



Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects Environmental Statement

Volume 1

Chapter 20 - Onshore Ecology and Ornithology (Revision B) (Tracked Change Version)

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Table of Contents

20	ONSHORE ECOLOGY AND ORNITHOLOGY	10
20.1	Introduction	10
20.2	Consultation	11
20.3	Scope	20
20.4	Impact Assessment Methodology	27
20.5	Existing Environment	45
20.6	Potential Impacts	67
20.7	Cumulative Impacts	97
20.8	Transboundary Impacts	105
20.9	Inter-relationships	105
20.10	Interactions	108
20.11	Potential Monitoring Requirements	115
20.12	Assessment Summary	115
	References	120

Table of Tables

Table 20-1:	Consultation Responses	12
Table 20-2:	Study Areas Used for Onshore Ecology and Ornithology Considered in this ES	20
Table 20-3:	Realistic Worst-Case Scenarios	23
Table 20-4:	Embedded Mitigation Measures	26
Table 20-5:	NPS Assessment Requirements	27
Table 20-6:	Other Available Data and Information Sources	38
Table 20-7:	Definitions of Importance Levels for Onshore Ecology and Ornithology	40
Table 20-8:	Definitions of Magnitude for Onshore Ecology and Ornithology	41
Table 20-9:	Impact Significance Matrix	43
Table 20-10:	Designated Nature Conservation Sites Summary	45
Table 20-11:	Summary of key habitats recorded within the DCO order limits	52
Table 20-12:	Breeding Bird Survey Results Summary	55
Table 20-13:	Summary of CWS' (non-statutory designated sites) within the DCO Order Limits	71
Table 20-14:	Potential Cumulative Impacts (Impact Screening)	98
Table 20-15:	Summary of Projects Considered for the CIA in Relation to Onshore Ecology and Ornithology (Project Screening)	100
Table 20-16:	Onshore Ecology and Ornithology Inter-Relationships	105
Table 20-17:	Interaction Between Impacts - Screening	109
Table 20-18:	Interaction Between Impacts – Phase and Lifetime Assessment	111
Table 20-19:	Summary of Potential Impacts on Onshore Ecology and Ornithology	116

Volume 2

Figure 20.1 Study Boundaries

Figure 20.2 Environmental Designations



Figure 20.3 UK Habitats of Principal Importance

Figure 20.4 Phase 1 Habitat Survey

Volume 3

Appendix 20.1 Extended Phase 1 Habitat Survey Report

Appendix 20.2 Great Crested Newt Survey Report

Appendix 20.3 Bat Activity Survey Report

Appendix 20.4 Wintering Bird Survey Report

Appendix 20.5 Breeding Bird Survey Report

Appendix 20.6 Initial Biodiversity Net Gain Assessment

Appendix 20.7 Onshore Ecology Desk Study

Appendix 20.8 Reptile Survey Report

Appendix 20.9 White Clawed Crayfish Survey Report

Appendix 20.10 Bat (Roosting) Survey Report

Appendix 20.11 Invertebrate Survey Report

Appendix 20.12 National Vegetation Classification (NVC) Survey Report

Appendix 20.13 Riparian Mammals (Water Vole and Otter) Survey Report

Appendix 20.14 Badger Confidential Appendix

Appendix 20.15 Arboricultural Report

Glossary of Acronyms

BAP	Biodiversity Action Plan
BBPP	Breeding Bird Protection Plan
BCT	Bat Conservation Trust
BEIS	Department for Business Energy and Industrial Strategy
BNG	Biodiversity Net Gain
BoCC	Birds of Conservation Concern
CBS	Cement Bound Sand
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CR	Critically Endangered
cSAC	Candidate Special Area of Conservation
CWS	County Wildlife Site
DCO	Development Consent Order
DDL	District Level Licence
DECC	Department of Energy and Climate Change
DEFRA	Department for the Environment and Rural Affairs
DEP	Dudgeon Extension Project
EA	Environment Agency
EcoW	Ecological Clerk of Works
EcIA	Ecological Impact Assessment
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electro-Magnetic Field
EN	Endangered
EP1HS	Extended Phase 1 Habitat Survey
EPP	Evidence Plan Process
EPS	European Protected Species
ES	Environmental Statement

ETG	Expert Topic Group
EU	European Union
GB	Great Britain
GCN	Great Crested Newt
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
IAQM	Institute of Air Quality Management
IDB	Internal Drainage Board
INNS	Invasive Non-Native Species
IPC	Infrastructure Planning Commission
IRZ	Impact Risk Zones
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
km	Kilometre
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LoNI	Letter of No Impediment
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
NBIS	Norfolk Biodiversity Information Service
NDR	(Norwich) Northern Distributor Road
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statements
NSIP	Nationally Significant Infrastructure Project
NT	Near Threatened
NVC	National Vegetation Classification
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
pSPA	Potential Special Areas of Protection
RIAA	Report to Inform Appropriate Assessment



RSPB	Royal Society for the Protection of Birds
RTA	Road Traffic Accident
RWCS	Realistic Worst-Case Scenario
SAC	Special Area of Conservation
SEP	Sheringham Extension Project
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom
UKBAP	United Kingdom Biodiversity Action Plan
UKHPI	UK Habitats of Principal Importance
VU	Vulnerable
WCA	Wildlife and Countryside Act, 1981, as amended



Glossary of Terms

Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
Order Limits	The area subject to the application for development consent, including all permanent and temporary works for SEP and DEP.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive. This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas, and is defined in regulation 8 of the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) 2019.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the EIA and HRA for certain topics.
Horizontal directional drilling (HDD) zones	The areas within the onshore cable corridor which would house HDD entry or exit points.
Jointing bays	Underground structures constructed at regular intervals along the onshore cable corridor 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 and connected to the onshore export cables.
Onshore cable corridor	The area between the landfall and the onshore substation sites, within which the onshore cable circuits will be installed along with other temporary works for construction.
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substation. 220 – 230kV
Onshore Substation	Compound containing electrical equipment to enable connection to the National Grid.
Separated Grid Option	Transmission infrastructure which allows each project to transmit electricity entirely separately.
Sheringham Shoal Offshore Wind Farm Extension site	Sheringham Shoal Offshore Wind Farm Extension lease area.
Study area	Area where potential impacts from the project could occur, as defined for each individual EIA topic.

<p>The Applicant</p>	<p>Equinor New Energy Limited. As the owners of SEP and DEP, Scira Extension Limited (SEL) and Dudgeon Extension Limited (DEL) are the named undertakers that 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 SEL and DEL as the undertakers of SEP and DEP.</p>
<p>The Sheringham Shoal Offshore Wind Farm Extension Project (SEP)</p>	<p>The Sheringham Shoal Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.</p>
<p>Transition joint bay</p>	<p>Connects offshore and onshore export cables at the landfall. The transition joint bay will be located above mean high water</p>



20 ONSHORE ECOLOGY AND ORNITHOLOGY

20.1 Introduction

1. This chapter of the Environmental Statement (ES) describes the potential impacts of the proposed Sheringham Shoal Offshore Wind Farm Extension Project (SEP) and Dudgeon Offshore Wind Farm Extension Project (DEP) on terrestrial (onshore) ecology and ornithology. The chapter provides an overview of the existing environment for the proposed onshore development area, followed by an assessment of the potential impacts and associated mitigation for the construction, operation, and decommissioning phases of SEP and DEP.
2. This assessment has been undertaken with specific reference to the relevant legislation and guidance, of which the primary source is the National Policy Statements (NPS). Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) are presented in **Chapter 5 EIA Methodology** and **Section 20.4.3**.
3. The assessment should be read in conjunction with the following linked chapters:
 - **Chapter 18 Water Resources and Flood Risk;**
 - **Chapter 22 Air Quality;**
 - **Chapter 23 Noise and Vibration;** and
 - **Chapter 26 Landscape and Visual Impact Assessment.**
4. Additional information to support the onshore ecology and ornithology assessment includes:
 - **Appendix 20.1 Extended Phase 1 Habitat Survey Report;**
 - **Appendix 20.2 Great Crested Newt Survey Report;**
 - **Appendix 20.3 Bat Activity Survey Report;**
 - **Appendix 20.4 Wintering Bird Survey Report;**
 - **Appendix 20.5 Breeding Bird Survey Report;**
 - **Appendix 22.6 Initial Biodiversity Net Gain Assessment;**
 - **Appendix 20.7 Onshore Ecology Desk Study;**
 - **Appendix 20.8 Reptile Survey Report;**
 - **Appendix 20.9 White Clawed Crayfish Survey Report;**
 - **Appendix 20.10 Bat (Roosting) Survey Report;**
 - **Appendix 20.11 Invertebrate Survey Report;**
 - **Appendix 20.12 National Vegetation Classification (NVC) Survey Report;**
 - **Appendix 20.13 Riparian Mammals (Water Vole and Otter) Survey Report;**
 - **Appendix 20.14 Badger Confidential Appendix;**
 - **Appendix 20.15 Arboricultural Report;** and
 - **Tree Preservation Order and Important Hedgerow Plan** (document reference 2.12).

20.2 Consultation

5. Consultation with regard to onshore ecology and ornithology has been undertaken in line with the general process described in **Chapter 5 EIA Methodology** and the **Consultation Report** (document reference 5.1). The key elements to date have included scoping, the ongoing Evidence Plan Process (EPP) via the onshore ecology and ornithology Expert Topic Group (ETG) and Section 42 consultation on the Preliminary Environmental Information Report (PEIR).
6. The feedback received throughout this process has been considered in preparing the ES. This chapter has been updated following consultation in order to produce the final assessment submitted within the Development Consent Order (DCO) application. **Table 20-1** provides a summary of the consultation responses received to date relevant to this topic, and details of how the Project team has had regard to the comment and how these have been addressed within this chapter.
7. The consultation process is described further in **Chapter 5 EIA Methodology**. Full details of the consultation process is presented in the **Consultation Report** (document reference 5.1), which has been submitted as part of the DCO application.

