ten of which were dry and one could not be accessed. Log piles were also identified in four locations which could act as a shelter for amphibian species including GCN. The full habitat survey results are in **Appendix 18-1**.
108. GCN are a European Protected Species (EPS) which means it has full protection under The Conservation of Habitats and Species Regulations 2017. It's an offence to deliberately capture, injure or kill, or deliberately disturb EPS and therefore in accordance with the criteria set out in **Table 18-7**, they are of high importance. Non-EPS amphibians are of medium importance.

18.5.4.2 Badger

109. The Desk Study identified five records of badger within 2km of the Onshore Study Area (**Appendix 18-2**). However, none of these records relate to areas within 2km of the Onshore Development Area.
110. The Scoping Report identifies that badger may be present within the Onshore Study Area (RWE Renewables, 2022b). Badger surveys are planned to be undertaken in 2023.
111. The habitat surveys recorded 33 signs of badger, this included two setts, two outlier setts, seven possible setts, one probable sett, one latrine, and other fields signs (e.g. hairs and footprints). Of these records two were within the Onshore Development Area, and 28 were within 2km of the Onshore Development Area. Multiple mammal runs were recorded in the Onshore Study Area during habitat surveys, at least two of which could have been created by badger. The full habitat survey results are in **Appendix 18-1**.
112. The Onshore Development Area provides suitable terrestrial habitat for foraging and commuting badger as well as for sett creation.
113. As a widespread species which is not threatened or rare in the county, in accordance with the criteria set out in **Table 18-7**, badgers are considered to be of low importance.

18.5.4.3 Bats

114. The Desk Study identified 85 sighting records within 2km of the Onshore Study Area. Of these records 66 were common pipistrelle *Pipistrellus pipistrellus*, other species were Daubenton's *Myotis daubentonii*, whiskered bat *M. mystacinus*, noctule *Nyctalus noctula*, Nathusius' pipistrelle *P. nathusii*, brown long-eared *Plecotus auritus* and parti-coloured *Vespertilio murinus* (**Appendix 18-2**). However, parti-coloured bats are very rare in the UK and are usually only found in the south of England, vagrants which occasionally cross the English Channel from Europe, with one or two records per year (BCT, 2010). They are not currently considered a resident species. They are also very hard to distinguish from Leisler's bat *Nyctalus leisleri* unless they are seen in the hand.
115. The Desk Study identified 283 roost records within 2km of the Onshore Study Area. relating to common pipistrelle, soprano pipistrelle *P. pygmaeus*, Daubenton's bat, whiskered bat, Natterer's bat *M. nattereri*, noctule, and brown long-eared bat (**Appendix 18-2**).
116. Within 2km of the Onshore Development Area boundary there were 18 records of bats, with one record of a common pipistrelle roost.

117. Static monitoring and transect surveys were undertaken between May – October 2022. Species recorded during the static monitoring and transect surveys were: common pipistrelle, soprano pipistrelle, pipistrelle spp., brown long-eared bat, Daubenton's bat, *Myotis* spp., and noctule (**Appendix 18-2**). The full survey results are available in **Appendix 18-4**.
118. The habitat survey (**Appendix 18-1**) identified trees and buildings with bat roost suitability. Detailed Preliminary Bat Roost Assessments (PBRA) surveys will be carried out in 2023. The full habitat survey results are in **Appendix 18-1**.
119. The Onshore Development Area provides suitable terrestrial habitat including woodland, hedgerows, rivers, and streams, for foraging, commuting and roosting bats.
120. All resident bat species are EPS and therefore in accordance with the criteria set out in **Table 18-7**, they are of high importance.

18.5.4.4 Birds

121. The Desk Study identified 75 species of bird recorded within 2km of the Onshore Study Area. Of these 12 were listed as Schedule 1 and 44 were listed as Red or Amber BoCC (Stanbury et al., 2021) (**Appendix 18-5**). Of these records 57 species were within 2km of the Onshore Development Area.

18.5.4.4.1 Over-wintering Birds

122. The over-wintering bird surveys comprised of transect surveys and vantage point surveys carried out between October 2021 and March 2022. As these surveys started at an early stage in the site selection process, they were undertaken on a wider area than the Onshore Study Area (see **Appendix 18-5**). Surveys are ongoing in the 2022/23 period on refined transects within the Onshore Development Area.
123. The results from October 2021 to March 2022 varied across the individual transects and vantage points, with high levels of activity and species diversity associated with transects located near to / on designated sites for birds (such as Hornsea Mere SPA and Tophill Low SSSI), which reflected their protected status. In addition, several other transects had high species diversity equivalent to a regional importance level. The vantage points returned lower species diversity and concentrations of records. (**Appendix 18-5**).

124. Transect (T)3 and T9 recorded the most species, and T3 recorded the most Schedule 1 species out of all ten transects. Revision of the boundary from time of survey to PEIR has ensured that T9 is no longer within the Onshore Development Area.
125. T3 was 8km in length, following the southern boundary of Hornsea Mere SPA in one direction. The route travelled through and / or adjacent to arable farmland, scrub and woodland areas and offered view across the mere at a small number of locations.
126. A diverse range of species was recorded from T3; a total of 88 species, including ten Schedule 1 species, 19 Red-listed and 32 Amber-listed species.
127. Of note were the presence of marsh harrier *Circus aeruginosus* across all visits, in addition to Cetti's warbler *Cettia cetti* associated with the reed and scrub areas. There was a large assemblage of wildfowl associated with the mere itself, including goldeneye *Bucephala clangula*, pochard *Aythya ferina*, scaup *A. marila*, Slavonian grebe *Podiceps auritus*, black-necked grebe *Podiceps nigricollis*, smew *Mergus albellus*, long-tailed duck *Clangula hyemalis*. A starling *Sturnus vulgaris* roost of approximately 6,000 birds, was noted.
128. Barnacle geese *Branta leucopsis*, brent geese *B. bernicla* and pink-footed geese *Anser brachyrhynchus* were recorded on the open fields adjacent to the mere and lapwing *Vanellus vanellus* were observed displaying during the final visit.
129. T9 was 17km in length, and divided in to two parts, T9a and 9b, to allow the transect to be effectively surveyed within a morning. Transect 9a ran adjacent to Puflin Bog SSSI and incorporated part of the Beverley and Barmston drain, and T9b followed the Leven Canal SSSI.
130. T9 supported one of the most diverse assemblages of the survey, with 87 species, this included eight Schedule 1 species, 19 Red-listed and 27 Amber-listed species. Marsh harrier, Cetti's warbler and water rail *Rallus aquaticus* were recorded across the survey period.
131. The pools adjacent to T9 supported good numbers of wildfowl, including goldeneye, gadwall *Ana strepera*, shoveler *A. clypeata*, shelduck *Tadorna tadorna* and scaup. Waders such as greenshank *Tringa nebularia* and redshank *T. totanus* were also recorded.

132. Lapwing and golden plover *Pluvialis apricaria* were recorded using the open fields on T9 in addition to farmland passerines tree sparrows *Passer montanus*, yellowhammer *Emberiza citrinella* and linnet *Linaria cannabina*. A flock of over 2,000 pink-footed geese were recorded on the first visit and a bittern *Botaurus stellaris* recorded along the Leven canal on the final visit.
133. On three other transects, roosts of wader and wildfowl were recorded:
 - T1 recorded wader roosts on the beach of sanderling *Calidris alba*, dunlin *C. alpina* and ringed plover *Charadrius hiaticula* primarily, but also grey plover *Pluvialis squatarola* were recorded;
 - T2 recorded wader roosts on the beach, consisting of dunlin, sanderling and ringed plover, and small group of snow bunting *Plectrophenax nivalis* was recorded on visit six;
 - T4 recorded small roosts of waders.
134. The over-wintering bird report (**Appendix 18-5**) results highlighted several transects which are of importance to birds and works should be avoided in these areas, if possible, namely T1, T3 (Hornsea Mere SPA), T9 (Leven Canal SSSI) and T10 (Tophill Low SSSI).
135. The Onshore Development Area provides suitable terrestrial habitat for over-wintering birds.
136. In accordance with the criteria set out in **Table 18-7**, over-wintering bird populations which form part of the cited interest of an internationally or nationally designated site are of high importance. Other over-wintering bird populations are of medium to low importance, depending on the conservation status of the species.

18.5.4.4.2 Breeding Birds

137. The breeding bird survey comprised transect surveys carried out between April and August 2022. Nine transect routes were designed to ensure sufficient geographical coverage of the Onshore Search Area, however due to lack of access only three (T5, T8 and T9) were surveyed in 2022. Locations of the transects are provided in **Appendix 18-6**.
138. Each of the three transects were accessed via PRoW, as landowner access permission was not granted at the time of the first survey visit. The areas which could be accessed by PRoW allowed collection of data in the general area of the Onshore Survey Area, however, this was not always in close proximity to the survey area, and therefore some areas may have been under-represented in terms of the bird activity present.

139. It should be noted that the corridor has since been refined, and surveys scheduled for the 2023 season, therefore it is considered that access issues during these breeding bird surveys will not be a significant issue to effectiveness of the results.
140. The transect areas supported a typical assemblage of farmland and generalist bird species, with no specific areas highlighted as supporting significant breeding assemblages or species (**Appendix 18-6**). However, there were areas showing higher concentration of records when compared to other areas within the Onshore Study Area (**Appendix 18-6**).
141. The results indicated that the habitats adjacent to the three surveyed transects supported assemblages of bird species typical of arable landscapes, with primarily ubiquitous species recorded, and small numbers of declining farmland specialists such as yellowhammer, yellow wagtail *Motacilla flava*, corn bunting *Emberiza calandra*, tree sparrow, grey partridge *Perdix perdix*, starling, skylark and lapwing. Rare Schedule 1 breeders in Yorkshire, garganey *Spatula querquedula* and quail *Coturnix coturnix* were recorded within the Onshore Study Area, with possible breeding of quail (**Appendix 18-6**).
142. In addition, a further six Schedule 1 species were recorded. Probable breeding was considered likely for Cetti's warbler and barn owl, and possible breeding was considered for kingfisher *Alcedo atthis*. Marsh harrier and hobby *Falco subbuteo* were observed flying over the Onshore Study Area and may have been breeding in nearby habitats away from the transect. Marsh harrier and hobby are listed as rare breeders in Yorkshire (Dobbs, 2022). The full survey results for breeding birds are available in **Appendix 18-6**.
143. The habitat survey has recorded barn owl four times, including one confirmed roost. A buzzard *Buteo buteo* nest was also recorded. The full habitat survey results are in **Appendix 18-1**.
144. The Onshore Development Area provides suitable terrestrial habitat for breeding birds.
145. In accordance with the criteria set out in **Table 18-7**, breeding bird populations which form part of the cited interest of an internationally or nationally designated site are of high importance. Other breeding bird populations are of medium to low importance, depending on the conservation status of the species.

18.5.4.5 Fish

146. The Desk Study identified 21 records of bony fish and *Agnatha* (lamprey) within 2km of the Onshore Study Area (**Appendix 18-2**). Four of these records relate to the Onshore Development Area.
147. There are numerous watercourses within the Onshore Study Area which could provide suitable habitat for protected fish species.
148. In absence of further data, for the purpose of this assessment it is assumed that the fish populations present are of high importance.

18.5.4.6 Hazel Dormouse

149. Hazel dormouse *Muscardinus avellanarius* have been scoped out of the assessment as East Riding of Yorkshire Council has confirmed the absence of this species from the Onshore Study Area (RWE Renewables, 2022b).

18.5.4.7 Invertebrates, Including White-clawed Crayfish

150. The Desk Study identified six insect records within 2km of the Onshore Study Area. These records related to three beetle species and three butterfly species (**Appendix 18-2**). Four of these records relate to the Onshore Development Area and are of holly blue butterfly *Celastrina argiolus* and common blue butterfly *Polyommatus icarus*.
151. There were no records of white-clawed crayfish within 2km of the Onshore Study Area. White-clawed crayfish have been scoped out due to no records and their distribution ranges.
152. Surveys for aquatic and terrestrial habitats that may support rare or notable invertebrates are due to be undertaken in 2023 (RWE Renewables, 2022b).
153. The ponds, woodland, improved grassland, arable field margins, and reedbeds recorded during the habitat surveys all provide suitable habitat for a range of invertebrates. Log piles were also identified in four locations which could act as a shelter for invertebrate species. The full survey results are in **Appendix 18-1**.
154. In absence of further data, for the purpose of this assessment it is assumed that the invertebrate populations present are of high importance.