Table 20-1: Consultation Responses

Consultee	Date/ Document	Comment	Project Response
Scoping Responses - The following comments were received prior to consultation on the PEIR and were in response to the Scoping Report or direct consultation with stakeholders. These comments were taken into account in the production of the PEIR.			
Planning Inspectorate (PINS)	Scoping Opinion, 2019	The Scoping Report identifies the need for jointing bays and link boxes up to every 300m. The Scoping Report does not state whether their locations will be determined by the time of the application, however, from experience gained in other offshore wind farms the Inspectorate anticipates this may not be the case. Assuming this outcome, the ES should identify a worst-case scenario for the number of jointing pits and link boxes. Where commitments are made at specific locations to mitigate any potential effects, these should be secured for example through a detailed construction method statement or Code of Construction Practice (CoCP)/Construction Environmental Management Plan (CEMP).	The location of link boxes would be determined during detailed design, however, since the scoping stage the frequency of link boxes has been further refined and this Ecological Impact Assessment (EclA) has assumed a Realistic Worst-Case Scenarios (RWCS) for link boxes to be present every 1,000m. The parameters of the RWCS are presented in Table 20-3 .
PINS	Scoping Opinion, 2019	Although the majority of onshore aspect chapters have identified a study area for the purposes of scoping, the Inspectorate assumes that given the onshore route will be refined and the onshore substation location determined prior to application, this is unlikely to be the same study area for the assessments in the ES. The Inspectorate notes that where surveys are proposed, the aspect chapters of the Scoping Report have identified (at a high level), the spatial coverage of baseline surveys. The extent of study areas should relate to the zone of influence of potential effects and should be clearly defined and justified within the ES. Reference should be made to recognised professional guidance, where relevant. Figures depicting the extent of study areas should be provided where relevant.	The study areas used for baseline ecological surveys and desk-based assessments have been defined in consultation (and subsequently agreed) with the onshore ecology and ornithology ETG. Each study area has considered the anticipated zones of influence of potential effects. Relevant industry guidance, professional guidance and understanding of species, justifications and figures showing the extents of study areas are provided in the accompanying Technical Appendices and are summarised in Section 20.3.2 .
PINS	Scoping Opinion, 2019	Some aspect chapters of the Scoping Report have identified specific receptors, but the majority of the Scoping Report identifies broad categories of receptors only. Specific receptors should be clearly identified within the ES, alongside a categorisation of their sensitivity and value. Section 1.6.4.1 of the Scoping Report explains that receptor sensitivity would be identified in order to assess the potential impacts upon each receptor and discusses considerations that will be taken into account in doing so. The Inspectorate expects a transparent and reasoned approach to be applied to assigning receptor sensitivity and that this will be clearly set out in the ES.	Section 20.6 presents the specific onshore ecology and ornithology receptors that have been identified for consideration (as informed from the findings of the baseline surveys undertaken to date) along with the categorisation of their sensitivity and value that has been assigned to them. The assigning of receptor sensitivity is in accordance with the EclA methodology presented in Section 20.4.3 .
PINS	Scoping Opinion, 2019	The ES should include details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Constraints and limitations encountered during the baseline ecological surveys undertaken to date are acknowledged and presented in the accompanying Technical Appendices. Section 20.4.6 presents a summary of the key assumptions and limitations.
PINS	Scoping Opinion, 2019	The Applicant is strongly encouraged to agree the methods used to collect baseline data, the likely effects of the project and to determine significance of effect with NE, representatives of the local authorities and any other relevant stakeholders.	The approach and methodology for obtaining all baseline data for SEP and DEP was agreed with all stakeholders at the onshore ecology ETG meeting held on the 28 th January 2020. The methodology used for all baseline ecological surveys are presented in the respective Technical Appendices accompanying this chapter.
PINS	Scoping Opinion, 2019	The Scoping Report states that European designated sites within 20km of the scoping area and nationally designated sites within 3km will be considered. However, it is not clear why these distances have been used. The ES should make it clear how the zone of influence for the project has been defined and how this has been used to identify the ecological receptors likely to be affected by the proposals.	The designated sites that have been identified as being relevant to SEP and DEP are presented in Section 20.5.1 . Section 20.3.1 presents the study areas that have been identified and used to inform this ecological impact assessment. These study areas have been defined using professional judgement and in accordance with industry guidance. Where potential for direct or indirect impacts on designated sites have been predicted, these are presented in Section 20.6 , along with explanations as to the anticipated mechanism of the impact and its extent.
PINS	Scoping Opinion, 2019	The Applicant is advised to contact local wildlife groups for local records which could be used to inform the baseline.	The Norfolk Biodiversity Information Service (NBIS) has been consulted to obtain biological records and information on non-statutory designated nature conservation sites for the DCO order limits and surrounding 2km. There are no discernible data gaps in the records provided by NBIS, and NBIS did not advise of any gaps (or of any requirement to contact specific groups for

Consultee	Date/ Document	Comment	Project Response
			species records they do not hold), therefore the NBIS data is considered to be a comprehensive biological records data set. Relevant records are provided in the Technical Appendices and are summarised in Section 20.5 .
PINS	Scoping Opinion, 2019	Any likely significant effects associated with the potential for breakout of bentonite drilling fluid should be assessed in the ES.	Consideration of a potential bentonite breakout is presented in Section 20.6 .
PINS	Scoping Opinion, 2019	The ES should assess any likely significant effects to non-seabird migrants from the construction and operation of the offshore elements of the Proposed Development.	A suite of over-wintering and breeding bird surveys have been undertaken. The findings of which are presented in the over-wintering and/or breeding bird Technical Appendix. The findings from these surveys have been used to inform the potential indirect and direct impacts on bird species, as presented in Section 20.6 .
PINS	Scoping Opinion, 2019	The Applicant should ensure that all mitigation measures proposed within the ES are secured. The Inspectorate welcomes the proposal to include drafts of the Landscape and Ecological Management Strategy with the DCO application. The methods to be used to reinstate habitats lost or harmed during the construction of the Proposed Development should be set out in the ES.	An Outline Landscape Management Plan (document 9.18) and Outline Ecological Management Plan (document 9.19) have been prepared and submitted as part of the DCO application. These documents both include proposals to reinstate and where possible enhance habitats such as hedgerows and grassland areas impacted by SEP and DEP. All appropriate mitigation measures identified (such as best-practice mitigation measures during construction, proposals for reinstatement of habitats etc.) are included within these documents and are consistent with those presented in Section 20.6 .
PINS	Scoping Opinion, 2019	Whilst aquatic invertebrate surveys have been proposed in Table 3-13, it is unclear whether consideration has been given to potential impacts on other aquatic species such as fish, for example from watercourse crossings. Any likely significant effects to protected species should be assessed in the ES.	Whilst no baseline survey for fish has been undertaken, information obtained from the Environment Agency has been used to inform the potential impacts and mitigation measures for fish. These are presented in Section 20.6.1.16 and further discussed in Chapter 18 Water Resources and Flood Risk .
PINS	November 2019 Scoping Opinion comment 197	In addition to the potential risk of invasive species during construction, any likely significant effects from the spread of disease carried by invasive species that endanger protected species should be assessed, with appropriate control measures set out in the ES.	The risk of the spread of diseases associated with Invasive Non-Native Species (INNS) is provided in Section 20.6 .
PINS	Scoping Opinion, 2019	The Applicant should assess any likely significant effects to wildlife through altered thermal and EMF [Electro-Magnetic Fields] from buried cables.	A project-specific National Grid EMF study has concluded that “All of the proposed technology options for the SEP and DEP export cables and third-party crossing points would be fully compliant with the Government policy. Specifically, all the [EMFs] produced would be below the relevant exposure limits. Therefore, there would be no significant EMF effects resulting from this proposed development.” There are, therefore, considered to be no discernible EMF related impacts on valued ecological receptors. The study can be found in Appendix 28.1 .
Barford and Wrampingham Parish Councils	Scoping Opinion, 2019	Barford and Wrampingham Parish Council would like the following information to be provided within the Environmental Statement: • ... Consideration to the environmental impact of potentially multiple cable lines on... ancient woodlands.	Through refinements made to the onshore cable corridor since the issuing of the Scoping Report, the onshore cable corridor does not pass directly through any ancient woodland. Consequently, no direct impacts are predicted.
Hansells Solicitors and Financial Advisors for Brandiston Parish	Scoping Opinion, 2019	The short-term and [long] term likely effects and impacts on the biodiversity ecology and habitats of the land through which the trenching will be routed.	The short-term and long-term effects and impacts of SEP and DEP on valued ecological receptors are assessed in Section 20.6 .
Environment Agency	Scoping Opinion, 2019	Biodiversity Net Gain: The Scoping Report mentions Biodiversity Net Gain at paragraph 183 stating that it will be sought through the mitigation hierarchy. By this we assume that it proposes the sequential process of: avoid, minimise remediate and compensate. We consider that although linked, Biodiversity Net Gain is not embedded in mitigation but sits above it. As such it should not be addressed as a mitigation process but should be informed by the mitigation required.	Biodiversity Net Gain (BNG) has been considered separately as a stand-alone evaluation of the overall biodiversity impact of SEP and DEP, using the defined BNG metric and incorporating BNG specific compensation and enhancement measures. The Applicant is committed to achieving a positive net gain in biodiversity as measured using the BNG metric 3.0. Appendix 22.6 Initial Biodiversity Net Gain Assessment .

Consultee	Date/ Document	Comment	Project Response
		Whilst Biodiversity Net Gain is not mentioned in National Policy Statements EN1 and EN3 the requirement to 'pursue opportunities for securing measurable net gains for biodiversity' is specifically mentioned in the more recently updated NPPF (para 174). Most recently, the Environment Bill 2019 –2020 proposed a requirement for 10% biodiversity net gain and confirmed a mechanism for measuring this using the metric developed by Defra. Although these proposals are not currently enshrined in law, we consider that the principles proposed reflect the spirit of the NPPF requirements and recommend that this methodology is adopted.	
Environment Agency	Scoping Opinion, 2019	Biosecurity: We welcome that the potential risk of spreading invasive species is recognised as a potential impact at paragraph 663. However, the potential to spread disease that endangers protected species should also be addressed. For example, the invasive signal crayfish can carry crayfish plague which threatens the native white-clawed crayfish. It is therefore, important that the need for biosecurity is addressed and control measures adopted. We would expect that a check, clean, dry regime is adopted together with appropriate disinfection using VIRKON.	The risk of the spread of diseases associated with INNS is presented in Section 20.6 .
Environment Agency	Scoping Opinion, 2019	The report does not identify the potential of buried cables to impact on wildlife. The altered thermal and EMF (Electro-Magnetic Fields) should be considered making the case for scoping in, or out of the assessment. This is especially important where the cable will cross watercourses.	A project-specific National Grid EMF study has concluded that "All of the proposed technology options for the SEP and DEP export cables and third-party crossing points would be fully compliant with the Government policy. Specifically, all the [EMFs] produced would be below the relevant exposure limits. Therefore, there would be no significant EMF effects resulting from this proposed development." SEP and DEP has committed to a minimum depth of cable 1.2m below ground level. All Main Rivers will be crossed using trenchless techniques such as HDD to avoid direct interaction with these watercourses, the cable will be at least 2m below the channel bed. There are, therefore, considered to be no discernible EMF related impacts on valued ecological receptors. The study can be found in Appendix 28.1 Sheringham and Dudgeon Extension Projects EMF Assessment .
Itteringham Parish Council	Scoping Opinion, 2019	The environmental and ecological damage needs to be clearly detailed together with the effect on the... entire environment including waterways.	Section 20.6 presents the EclA that has been undertaken using the findings from the baseline surveys undertaken to date. Chapter 18 Water Resources and Flood Risk presents the assessment that has been undertaken on water resources and flood risk.
Natural England	Scoping Opinion, 2019	In accordance with the 2017 Habitats Regulations 63 (2) and 2017 Offshore Habitat Regulations (as amended) anyone applying for development consent for an NSIP must provide the competent authority with such information as may reasonably be required "for the purposes of the assessment" or "to enable them to determine whether an appropriate assessment is required". Natural England advises that this information should therefore be provided and appraised as part of the EIA process.	Information on proximity to, and potential for impacts upon, statutory designated nature conservation sites is presented in Section 20.6 . Information relating to the Habitat Regulations Assessment is provided in Habitats Regulations Assessment (HRA) - Report to Inform Appropriate Assessment (RIAA) (document reference 5.4).
Natural England	Scoping Opinion, 2019	... key concerns are as follows:... The potential for impacts on designated sites from offshore and onshore cable installation – both at a project level and cumulatively.	The potential impacts (direct and indirect) on designated sites as a result of SEP and DEP is presented in Section 20.6 . The potential impacts at a cumulative level are presented in Section 20.7 .
Natural England	Scoping Opinion, 2019	Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EclA) have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website.	Section 20.5 presents the baseline environment for SEP and DEP. Section 20.6 presents the predicted impacts for SEP and DEP that have been identified, in accordance with the CIEEM EclA guidance presented in Section 20.4.3 . BNG is considered separately as a stand-alone evaluation of the overall biodiversity impact of SEP and DEP, using the defined BNG metric and incorporating BNG specific compensation and enhancement measures. SEP and DEP are committed to achieving a positive net gain in biodiversity as measured using the BNG metric 3.0. Appendix 22.6 Initial Biodiversity Net Gain Assessment .