18.5.4.8 Otter

- 155. The Desk Study identified records of otter within 2km of the Onshore Study Area (**Appendix 18-2**). One record relates to the Onshore Development Area, the type of record is unknown.
- 156. Surveys for otter are due to be undertaken in 2023 (**Appendix 18-6**). No specific otter signs were recorded during the habitat surveys. However, ten mammal runs were recorded, which may have been created by otter.
- 157. There are numerous watercourses within the Onshore Study Area that provide suitable habitat for foraging and commuting otter as well as for holt creation. The full habitat survey results are in **Appendix 18-1**.
- 158. Otter are EPS and therefore in accordance with the criteria set out in **Table 18-7**, they are of high importance.

18.5.4.9 Other Notable Species

- 159. The desk study report (**Appendix 18-2**) reported records of hedgehog, brown hare and water shrew *Neomys fodiens* being returned within 2km of the Onshore Study Area. All these species have records returned within 2km of the Onshore Development Area.
- 160. The habitat surveys (**Appendix 18-1**) recorded three sightings of brown hare and one sighting of brown hare droppings.
- 161. In accordance with the criteria set out in **Table 18-7**, these other notable species are of low importance.

18.5.4.10 Reptiles

- 162. The Desk Study identified seven records within 2km of the Onshore Study Area. Six were for grass snake and one for adder (**Appendix 18-2**). Four of these records (three grass snake, one adder) were within the Onshore Development Area.
- 163. The habitat surveys identified six areas suitable for reptile species (**Appendix 18-1**). Log piles were also identified in four locations which could act as a shelter for reptile species. The full survey results are in **Appendix 18-1**.
- 164. Species specific surveys for reptiles are due to be undertaken in 2023.
- 165. Due to their southern distribution ranges, it is unlikely that either of the two EPS reptile species (sand lizard and smooth snake) would be found in the Onshore Development Area.
- 166. In accordance with the criteria set out in **Table 18-7**, all reptile species that could use the Onshore Study Area are of medium importance.

18.5.4.11 Water Vole

167. The Desk Study identified records for water vole within 2km of the Onshore Study Area (**Appendix 18-2**), ten of which are within 2km of the Onshore Development Area.
168. All watercourses within the Onshore Development Area provide suitable habitat for water vole and could provide habitat for burrow creation in banks.
169. The habitat survey recorded three target notes relating to water vole. The full habitat survey results are in **Appendix 18-1**. Species-specific surveys for water vole are due to be undertaken in 2023.
170. In accordance with the criteria set out in **Table 18-7**, water vole is of medium importance.

18.5.4.12 INNS

171. The desk study identified 14 invasive non-native species (INNS) within 2km of the Onshore Study Area. This included 11 plant species listed on Schedule 9 of the WCA (Canadian waterweed *Elodea canadensis*, cotoneaster *Cotoneaster spp.*, curly waterweed *Lagarosiphon major*, floating pennywort *Hydrocotyle ranunculoides*, giant hogweed *Heracleum mantegazzianum*, Himalayan balsam *Impatiens glandulifera*, Japanese knotweed *Reynoutria japonica*, Japanese rose *Rosa rugosa*, New Zealand pigmyweed *Crassula helmsii*, rhododendron *Rhododendron ponticum*, water fern *Azolla filiculoides*), two mammal species (grey squirrel *Sciurus carolinensis* and American mink *Neovison vison*), and one amphibian (Marsh frog *Pelophylax ridibundus*) (**Appendix 18-2**). Eight of these species returned records within the Onshore Development Area.
172. The habitat surveys target notes have recorded four instances in the Onshore Study Area of INNS (**Appendix 18-1**). These related to Japanese knotweed, Himalayan balsam, and two records of snowberry *Symphoricarpos albus*.

18.5.5 Future Trends

173. In the event that the Projects are not developed, an assessment of future conditions for terrestrial ecology has been carried out and is described within this section.
174. Statutory and non-statutory designated sites would continue to be managed by the relevant organisations, to protect the designated flora and fauna. It is assumed that areas of land used for agriculture and residential will continue to be managed in the same way.
175. Climate change could affect species distribution and abundance. If management of habitats and species continues as current, populations of species could decrease due to climate change reducing and shifting the ranges of species, or increase species population sizes for example allowing to have a higher rate of winter survival in more northern parts of the country. Furthermore, hazel dormouse and beavers are being re-introduced across the country which could lead to an increase in populations for these species. Licences for water vole mitigation are now also available so areas could become compensation sites for water vole, allowing this species to increase its range.
176. Due to climate change sea levels are expected to rise, this could result in a loss of terrestrial habitats along the coast and habitat change would occur. Freshwater river and streams would have an increase in salinity if they were flooded by sea water, potentially affecting populations of fish, invertebrates and other aquatic species.
177. In general, most species of conservation concern which have been subject of targeted ecological surveys in relation to this PEIR chapter are experiencing negative trends in the form of population declines, shifts or contractions in range, habitat loss, fragmentation of habitats and species populations, and from the spread of diseases and non-native species. These long-term trends are associated with a myriad of factors including climate change, alterations to land-uses (particularly intensification of farming and increased built development), increased human disturbance and anthropogenic pollution of waters, land and air.

178. However, measures such as legislation regarding protection of species and habitats, changing farming practices and nature conservation efforts are limiting the magnitude of these negative trends (or in some cases, reversing them), particularly at specific scales relevant to the onshore cable corridor (e.g. county / district scale). Where a valued ecological receptor is known to be experiencing baseline natural trends that are relevant to this impact assessment, this is noted in the individual receptor's assessment presented in section 18.6.

18.6 Assessment of Significance

179. It should be noted that:

- Likely significant effects to the onshore habitat sites have been screened in section 18.5.2. Therefore, they are scoped out of assessment in this chapter. However, if anything changes it may result in the two sites needing to be screened back into the HRA;
- Hazel dormouse have been scoped out of the report. Therefore, mitigation is not currently required. However, if hazel dormouse are found in the Onshore Development Area at any time during the works, works must stop immediately and Natural England consulted, these values would then need to be re-assessed. This would likely require additional mitigation measures and application of an EPS mitigation licence; and
- White-clawed crayfish have been scoped out of the report. Therefore, mitigation is not currently required. However, if white-clawed crayfish are found in the Onshore Development Area at any time during the works, works must stop immediately and Natural England consulted, these values would then need to be re-assessed. This would likely require additional mitigation measures and application of a species mitigation licence.

18.6.1 Potential Effects During Construction

18.6.1.1 Impact 1: Construction Disturbance to Statutory Designated Nature Conservation Sites.

180. Embedded mitigation as described in **Table 18-3** has included the avoidance of statutory designated sites for nature conservation where possible as part of the site selection and route planning process. As a result, there will be no direct impacts to designated sites (RWE Renewables, 2022b). Statutory international and national designated nature conservation sites can be seen in **Figures 18-2** and **Figure 18-3**.
181. While there are no statutory designated sites within the Onshore Development Area, Burton Bushes SSSI and Beverley Parks LNR are located directly adjacent to the Onshore Development Area. These sites can be seen in **Figure 18-3**.
182. Burton Bushes SSSI is designated for its oak woodland. The woodland is also listed on the Ancient Woodland Inventory. It is located adjacent to the onshore export cable corridor and is approximately 130m from a possible Temporary Construction Compound and 240m from a trenchless crossing such as HDD.
183. Beverley Parks LNR is located next to Substation Zone 1. Beverley Parks LNR is designated for its orchard and woodland habitats within an open landscape. It is currently being restored to parkland.
184. For Burton Bushes SSSI and Beverley Parks LNR there is the potential for disturbance caused by works associated with the onshore export cable corridor and substation due to activities which generate fugitive emissions (i.e. dust and emissions from an increase in construction traffic and road access), noise disturbance from increased traffic, and trenchless crossing such as HDD. These sites are unlikely to be affected by works associated with the landfall, due to the distance between the designated sites and these areas.
185. Withow Gap, Skipsea SSSI is not included within this chapter as it is designated for geological reasons rather than ecological. Impacts to this site are considered in **Chapter 19 Geology and Land Quality**. No mechanisms or pathways have been identified likely to impact other statutory designated sites.

18.6.1.1.1 *Magnitude of Impact – All Scenarios*

186. For all scenarios (in isolation, concurrently or sequentially) without mitigation, the magnitude of effect is low as construction activities would not adversely affect the integrity or conservation status of the statutory sites. As the Projects will last for over a year the duration is classed as long term.

18.6.1.1.2 *Sensitivity of Receptor*

187. Burton Bushes SSSI is of high importance and high sensitivity as ancient woodland is unable to tolerate effects resulting in permanent change in its abundance or quality as it is considered irreplaceable habitat.
188. Beverley Parks LNR is of medium importance and medium sensitivity. LNRs are typically designated for their local nature conservation importance, and also for their value to people. Therefore, their nature conservation importance would not be expected to meet the same threshold as SSSIs. The site is not ancient woodland, therefore it is easier to replace habitat.

18.6.1.1.3 *Significance of Effect – All Scenarios*

189. For all scenarios, prior to mitigation the magnitude of impact to statutory designated sites would be low. For Burton Bushes SSSI this results in a moderate adverse significance of effect and for Beverley Parks LNR a minor adverse significance of effect.

18.6.1.1.4 *Mitigation and Residual Significance of Effect – All Scenarios*

190. Mitigation measures will be secured through the OLEMP that will be submitted with the DCO application. Mitigation would include, but not be limited to the following:
- Follow best practice pollution prevention guidance throughout the works;
 - Implement a tree protection plan where appropriate; and
 - Dust suppression techniques.
191. These measures will reduce the magnitude of impact to Burton Bushes SSSI and Beverley Parks LNR from low to negligible, therefore the residual effect on statutory designated sites is **minor** adverse, which is deemed to be not significant.

18.6.1.2 Impact 2: Construction Disturbance to Non-Statutory Designated Nature Conservation Sites.

192. There are 17 non-statutory designated nature conservation sites wholly or partially within or adjacent to the Onshore Development Area as presented in **Table 18-12** and shown on **Figure 18-4**. Only those non-statutory designated sites which are partially or wholly within or directly adjoining the Onshore Development Area have been considered in this assessment.

Table 18-12 Details of Non Statutory Sites Within or Adjacent to the Onshore Development Area

Site name and Designation	Qualifying feature(s)	Location
Bentley Moor Wood LWS	Ancient semi-natural woodland.	Wholly within the Onshore Development Area (Substation Zones). The layout of substations and associated compounds have been designed to avoid direct impacts on this LWS.
Catfoss Gravel Pits LWS	No data available.	Wholly within the Onshore Development Area, between Catfoss Drain and the A1305. Trenchless crossings such as HDD or avoidance measures will be employed at this location.
Beeford - Dunnington Road Verge LWS	Good quality established semi-natural verge.	Partially within the Onshore Development Area. Trenchless crossings such as HDD will be employed at this location.
Ings Road Field LWS	No data available.	Partially within the Onshore Development Area. If required, avoidance measures and/or mitigation such as an appropriate buffer zone would be implemented at this location.
Monk Dyke LWS	No data available.	Partially within the Onshore Development Area. If required, avoidance measures and/or mitigation such as an appropriate buffer zone would be implemented at this location.

Site name and Designation	Qualifying feature(s)	Location
Walkington Road LWS	Good quality hedgerow with 10 woody species per 30m sample.	Partially within the Onshore Development Area. If required, avoidance measures and/or mitigation such as an appropriate buffer zone, or trenchless crossing such as HDD, would be implemented at this location.
11 Acre Plantation LWS	No data available.	Adjacent (0 m) to the Onshore Development Area (Substation Zones). If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Beverley Westwood LWS	No data available.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Birkhill Wood LWS	Ancient semi-natural woodland with evidence of features to support this.	Adjacent (0 m) to the Onshore Development Area next to the onshore export cable corridor. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Burton Bushes LWS	Ancient Woodland	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Burton Bushes Veteran Trees LWS	Veteran trees.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Catwick - Seaton Road LWS	Good quality hedgerow with 6 woody species per 30m sample.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.