Consultee	Date/ Document	Comment	Project Response
Natural England	Scoping Opinion, 2019	The ES should thoroughly assess the potential for the proposal to affect designated sites. Internationally designated sites (e.g. designated Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (as amended) and the Offshore Conservation of Habitats and Species Regulations 2017 (as amended). In addition, paragraph 176 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites.	Potential impacts on designated sites are presented in Section 20.6 .
Natural England	Scoping Opinion, 2019	Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) and 28 of the Offshore Conservation of Habitats and Species Regulations 2017 (as amended), an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site. The ES should include a full assessment of the direct and indirect effects of the development on the features of special interest within these sites and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects. Further information on the location of SPAs, SACS and Ramsar sites and their special interest features can be found at www.magic.gov.uk . Further information on the special interest features, their conservation objectives, and any relevant conservation advice packages for designated sites is available on our website https://designatedsites.naturalengland.org.uk/	Potential impacts on designated sites are presented in Section 20.6 with information relating to the Habitat and Regulations Assessment presented in Habitats Regulations Assessment (HRA) - Report to Inform Appropriate Assessment (RIAA) (document reference 5.4).
Natural England	Scoping Opinion, 2019	The EIA will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The ES should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures	Potential impacts on local wildlife sites are presented in Section 20.6 . Potential impacts on geological sites are considered in Chapter 17 Ground Conditions and Contamination .
Natural England	Scoping Opinion, 2019	The ES should assess the impact of all phases of the proposal on protected species (including... terrestrial invertebrates, bats, great crested newts, reptiles, water voles, and badgers etc.). ... Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, NBN Atlas, groups and individuals; and consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. In order to provide this information, there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted standing advice for terrestrial protected species which includes links to guidance on survey and mitigation. Information on the relevant legislation protecting marine species can be reviewed on the following link https://www.gov.uk/government/publications/protected-marine-species .	Potential impacts on protected species are presented in Section 20.6 . Ecological surveys have been undertaken by suitably qualified and, where necessary, licensed ecologists and at the appropriate times of year. A biological records search with NBIS has also been undertaken, which included all areas within the DCO order limits plus a 2km buffer. Full details of the ecological desk study that has been undertaken is presented in Appendix 20.7 Ecological Desk Study .
Natural England	Scoping Opinion, 2019	The cable routes proposed will result in the loss, severance or potential degradation of various habitats and severance between these. These impacts, together with potential pollution risks, have the potential to affect various protected species. An assessment of the impact of all phases of the proposal on protected species should be undertaken	Potential impacts relating to habitat degradation and severance are presented in Section 20.6 .

Consultee	Date/ Document	Comment	Project Response
Natural England	Scoping Opinion, 2019	<p>The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006.</p> <p>Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity...</p> <p>Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration...in the making of planning decisions'. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP.</p> <p>Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of:</p> <ul style="list-style-type: none"> • Any historical data for the site affected by the proposal (e.g. from previous surveys); • Additional surveys carried out as part of this proposal; • The habitats and species present; • The status of these habitats and species (e.g. whether priority species or habitat); • The direct and indirect effects of the development upon those habitats and species; • Full details of any mitigation or compensation that might be required. <p>The development should seek if possible to avoid adverse impact on sensitive areas for wildlife within the site, and if possible provide opportunities for overall biodiversity (or wildlife) net gain.</p> <p>The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of priority habitat for the area under consideration.</p>	<p>The EclA includes consideration of impacts on Habitat and Species of Principal Importance and those included in the local BAP (Section 20.6).</p> <p>Where important/ valued habitats had been recorded during the Extended Phase 1 Habitat Survey, further surveys such as National Vegetation Classification (NVC) surveys have been undertaken. These have been focused on habitats within the landfall area. The findings of which are presented in Section 20.5.2.</p> <p>This EclA has included all requested information where this has been obtainable (such as historical data for affected sites, habitats and species present, the status of the habitats/ species, mitigation and compensation requirements etc.).</p>
Natural England	November 2019 Scoping Opinion comment 447	<p>A full 32implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.</p> <p>The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information):</p> <ol style="list-style-type: none"> a. existing completed projects; b. approved but uncompleted projects; c. ongoing activities; d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects 	<p>Section 20.7 has considered all types of projects where information is available.</p>
Natural England	November 2019 Scoping Opinion comment 494	<p>Consideration should also be given within the ES to the possible requirement for a European Protected Species licence.</p>	<p>The potential requirement for mitigation licensing for badgers, bats and great crested newts (GCN) is presented in Section 20.6 and has been informed from the findings of the baseline ecology surveys undertaken to date.</p> <p>Draft mitigation licences were submitted to Natural England and Letters of No Impediment (LoNI) were received for badgers and bats. A copy of both LoNI are included as appendices to the Planning Statement (document reference 9.1).</p> <p>A provisional DLL certificate was provided by NE on 15th August 2022 and is included as an appendix to the Planning Statement (document reference 9.1).</p>

Consultee	Date/ Document	Comment	Project Response
Natural England	Scoping Opinion, 2019	We advise that the closest distance to any proposed development is used. The Broads is SAC only, while Broadland is an SPA as well as a Ramsar site. Mundesley Cliffs SSSI should be included... Sand martins nest in the cliffs although they are not listed as a designated feature. Weybourne Town Pit SSSI should be included as it occurs within the onshore scoping area.	These designated sites and sand martins are considered where relevant in Section 20.6) and the assessment uses the closest Euclidian distance from the designated site to the DCO order limits. It should be noted that the comment regarding The Broads SAC, Broadland SPA/Ramsar and Mundesley Cliffs SSSI relates to the previously proposed eastern route to Bacton, which no longer forms part of SEP and DEP.
Natural England	Scoping Opinion, 2019	Functional Linked Land: Functional habitat is an undesignated area beyond the boundary of a protected site which is used by designated bird populations. A typical bird requires a secure roost and / or nest site, and sufficient food, all encompassed within a home range. Where an essential ecological function, such as foraging, occurs beyond a site boundary, then the area within which this occurs is termed functionally linked land, or is known as functional habitat. As the presence of this land is essential in meeting a species' needs, damage or deterioration of this habitat could in turn impact upon the designated population. The development may result in the removal of functional habitat or the disturbance of interest features, the relevant surveys should be completed to ascertain if designated species utilise the site and if the proposal is likely to significantly affect those species	This issue is considered within Section 20.6) and has been incorporated into the survey design, such as for over-wintering birds which have focused on potential bird foraging habitats within 10km of SPAs (see Appendix 20.4 Wintering Birds Survey Report).
Natural England	Scoping Opinion, 2019	A wide range of mitigation and compensation measures will be required for the environmental impacts. At this early stage, we encourage the adoption of a landscape scale approach with a clear vision and coherent strategy of how measures can be delivered across a wider area beyond the compulsory purchase corridor of any route, cannot only provide mitigation and compensation but deliver a net gain for biodiversity and people. To achieve this will mean looking well beyond the footprint of any chosen route. Measures to create new, restore existing and link severed or isolated habitats across the wider area should be incorporated, with the focus on wetland and woodland habitats. This approach should also secure a net gain for biodiversity in line with government policy.	Section 20.6 presents the predicted impacts from SEP and DEP during the construction, operation and decommissioning phases. Section 20.11 presents the proposed monitoring requirements. Biodiversity Net Gain (BNG) is considered separately as a stand-alone evaluation of the overall biodiversity impact of SEP and DEP, using the defined BNG metric and incorporating BNG specific compensation and enhancement measures. SEP and DEP are committed to achieving a positive biodiversity net gain as measured using the BNG metric 3.0 (see Appendix 22.6 Initial Biodiversity Net Gain Assessment). There are widespread opportunities for enhancement of habitats throughout the DCO order limits, although many of these will require agreement with landowners. Where relevant, these opportunities are presented in the Initial Biodiversity Net Gain Assessment (Appendix 22.6) and include improved management of retained habitats to improve condition and replacing removed habitats with higher distinctiveness (such as creation of other neutral grassland in place of removed modified grassland). The Initial Biodiversity Net Gain Assessment will be refined post-consent and pre-construction and once detailed design has been completed.
Norfolk County Council	Scoping Opinion, 2019	The EIA will be supported by information to support an HRA and the applicant intends to undertake the Ecological Impact Assessment (EclA) in accordance with guidelines published by the Chartered Institute of Ecology and Environmental Management (CIEEM) – Please note that EclA guidelines were updated in 2019 and that the new guidelines should be followed.	A HRA is provided separately (see Habitats Regulations Assessment (HRA) - Report to Inform Appropriate Assessment (RIAA) (document reference 5.4). All relevant CIEEM guidelines (at the time of preparing this document) have been used to complete this EclA.
Norfolk County Council	Scoping Opinion, 2019	<ul style="list-style-type: none"> Wintering bird surveys <p>3.6. Ecological surveys will need to be undertaken at the appropriate time of year in accordance with best practice guidelines (outlined in paragraph 677) and by suitably qualified and experienced surveyors (please state surveyor name, licence numbers and experience where applicable);</p> <p>We would encourage the applicant to undertake reptile surveys on all land that has potential to support this species rather than concentrating on 'on habitats that may support significant populations' ;</p> <p>The scope of ecological surveys, which will be refined following the Phase 1 survey, needs to consider species for which sites are designated e.g. the White clawed Crayfish;</p>	Ecological surveys have been completed by suitably qualified and, where relevant, licensed ecologists and at the appropriate times of year. Where any surveys have been completed outside of the optimal seasonal windows, this is listed as in the Constraints sections of the Technical Appendices and is summarised in this report. Any suitable reptile habitat within the DCO order limits has been surveyed for reptiles. The findings of which are presented in Appendix 20.8 Reptile Survey Report . Key stakeholders have been consulted, primarily through the onshore ecology ETG meeting (see below), on the scope of all baseline ecological surveys.