Site name and Designation	Qualifying feature(s)	Location
Jillywood Lane LWS	Good quality hedgerow, medieval boundary and ancient woodland boundary.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Meaux Lane LWS	Good quality established semi-natural verge and hedgerow.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Newbald Road, Beverley Westwood LWS	Good quality hedgerow.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Shorthill Hag LWS	No data available.	Adjacent (0 m) to the Onshore Development Area. If required, mitigation such as an appropriate buffer zone would be implemented at this location.
Swine Moor LWS	Mosaic of habitats including grassland and wetland.	Adjacent (0 m) to the Onshore Development Area on opposite side of road. If required, appropriate mitigation such as dust suppression techniques would be implemented at this location.

193. As outlined in **Table 18-12** Bentley Moor Wood LWS is located wholly within Substation Zone 4, however the layout of the substations and the associated compounds have been designed to avoid any direct impacts on this site (see **Chapter 4 Site Selection and Assessment of Alternatives** for further details).
194. Catfoss Gravel Pits LWS is wholly within the Onshore Development Area, and Beeford – Dunnington Road Verge LWS is partially located within the Onshore Development Area. At these sites, the implementation of a trenchless crossing such as HDD or site avoidance measures will prevent direct land-take impacts during the onshore export cable installation. Indirect impacts would include an increase in noise levels from trenchless crossing techniques, and dust emissions.
195. Ings Road Field LWS, Monk Dyke LWS and Walkington Road LWS are located partially within the Onshore Development Area. If required, site avoidance measures and/or mitigation such as maintaining an appropriate distance between the cable installation works and the LWS would be implemented to minimise potential direct impacts on these local sites.
196. 11 Acre Plantation LWS, Beverley Westwood LWS, Birkhill Wood LWS, Burton Bushes LWS, Burton Bushes Veteran Trees LWS, Catwick - Seaton Road LWS, Jillywood Lane LWS, Meaux Lane LWS, Newbald Road, Beverley Westwood LWS, Shorthill Hag LWS and Swine Moor LWS are located directly adjacent to the Onshore Development Area. Where possible the refinement of the DCO boundary will seek to maintain an appropriate distance between physical works and these local sites to minimise potential impacts.
197. Despite the commitment to the embedded mitigation measures of avoidance, there would remain a risk of temporary indirect disturbance impacts (e.g., from dust or pollution) to habitats and wildlife associated with these LWSs which likely includes valued and protected species, such as nesting birds (possibly including Schedule 1 species such as kingfisher and barn owl), bats, reptiles, otters, water voles and white-clawed crayfish.

18.6.1.2.1 *Magnitude of Impact – All Scenarios*

198. For all scenarios (in isolation, concurrently or sequentially) without mitigation, the magnitude of effect is considered to be medium as construction activities are unlikely to adversely affect the integrity or conservation status of the non-statutory designated sites and would only be experienced at a local level. As the Projects will last for over a year the duration is classed as long-term.

18.6.1.2.2 Sensitivity of Receptor

199. In accordance with the criteria set out in **Table 18-7**, all non-statutory designated sites are of medium importance and therefore are considered to be medium sensitivity.

18.6.1.2.3 Significance of Effect – All Scenarios

200. The magnitude of impact and sensitivity of receptor are both considered to be medium. Without mitigation, the impact to non-statutory sites is therefore **moderate** adverse, which is deemed to be significant

18.6.1.2.4 Mitigation and Residual Significance of Effect – All Scenarios

201. All mitigation measures will be included in the OLEMP that will be submitted with the DCO application. Mitigation would include, but not be limited to the following:
- Follow best practice pollution prevention guidance throughout the works;
 - Implement a tree protection plan where appropriate; and
 - Dust suppression techniques.
202. The principal mitigation measure for addressing impacts to non-statutory designated sites will be the embedded commitment for construction impacts to avoid these sites where possible through trenchless crossings such as HDD installation or micro-siting of the construction footprint. If required, further measures such as maintaining appropriate buffer zones between the construction footprint and the LWSs would be implemented.
203. There will be other mitigation measures that can be adopted to mitigate specific impacts once such impacts are discernible following finalisation of the onshore cable corridor and working practices. For LWSs this could include minimising any artificial lighting requirements of the nearby parts of the construction site, and/or careful design of any essential lighting nearby. Appropriate hydrological pollution prevention measures will also be adopted (as outlined in **Chapter 20 Flood Risk and Hydrology**).
204. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.3 Impact 3: Permanent and Temporary Loss / Fragmentation of Habitats

18.6.1.3.1 Coastal and Flood Plain Grazing Marsh

- 205. There are 19 areas of coastal and flood plain grazing marsh Habitat of Principal Importance (HPI) within 250m of the Onshore Development Area. This includes areas close to the River Hull where it enters the Onshore Development Area.
- 206. There could be direct impacts due to temporary habitat loss from the construction of the onshore export cable corridor. In areas of temporary loss the habitat will be reinstated. The habitat could also be subject to indirect effects due to activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access).

18.6.1.3.2 Woodland

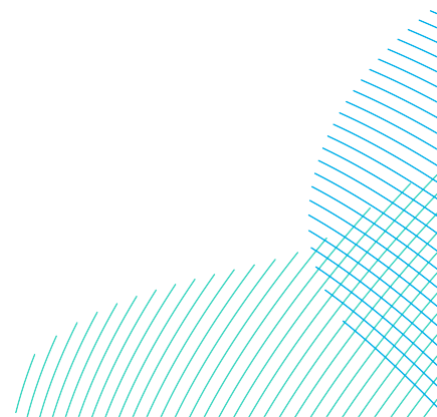
- 207. The onshore export cable corridor avoids all areas of ancient woodland. There is an area of ancient woodland within Substation Zone 4, however works associated with the substations will avoid this woodland.
- 208. Other woodland surveyed to date is dominated by mixed broad-leaved woodland, and conifer woodland (**Appendix 18-1**).
- 209. There are 45 areas of deciduous woodland HPI within 250m of the Onshore Development Area. Of these, two are located within the Onshore Development Area. The first is Bentley Wood LWS, as discussed in section 18.6.1.2.
- 210. The second is an unnamed woodland between Catwick and Sigglesworth, adjacent to Catfoss Gravel Pits LWS (as shown on **Figure 18-4**). There is not expected to be any temporary or permanent vegetation clearance of this HPI as this area of woodland would be avoided during construction; if avoidance was not possible, mitigation measures would be agreed e.g. trenchless techniques such as HDD to install the onshore export cables under the woodland. However, the HPI may be indirectly affected by activities which generate fugitive emissions (i.e. dust and emissions from an increase in construction traffic and road access).
- 211. There is an area of woodland north of Catfoss Road, within the onshore export cable corridor. It is expected that cable installation would avoid this woodland, however if crossing of the woodland is required then mitigation measures would be agreed e.g. a trenchless technique such as HDD, which would avoid direct impacts to woodland habitats. However, the woodland may be indirectly affected due to activities which generate fugitive emissions (i.e. dust and emissions from an increase in construction traffic and road access) and noise disturbance from increased traffic.

18.6.1.3.3 Maritime Cliff and Slope

- 212. The possible landfall locations are within a Maritime Cliff and Slope HPI, which runs the length of the coastal cliffs.
- 213. Trenchless crossings such as HDD will be used at the landfall. Therefore, the HPI is unlikely to be directly impacted by the works. However, it could be indirectly impacted from activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access).

18.6.1.3.4 Traditional Orchard

- 214. There are six areas of traditional orchard HPI within 250m of the Onshore Development Area, one of which is within the Onshore Development Area, adjacent to the A164. Trenchless crossing such as HDD will be employed at this location.
- 215. The habitat could also be subject to indirect effects due to activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access) and noise disturbance from increased traffic.



18.6.1.3.5 Agricultural Land

- 216. The vast majority of the area surveyed to date is agricultural land, including improved grassland (**Appendix 18-1**).
- 217. Agricultural land does support some wildlife including ground-nesting birds such as skylark and some terrestrial animals such as brown hare. Arable habitat soils are heavily disturbed through ploughing and application of fertilisers, herbicides and other ground treatments, so disturbance to the soils is expected to be less ecologically impactful than at other habitats where soils have been less disturbed.
- 218. Arable field margins are strips of grassland which can support a diverse range of grasses and forbs. They are a component of field boundaries which provide ecologically important linear features (typically in combination with features such as hedgerows, trees and ditches) within arable landscapes. This habitat is considered to be of medium or low sensitivity; any better-established, larger, more florally diverse and better ecologically connected margins are considered to be of medium sensitivity, whereas more ephemeral, smaller, less florally diverse and ecologically isolated margins are considered to be of low sensitivity.
- 219. The Onshore Development Area crosses multiple parcels of agricultural land. There will be permanent habitat loss within the Onshore Substation Zones as well as temporary habitat loss from trenched crossings for the onshore export cable corridor. The habitat could also be subject to indirect effects due to activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access) and trenched crossings.

18.6.1.3.6 Grassland

- 220. The footprint of the Onshore Development Area passes through a number of grasslands, which have all so far been recorded as modified or other neutral grassland.
- 221. There could be direct impacts due to temporary habitat loss from the construction of the onshore export cable corridor. In areas of temporary loss the habitat will be reinstated. The habitat could also be subject to indirect effects due to activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access).
- 222. Although the reinstatement of habitat to its baseline condition will not result in substantial changes as a result of the proposed works, it is possible that disturbance to grassland soils could result in some germination of plant species other than those which dominate the baseline condition; this could improve structural and/or floral diversity. Once management of the grassland (such as grazing) recommences following completion of installation and reinstatement of the soils, the grasslands would be expected to return to baseline conditions within no more than a few years. Improved grasslands are therefore considered to be of low sensitivity. This process could take longer for poor semi-improved grasslands as these typically have a botanically and structurally more varied sward, so these grasslands are considered to be of medium sensitivity.

18.6.1.3.7 Hedgerows

- 223. There are a number of Priority Habitat hedgerows across the areas that have been surveyed to date **(Appendix 18-1)**.
- 224. Temporary removal of hedgerow habitat to accommodate the onshore export cable corridor will result in a temporary loss of the habitat itself but will also temporarily reduce the ecological function of hedgerows, which provide ecologically important linear connections within the landscape.
- 225. The habitat could also be subject to indirect effects due to activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access) and trenched crossings.

18.6.1.3.8 Watercourses

226. The onshore export cable corridor crosses the following Main Rivers:
- Stream Dyke;
 - Monk Dyke;
 - Meaux and Routh East Drain;
 - Holderness Drain;
 - River Hull;
 - Beverley and Barnston Drain; and
 - Catchwater Drain.
227. Trenchless crossing techniques such as HDD are embedded in the design for all Main Rivers. Although ground disturbance will occur at the HDD entry and exit points, there would be no direct disturbance to the watercourses crossed using a trenchless technique. Therefore, there is no direct mechanism for impacts to occur to the geomorphology, hydrology and physical habitats of these watercourses.
228. Trenched crossings would be carried out on the majority of ordinary watercourses which intersect with the Onshore Development Area. This method has potential to directly alter the habitats of the watercourses. Trenched crossings of watercourses involve installing temporary dams upstream and downstream of the crossing point. The cable trench is then excavated in the dry area of riverbed between the two dams with the river flow maintained using a temporary pump or flume.
229. In addition to the cable infrastructure itself, it may also be necessary to install temporary structures to allow access across watercourses where direct access is not readily available from both sides. This will comprise temporary bridges or temporary culverts depending on local site conditions.
230. Further information is provided in **Chapter 20 Flood Risk and Hydrology**.

18.6.1.3.9 *Other Habitats*

231. There are mature trees along Newbald Road which could be affected if this crossing is trenched. A detailed study will be carried out prior to construction to determine if a trenched crossing can be achieved without significant impacts to the mature trees. If such impacts cannot be avoided, mitigation would be agreed e.g. trenchless crossing such as HDD. There could be indirect effects due to activities which generate fugitive emissions (i.e., dust and emissions from an increase in construction traffic and road access), noise disturbance from increased traffic, and trenched crossings.
232. Developed land, sealed surfaces, buildings, artificial unvegetated unsealed surface, and other developed land all have a negligible ecological value.

18.6.1.3.10 *Summary of Impacts*

233. The potential impacts to Priority Habitats as a result of the Projects include the following:
- Permanent loss of agricultural land at the onshore substations;
 - Temporary habitat disturbance and fragmentation from the constriction of the onshore export cable will occur to agricultural land, grasslands and hedges;
 - Risk of pollution incident and sedimentation to watercourses from construction activities adjacent to rivers and streams; and
 - Dust pollution on the Priority Habitats.
234. Direct disturbance to HPI would be avoided through the use of trenchless crossing such as HDD if required.
235. Permanent habitat loss will be minimised during the site selection and route refinement process of the Projects. All habitats temporarily lost will be reinstated on completion of the constructions works. Detailed Project design will ensure that significant long-term effects on 'irreplaceable' habitats, such as ancient woodland, would be avoided, i.e. through route selection and use of non-damaging methods, including trenchless crossing such as HDD.

18.6.1.3.11 Magnitude of Impact – All Scenarios

- 236. For all scenarios (in isolation, concurrently or sequentially) in the worst case scenario where there is permanent Priority Habitat loss and / or fragmentation, the magnitude of this effect is considered to be high (in the absence of mitigation), as the habitat will be permanently lost.
- 237. In the worst case scenario where there is temporary Priority Habitat loss and / or fragmentation, the magnitude of this effect is considered to be medium (in the absence of mitigation), indicating that there would be no permanent effects on the affected habitat, or the species that it supports.

18.6.1.3.12 Sensitivity of Receptor

- 238. Coastal and flood plain grazing marsh is a Priority Habitat, reflecting their ecological importance. In general, they are considered to be of medium sensitivity.
- 239. Woodland is an ecologically valued habitat of high sensitivity which has a long recovery period (in some cases hundreds of years) following any damage or destruction.
- 240. Arable fields are of low sensitivity and are not an ecologically valued habitat due to their high levels of disturbance/management, monoculture vegetation and homogenous vegetation structure.
- 241. The sensitivity of arable field margins in areas of temporary loss is considered to be medium, reflecting that the habitats have some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.
- 242. Hedgerows are a Priority Habitat, reflecting their ecological importance. In general, they are considered to be of medium sensitivity.
- 243. Watercourses within the Onshore Development Area are of medium to high sensitivity depending on if they are a main priority habitat river or a smaller stream or ditch.
- 244. Developed land sealed surface, buildings, artificial unvegetated unsealed surface, and other developed land all have a low sensitivity.

18.6.1.3.13 Significance of Effect – All Scenarios

- 245. Permanent habitat loss would be of high magnitude, arable land is of low value therefore the impact from the construction of the substation would be **moderate** adverse.

246. Temporary disturbance from trenched cable laying would be of low magnitude, arable land is of low value therefore the impact from the construction to arable land would be **minor** adverse which is deemed to be not significant.
247. Temporary disturbance from trenched cable laying would be of low magnitude, coastal and plod plain grazing marsh, hedges and arable field margins are of medium sensitivity therefore the impact from the construction to arable land would be **minor** adverse which is deemed to be not significant.
248. Dust Pollution would be of medium magnitude, HPI habitats are of medium sensitivity, therefore in the worst case scenario the impact to HP from dust would be **moderate** adverse which is deemed to be significant.
249. Watercourses are of high value, pollution or sedimentation could be of high magnitude therefore the impact to watercourses from construction could be **major** adverse which is deemed significant.

18.6.1.3.14 Mitigation and Residual Significance of Effect – All Scenarios

250. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
251. General mitigation could include:
 - Avoid loss of nature conservation habitat where possible;
 - Keep vegetation clearance to as low as reasonably practicable;
 - Dust suppression techniques;
 - Noise and vibration reduction through screening of permanent infrastructure;
 - Adherence to British Standard 5837: 2012 for trees; and
 - Following pollution prevention guidance throughout the works.
252. Specific mitigation in the worst case scenario would be creating like for like compensation habitat for those areas that will be permanently lost as a result of the Projects, where possible, prior to clearance of existing habitats.
253. Temporarily lost habitats will be reinstated or allowed to naturally regenerate once the construction works have been completed. This would depend on the plant assemblages and habitat types that have been temporarily lost.
254. These measures will reduce the magnitude of impact from high to low or negligible therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.4 Impact 4: Potential Mortality, Harm or Disturbance to GCN, or Destruction, Damage, or Disturbance to GCN Habitat

255. In the worst case scenario ponds and terrestrial habitat will be permanently lost as a result of the Projects.
256. 29 ponds have been surveyed to date, five of which returned positive eDNA result which indicates GCN presence within the Onshore Development Area (**Appendix 18-3**). Four of the ponds returning positive results are located within the Onshore Development Area (Ponds 12, 13, 23 and 39) An additional positive result was returned from a pond (Pond 3) which located over 1km from the Onshore Development Area. The full results can be seen in **Appendix 18-3**.
257. The potential impacts to GCN as a result of The Projects include the following:
- Risk of killing or injuring foraging GCNs during the construction phase;
 - Temporary terrestrial habitat and / or pond loss for the duration of the onshore construction works; and
 - Permanent pond and terrestrial habitat loss.

18.6.1.4.1 Magnitude of Impact – All Scenarios

258. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially), there will be short term and permanent impacts on GCN. The magnitude of the effect is therefore considered to be medium in the absence of mitigation, indicating that the potential impacts are unlikely to adversely affect GCN and amphibian integrity or conservation status.

18.6.1.4.2 Sensitivity of Receptor

259. Overall the sensitivity of GCN is considered to be medium, reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.
260. In the worst case scenario where there is a permanent habitat loss as a result of the onshore substations there would still be no permanent change in the abundance of GCN, as individuals can be translocated and move through connected habitat.

18.6.1.4.3 Significance of Effect – All Scenarios

261. Overall, without mitigation the magnitude is medium, and the sensitivity is medium. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.4.4 Mitigation and Residual Significance of Effect – All Scenarios

262. All mitigation measures will be provided in OLEMP that will be submitted with the DCO application.
263. Natural England have confirmed that a District Level Licence (DLL) application approach is satisfactory (Discretionary Advice Service response, 16/03/2022). level licensing is an alternative approach to EPS mitigation licensing for developments which could affect great crested newts. District level licensing aims to increase the number of great crested newts by providing new or better habitats in targeted areas to benefit their wider population. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.5 Impact 5: Potential Mortality, Harm or Disturbance to Badger, or Destruction, Damage, or Disturbance to Badger Habitat

264. In the worst case scenario main and annex badger setts will be permanently lost as a result of the Projects.
265. The surveys undertaken to date have not identified any badger setts within 30m of the Onshore Development Area. The closest identified sett is located 120m from the onshore export cable corridor. The closest sett to the Onshore Substation Zones was approximately 1km away. The results of the surveys undertaken to date can be seen in **Appendix 18-1**. In the absence of full survey coverage for the whole Onshore Development Area the worst case scenario assumes that setts are present.
266. The potential impacts to badger as a result of the Projects include the following:
- Temporary habitat loss for foraging and commuting badger for the duration of the construction phase;
 - Permanent habitat loss for foraging and commuting badger;
 - Permanent exclusion of badger from setts; and
 - Risk of injuring or killing badger during the construction phase.

18.6.1.5.1 Magnitude of Impact – All Scenarios

267. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) main and / or annex setts may be located within the Onshore Development Area and will need to be destroyed. The magnitude of the effect is therefore considered to be medium in the absence of mitigation, indicating that the potential impacts are unlikely to adversely affect badger integrity or conservation status.

18.6.1.5.2 Sensitivity of Receptor

268. The sensitivity of badger is medium, reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

18.6.1.5.3 Significance of Effect – All Scenarios

269. Overall, in absence of mitigation, the magnitude is medium, the sensitivity is medium. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.5.4 Mitigation and Residual Significance of Effect – All Scenarios

270. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
271. General mitigation could include:
- Avoid loss of habitat where possible;
 - Keeping vegetation clearance to as low as reasonably practicable;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure;
 - Excavations will be fenced off and a means of escape will be provided where required; and
 - Following pollution prevention guidance throughout the works.
272. The worst case scenario would be if a main or annex badger sett is identified within or within 30m of the Onshore Development Area. This may require:
- Main sett replacement in the proposed Mitigation Areas and closure under licence;
 - A replacement sett must be in place six months in advance of closure of existing sett, and badgers must have used the artificial sett;
 - Sett closure can only occur between 1 July and 30 November;
 - If it is a main sett proof of use of the artificial sett is required prior to closure of the main sett; and
 - Bait marking surveys may be required to ensure the artificial sett is not being built in another clan's territory.

273. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.6 Impact 6: Potential Mortality, Harm or Disturbance to Roosting Bats, or Destruction, Damage, or Disturbance to Roosting Bat Habitat

274. In the worst case scenario roosting features would be lost and disturbed within the Onshore Development Area. The surveys to date have identified 243 trees with bat roost potential. These trees are located across the terrestrial ecology study area. Eight buildings have also been identified as having bat roost potential (**Appendix 18-1**).
275. Based on the data provided by NEYEDC (**Appendix 18-2**) and the species identified in bat surveys undertaken to date (**Appendix 18-4**) species likely to be present in the Onshore Development Area are Daubenton's, whiskered, natterer's, noctule, common pipistrelle, soprano pipistrelle, Nathusius pipistrelle, brown long-eared, parti-coloured. Other species may also be present and have just not yet been recorded.
276. Roosting bats could therefore be within the Onshore Development Area. The potential impacts to roosting bats as a result of the Projects include the following:
- Risk of killing or injuring roosting bats during the onshore construction phase;
 - Risk of noise, light and vibration disturbance to roosting bats during the onshore construction phase; and
 - Permanent loss of roosting features in the Onshore Development Area.

18.6.1.6.1 Magnitude of Impact – All Scenarios

277. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) highly sensitive roosts (i.e. maternity or transitional roosts) need to be removed or disturbed. The magnitude of the effect is therefore considered to be high in the absence of mitigation, indicating that the potential impacts are likely to have an adverse effect on the integrity of a site of the conservation status of a species or species assemblage.

18.6.1.6.2 Sensitivity of Receptor

278. In the worst case scenario and without mitigation, the sensitivity of roosting bats is high, reflecting that species is unable to tolerate effect resulting in permanent change in its abundance or quality.

18.6.1.6.3 Significance of Effect – All Scenarios

279. Overall, in absence of mitigation the magnitude is high and the sensitivity high. Therefore, the significance on the effect is of **major** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.6.4 Mitigation and Residual Significance of Effect – All Scenarios

280. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
281. General mitigation could include:
- Avoid permanent habitat loss where possible of woodland, and other trees providing suitable roost features;
 - Keeping vegetation clearance to the minimum amount possible of suitable roosting trees;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure; and
 - Retention of known roosting sites;
282. In the worst case scenario, an EPS Mitigation licence would be required, the mitigation requirements would be outlined within the licence. The requirements of this will depend on what species is using the roost and what type of roost it is (night roost, day roost, general roost, maternity roost, hibernation roost, or transitional roost). General requirements may include:
- Installation of compensatory bat roost boxes nearby to ensure there is no overall loss in roosting capacity; ‘Soft-felling’ whereby a tree is cut into sections which are then gently lowered to the ground using ropes; and
 - Specific timings of roost removal e.g., remove a hibernation roost in summer months.
283. These measures will reduce the magnitude of impact from high to low therefore the residual effect is **moderate** adverse, which is deemed to be significant. However, this is worst case scenario due to data gaps, the level of assessment and mitigation will be reviewed in the ES to aim for ensuring that any residual effects will be no more than **minor** adverse.

- 18.6.1.7 Impact 7: Potential Mortality, Harm or Disturbance to Foraging and Commuting Bats, or Destruction, Damage, or Disturbance to Foraging and Commuting Bat Habitat
284. In the worst case scenario foraging and commuting habitat for bats would be permanently lost in the Onshore Development Area. At least six species have been recorded foraging and commuting within the Onshore Study Area.
285. Based on data provided by NEYEDC (**Appendix 18-2**) and the species identified in bat surveys undertaken to date (**Appendix 18-4**) species likely to be present in the Onshore Development Area are Daubenton's, whiskered, natterer's, noctule, common pipistrelle, soprano pipistrelle, Nathusius pipistrelle, brown long-eared, parti-coloured. Other species may also be present and have just not yet been recorded.
286. The potential impacts to foraging and commuting bats as a result of the Projects include the following:
- Risk of injuring or killing foraging and commuting bats during the construction phase;
 - Risk of noise, light and vibrance disturbance to foraging and commuting bats during the construction phase;
 - Temporary foraging and commuting habitat loss for the duration of the Onshore construction phase; and
 - Permanent foraging and commuting habitat loss.