Consultee	Date/ Document	Comment	Project Response
		<p>Important hedgerows, as defined by the Hedgerows Act 1997 will need to be identified;</p> <p>Complete baseline data should support the EIA to ensure certainty in the conclusions, beyond reasonable doubt, that no Adverse Effects will result from the proposed proposals alone, and in combination with other proposals;</p> <p>We welcome the proposal for liaison with the applicant as to the approach and methodology for data collection. The survey methodology for the PEA, and any subsequent habitat or species-specific surveys should be agreed with Natural England, the EA and the county ecologist, as appropriate, in advance of the surveys being undertaken;</p> <p>All ecological data (including that from pre-construction and post construction monitoring) should be submitted to the Local Records Centre, in a timely manner and in a form that is readily accessible;</p> <p>Table 3.9 European designated sites within 20km - Paston Great Barn SAC is not the only known barbastelle maternity roost in Norfolk. It was when the site was designated. The Norfolk Barbastelle Study Group be approached for data.;</p> <p>Specialist local wildlife groups could be approached for local records, including Norfolk Barbastelle Study Group;</p> <p>When selecting the onshore cable route, significant impacts on statutory and non- statutory designated sites should be avoided wherever possible, and where impacts cannot be avoided, appropriate mitigation or compensation put in place;</p> <p>Consideration should also be given to securing biodiversity net gain</p>	<p>All ecological data collected as part of the onshore ecology survey effort have been provided to the local records centre.</p> <p>Local biodiversity groups, including but not limited to the Norfolk Barbastelle Study Group has been contacted for information they may hold relating to ecology receptors. Where available information has been provided, this has been used to inform the scope of the relevant species-specific survey and/or the impact assessment presented in Section 20.6.</p> <p>Section 20.6 presents the mitigation measures that have been identified for those predicted impacts on habitats and/or species as a result of SEP and DEP.</p>
South Norfolk District Council	Scoping Opinion, 2019	<p>The Council would respectfully request that the Environmental Impact Assessment includes a full tree survey and Arboricultural Impact Assessment of all trees effected by the proposal and an assessment of all hedgerows using the 'importance' criteria set by the Hedgerows Regulations 1997.</p>	<p>A targeted arboricultural survey has been undertaken to inform the EIA and is presented in Appendix 20.15. The survey was informed by a desk study that considered known protected and high value trees within the entire DCO order limits such as trees with a Tree Preservation Order, in a Conservation Area, within an Area of Outstanding Natural Beauty and veteran/ancient trees.</p> <p>In advance of construction a full arboricultural survey of the entire DCO order limits would be undertaken by an appropriately experienced arboriculturalist. This survey will define specific mitigation measures to protect trees situated adjacent to the working corridor, including defining root protection areas. The arboricultural report would be submitted to and agreed with the local authority prior to the commencement of any construction works.</p> <p>An assessment of all hedgerows using the importance criteria set out by the Hedgerows Regulations 1997 has been undertaken (see Tree Preservation Order and Hedgerow Plan (document reference 2.12)).</p>
Weybourne Parish Council	Scoping Opinion, 2019	<p>Environmental and Ecological Impact</p> <p>Weybourne Parish Council are deeply concerned about the impact these proposals would have on the ecology and biodiversity of the Weybourne area including, but not limited to:</p> <ul style="list-style-type: none"> • Impact on wildlife and biodiversity through the disruption and destruction of key habitats • Impact on bird populations, including residential and wintering birds, but also migrating birds, an area that is not addressed in the scoping document • The impact of light pollution on the dark skies • The impact on the SSSI 	<p>The site selection process has considered and sought to avoid sensitive areas and where this has not been possible, the projects have committed to use technical solutions to minimise the potential impacts, for example but not limited to the adoption of trenchless crossing methodologies at Weybourne Woods.</p> <p>The EclA considers potential impacts on biodiversity through disruption and destruction of key habitats, including on residential and wintering bird populations, impacts from lighting pollution on sensitive ecological receptors and on designated sites such as, but not limited to, SSSIs and bats (see Section 20.6). However, any lighting requirements have been designed in accordance with The Bat Conservation Trust (BCT) guidance for artificial lighting.</p>
ETG Meetings			
Natural England, Environment Agency, Broadland District	ETG meeting on 28/01/20	Meeting agreed the general scope of ecological surveys for 2020 for Extended Phase 1 Habitat Surveys, breeding birds, over-wintering birds and great crested newts. Agreed survey scopes were to ensure all parts of the onshore cable corridor were surveyed (where	Where comments were provided on the proposed baseline survey scopes/methodologies, these have been incorporated into the survey effort that has been undertaken to inform this EclA.

Consultee	Date/ Document	Comment	Project Response
Council, North Norfolk District Council, South Norfolk District Council, Norfolk County Council		landowner access was permitted) in accordance with industry standard guidelines. For great crested newts the survey would cover the onshore cable corridor plus a 250 metre surrounding buffer. Norfolk County Council highlighted concerns over barbastelle bat in the general area of the River Wensum and areas of suitable habitat nearby to the north.	
Natural England, Environment Agency, RSPB, Norfolk Wildlife Trust, , North Norfolk District Council	ETG meeting on 10/12/20	Meeting to provide stakeholders with an update on the project since the last ETG meeting and advising on the refined project parameters for which the PEIR will assess. A summary on the findings from the baseline surveys undertaken in 2020 was also provided to all attendees, providing an opportunity to comment on the results and highlighting any specific areas of concern.	Where comments were provided on the findings from the 2020 baseline surveys, these were considered and incorporated within the 2021 survey effort. The findings of both the 2020 and 2021 surveys have been used to inform this EclA.
Natural England, Environment Agency, Norfolk Wildlife Trust, , North Norfolk District Council, Norfolk County Council	ETG meeting on 01/07/2021	Meeting to provide further updates to stakeholders on the project since PEIR and proposed programme for the DCO submission. Updates provided to stakeholders on findings from all surveys undertaken to date and the proposed mitigation measures that will be presented in the ES.	Where comments were provided on the findings from the 2020 and 2021 baseline surveys, these have been considered when informing this EclA.
Natural England	ETG meeting on 30/06/2022	Meeting to provide updates to Natural England on the initial biodiversity net gain assessment for the DCO submission.	NA

20.3 Scope

20.3.1 Study Area

8. The study areas for onshore ecological receptors are presented in **Table 20-2** and shown on **Figure 20.1**. Different study areas have been used for different receptors depending on their sensitivity and their habitat preferences. These study areas were selected according to standard industry guidance (CIEEM 2018) which is presented in **Section 20.4**, as well as using professional judgement and experience.

Table 20-2: Study Areas Used for Onshore Ecology and Ornithology Considered in this ES

Data/Survey	Study area
Protected and notable species (excluding great crested newts, birds and bats)	Within and up to 2 km from the DCO order limits.
Great crested newts	Within and up to 250 m from the DCO order limits.
Bats and birds	Within and up to 5 km from the DCO order limits.
Statutory and non-statutory designated sites	Within and up to 2 km from the DCO order limits.
UK Habitats of Principal Importance (UKHPI) and Forestry habitats	Within and up to 2 km from the DCO order limits.
Statutory Sites and Associated Impact Risk Zones (IRZ)	Within and up to 2 km from the DCO order limits.
Extended Phase 1 Habitat Survey	Within and up to 50 m from the DCO order limits.

20.3.2 Realistic Worst-Case Scenario

20.3.2.1 General Approach

9. The final design of SEP and DEP will be confirmed through detailed engineering design studies that would be undertaken post-consent to enable the commencement of construction. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst-case scenarios have been defined in terms of the potential effects that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine: Rochdale Envelope (v3, 2018). The Rochdale Envelope for a project outlines the realistic worst-case scenario for each individual impact, so that it can be safely assumed that all lesser options will have less impact. Further details are provided in **Chapter 5 EIA Methodology**.
10. The realistic worst-case scenarios for the onshore ecology and ornithology assessment are summarised in **Table 20-3**. These are based on the project parameters described in **Chapter 4 Project Description**, which provides further details regarding specific activities and their durations.



11. In addition to the design parameters set out in **Table 20-3**, consideration is also given to how SEP and DEP would be built out as described in **Section 20.3.2.2** to **Section 20.3.2.4** below. This accounts for the fact that whilst SEP and DEP are the subject of one DCO application, it is possible that either one or both of the projects would be developed, and if both are developed, that construction may be undertaken either concurrently or sequentially. Further details are provided in **Chapter 4 Project Description**.

20.3.2.2 Construction Scenarios

12. In the event that both SEP and DEP are built, the following principles set out the framework for how SEP and DEP may be constructed:
- SEP and DEP may be constructed at the same time, or at different times;
 - If built at the same time both SEP and DEP could be constructed in four years;
 - If built at different times, either Project could be built first;
 - If built at different times, each Project would require a four year period of construction;
 - If built at different times, the offset between the start of construction of the first Project, and the start of construction of the second Project may vary from two to four years;
 - Taking the above into account, the total maximum period during which construction could take place is eight years for both Projects; and
 - The earliest construction start date is 2025.
13. The impact assessment for onshore ecology and ornithology considers the following development scenarios in determining the worst-case scenario for each topic:
- Build SEP or build DEP in isolation;
 - Build SEP and DEP sequentially with a gap of up to four years between the start of construction of each Project – reflecting the maximum duration of effects; and
 - Build SEP and DEP concurrently – reflecting the maximum peak effects.
14. Any differences between SEP and DEP, 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 the impact assessment section of this chapter (**Section 20.6**). For each potential impact, where necessary, 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 20.6**.

20.3.2.3 Operation Scenarios

15. Operation scenarios are described in detail in **Chapter 4 Project Description**. Where necessary, the assessment considers the following three scenarios:
- Only SEP in operation;
 - Only DEP in operation; and



- The two Projects operating at the same time, with a gap of two to four years between each Project commencing operation.

16. The operational lifetime of each Project is expected to be 40 years.

20.3.2.4 Decommissioning Scenarios

17. Decommissioning scenarios are described in detail in **Chapter 4 Project Description**. Decommissioning arrangements for the onshore elements of SEP and DEP will be agreed through the submission of an onshore decommissioning programme to the relevant planning authority for approval within six months of the permanent cessation of commercial operation (unless otherwise agreed in writing by the relevant planning authority), however for the purpose of this assessment it is assumed that decommissioning of SEP and DEP could be conducted separately, or at the same time.

Table 20-3: Realistic Worst-Case Scenarios

Impact	SEP or DEP in isolation	SEP and DEP concurrently	SEP and DEP sequentially	Notes and Rationale
Construction				
<p>Impact 1: Construction disturbance to statutory designated nature conservation sites.</p> <p>Impact 2: Habitat destruction or damage, or construction disturbance to non-statutory designated nature conservation sites.</p> <p>Impacts 3-10: Loss of or damage to valued habitats.</p> <p>Impact 11: Potential spread of INNS.</p> <p>Impacts 12-22: Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat.</p>	<p>Landfall:</p> <ul style="list-style-type: none"> HDD drills: Number: 2, Length: 1,150m. Transition joint bays: Number: 1, Dimensions: 26m (L) x 10m (W) x 3m (D) HDD compound area: 75m x 75m Total works area: 48,955.1m² Approximate quantity of excavated material: Total: 3,250m³ Duration: Landfall HDD: 4 months, Landfall cable pull: 2 months 	<p>Landfall:</p> <ul style="list-style-type: none"> HDD drills: Number: 4, Length: 1,150m. Transition joint bays: Number: 2, Dimensions: 26m (L) x 12m (W) x 3m (D) HDD compound area: 75m x 75m Total works area: 48,955.1m² Approximate quantity of excavated material: Total: 3,450m³ Duration: Landfall HDD: 5 months, Landfall cable pull: 4 months 	<p>Landfall:</p> <ul style="list-style-type: none"> HDD drills: Number: 4, Length: 1,150m. Transition joint bays: Number: 2 (adjacent to each other), Dimensions: 26m (L) x 10m (W) x 3m (D) HDD compound area: 75m x 75m (per project) Total works area: 48,955.1m² Approximate quantity of excavated material: Total: 6,500m³ Duration: Landfall HDD: 4 months, Landfall cable pull: 2 months (per project) 	<p>These parameters represent the maximum footprint of disturbance within the DCO order limits at the landfall, in which the potential disturbance to onshore ecology and ornithology receptors could occur.</p> <p>Works at the landfall are not expected to cause direct disturbance as HDD would be used. Furthermore, the HDD works should not require any prolonged periods of restrictions or closures to the beach for public access, although it is possible that some work activities would be required to be performed on the beach that may require short periods of restricted access.</p> <p>Whilst the construction of SEP and DEP in the concurrent scenario will be across a longer duration and therefore more relevant for Impact 1 and Impacts 12-22, it is considered that construction of both SEP and DEP in all scenarios will as a whole result in a similar scale of impacts on ecological receptors once the embedded mitigation measures are taken into account and due to the fact that all working areas will be reinstated on completion of the construction works.</p>
	<p>Onshore Cable Corridor:</p> <ul style="list-style-type: none"> Construction corridor: Length: 60km, Width: 45m (100m at trenchless crossings). Main construction compound: Number: 1, Area: 30,000m². Secondary construction compounds with cement bound sand (CBS): 2, Area 7,500m², Duration 18-24 months (actively in operation ~14 months) Secondary construction compounds without CBS: 6, Area 2,500m², Duration 12-18 months (actively in operation ~6 months). Trenchless crossing compounds: Area: 1,500m² – 4,500m². Total works area (incl. compounds and accesses): 4,566,250.6m² Cable trench: Number: 1, Width at base: 0.85m, Width at surface: 3m, Depth: 2m. Haul road: Number :1, Length: 55km, Width: 5m (8m at passing places), Total area: 315,640m². 	<p>Onshore Cable Corridor:</p> <ul style="list-style-type: none"> Construction corridor: Length: 60km, Width: 60m (100m at trenchless crossings). Main construction compound: Number: 1, Area: 30,000m². Secondary construction compounds with CBS: 2, Area 7,500m², Duration 18-24 months (actively in operation ~14 months) Secondary construction compounds without CBS: 6, Area 2,500m², Duration 12-18 months (actively in operation ~6 months). Trenchless crossing compounds: Area: 1,500m² – 4,500m². Total works area (incl. compounds and accesses): 4,566,250.6m² Cable trench: Number: 2, Width at base: 0.85m, Width at surface: 3m, Depth: 2m. Haul road: Number :1, Length: 55km, Width: 5m (8m at passing places), Total area: 315,640m². Jointing bays: Typical frequency: Every 1000m, Approximate number: 120, Dimensions: 16m (L) x 3.5m (W) x 2m (D) (per circuit). 	<p>Onshore Cable Corridor:</p> <ul style="list-style-type: none"> Construction corridor: Length: 60km, Width: 60m (100m at trenchless crossings). Main construction compound: Number: 1, Area: 30,000m² (for each project). Secondary construction compounds with CBS: 2, Area 7,500m², Duration 18-24 months (actively in operation ~14 months) Secondary construction compounds without CBS: 8, Area 2,500m², Duration 12-18 months (actively in operation ~6 months). Trenchless crossing compounds: Area: 1,500m² – 4,500m². Total works area (incl. compounds and accesses): 4,566,250.6m² Cable trench: Number: 2, Width at base: 0.85m, Width at surface: 3m, Depth: 2m. Haul road: Number :1 (for each project), Length: 55km, Width: 5m (8m at passing places), Total area: 315,640m². 	<p>The onshore cable duct would be installed in sections of up to 1km at a time, with a typical construction presence of up to four weeks along each 1km section.</p> <p>It is considered that construction of both SEP and DEP in all scenarios will result in a similar scale of impacts on ecological receptors once the embedded mitigation measures are taken into account and due to the fact that all working areas will be reinstated on completion of the construction works</p>

Impact	SEP or DEP in isolation	SEP and DEP concurrently	SEP and DEP sequentially	Notes and Rationale
	<ul style="list-style-type: none"> Jointing bays: Typical frequency: Every 1000m, Approximate number: 60, Dimensions: 16m (L) x 3.5m (W) x 2m (D). Link boxes: Typical frequency: Every 1000m, Approximate number: 60, Dimensions: 2.6m (L) x 2m (W) x 1.5m (D). Approximate quantities of excavated material: Cable trench: 360,000m³, Haul Road: 123,00m³, Jointing bays and link boxes: 36,720 m³, Temporary Compounds: 21,450m³, Total: 541,710m³ Main construction compound: Duration: 48 months. Secondary construction compounds: Duration: 12 - 24 months Trenchless crossing compounds: Duration: 7 weeks. Duration: Onshore cable ducting and installation (incl. reinstatement): 24 months. 	<ul style="list-style-type: none"> Link boxes: Typical frequency: Every 1000m, Approximate number: 120, Dimensions: 2.6m (L) x 2m (W) x 1.5m (D) (per circuit). Approximate quantities of excavated material: Cable trench: 360,000m³, Haul Road: 123,00m³, Jointing bays and link boxes: 36,720 m³, Temporary Compounds: 21,450m³, Total: 541,710m³ Main construction compound: Duration: 48 months. Secondary construction compounds: Duration: 12 - 24 months Trenchless crossing compounds: Duration: 7 weeks. Duration: Onshore cable ducting and installation (incl. reinstatement): 26 months. 	<ul style="list-style-type: none"> Jointing bays: Typical frequency: Every 1000m, Approximate number: 120, Dimensions: 16m (L) x 3.5m (W) x 2m (D) (per circuit). Link boxes: Typical frequency: Every 1000m, Approximate number: 120, Dimensions: 2.6m (L) x 2m (W) x 1.5m (D) (per circuit). Approximate quantities of excavated material: Cable trench: 360,000m³, Haul Road: 123,00m³, Jointing bays and link boxes: 36,720 m³, Temporary Compounds: 21,450m³, Total: 541,710m³ Main construction compound: Duration: 48 months. Secondary construction compounds: Duration: 12 - 24 months Trenchless crossing compounds: Duration: 7 weeks. Duration: Onshore cable ducting and installation (incl. reinstatement): 24 months. 	
	<p>Onshore Substation:</p> <ul style="list-style-type: none"> Substation platform: Area: 3.25ha Substation compound: Total area: 10,000m² Permanent access road: Number: 1, Length: 850m: Width: 6m, Area: 5,100m² Foundations: Subject to detailed design. Potential for Continuous Flight Auger (CFA) piles is assumed. Total works area: 445,653.3m²; 400kv connection: Approximate length: 600m, Width: 2m, Cable trench depth: 1.2m. Construction easement 38m, Permanent easement 10m. Duration: 28 months 	<p>Onshore Substation:</p> <ul style="list-style-type: none"> Substation platform: Area: 6.0ha, Depth of topsoil strip: 300mm Substation compound: Total area: 10,000m², Topsoil strip: 12,500² Permanent access road: Number: 1, Length: 850m: Width: 6m, Area: 5,100m² Total works area: 445,653.3m²; Foundations: Subject to detailed design. Potential for CFA piles is assumed. 400kv connection: Approximate length: 600m, Width: 2m, Cable trench depth: 1.2m. Construction easement 38m, Permanent easement 20m Duration: 30 months 	<p>Onshore Substation:</p> <ul style="list-style-type: none"> Substation platform: Area: 6.0ha, Depth of topsoil strip: 300mm Substation compound: Total area: 10,000m², Topsoil strip: 12,500² Permanent access road: Number: 1, Length: 850m: Width: 6m, Area: 5,100m² Total works area: 445,653.3m²; Foundations: Subject to detailed design. Potential for CFA piles is assumed. 400kv connection: Approximate length: 600m, Width: 2m, Cable trench depth: 1.2m. Construction easement 45m, Permanent easement 20m Duration: 28 months (per project) 	<p>Whilst a larger area of land take would be required for SEP and DEP to be constructed concurrently or sequentially, it is considered that construction of both SEP and DEP in all scenarios will result in a similar scale of impacts on ecological receptors once the embedded mitigation measures are taken into account and due to the fact that all working areas will be reinstated on completion of the construction works</p>
<p>Operation</p> <p>: Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat.</p>	<p>Onshore Cable Corridor:</p> <ul style="list-style-type: none"> Cable corridor permanent dimensions: length: 60km, permanent easement: 10m, minimum depth after burial: 1.2m. Jointing bays: number: approximately 60, located: approximately every 1000m. Size of jointing bay: 16m (L) x 3.5m (W) x 2m (D), depth of jointing bay: >1.2m. Link box dimensions (below ground): up to 2.6m x 2m x 1.5m. 	<p>Onshore Cable Corridor:</p> <ul style="list-style-type: none"> Cable corridor permanent dimensions: length: 60km, permanent easement: 10m, minimum depth after burial: 1.2m. Jointing bays: number: approximately 120, located: approximately every 1000m. Size of jointing bay: 16m (L) x 3.5m (W) x 2m (D), depth of jointing bay: >1.2m. Link box dimensions (below ground): up to 2.6m x 2m x 1.5m. 	<p>Onshore Cable Corridor:</p> <ul style="list-style-type: none"> Cable corridor permanent dimensions: length: 60km, permanent easement: 10m, minimum depth after burial: 1.2m. Jointing bays: number: approximately 120, located: approximately every 1000m. Size of jointing bay: 16m (L) x 3.5m (W) x 2m (D), depth of jointing bay: >1.2m. Link box dimensions (below ground): up to 2.6m x 2m x 1.5m. 	<p>It should be noted that the use of vehicles for maintenance activities is the main potential source of impacts to onshore ecology and ornithology receptors. Whilst there are more joint bays and link boxes for SEP and DEP compared to SEP or DEP in isolation, the scale of the activity is very small for all scenarios. Consequently, there is not considered to be any difference in the worst-case between these scenarios. Link boxes are expected to be below ground but will have an above ground lid for access during maintenance.</p>