18.6.1.7.1 *Magnitude of Impact – All Scenarios*

287. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) foraging and commuting habitat will be lost in areas of high activity of more sensitive and / or rarer bat species. The magnitude of the effect is therefore considered to be high in the absence of mitigation, indicating that the potential impacts are likely to have an adverse effect on the integrity of a site of the conservation status of a species or species assemblage.

18.6.1.7.2 *Sensitivity of Receptor*

288. In the worst case scenario and without mitigation, the sensitivity of foraging and commuting bats is high because if flight lines or significant habitat is lost this can significantly effect a population. Reflecting that species is unable to tolerate effect resulting in permanent change in its abundance or quality.

18.6.1.7.3 Significance of Effect – All Scenarios

289. Overall, in absence of mitigation the magnitude is high, and the sensitivity is high. Therefore, the significance of the effect is of **major** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.7.4 Mitigation and Residual Significance of Effect – All Scenarios

290. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
291. General mitigation could include:
- Avoid permanent and temporary habitat loss wherever possible to suitable habitat such as woodland, hedgerows and lines of trees;
 - Retain connectivity and flight paths of bats by keeping permanent and temporary vegetation clearance to a minimum;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats; and
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure.
292. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **moderate** adverse, which is deemed to be significant. However, this is worst case scenario due to data gaps, the level of assessment and mitigation will be reviewed in the ES to aim for ensuring that any residual effects will be no more than **minor** adverse.

18.6.1.8 Impact 8: Potential Mortality, Harm or Disturbance to Breeding Birds, or Destruction, Damage, or Disturbance to Breeding Bird Habitat

293. In the worst case scenario, there will be permanent habitat loss to breeding birds as a result of the Projects. The potential impact to breeding birds as a result of the Projects include the following:
- Risk of injuring and killing breeding birds during the construction phase;
 - Risk of noise, vibration and light disturbance to breeding birds during the construction phase;
 - Permanent breeding habitat loss; and
 - Temporary breeding habitat loss for the duration of the onshore works.

18.6.1.8.1 Magnitude of Impact – All Scenarios

294. The worst case scenario for all scenarios (in isolation, concurrently or sequentially) is if Schedule 1 breeding birds are confirmed to be breeding within the Onshore Development Area and will be impacted due to the works. In this case and in the absence of mitigation the magnitude of impact would be high. Indicating that the potential impacts are likely to have an adverse effect on the integrity of a site of the conservation status of a species or species assemblage.

18.6.1.8.2 Sensitivity of Receptor

295. In the worst case scenario and without mitigation, the sensitivity of breeding birds is high, reflecting that species is unable to tolerate effect resulting in permanent change in its abundance or quality.

18.6.1.8.3 Significance of Effect – All Scenarios

296. Overall, in absence of mitigation the magnitude is high, and the sensitivity is high. Therefore, the significance of the effect is of **major** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.8.4 Mitigation and Residual Significance of Effect – All Scenarios

297. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application. General mitigation could include:
- Avoid habitat loss for Schedule 1 birds wherever possible;
 - Keeping vegetation clearance to the minimum amount possible;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure; and
 - Following pollution prevention guidance throughout the works.

298. The key measure to avoid impacts to nesting will involve the removal of vegetation such as hedgerows and scrub outside of the main bird nesting season which runs from 1 March to 31 August. In locations where this measure cannot be accommodated, certain habitats (such as hedgerows and small amounts of scrub) would be checked by an ecologist for the presence of active birds' nests. Where this check confirms the absence of active nests, clearance works can proceed shortly after, within no more than 48 hours of the check. If active birds' nests are found, these would be retained in-situ and allowed to reach their natural conclusion without being disturbed or damaged.
299. In addition to the above, the following mitigation measures could be employed:
- Pre-construction bird surveys would be undertaken to establish the presence of breeding birds;
 - Measures would be adopted to minimise noise, light and disturbance on identified breeding birds, such as visual screening (e.g., opaque fencing) where necessary;
 - Construction activities would be monitored by an Ecological Clerk of Works (ECoW) or suitably qualified ornithologist, who would seek to ensure compliance with the WCA 1981 by avoiding destruction of nests, eggs, or young, and affording increased protection from disturbance to Schedule 1 species breeding birds; and
 - Where breeding bird activity is recorded, such construction works (excluding vehicle and personnel movements) may be halted immediately until a disturbance risk assessment is undertaken by a suitably qualified ecologist. The risk assessment would consider the nature of construction activity, likelihood of disturbance, and possible implications of the construction activities on the breeding attempt and set out measures to ensure that no disturbance occurs. Where it is determined that breeding birds are not likely to be affected, construction works will continue. Where it is determined that breeding birds may be affected, additional mitigation works would be implemented to prevent disturbance. Where, in the opinion of the suitably qualified ecologist, disturbance cannot be avoided by mitigation, construction works within the area of disturbance would be suspended until chicks have fledged.

300. It should be noted that if a breeding pair of any bird of prey are within the Onshore Development Area they have large buffer zones that vary for each species but are at least 200m from the nest site.
301. These measures will reduce the magnitude of impact from high to low therefore the residual effect is **moderate** adverse, which is deemed to be significant. However, this is worst case scenario due to data gaps, the level of assessment and mitigation will be reviewed in the ES to aim for ensuring that any residual effects will be no more than **minor** adverse.

18.6.1.9 Impact 10: Potential Mortality, Harm or Disturbance to Over-wintering Birds, or Destruction, Damage, or Disturbance to Over-wintering Bird Habitat

302. In the worst case scenario suitable habitat for over-wintering birds will be permanently lost as a result of the Projects. T1, T3, and T10 were important areas for over-wintering birds. The potential impacts to over-wintering birds as a result of the Projects include the following:
- Risk of injuring or killing over-wintering birds during the construction phase;
 - Risk of noise, vibration and light disturbance to over-wintering bird species;
 - Temporary habitat loss for the duration of the onshore construction works; and
 - Permanent habitat loss.

18.6.1.9.1 Magnitude of Impact – All Scenarios

303. The worst case scenario for all scenarios (in isolation, concurrently or sequentially) would be if Schedule 1 over-wintering birds are present within the Onshore Development Area and will be impacted due to the works. The desk study report does not indicate that any of the designated sites are designated for over-wintering birds (**Appendix 18-2**). This would therefore be of medium magnitude. The impact adversely affects an ecological receptor but is unlikely to adversely affect its integrity or conservation status.

18.6.1.9.2 Sensitivity of Receptor

304. The worst case scenario would be if Schedule 1 over-wintering birds are present within the Onshore Development Area and will be impacted due to the works. This would have a medium sensitivity reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

18.6.1.9.3 Significance of Effect – All Scenarios

305. Overall, in absence of mitigation the magnitude is medium, the sensitivity is medium. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.9.4 Mitigation and Residual Significance of Effect – All Scenarios

306. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
307. General mitigation could include:
- Avoid loss of habitat where possible;
 - Keeping vegetation clearance to the minimum amount possible;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure;
 - Excavations will be fenced off and a means of escape will be provided where required; and
 - Following pollution prevention guidance throughout the works.
308. Where construction works are undertaken within suitable habitat or functionally linked habitat between November and January, a pre-construction survey will be undertaken to record the distribution and abundance of over-wintering birds and the distribution of suitable habitat likely to be affected during the winter season within which construction works will be undertaken. The findings of these pre-construction surveys will determine whether mitigation measures to reduce disturbance will be required; however, such mitigation measures may comprise pre-work habitat manipulation works to actively discourage bird species from using the fields where works are required and subsequently installing exclusion fencing to deter birds from the area as well as ensuring all lighting (if required) is only directed onto the construction works area.
309. During the construction works and should over-wintering birds be present, the ECoW will be responsible for advising on the appropriate levels of mitigation, e.g., watching briefs, tool box talks to the construction personnel etc.

310. Lighting, noise and vibration may need to be controlled throughout the works.
311. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.10 Impact 11: Potential Mortality, Harm or Disturbance to Protected Fish Species, or Destruction, Damage, or Disturbance to Protected Freshwater Fish Species Habitat

312. Baseline fish surveys have not been undertaken. Therefore, it has been assumed that protected fish species are present in all of the suitable watercourses within the Onshore Development Area.
313. The Onshore Development Area crosses several main rivers. Trenchless crossing techniques such as HDD will be used under the Main Rivers to avoid direct impacts to fish such as obstruction to passage and indirect impacts such as pollution from accidental spills.
314. In the worst case scenario suitable habitat for freshwater fish could be negatively impacted by construction works adjacent to any watercourse. The potential impacts to freshwater fish species as a result of the Projects include the following:
- Risk of injuring or killing freshwater fish species during the construction phase through accidental pollution events; and
 - Risk of injuring or killing freshwater fish species during the construction phase through accidental sedimentation events

18.6.1.10.1 Magnitude of Impact – All Scenarios

315. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) the magnitude is medium, indicating that the potential impacts are unlikely to adversely affect freshwater protected fish species integrity or conservation status.

18.6.1.10.2 Sensitivity of Receptor

316. The sensitivity of freshwater protected fish species is medium, reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

18.6.1.10.3 Significance of Effect – All Scenarios

317. Overall, in absence of mitigation the magnitude is medium, the sensitivity is medium. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.10.4 Mitigation and Residual Significance of Effect – All Scenarios

318. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
319. General mitigation would involve following pollution prevention guidance throughout the works.
320. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.11 Impact 12: Potential Mortality, Harm or Disturbance to Invertebrates, or Destruction, Damage, or Disturbance to Invertebrates Habitat

321. Baseline invertebrate surveys have not been undertaken at the time of writing. Therefore, it has been assumed that protected invertebrate species, and their suitable habitats are present within the Onshore Development Areas and could experience permanent and temporary habitat loss.
322. In the worst case scenario suitable habitat for invertebrates will be permanently lost as a result of the Projects. Four records relate to the Onshore Development Area and are of holly blue butterfly and common blue butterfly.
323. The potential impacts to invertebrates as a result of the Projects include the following:
- Directly through the risk of injuring or killing invertebrate during the construction phase;
 - Indirectly through light disturbance to nocturnal invertebrate species;
 - Indirectly through habitat loss for the duration of the onshore construction works; and
 - Indirectly through permanent habitat loss.

18.6.1.11.1 Magnitude of Impact – All Scenarios

324. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) that protected invertebrate species such as species of principal importance, EPS species, WCA Schedule 5 species, and LBAP listed species and their suitable habitats are permanently lost, the magnitude would be high because they don't disperse far and often have specific food plants. The impact is likely to have an adverse effect on the integrity of a site of the conservation status of a species or species assemblage.

18.6.1.11.2 Sensitivity of Receptor

325. In the worst case scenario and without mitigation, the sensitivity of invertebrates is high, reflecting that species is unable to tolerate effect resulting in permanent change in its abundance or quality.

18.6.1.11.3 Significance of Effect – All Scenarios

326. Overall, in absence of mitigation the magnitude is high, the sensitivity is high. Therefore, the significance of the effect is of **major** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.11.4 Mitigation and Residual Significance of Effect – All Scenarios

327. All mitigation measures will be provided in OLEMP that will be submitted with the DCO application.
328. General mitigation could include:
- Avoid loss of habitat where possible;
 - Keeping vegetation clearance to the minimum amount possible;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure; and
 - Following pollution prevention guidance throughout the works.
329. Mitigation will depend on the species identified within the Onshore Development Area; mitigation could include:
- Habitat replacement; and
 - Habitat enhancement.
330. If translocation is required the receptor site needs to be ready prior to habitat clearance.
331. These measures will reduce the magnitude of impact from high to low therefore the residual effect is **moderate** adverse, which is deemed to be significant. However, this is worst case scenario due to data gaps, the level of assessment and mitigation will be reviewed in the ES to aim for ensuring that any residual effects will be no more than **minor** adverse.