Impact	SEP or DEP in isolation	SEP and DEP concurrently	SEP and DEP sequentially	Notes and Rationale
	<ul style="list-style-type: none"> Link boxes would require periodic access by technicians for inspection and testing during operation and maintenance. Link box locations: approximately every 1000m, approximately 60 in total. 	<ul style="list-style-type: none"> Link boxes would require periodic access by technicians for inspection and testing during operation and maintenance. Link box locations: approximately every 1000m, approximately 120 in total. 	<ul style="list-style-type: none"> Link boxes would require periodic access by technicians for inspection and testing during operation and maintenance. Link box locations: approximately every 1000m, approximately 120 in total. 	
	<p>Onshore Substation:</p> <ul style="list-style-type: none"> Permanent access road: 3,000m². Operational access: extension of existing National Grid access road. Unmanned with visits for maintenance staff and visitors approximately 1 visit per week. Operational period: 40 years. Hazardous materials / substances: transformer oil: filled during construction, only topped up in the event of a leak. 	<p>Onshore Substation:</p> <ul style="list-style-type: none"> Permanent access road: 3,000m². Operational access: extension of existing National Grid access road. Unmanned with visits for maintenance staff and visitors approximately 1 visit per week. Operational period: 40 years. Hazardous materials / substances: transformer oil: filled during construction, only topped up in the event of a leak. 	<p>Onshore Substation:</p> <ul style="list-style-type: none"> Permanent access road: 3,000m². Operational access: extension of existing National Grid access road. Unmanned with visits for maintenance staff and visitors approximately 1 visit per week. Operational period: 40 years. Hazardous materials / substances: transformer oil: filled during construction, only topped up in the event of a leak. 	<p>It should be noted that the use of vehicles for maintenance activities is the main potential source of impacts to onshore ecology and ornithology receptors. The maintenance visits for SEP or DEP in isolation or SEP and DEP would be very similar. Consequently, there is not considered to be any difference in the worst-case between these scenarios.</p>
<p>Decommissioning</p> <p>No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable corridor and onshore substation. 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, would be removed, reused or recycled where possible and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and would be agreed with the regulator. It is anticipated that for the purposes of a worst-case scenario, the impacts would be no greater than those identified for the construction phase.</p>				

20.3.3 Summary of Mitigation Embedded in the Design

18. This section outlines the embedded mitigation relevant to the onshore ecology and ornithology assessment, which has been incorporated into the design of SEP and DEP (**Table 20-4**). Where other mitigation measures are proposed, these are detailed in the impact assessment (**Section 20.6**).

Table 20-4: Embedded Mitigation Measures

Parameter	Mitigation Measures Embedded into the Design of SEP and DEP
Valued Habitats	
Designated nature conservation sites	SEP and DEP have undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. The onshore cable corridor has been routed to avoid designated nature conservation sites (e.g. SPA, SSSI etc.) where possible. Trenchless installation methods for the export cables have been proposed to avoid direct impacts to any designated sites that currently fall within the DCO order limits. Further details are provided in Section 20.3.2.2 .
Woodland and Hedgerows	<p>Where the onshore cable corridor crosses through woodland and hedgerows, the working corridor width would be reduced to a typical working width of 20m. This is on the basis that a large part of the 45m (for a single project) or 60m (for both SEP and DEP) corridor is for soil storage/management, and trees and hedgerows would not be removed for this purpose and would be retained outside the 20m working corridor. The reduced 20m working width at woodland and hedgerow crossing applies to all scenarios; in reality, it is likely to be less for a single project but not for the purposes of the assessment. Hedgerows would be replanted. Trees and woodland would be replanted within the construction corridor but outside the final cable easement of 20m width if both SEP and DEP are constructed and 10m if only SEP or DEP is constructed, where tree planting would be prohibited. Planting would be implemented during the first planting season following completion of construction of either SEP or DEP (subject to landowner agreements), whether constructed concurrently or sequentially. Further details on hedgerow and tree removal, retention, replacement and management are presented in the Outline Landscape Management Plan (document reference 9.18).</p> <p>The DCO order limits have been routed to avoid woodland habitat wherever possible, as demonstrated by the DCO order limit alignment around woodlands such as Mossymere Wood (in the Civil Parishes of Itteringham and Corpusty and Saxthorpe), Colton Wood (in the Civil Parish of Marlingford and Colton) and Smeeth Wood (in the Civil Parish of Ketteringham). Colton Wood and Smeeth Wood are the only Ancient Woodlands in close proximity to the DCO order limits.</p>
Watercourse crossings	
Cable crossings over watercourses	All Main Rivers and Internal Drainage Board (IDB) maintained Ordinary Watercourses would be crossed using trenchless techniques such as HDD to avoid direct interaction with these watercourses. The cable entry and exit pits would be at least 9m from the banks of the watercourse, and the cable would be at least 2m below the channel bed.



20.4 Impact Assessment Methodology

20.4.1 Policy, Legislation and Guidance

19. The following sections detail information on the key pieces of UK legislation, policy and guidance relevant to the assessment within this chapter. Further detail where relevant is provided in **Chapter 2 Policy and Legislative Context**.

20.4.1.1 National Policy

20.4.1.1.1 National Policy Statements

20. The assessment of potential impacts upon onshore ecology and ornithology has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision-making policy documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to the Project are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a);
- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b); and
- NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c).

21. The specific assessment requirements for ecology, as detailed in the NPS, are summarised in **Table 20-5** together with an indication of the section of the ES chapter where each is addressed.

22. It is noted that NPS' EN-1, EN-3 and EN-5 are in the process of being revised. A draft version of each NPS was published for consultation in September 2021 (Department for Business Energy and Industrial Strategy (BEIS), 2021). A review of the draft versions has been undertaken in the context of this ES chapter.

23. **Table 20-5** includes a section for the draft version of NPS (EN-1, EN-3 and EN-5) in which relevant additional NPS requirements not presented within the current NPS (EN-1, EN-3 and EN-5) have been included. A reference to the particular requirement's location within the draft NPS and to where within this ES chapter or wider ES it has been addressed has also been provided.

24. Minor wording changes within the draft version which do not materially influence the NPS (EN-1, EN-3, EN-5) requirements have not been reflected in **Table 20-5**.

Table 20-5: NPS Assessment Requirements.

NPS Requirement	NPS Reference	Section Reference
EN-1 NPS for Energy (EN-1)		
'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	Paragraph 5.3.3	Potential impacts on internationally, national 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



NPS Requirement	NPS Reference	Section Reference
<p>should provide environmental information proportionate to the infrastructure where EIA is not required to help the Infrastructure Planning Commission (IPC) [now the Secretary of State] consider thoroughly the potential effects of a proposed project.'</p>		<p>are considered in Section 20.6.</p>
<p>'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'</p>	<p>Paragraph 5.3.4</p>	<p>Embedded mitigation measures are provided in Section 20.3.3 and where applicable, further mitigation measures are outlined in Section 20.6.</p>
<p>'The Government's biodiversity strategy is set out in 'Working with the grain of nature'. Its aim is to ensure:</p> <ul style="list-style-type: none"> ● 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. 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. <p>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 for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment.'</p>	<p>Paragraph 5.3.5 – Paragraph 5.3.8</p>	<p>Site selection decisions and embedded mitigation measures have sought to minimise impacts to features of biodiversity and geological interest.</p> <p>Embedded mitigation measures are provided in Section 20.3.3 and where applicable, further mitigation measures are outlined in Section 20.6.</p>
<p>'For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes 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'.</p>	<p>Paragraph 5.3.9</p>	<p>Designated sites are presented in Section 20.5.1.</p> <p>Site selection decisions have sought to minimise impacts to interest features within designated sites.</p>
<p>'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.'</p>	<p>Paragraph 5.3.10</p>	<p>Designated sites are presented in Section 20.5.1.</p> <p>Site selection decisions have sought to minimise</p>



NPS Requirement	NPS Reference	Section Reference
		impacts to interest features within designated sites.
<p>‘Where a proposed development on land within or outside a Site of Special Scientific Interest (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 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.’</p>	Paragraph 5.3.11	SEP and DEP only have the potential to affect a single watercourse designated as a SSSI - the River Wensum. Potential impacts to the River Wensum SSSI are considered in Section 20.6 . The Applicant has committed to cross this designated water body using trenchless techniques to minimise the potential for any impacts.
<p>“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.”</p>	Paragraph 5.3.13	<p>Designated sites are presented in Section 20.5.1.</p> <p>Site selection decisions have sought to minimise impacts to interest features within designated sites.</p>
<p>‘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 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.’</p>	Paragraph 5.3.14	Ancient woodland is present within the DCO order limits and information relating to this is presented in Section 20.5.2 . The onshore cable corridor has avoided ancient woodland in the majority of cases; however two sections of ancient woodland are crossed and these are specifically Colton Wood and Smeeth Wood.
<p>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.</p>	Paragraph 5.3.15	Biodiversity Net Gain (BNG) has been considered separately as a stand-alone evaluation of the overall biodiversity impact of SEP and DEP, using the defined BNG metric and incorporating



NPS Requirement	NPS Reference	Section Reference
		<p>BNG specific compensation and enhancement measures. The Applicant is committed to achieving a positive biodiversity net gain as measured using the BNG metric 3.0. The Initial Biodiversity Net Gain Assessment Report (Appendix 22.6) presents the initial biodiversity net gain assessment that has been undertaken.</p>
<p>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. '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 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.'</p>	<p>Paragraph 5.3.16 – 5.3.17</p>	<p>Information on protected species and habitats is provided in Section 20.5.2 and Section 20.5.3 and the outcome of the assessment process is provided in Section 20.6.</p>
<p>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.</p>	<p>Paragraph 5.3.18</p>	<p>Embedded mitigation measures are presented in Section 20.3.3. Mitigation measures associated with potential impacts are presented in Section 20.6. The Applicant is committed to achieving a positive biodiversity net gain as measured using the BNG metric, through opportunities to enhance existing habitats and create new habitats of value where practicable. Appendix 22.6 presents the Initial Biodiversity Net Gain Assessment.</p>
<p>'The IPC [now the Secretary of State] will need to take account of what mitigation measures may have been agreed between the applicant and whether Natural England has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'</p>	<p>Paragraph 5.3.20</p>	<p>The potential requirement for mitigation licensing for badgers, bats and great crested newts (GCN) is presented in Section 20.6 and has been informed from the findings of the baseline ecology surveys undertaken to date. Draft mitigation licences were submitted to Natural</p>



NPS Requirement	NPS Reference	Section Reference
		<p>England and Letters of No Impediment (LoNI) were received for badgers and bats. A copy of both LoNI are included as appendices to the Planning Statement (document reference 9.1).</p> <p>A provisional DLL certificate was provided by NE on 15th August 2022 and is included as an appendix to the Planning Statement (document reference 9.1).</p>
EN-3 NPS for Renewable Energy Infrastructure		
<p>'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.'</p>	<p>Paragraph 2.4.2</p>	<p>Project design has avoided sensitive features where possible. Embedded mitigation measures are presented in Section 20.3.3 and further mitigation measures are set out in Section 20.6.</p>
<p>'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.'</p>	<p>Paragraph 2.6.71</p>	<p>Monitoring requirements are set out in Section 20.11.</p>
<p>'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.'</p>	<p>Paragraph 2.6.15</p>	<p>Decommissioning is discussed in Section 20.6.3.</p>
Draft EN-1 NPS for Energy (BEIS, 2021)		
<p>As set out in Section 4.6, the design process should embed opportunities for nature inclusive design. The applicant is encouraged to consider how their proposal can contribute towards Biodiversity Net Gain in line with the ambition set out in the 25 Year Environment Plan. Energy infrastructure projects have the potential to deliver significant benefits and enhancements beyond Biodiversity Net Gain, which result in wider environmental gains. The scope of potential gains will be dependent on the type, scale, and location of each project.</p>	<p>Paragraph 5.4.4</p>	<p>Biodiversity Net Gain (BNG) has been considered separately as a stand-alone evaluation of the overall biodiversity impact of SEP and DEP, using the defined BNG metric and incorporating BNG specific compensation and enhancement measures. The Applicant is committed to achieving a positive biodiversity net gain as measured using the BNG metric 3.0. Appendix 22.6 presents the Initial Biodiversity Net Gain Assessment.</p>



NPS Requirement	NPS Reference	Section Reference
<p>In particular, the applicant should demonstrate that...the timing of construction has been planned to avoid or limit disturbance to birds during the breeding season.</p>	<p>Paragraph 5.4.18</p>	<p>A suite of breeding bird surveys has been undertaken and the findings of which have been used to inform the potential direct and indirect impacts, as presented in Section 20.6.1.13. Where required, appropriate mitigation measures that would be adopted to avoid or limit disturbance to breeding birds is presented in Section 20.6.1.13.</p>

20.4.1.1.2 National Planning Policy Framework

25. The overarching policy guidance for biodiversity is 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.
26. 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.”
27. Biodiversity Net Gain (BNG) has been considered separately as a stand-alone evaluation of the overall biodiversity impact of SEP and DEP, using the defined BNG metric and incorporating BNG specific compensation and enhancement measures. The Applicant is committed to achieving a positive biodiversity net gain as measured using the BNG metric. Appendix 22.6 contains Outline Biodiversity Net Gain Strategy.
28. Further detail is provided in [Chapter 2 Policy and Legislative Context](#).

20.4.1.2 Legislation

29. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of ecological impacts on designated sites, protected species and habitats.



20.4.1.2.1 *International Site Designations*

30. The European Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (the Habitats Directive) as amended 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.
31. Annex I of the Habitats Directive as amended 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 UK legislation by The Conservation (Natural Habitats & c.) Regulations 1994, later replaced by Conservation of Habitats and Species Regulations 2017.
32. Habitats of European-wide importance for birds are listed under the Birds Directive (Directive 2009/147/ED) as amended. Habitats designated under this Directive are notified as Special Protection Areas (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.
33. 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.'

20.4.1.2.2 *National (UK) Site Designations*

34. National ecological designations, such as Sites of Special Scientific Interest (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) as amended. 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.

20.4.1.2.3 *Non-Statutory (County) Site Designations*

35. 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 Norfolk such sites are designated as County Wildlife Sites (CWS). Designation of such sites does not itself confer statutory protection.

20.4.1.2.4 *Species Designation and Protection*

36. The Protection of Badgers Act 1992 makes it unlawful to knowingly kill, capture, disturb or injure an individual badger *Meles meles*, or to intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers (i.e. a sett).

37. 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 from by 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.
38. 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.
39. 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 occurring in East Anglia, adder *Vipera berus*, grass snake *Natrix helvetica*, slow-worm *Anguis fragilis* and common lizard *Zootoca vivipara*, this protection prohibits deliberate or reckless killing and injury but does not include habitat protection.
40. The GCN *Triturus cristatus* is 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.
41. Otters *Lutra lutra* 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.
42. 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.
43. The white-clawed crayfish *Austropotamobius pallipes* is listed on Schedule 5 of the WCA but only receives protection under Sections 9(1) and 9(5). This makes it an offence to take or sell white-clawed crayfish. Section 9 applies to all stages in their life cycle.
44. 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.

45. 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 (IUCN) criteria. Any taxon that is threatened (Critically Endangered [CR], Endangered [EN], Vulnerable [VU]) or Near Threatened (NT) 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.

20.4.1.2.5 *Priority Species and Habitats*

46. Other priority species and habitats 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 (NERC Act) (Section 40) which requires every public body in the exercising of its functions to 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Biodiversity, as covered by the Section 40 duty, includes all biodiversity, not just the Habitats and Species of Principal Importance (commonly referred to as Priority Habitats and Species).
47. Section 41 of the NERC Act lists a number of species and habitats as being Species/Habitats of Principal Importance (commonly known as Priority Habitats/Species). 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 (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.
48. Widespread Priority Habitats in East Anglia include:
- Arable field margins;
 - Traditional orchards;
 - Hedgerows;
 - Eutrophic standing waters;
 - Ponds;
 - Rivers;
 - Lowland calcareous grassland;
 - Lowland dry acid grassland;
 - Lowland fen;
 - Lowland meadows;
 - Coastal and floodplain grazing marsh;
 - Reedbeds;
 - Lowland mixed deciduous woodland;

- Wet woodland; and
 - Wood-pasture and parkland.
49. Widespread Priority Habitats in East Anglia (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 Red-listed species (e.g. skylark *Alauda arvensis*, spotted flycatcher *Muscicapa striata*);
 - Common toad *Bufo*;
 - European eel *Anguilla anguilla*;
 - Multiple invertebrate species (e.g. cinnabar moth *Tyria jacobaeae*, small heath butterfly *Coenonympha pamphilus*); and
 - Multiple plant species.

20.4.1.3 Guidance

50. 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;
 - British Standard 42020:2013 – Biodiversity. Code of Practice for planning and development;
 - 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).
51. The following species-specific guidance and standards have been used during the assessment process:
- Standing advice on protected species (bats (all species), great crested newts *Triturus cristatus*, badgers, water voles *Arvicola amphibius*, otters *Lutra lutra*, reptiles, protected plants, invertebrates, white-clawed crayfish *Austropotamobius pallipes*, 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 (Joint Nature Conservation Committee (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);
- 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).

20.4.2 Data and Information Sources

20.4.2.1 Site specific surveys

52. In order to provide site specific and up to date ecological information on which to base the ecological impact assessment, the surveys listed below have been undertaken:

- Extended Phase 1 Habitat Survey;
- Onshore Ornithology (wintering birds);
- Onshore Ornithology (breeding birds);
- Great Crested Newt eDNA surveys;
- Riparian Mammals (water vole and otters) presence/absence surveys;
- White Clawed Crayfish eDNA surveys;

- Bat Tree Roost surveys;
- Static Bat Detector and Transect surveys;
- NVC surveys;
- Terrestrial invertebrate presence/absence surveys;
- Reptile presence/absence surveys;
- Badger presence/absence surveys; and
- Arboricultural surveys.

53. Full survey methodologies and results are presented in their respective technical appendix that support this chapter.

20.4.2.2 Other Available Sources

54. Information on statutory designated nature conservation sites within and up to 2km from the DCO order limits has been obtained using the Natural England Multi-Agency Geographic Information for the Countryside (MAGIC) website. Citations for any designated nature conservation sites identified were obtained from the websites of Natural England and the Joint Nature Conservation Committee (JNCC).

55. A data search with Norfolk Biodiversity Information Service (NBIS) was completed in January 2021 and updated in August 2021, which obtained all biological records and records of any non-statutory designated nature conservation sites (such as County Wildlife Sites (CWS)) within and up to 2km from the DCO order limits. The data set provided by NBIS did not include any discernible omissions (such as records of individual species which may be held by a different organisation/body such as a county recorder), and NBIS did not advise that there were any such gaps. The data set is therefore considered to be a comprehensive search of biological records for the study area.

56. NBIS was also asked to provide all “Norfolk Living Map” data held for the DCO order limits. This data set provides a broad classification of habitats across Norfolk, so has been used as a supplementary data source for classifying habitats within the DCO order limits.

57. Results of the desk study are presented in [Appendix 20.7 Onshore Ecology Desk Study Report](#).

58. Other sources that have been used to inform the assessment are listed in [Table 20-6](#).

Table 20-6: Other Available Data and Information Sources.

Data set	Spatial coverage	Year	Notes
Ecological data from Dr. Carl Sayer	Ponds between Baconsthorpe and Bodham in the north of the DCO order limits.	2011-2019	The data includes records of GCN presence at six ponds within the GCN survey area.
Norfolk Crayfish Group Actions 2020 Report	Selected rivers in Norfolk, including Glaven, Bure and Yare.	2020	Report provides records of white-clawed crayfish and the invasive signal crayfish in selected watercourses.



20.4.3 Impact Assessment Methodology

59. **Chapter 5 EIA Methodology** provides a summary of the general impact assessment methodology applied to SEP and DEP. The following sections confirm the methodology used to assess the potential impacts on onshore ecology and ornithology, specifically the EclA methodology that has been applied in relation to onshore ecology that is based on the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018). This methodology was consulted on and agreed with stakeholders through the ETG process.
60. The CIEEM guidelines aim to predict the residual impacts on important ecological features affected, either directly or indirectly by a development, once all the appropriate mitigation has been implemented.
61. The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where possible, quantifying the sensitivity, value and magnitude of all ecological receptors which have been scoped into this assessment. Using this information, a significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.
62. The EclA has used professional judgement to ensure the assessed significance level is appropriate for each individual receptor, taking account of local values for biodiversity to avoid a subjective assessment wherever possible as per the CIEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix detailed below.

20.4.3.1 Importance

63. The first stage of an EclA is determining the ‘importance’ of ecological features or ‘receptors’. CIEEM identifies the important ecological features as those key sites, habitats and species which have been identified by European, national and local Governments and specialist organisations as a key focus for biodiversity conservation in the UK. These include:
- Statutory and non-statutory designated sites for nature conservation;
 - Species occurring on national biodiversity lists;
 - UK Habitats of Principal Importance; and
 - Red listed, rare or legally protected species.
64. Importance is also qualified by the geographic context of an ecological receptor, i.e. a species which may be not recognised on a national biodiversity list may be locally in decline, and therefore its local importance is greater than its national importance.
65. For this EclA, the guidelines outlined in **Table 20-7** have been followed to provide the relative importance of different ecological features.

Table 20-7: Definitions of Importance Levels for Onshore Ecology and Ornithology

Importance	Definition
High	<p>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).</p> <p>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).</p> <p>Habitats or species that form part of the cited interest within a nationally designated site, such as an SSSI or a NNR.</p> <p>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.</p>
Medium	<p>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.</p> <p>Habitats or species that form part of the cited interest of an LNR, or some local-level designated sites, such as a LWS, also referred to as a non-statutory Site of Importance for Nature Conservation or the equivalent, e.g. Ancient Woodland designation. Presence of LBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.</p>
Low	<p>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.</p>
Negligible	<p>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.</p>

66. In addition to the features listed in **Table 20-7**, ecological features which play a key functional role in the landscape or are locally rare have been considered. The importance of such features has been determined by professional judgement.
67. CIEEM places the emphasis on using professional judgement when considering importance of ecological receptors, based on available guidance, information and expert advice (CIEEM 2018). Various aspects of ecological importance should be considered, including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features.

20.4.3.2 Sensitivity

68. Sensitivity is not an inherent characteristic of a receptor or resource. Receptor or resource sensitivity is the degree in which it is tolerant of, adaptable to and able to recover from a change in its environment. The definitions of terms relating to sensitivity which have been used for this EclA are presented below:
 - **High** – 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 (e.g. 10 years or more).



- **Medium** – 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** – 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).