18.6.1.12 Impact 13: Potential Mortality, Harm or Disturbance to Otter, or Destruction, Damage, or Disturbance to Otter Habitat

332. In the worst case scenario suitable habitat for otter will be permanently lost as a result of the Projects. The potential impacts to otter as a result of the Projects include the following:

- Risk of injuring or killing otter during the construction phase;
- Risk of noise, vibration and light disturbance to otter;
- Exclusion of otter from holts;
- Temporary habitat loss for the duration of the onshore construction works; and
- Permanent habitat loss.

18.6.1.12.1 Magnitude of Impact – All Scenarios

333. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) holts would be identified and need to be disturbed. Direct habitat loss and burrow loss is not expected as trenchless techniques will be used. The magnitude of impact is high. The impact is likely to have an adverse effect on the integrity of the conservation status of an otter.

18.6.1.12.2 Sensitivity of Receptor

334. The sensitivity of otter is medium, reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

18.6.1.12.3 Significance of Effect – All Scenarios

335. Overall, in absence of mitigation the magnitude is high, the sensitivity is medium. Therefore, the significance of the effect is of **major** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.12.4 Mitigation and Residual Significance of Effect – All Scenarios

336. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
337. General mitigation could include:
- Avoid loss of habitat where possible;
 - Keeping vegetation clearance to the minimum amount possible;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Excavations will be fenced off and a means of escape will be provided where required; and
 - Following pollution prevention guidance throughout the works.
338. In the worst case scenario, the works will affect otter holts and an EPS licence will need to be applied for.
339. These measures will reduce the magnitude of impact from major to minor therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.13 Impact 14: Potential Mortality, Harm or Disturbance to Reptile, or Destruction, Damage, or Disturbance to Reptile Habitat

340. In the worst case scenario suitable habitat for reptile will be permanently lost as a result of the Projects. Six areas of suitable habitat were identified in the habitat survey (Peak Ecology, 2022a). The potential impacts to reptile species as a result of the Projects include the following:

- Risk of injuring or killing reptiles during the construction phase;
- Risk of noise, vibration and light disturbance to reptiles;
- Temporary habitat loss for the duration of the onshore construction works; and
- Permanent habitat loss.

18.6.1.13.1 Magnitude of Impact – All Scenarios

341. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially), the habitats will be suitable to sustain high population of reptile species and the habitat would be permanently lost. The magnitude of the effect is therefore considered medium without mitigation.

18.6.1.13.2 Sensitivity of Receptor

342. The sensitivity of reptiles is considered to be medium, reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

18.6.1.13.3 Significance of Effect – All Scenarios

343. Overall, the magnitude is medium, the sensitivity is medium. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.13.4 Mitigation and Residual Significance of Effect – All Scenarios

344. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
345. General mitigation could include:
- Avoid habitat loss where possible;
 - Keeping vegetation clearance to the minimum amount possible;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure;
 - Excavations will be fenced off and a means of escape will be provided where required; and
 - Following pollution prevention guidance throughout the works.
346. In the worst case scenario reptile translocation and exclusion will need to take place. This would include:
- 120 days of trapping, in suitable weather conditions (based on the worst case scenario of high adder population being present in the Onshore Development Area). Every third day should be planned as not being suitable weather. This value will change depending on the species in the Onshore Development Area and the population sizes.
 - Finding a receptor site within the proposed Mitigation Areas and assessing for current population sizes of each species;
 - Biosecurity will need to be considered between the two sites;
 - Habitat replacement; and
 - Habitat enhancement using refugia, hibernacula, basking sites.
347. The two EPS species (smooth snake and sand lizard) have been scoped out of the report therefore there is no magnitude of impact or sensitivity of receptor. Mitigation is therefore not currently required.
348. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.14 Impact 15: Potential Mortality, Harm or Disturbance to Water Vole, or Destruction, Damage, or Disturbance to Water Vole Habitat

349. In the worst case scenario suitable habitat for water vole will be disturbed as a result of the Projects. Direct habitat loss and burrow loss is not expected as trenchless crossing techniques such as HDD will be used. Three target notes within the habitat survey were related to water vole (**Appendix18-2**), however it is assumed that water vole are present in all suitable habitat until the full habitat survey is completed. The potential impacts to water vole as a result of the Projects include the following:

- Risk of injuring or killing water vole during the construction phase;
- Risk of noise, vibration and light disturbance to water vole;
- Temporary habitat loss for the duration of the onshore construction works; and
- Permanent habitat loss.

18.6.1.14.1 Magnitude of Impact – All Scenarios

350. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially), water-vole burrows will need to be disturbed as part of the proposed works. Water vole do not have large ranges and if a large area needs to be removed this would be the worst case scenario. The magnitude of the effect is therefore considered to be high in the absence of mitigation, indicating the impact is likely to have an adverse effect on the integrity of a site of the conservation status of a species or species assemblage.

18.6.1.14.2 Sensitivity of Receptor

351. The sensitivity of water vole is considered to be medium, reflecting that the species has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

18.6.1.14.3 Significance of Effect – All Scenarios

352. Overall, in absence of mitigation the magnitude is high, the sensitivity is medium. Therefore, the significance of the effect is of **major** adverse significance without mitigation. As the Projects will last for over a year the duration is classed as long term.

18.6.1.14.4 Mitigation and Residual Significance of Effect – All Scenarios

353. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
354. General mitigation could include:
- Avoid habitat loss where possible;
 - Keeping vegetation clearance to the minimum amount possible;
 - Restriction on night-time working (occasional night work will be required);
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats;
 - Reduction of noise and vibration disturbance e.g. acoustic barriers, screening of permanent infrastructure;
 - Excavations will be fenced off and a means of escape will be provided where required; and
 - Following pollution prevention guidance throughout the works.
355. The worst case scenario would be a water vole burrow needing to be disturbed this would include needing a mitigation licence which will have specific mitigation requirements that might include:
- Translocating water vole with a daily dispersal limit to the proposed Mitigation Areas; and
 - Checking territories so water voles are not being dispersed into other territories.
356. These measures will reduce the magnitude of impact from high to low therefore the residual effect is **minor** adverse, which is deemed to be not significant.

18.6.1.15 Impact 16: Spread of Non-native Species

357. The desk study report (**Appendix 18-2**) returned eight species of WCA Schedule 9 species within 2km of the Onshore Development Area. These records were of marsh frog, New Zealand pigmy weed, Canadian waterweed, Nuttall's waterweed, Japanese knotweed, floating pennywort, rhododendron and Japanese rose.

358. The habitat survey recorded two WCA Schedule 9 plants within the Study Area, they were Japanese knotweed and Himalayan balsam. The two locations provided are not within the Onshore Development Area. However, as a full habitat survey has not been completed of the whole Onshore Development Area there could be other WCA Schedule 9 records and other species present within the Onshore Development Area.
359. No INNS are a valued ecological receptor. However, INNS requires consideration as the onshore export cable works risk furthering the spread of this species (which would represent a negative ecological impact and an offence being committed).
360. INNS such as Himalayan balsam can outcompete native vegetation, thereby reducing species diversity of plants and animals where it becomes established. As a result, when Himalayan balsam dies back over winter, it can leave the banks of watercourses largely un-vegetated and therefore more vulnerable to erosion. Removal of the species can be difficult, expensive and time-consuming, typically requiring a persistent approach over 5-10 years. Consequently, the establishing of this species can result in extensive and long-lasting adverse ecological impacts.

18.6.1.15.1 Magnitude of Impact – All Scenarios

361. In the worst case scenario for all scenarios (in isolation, concurrently or sequentially) construction works and construction vehicles and personnel would be working in proximity to areas that support INNS. Without the adoption of careful control / prevention measures, this could have a permanent negative impact on affected habitats and native species where it becomes newly established, which is likely to comprise valued habitats such as watercourses and could impact protected species. The magnitude is therefore considered to be high in a worst case scenario.

18.6.1.15.2 Sensitivity of Receptor

362. As INNS are covered under the WCA Schedule 9, they do not have a sensitivity value.

18.6.1.15.3 Significance of Effect – All Scenarios

363. As there is no sensitivity value, there is no significance of effect. However, mitigation is still required to prevent the spread of these species.

18.6.1.15.4 Mitigation and Residual Significance of Effect – All Scenarios

364. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
365. Control of invasive species, where required, would be incorporated into the OLEMP for the Projects to provide mitigation.
366. Prior to the commencement of construction works, an INNS Management Plan would be developed for approval by the relevant stakeholders. This plan will likely include the following measurements:
 - A plan of all INNS locations and extents;
 - A protocol for removing INNS and or managing the waste generated;
 - Good site practice measures for managing the spread of INNS during works at watercourses; and
 - A requirement for an ECoW and details of their responsibilities with respect to INNS.

18.6.2 Potential Effects During Operation

18.6.2.1 Impact 17: Disturbance to Habitats and Species from Maintenance Activities

- 367. Planned maintenance at the onshore substations or routine access and maintenance at link boxes along the onshore export cable corridor is anticipated to be localised with a minimal likelihood of disturbance expected to the adjacent habitats and species.
- 368. In the unlikely event of a cable failure there may be a need to access the buried cables to enable the replacement of a failed cable section. Such reactive repairs are expected to have potential impacts similar to those of construction, however they would be expected to be more localised, of smaller scale and temporary in nature.

18.6.2.1.1 Magnitude of Impact – All Scenarios

- 369. In all scenarios (in isolation, concurrently or sequentially) maintenance works would cause a short term and temporary impact on the habitats and species adjacent to the works. The magnitude of effect is therefore considered to be minor in the absence of mitigation. Indicating that the impact adversely affects the receptor but would not adversely affect its integrity or conservation status.

18.6.2.1.2 Sensitivity of Receptor

- 370. The sensitivity of the receptor will depend on what species or habitats are affected by the maintenance works. In the worst case the sensitivity would be high. Indicating it is unable to tolerate the effect and there is a permanent change in its abundance or quality.

18.6.2.1.3 Significance of Effect – All Scenarios

- 371. Overall, without mitigation the magnitude is minor, and in the worst case scenario the sensitivity is high. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation.

18.6.2.1.4 Mitigation and Residual Significance of Effect – All Scenarios

372. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
373. General mitigation depending on the maintenance required could include:
- Avoid loss of important nature conservation habitat where possible;
 - If required keep vegetation clearance to a minimum;
 - Supervision of work by a suitably qualified ecologist if works will potentially disturb important habitats or species;
 - Noise and vibration suppression techniques e.g. acoustic barriers, screening of permanent infrastructure;
 - Excavations will be fenced off and a means of escape will be provided where required; and
 - Following pollution prevention guidance throughout the maintenance works.
374. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **moderate** adverse, which is deemed to be significant. However, this is worst case scenario, the level of assessment and mitigation will be reviewed in the ES to aim for ensuring that any residual effects will be no more than **minor** adverse.

18.6.2.2 Impact 18: Disturbance to Species from Artificial Lighting

375. During operation of the onshore substations, it is assumed that there will be no requirement for continuous lighting and therefore disturbance impacts on species is not predicted. However, temporary lighting may be required.

18.6.2.2.1 Magnitude of Impact – All Scenarios

376. Without mitigation if the onshore substations require temporary artificial lighting this would be short term. The magnitude of effect is therefore considered to be minor in the absence of mitigation. Indicating that the impact adversely affects the receptor but would not adversely affect its integrity or conservation status.

18.6.2.2.2 Sensitivity of Receptor

377. The sensitivity of the receptor will depend on what species are affected by the maintenance works. In the worst case the sensitivity would be high. Indicating it is unable to tolerate the effect and there is a permanent change in its abundance or quality.

18.6.2.2.3 Significance of Effect – All Scenarios

378. Overall, without mitigation the magnitude is minor, and in the worst case scenario the sensitivity is high. Therefore, the significance of the effect is of **moderate** adverse significance without mitigation.

18.6.2.2.4 Mitigation and Residual Significance of Effect – All Scenarios

379. All mitigation measures will be provided in the OLEMP that will be submitted with the DCO application.
380. General mitigation techniques would include:
- Restriction on night-time working; and
 - Use of directional and low-level lighting to reduce additional light spill into retained and adjacent habitats.
381. These measures will reduce the magnitude of impact from medium to low therefore the residual effect is **moderate** adverse, which is deemed to be significant. However, this is worst case scenario, the level of assessment and mitigation will be reviewed in the ES to aim for ensuring that any residual effects will be no more than **minor** adverse.

18.6.3 Potential Effects During Decommissioning

382. Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of a smaller magnitude.
383. The same potential impacts noted for construction are therefore expected to be scoped in (and out) for decommissioning.

18.7 Preliminary Assessment of Cumulative Effects

384. As detailed in section 18.4.5 this section presents a preliminary assessment of cumulative effects in relation to terrestrial ecology. The final CEA will be undertaken within the ES chapter.

18.7.1 Initial Screening for Cumulative Effects

385. **Table 18-13** below details the potential cumulative effects that may occur between the Projects and other plans, projects and activities. Only potential impacts assessed in section 18.6 where the potential for cumulative effects has been identified (minor, moderate or major) will be taken forward to the final CEA (i.e. those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact).

Table 18-13 Potential Cumulative Effects

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Construction			
Impact 1: Construction Disturbance to Statutory Designated Nature Conservation Sites.	Yes	High	Plans and projects currently in planning have potential to have cumulative indirect effects on onshore designated sites where zones of influence overlap
Impact 2: Construction Disturbance to Non-Statutory Designated Nature Conservation Sites.	Yes	High	Plans and projects currently in planning have potential to have cumulative indirect effects on onshore designated sites where zones of influence overlap

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 3: Permanent and Temporary Loss / Fragmentation of Habitats	Yes	High	Plans and projects currently in planning have potential to have cumulative permanent habit loss across the region as well as cumulative temporary habitat disturbance where projects are carried out simultaneously
Impact 4: Potential Mortality, Harm or Disturbance to GCN, or Destruction, Damage, or Disturbance to GCN Habitat	No	High	Any project with a risk to GCN will either be required to manage risks and compensate habitats through the District Level Licencing Scheme or the Natural England EPS licensing route. Therefore the likelihood of a cumulative effect is low.
Impact 5: Potential Mortality, Harm or Disturbance to Badger, or Destruction, Damage, or Disturbance to Badger Habitat	No	High	Any project with a risk to badger will be required to manage risks and compensate loss of setts through the Natural England EPS licensing route. Therefore the likelihood of a cumulative effect is low.

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 6: Potential Mortality, Harm or Disturbance to Roosting Bats, or Destruction, Damage, or Disturbance to Roosting Bat Habitat	No	High	Any project with a risk to bats will be required to manage risks and compensate loss of setts through the Natural England EPS licensing route. Therefore the likelihood of a cumulative effect is low.
Impact 7: Potential Mortality, Harm or Disturbance to Foraging and Commuting Bats, or Destruction, Damage, or Disturbance to Foraging and Commuting Bat Habitat	Yes	High	Plans and projects currently in planning have potential to have cumulative permanent habit loss across the region as well as cumulative temporary direct and indirect disturbance where projects are carried out simultaneously
Impact 8: Potential Mortality, Harm or Disturbance to Breeding Birds, or Destruction, Damage, or Disturbance to Breeding Bird Habitat	Yes	High	Plans and projects currently in planning have potential to have cumulative permanent habit loss across the region as well as cumulative temporary direct and indirect disturbance where projects are carried out simultaneously

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 10: Potential Mortality, Harm or Disturbance to Over-wintering Birds, or Destruction, Damage, or Disturbance to Over-wintering Bird Habitat	Yes	High	Plans and projects currently in planning have potential to have cumulative permanent impacts across the region as well as cumulative temporary direct and indirect disturbance where projects are carried out simultaneously
Impact 11: Potential Mortality, Harm or Disturbance to Protected Fish Species, or Destruction, Damage, or Disturbance to Protected Freshwater Fish Species Habitat	No	High	Each project will be carried out under PPG to manage risks to watercourses. Therefore the likelihood of a cumulative effect is low.
Impact 12: Potential Mortality, Harm or Disturbance to Invertebrates, or Destruction, Damage, or Disturbance to Invertebrates Habitat	Yes	Medium	Plans and projects currently in planning have potential to have cumulative permanent habit loss across the region as well as cumulative temporary direct and indirect disturbance where projects are carried out simultaneously

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 13: Potential Mortality, Harm or Disturbance to Otter, or Destruction, Damage, or Disturbance to Otter Habitat	Yes	High	Plans and projects currently in planning have potential to have cumulative permanent habit loss across the region as well as cumulative temporary direct and indirect disturbance where projects are carried out simultaneously
Impact 14: Potential Mortality, Harm or Disturbance to Reptile, or Destruction, Damage, or Disturbance to Reptile Habitat	Yes	High	Plans and projects currently in planning have potential to have cumulative permanent habit loss across the region as well as cumulative temporary direct and indirect disturbance where projects are carried out simultaneously
Impact 15: Potential Mortality, Harm or Disturbance to Water Vole, or Destruction, Damage, or Disturbance to Water Vole Habitat	No	High	Any project with a risk to water vole will be required to manage risks and compensate loss of setts through the Natural England EPS licensing route. Therefore the likelihood of a cumulative effect is low.

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 16: Spread of Non-native Species	No	High	Each project individually comes with a risk of spreading Non-native Species but there will no movement of construction vehicles between project sites, therefore the likelihood of a cumulative effect is low.
Operation & Maintenance			
Impact 17: Disturbance to Habitats and Species from Maintenance Activities	Yes	High	Plans and projects currently in planning have potential to have ongoing cumulative temporary direct and indirect disturbance if maintenance activities are undertaken simultaneously.
Impact 18: Disturbance to Species from Artificial Lighting	Yes	High	Plans and projects currently in planning have potential to have ongoing cumulative effects from lighting where this is installed.
Decommissioning			
Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of a smaller magnitude. The same potential impacts noted for construction are therefore expected to be scoped in (and out) for decommissioning.			

18.7.2 Plans/Projects Considered for Cumulative Impacts

386. A high-level list of plans/projects that may result in cumulative effects with the Projects is detailed in **Table 18-14**. For Terrestrial Ecology and Ornithology, a search distance of 2km from the Onshore Development Area has been used to determine the initial list of projects considered for the CEA.
387. Plans / projects have been assigned a tier level between 1 and 7, based on the most recent guidance (see **Chapter 6 EIA Methodology**). For the final CEA at ES, this high-level list will be reviewed and screened to ensure all relevant plans / projects are considered in the final assessment. All listed plans / projects will be re-examined at ES to ensure each assigned tier remains accurate at the time of writing.
388. In addition to other offshore wind farms, the classes of projects that could potentially be considered for the cumulative assessment of infrastructure and other users includes:
- Large scale housing projects;
 - Large scale commercial and industrial projects;
 - Changes to agricultural land use.
389. With respect to these activities, the cumulative assessment considers them to be part of the baseline conditions for the surrounding area. As such, it is not expected that the Projects will contribute to cumulative effects with the existing activities in the above list, and therefore these have been have not been the subject of further assessment.

Table 18-14 High-Level List of Plans/Projects Screened For Further Assessment in the Final CEA

Tier	Plan / Project	Distance to Onshore Development Area (km)
2	Dogger Bank A & B Offshore Wind Farm	Crosses onshore export cable corridor
3	A164 and Jock Lodge Junction Improvement Scheme	Crosses onshore export cable corridor
3	Solar Farm – Land south of Creyke Beck Substation, 4875 Park Lane, Cottingham	Within Onshore Development Area
3	Solar Farm – Land east and west of West of Tickton Bridge Plantation, Main Road, Routh	Adjacent to the Onshore Development Area
4	Hornsea Project Four Offshore Wind Farm	Adjacent to onshore export cable corridor
4	Scotland England Green Link 2	3.5
4	Solar Farm – Land north east and west of Carr Plantation, Ferry Road, Wawne	1.5
4	Household Recycling Centre – Land north west of Ings Road Picnic Site, Molescroft	Within Onshore Development Area
6	Solar Farm – Robson & Co, White Hall, Shepard Lane, Woodmansey	Within Onshore Development Area
7	New National Grid Substation (Birkill Wood)	Within Onshore Development Area
7	North Humber to High Marnham	Within Onshore Development Area
7	Creyke Beck Substation Extension	400m from Onshore Development Area

18.8 Potential Monitoring Requirements

390. Monitoring requirements will be described in the OLEMP that will be submitted with the DCO application, and further developed and agreed with stakeholders prior to construction based on the OLEMP and taking account of the final detailed design of the Projects.
391. The potential spread of INNS will need to be monitored in areas affected by INNS. In the worst case scenario if the Projects are concluded to have resulted in the spread of INNS (e.g. Himalayan Balsam to a previously unaffected watercourse), remedial action would be required in the form of an eradication effort.
392. If any EPS mitigation licenses for any species reviewed within this report are required for the Projects monitoring after the creation of the feature covered in the licence would be required. If required the monitoring would be very focused, such as to the relevant trees (in the case of roosting bats where replacement bat roosting sites have been created) or if active badger setts are found it would be the monitoring of newly constructed badger setts.
393. Should compensatory features be required for EPS species then ecological monitoring during and post construction would be required in order to confirm the effectiveness of mitigation measures described above. As a minimum, ecological monitoring for the scheme would comprise:
- Monitoring of bat boxes installed during construction as part of the bat mitigation on site, this will include checking their condition and clearing them out as well as for presence of roosting bats;
 - Monitoring of bird boxes installed during construction as part of the bird mitigation on site, this will include checking their condition and clearing them out as well as monitoring their use by birds;
 - Monitoring the establishment of any new shrubs, trees and other plants created as part of mitigation for habitat loss;
 - Monitoring the populations of all species that required specific surveys and mitigation; and
 - Ensuring eradication of any INNS species.

18.9 Interactions

394. The effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects are presented in **Table 18-15**. This provides a screening tool for which effects have the potential to interact. **Table 18-16** provides an assessment for each receptor (or receptor group) as related to these impacts.
395. Within **Table 18-16** the effects are assessed relative to each development phase to see if multiple effects could increase the significance of the effect upon a receptor. Following this a lifetime assessment is undertaken which considers the potential for effect to affect receptors across all development phases.

Table 18-15 Interactions Between Impacts - Screening

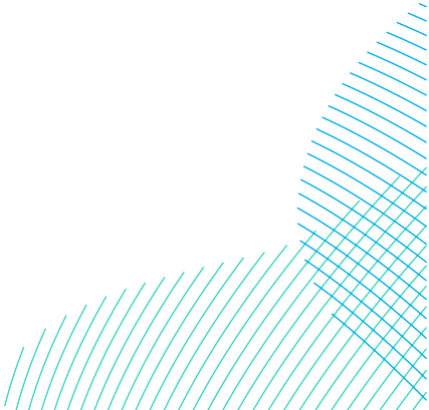
Potential Interactions Between Impacts					
Construction					
	Impact 1 Construction disturbance to statutory designated nature conservation sites	Impact 2 Habitat destruction or damage, or construction disturbance to non-statutory designated nature conservation sites	Impact 3 Loss of or damage to valued habitats	Impacts 4 -15 Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat	Impact 16 Potential spread of INNS
Impact 1 Construction disturbance to statutory designated nature conservation sites		Yes	Yes	Yes	Yes
Impact 2 Habitat destruction or damage, or construction disturbance to non-statutory designated nature conservation sites	Yes		Yes	Yes	Yes
Impact 3 Loss of or damage to valued habitats	No	Yes		Yes	Yes
Impacts 4 -15 Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat	No	Yes	No		Yes
Impact 16 Potential spread of INNS	No	Yes	No	No	
Operation					
	Impact 17: Disturbance to habitats and species from maintenance activities		Impact 18: Disturbance to species from artificial lighting		
Impact 17: Disturbance to habitats and species from maintenance activities			Yes		
Impact 18: Disturbance to species from artificial lighting	Yes				

Table 18-16 Interaction Between Impacts - Phase and Lifetime Assessment

Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
Designated Nature Conservation Sites	Minor adverse	Minor adverse	Minor adverse	No greater than individually assessed impact. The impacts are considered to have low magnitudes of effects on designated sites, with impact significances judged at no more than minor adverse during construction only. Given the low magnitudes and significances of the predicted impacts and effects, coupled with the avoidance / mitigation measures due to be adopted, and the anticipated absence of / limited potential for impacts during operation or decommissioning, it is considered that there would either be no interactions between the phases, or that these would not result in greater impacts than are assessed individually.	No greater than individually assessed impact. Impacts to designated nature conservation sites during operation are expected to be negligible, and during decommissioning impacts are expected to be equivalent or less than those predicted / assessed during construction. It is therefore considered that impacts to designated sites would not combine over the lifetime of DBS East and DBS West to increase the significance level of any impacts.
Priority Habitats	Minor adverse	Minor adverse	Minor adverse	No greater than individually assessed impact. Notable impacts to valued habitats are only predicted during the construction and decommissioning phases; during operation Priority Habitats are expected to experience minor impacts. During decommissioning, any impacts to Priority Habitats are likely to be of no more than equivalent significances for Priority Habitats because the decommissioning footprint will likely be smaller, timeframes will likely be shorter, and impacts would be focused on those habitats which had previously been impacted during construction. It is possible that habitats which become established within the DCO order limits between construction and decommissioning would need to be cleared to accommodate decommissioning works, but the types of habitats which would become established between construction and decommissioning are, by their nature, quick to establish and therefore would be quick to recover post decommissioning. The most ecologically	No greater than individually assessed impact. Notable impacts to valued habitats are only predicted during the construction and possibly during the decommissioning phases. Given the time delay between these two phases and the fact that the most valued/sensitive habitats are due to be avoided by decommissioning, there is no realistic potential for impacts to combine over the lifetime of the project and lead to levels of significance which would be greater than those assessed at individual (i.e., construction) phases. It is possible that some quickly regenerating habitats could experience cumulative impacts over the course of the Projects (if such a habitat becomes established within the decommissioning footprint), but the overall impact during the lifetime of the Projects would not be considered any more significant than during individual phases because these types of habitats would recover similarly quickly post decommissioning.

Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
				valued habitats are not expected to be impacted by decommissioning works because cabling / ducting is due to be extracted from in-situ jointing bays / inspection pits, rather than require extensive open-trench removal. Impacts significances during decommissioning are therefore judged to be of lower (or certainly of no greater) significances than are predicted during the construction phase. Given the likely time delay between these two phases, no interactions resulting in greater impacts than are assessed individually are expected.	The most ecologically valued habitats are not expected to be impacted by decommissioning works because cabling / ducting is due to be extracted from in-situ jointing bays / inspection pits, rather than require extensive open-trench removal. Impacts significances throughout the lifetime of the Projects are therefore judged to be of no greater significances than are predicted during any one phase.
INNS (Potential spread of)	High Magnitude permanent negative impact	High Magnitude permanent negative impact	High Magnitude permanent negative impact	No greater than individually assessed impact. The same preventative measures relating to INNS would need to be taken at decommissioning stage. Decommissioning works are expected to involve relatively minor works compared with construction meaning the risk of spreading INNS should be lower. However, it is possible that INNS will have spread relative to their status at construction phase, in which case the pre-mitigation impact during decommissioning could increase. However, assuming appropriate mitigation measures are adopted (in line with measures due to be adopted at the construction phase) there would be no realistic potential for interaction between impacts in various stages of the Projects.	No greater than individually assessed impact The same preventative measures relating to INNS would need to be taken at decommissioning stage as would be adopted during construction. Decommissioning works are expected to involve relatively minor works compared with construction meaning the risk of spreading INNS should also be lower. However, it is possible that INNS will have spread or become more established relative to their status at construction phase, in which case the pre-mitigation impact during decommissioning could increase. However, assuming appropriate mitigation measures are adopted (in line with measures due to be adopted at the construction phase) there would be no realistic potential for cumulative impacts through the lifetime of the Projects.
Protected and valued species	Moderate adverse	Moderate adverse	Moderate adverse	No greater than individually assessed impact The construction phase is expected to have the most significant impacts and effects on protected and valued species due to the larger footprint and longer timeframes than other phases. In contrast, operational impacts are expected to have	No greater than individually assessed impact. Given the anticipated small footprint and short timeframe of decommissioning works relative to construction, there is considered to be no realistic potential for impacts to protected and valued species to cumulate over the lifetime of the

Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
				negligible impacts on protected and valued species, and decommissioning works (which would be of a smaller scale and shorter timeframe than construction) would not be expected to have impacts of greater magnitudes or effects of greater significance than construction. Furthermore, it is anticipated that relevant mitigation measures would be adopted during decommissioning (e.g., clearance of woody vegetation outside of the main nesting bird season), which further reduces the potential for inter-related impacts across multiple phases of the Projects.	Projects. It is conceivable that some of the same populations (e.g., of nesting birds, GCN or badgers, for example) could be impacted both during construction and again during decommissioning, but given the long period between these events, any combined impacts would be no greater than those assessed at individual phases. It is also anticipated that relevant mitigation measures for protected and valued species (in particular, measures which ensure legal offences are avoided, such as destruction of birds’ nests, GCN habitat or badger setts, for example) would be adopted during decommissioning in the same manner they would be adopted during construction.



18.10 Inter-relationships

396. For terrestrial ecology potential inter-relationships between other topics assessed within this PEIR including terrestrial ecology. A summary of the potential inter-relationships between Marine Physical Environment, Flood Risk and Hydrology, Noise and Air Quality is provided in **Table 18-17**.

Table 18-17 Terrestrial Ecology Inter-relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction			
Impacts on water dependent habitats and designated sites.	Chapter 20 Flood Risk and Hydrology	Section 18.6.1.1	Potential change to ground conditions (including chemical quality and physical properties) during construction could affect the quality and quantity of groundwater and hydrologically connected surface water receptors which could in turn affect valued ecological receptors which rely on these water sources. This could include valued habitats (e.g., grasslands, rivers and woodland).
Potentially kill, harm or disturbance to protected species or destruction, damage or disturbance to protected species' habitat. Impacts on protected	Chapter 25 Noise	Section 18.6	Construction activities will inevitably result in new sources of noise, ground vibration. These have the potential to impact nearby wildlife such as breeding birds, bats (roosting and non-roosting), amphibians, riparian mammals, badgers, invertebrates and other terrestrial wildlife. It has been assumed that all construction works along the onshore cable corridor will be undertaken during daylight hours and appropriate mitigation

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
and / or notable species from changes in noise and ground vibration during construction.			measures (e.g., temporary screening around working areas, use of silences and / or enclosures around noisy equipment) will be implemented. Mitigation measures will be implemented that will include turning off of plant when not in use, ensuring equipment is in good working order and installation of screening to further reduce noise levels where required.
Impacts on habitats through increased acid and nitrogen from machinery during the construction phase.	Chapter 26 Air Quality	Section 18.6	Potential changes to air quality (e.g., from fumes emanating from operating construction machinery) could affect nearby habitats. Animals which are not mobile could also be temporarily affected (whereas mobile animals would be expected to move away), including invertebrates, nesting birds, roosting bats and other small terrestrial animals.
Operation			
Inter-relationships and the identified impacts associated with the operation phase would be no greater than those identified for the construction phase.			
Decommissioning			
Inter-relationships and the identified impacts associated with the decommissioning phase would be no greater than those identified for the construction phase.			

18.11 Summary

397. This chapter has provided a characterisation of the existing environment for terrestrial ecology based on both existing and site specific survey data.
398. Impacts assessed are construction disturbance to statutory and non-statutory designated nature conservation sites, permanent and temporary habitat loss / fragmentation, and death, injury or disturbance to protected species or destruction damage or disturbance to protected species habitat.
399. There will be a **moderate** adverse effect on roosting bats, foraging and commuting bats, breeding birds, and invertebrates as a result of the Projects. However, a worst case scenario of assumed presence has been applied due to a lack of survey data. The assessment and any necessary mitigation will be reviewed in the ES once additional survey data is available. It is expected that following the surveys and any subsequent design refinement the residual effects will be no more than **minor** adverse for all designated sites, habitats and species.
400. There will be a **minor** adverse residual effect on Priority Habitats, designated sites, GCN, over-wintering birds, fish, otter, reptiles, and water vole as a result of the Projects.
401. Hazel dormouse, white-clawed crayfish and EPS reptiles have been scoped out of the PEIR.
402. Currently the assessment that has been undertaken is a worst case scenario due to data gaps. The following surveys will be undertaken in 2023 to fill these data gaps :
- Otter and water vole surveys;
 - Badger surveys;
 - GCN eDNA surveys;
 - Ground level tree assessment for roosting bats;
 - Reptile surveys;
 - Terrestrial invertebrates; and
 - Further habitat surveys, including condition assessments.

403. Examples of worst case scenario mitigation identified at the construction phase includes, but is not limited to:
- Avoidance of habitat clearance;
 - Keeping vegetation clearance to a minimum;
 - Reduction of noise pollution through screening;
 - Reduction of dust pollution, through suppression techniques;
 - Following best practice pollution guidance;
 - Re-generation / replacement of lost habitat;
 - Two stage vegetation clearance;
 - Covering excavations over-night;
 - Restrictions on night-time working and the use of directional and low-level artificial lighting (occasional night work will be required);
 - Species translocations and installation of exclusion fencing;
 - INNS management
 - Replacement of resting locations i.e., bat roosts, badger setts, and otter holts; and
 - EPS licence specific mitigation measures.
404. Impacts during the operational and decommissioning phases are expected to be similar in nature to those anticipated during construction but of a smaller magnitude. The same potential impacts noted for construction are therefore expected to be scoped in (and out) for decommissioning.
405. As a minimum ecological monitoring for the scheme would include, but not be limited to:
- INNS management;
 - Any specific mitigation from required EPS licences;
 - Monitoring of bat boxes;
 - Monitoring of bird boxes;
 - Monitoring of any replacement habitat; and
 - Surveys.
406. There are no transboundary effects with regard to terrestrial ecology as the Onshore Development Area is not in proximity to any international boundaries.

Table 18-18 Summary of Potential Likely Significant Effects on Terrestrial Ecology

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Construction						
Construction disturbance	National statutory designated sites	High	Low	Moderate adverse	Pollution control Dust Management	Minor adverse
Construction disturbance	Non-statutory designated sites	Medium	Medium	Moderate adverse	Minimise habitat loss Pollution control Dust Management	Minor adverse
Habitat loss / fragmentation	Priority Habitats	Medium	Medium	Moderate adverse	Minimise habitat loss Pollution control Dust Management	Minor adverse
Death, injury or disturbance	Amphibians, including GCN	Medium	Medium	Moderate adverse	EPS licence	Minor adverse
Death, injury or disturbance	Badger	Medium	Medium	Moderate adverse	Exclusion from setts under licence	Minor adverse
Death, injury or disturbance	Foraging and commuting bats	High	High	Major adverse	EPS licence, lighting control	Moderate adverse (to be reviewed at ES)
Death, injury or disturbance	Roosting bats	High	High	Major adverse	EPS licence, lighting control	Moderate adverse (to be reviewed at ES)
Death, injury or disturbance	Breeding birds	High	High	Major adverse	Avoid breeding season, pollution control	Moderate adverse (to be reviewed at ES)
Death, injury or disturbance	Over-wintering birds	Medium	Medium	Moderate adverse	Avoid over-wintering season, pollution control	Minor adverse
Death, injury or disturbance	Freshwater fish	Medium	Medium	Moderate adverse	Pollution control	Minor adverse
Death, injury or disturbance	Invertebrates	High	High	Major adverse	Minimise habitat loss Pollution control	Moderate adverse (to be reviewed at ES)

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Death, injury or disturbance	Otter	Medium	High	Major adverse	EPS licence	Minor adverse
Death, injury or disturbance	Reptile	Medium	Medium	Moderate adverse	Translocation and exclusion fencing	Minor adverse
Death, injury or disturbance	Water vole	Medium	High	Major adverse	Mitigation licence	Minor adverse
Operational						
Habitat and species disturbance from maintenance	All adjacent habitat and species at the time of the maintenance	High	Medium	Moderate adverse	General mitigation techniques	Minor adverse
Species disturbance from artificial lighting	All adjacent habitat and species at the time of the artificial lighting use	High	Medium	Moderate adverse	General mitigation techniques	Minor adverse
Decommissioning						
The detail and scope of the decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A Decommissioning Plan would be provided. As such, impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.						

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