20.4.3.3 Magnitude

69. The magnitude of the impact is assessed according to:

- The extent of the area subject to a predicted impact;
- The duration the impact is expected to last prior to recovery or replacement of the resource or feature;
- Whether the impact is reversible, with recovery through natural or spontaneous regeneration, or through the implementation of mitigation measures or irreversible, when no recovery is possible within a reasonable timescale or there is no intention to reverse the impact; and
- The timing and frequency of the impact, i.e. conflicting with critical seasons or increasing impact through repetition.

70. **Table 20-8** summaries the definitions of magnitude that have been used for the onshore ecology receptors.

Table 20-8: Definitions of Magnitude for Onshore Ecology and Ornithology

Magnitude	Definition
Major	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.
Moderate	The impact adversely affects an ecological receptor but is unlikely to adversely affect its integrity or conservation status.
Minor	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.

20.4.3.4 Duration

71. The definitions of duration used within this EclA are dependent on the individual ecological receptor, and how sensitive it is to effects over different timescales. However, in general terms the following definitions have been used:

- **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 occur over the full duration 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; and
- **Long term** – effects which occur over the multiple active or growing seasons, i.e. typically impacts which occur over more than one year.

20.4.3.5 Impact Significance

72. Following the identification of receptor importance and magnitude of the effect, it is possible to determine the significance of the impact.
73. Ecologically significant impacts are defined as:
‘...impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)’ (CIEEM 2018).
74. Impacts are unlikely to be significant where features of low importance are subject to small scale or short-term effects. If an impact is not significant at the level at which the resource or feature has been valued, it may be significant at a more local level.
75. CIEEM recommend that the following factors are considered when determining significance for selected ecological receptors:
 - Designated sites – is the project and associated activities likely to undermine the site’s conservation objectives, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features.
 - Ecosystems – is the project likely to result in a change in ecosystem structure and function.
 - Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
 - Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area (CIEEM 2018).
76. Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in **Table 20-9** below and knowledge of the ecological features affected.
77. The assessment of potential impacts has been undertaken assuming implementation of embedded mitigation and project commitments made as part of the design process. Where, following this assessment, significant impacts (moderate or major) are identified, additional mitigation measures are then proposed. A final assessment of the residual impacts remaining following implementation of these additional mitigation measures is then made.



Table 20-9: Impact Significance Matrix

		Negative Magnitude				Beneficial Magnitude			
		Major	Moderate	Minor	Negligible/No change	Negligible/No change	Minor	Moderate	Major
Importance	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Moderate	Major	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

20.4.4 Cumulative Impact Assessment Methodology

78. The cumulative impact assessment (CIA) considers other plans, projects and activities that may impact cumulatively with SEP and DEP. As part of this process, the assessment considers which of the residual impacts assessed for SEP and/or DEP on their own have the potential to contribute to a cumulative impact, the data and information available to inform the cumulative assessment and the resulting confidence in any assessment that is undertaken. **Chapter 5 EIA Methodology** provides further details of the general framework and approach to the CIA.
79. For onshore ecology, these activities include the onshore elements of other offshore wind farm projects, construction projects (commercial, residential and transport developments) and agricultural development within or near the DCO order limits, where the scope of ecological impacts is relevant to those considered in the EclA. Only those plans or projects which would be active at the same time as (or have overlapping impact timeframes with) the onshore works associated with SEP and DEP are considered within the CIA.

20.4.5 Transboundary Impact Assessment Methodology

80. The transboundary assessment considers the potential for transboundary effects to occur on onshore ecology and ornithology receptors as a result of SEP and DEP; either those that might arise within the Exclusive Economic Zone (EEZ) of European Economic Area (EEA) states or arising on the interests of EEA states e.g. a non-UK fishing vessel. **Chapter 5 EIA Methodology** provides further details of the general framework and approach to the assessment of transboundary effects.
81. For onshore ecology and ornithology, the potential for transboundary impacts has been scoped out as the onshore study area is not adjacent to any international boundaries.



20.4.6 Assumptions and Limitations

82. The data limitations outlined in this section have been summarised from the technical appendices supporting this chapter. These limitations are not considered to be major constraints or to have adversely affected the results of the onshore ecology survey effort and the subsequent EclA that has been completed; however, they have been presented for completeness. Furthermore, pre-construction surveys would be undertaken, and these are outlined in the **Outline Ecological Management Plan** (document number 9.19).
83. Ecological data collection carried out in 2020 was constrained by limited land access for surveys and constraints associated with the public health restrictions during the COVID-19 lockdown period. Where this impacted on survey coverage in 2020, albeit limited as approximately 90% was subject to a survey, data collected in the field has been supplemented using NBIS biological records and Norfolk Living Maps where appropriate. Furthermore, as a precaution and to address this constraint, the assessment considers the worst-case scenario for onshore ecology and ornithology receptors wherever there is uncertainty surrounding impact potentials.
84. The vast majority of the Extended Phase 1 Habitat Survey (EP1HS) was undertaken during the optimal survey season, between May and September in 2020. Small areas of the DCO order limits were surveyed in March and April 2020, and in January and September 2021. These are acceptable times of year for completing EP1HS (as the survey can be done at any time of year), but January, March and April are outside the optimal season. This is not considered a significant constraint as most of the areas surveyed at those times were arable habitats or improved grasslands which could still be accurately classified. It is extremely unlikely that any habitats would have been misclassified; the surveys completed outside of the optimal survey window may, however, have recorded slightly reduced species diversity in certain habitats, if flowering plants were not identifiable at the time the survey was completed.
85. Much of the badger survey effort was undertaken in parallel with the EP1HS survey undertaken during the summer months. This was due to landowner access restrictions earlier in the survey season and resulted in the badger survey being undertaken when vegetation cover was dense, which may have restricted survey efficacy. However, it is unlikely that badger setts would not have been noted given the accumulations of badger field signs associated with an active sett. Overall, this was not expected to have had a substantial impact on the reliability of the survey results and they are therefore considered sufficiently accurate and reliable to inform the EclA and any likely mitigation requirements for the purposes of the DCO application.
86. A total of 15 ponds were inaccessible due to landowner access limitations during the GCN survey, with an additional four ponds that were not physically accessible due to steep/unstable banks or impenetrable vegetation and presence of nesting birds. Inherent constraints to eDNA surveys include potential natural contamination leading to false positives and limited access leading to false negatives as sampling may not have been undertaken within areas of a pond used by GCN. The identified constraints are not considered to have had a substantial impact on the reliability of the GCN eDNA survey.

20.5 Existing Environment

20.5.1 Designated Nature Conservation Sites

87. Statutory designated sites that are within 2km of the DCO Order Limits, and non-statutory designated sites located within the DCO Order Limits are presented in **Table 20-10** and shown in **Figure 20.2**. **Table 20-10** also provides a summary of the qualifying features/reasons for notification of these designated sites.

Table 20-10: Designated Nature Conservation Sites Summary

Designated Site Name and NBIS Reference Number (for CWSs only)	Location and Proximity to/Relationship with DCO order limits	Summary of Reasons for Site Designation
Statutory Designated Sites		
River Wensum Special Area of Conservation (SAC)/Site of Special Scientific Interest (SSSI)	The River Wensum SAC/SSSI follows the course of the river from its headwaters south-west of Fakenham to where the river flows into the west side of Norwich. This designated site passes through the DCO order limits south of Attlebridge, where a 200m length (approximately) of the river is within the DCO order limits.	<p><u>Annex I habitats that are a primary reason for selection of this site:</u> 3260: watercourses of plane to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation.</p> <p><u>Annex II species that are a primary reason for selection of this site:</u> 1092 White-clawed crayfish <i>Austropotamobius pallipes</i></p> <p><u>Annex II species present as a qualifying feature, but not a primary reason for site selection:</u> 1061 Desmoulin's whorl snail <i>Vertigo moulinsiana</i> 1096 Brook lamprey <i>Lampetra planeri</i> 1163 Bullhead <i>Cottus gobio</i></p>
North Norfolk Coast Ramsar, SAC, SPA and SSSI	Approximately 530m west of the DCO order limits at the landfall location.	<p>The site qualifies under Ramsar criteria 1, 2, 5 and 6.</p> <p>Criterion 1: The site is one of the largest expanses of undeveloped coastal habitat of its type in Europe. It is a particularly good example of marshland coast with intertidal sand and mud, saltmarshes, shingle banks and sand dunes. There are a series of brackish lagoons and extensive areas of freshwater grazing marsh and reedbeds.</p> <p>Criterion 2: The site supports at least three British Red Data Book and nine nationally scarce vascular plants, one British Red Data Book lichen and 38 British Red Data Book invertebrates.</p> <p>Criterion 5: The site supports an assemblage of international importance of 98,462 waterfowl over winter.</p>



Designated Site Name and NBIS Reference Number (for CWSs only)	Location and Proximity to/Relationship with DCO order limits	Summary of Reasons for Site Designation
		<p>Criterion 6: The site supports the following species/populations which occur in internationally important numbers:</p> <p>Species regularly supported during the breeding season: sandwich tern <i>Thalassius sandvicensis</i> (4,275 apparently occupied nests - 7.7% of breeding population), common tern <i>Sterna hirundo</i> (408 apparently occupied nests – 4% of GB population) and little turn <i>Sternula albifrons</i> (291 apparently occupied nests – 2.5% of breeding population).</p> <p>Species with peak counts in spring/autumn: knot <i>Calidris canutus</i> (30,781 individuals – average of 6.8% of the population).</p> <p>Species with peak counts in winter: pink-footed goose <i>Anser brachyrhynchus</i> (16,787 individuals – average of 6.9% of the population), Brent goose <i>Branta bernicla</i> (8,690 individuals – average of 4% of the population), wigeon <i>Anas penelope</i> (17,940 individuals – average of 1.1% of the population) and pintail <i>Anas acuta</i> (1,148 individuals – 1.9% of the population).</p> <p>Species/populations identified subsequent to designation for possible future consideration under Criterion 6:</p> <p>Species with peak counts in spring/autumn: ringed plover <i>Charadrius hiaticula</i> (1,740 individuals – average of 2.3% of the population), sanderling <i>Caldris alba</i> (1,303 individuals – average of 1% of the population) and bar-tailed godwit <i>Limosa lapponica</i> (3,933 individuals – average of 3.2% of the population).</p> <p><u>Annex I habitats that are a primary reason for selection of this site:</u></p> <p>1150: Coastal lagoons * Priority feature</p> <p>1220: Perennial vegetation of stony banks</p> <p>1420: Mediterranean and thermo-Atlantic <i>halophilous</i> scrubs (<i>Sarcocornetea fruticosi</i>)</p> <p>2110: Embryonic shifting dunes</p>



Designated Site Name and NBIS Reference Number (for CWSs only)	Location and Proximity to/Relationship with DCO order limits	Summary of Reasons for Site Designation
		<p>2120: "Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")"</p> <p>2130: "Fixed coastal dunes with herbaceous vegetation ("grey dunes")"</p> <p>* Priority feature</p> <p>2190: Humid dune slacks</p> <p><u>Annex II species present as a qualifying feature, but not a primary reason for site selection:</u></p> <p>1355: Otter <i>Lutra lutra</i></p> <p>1395: Petalwort <i>Petalophyllum ralfsii</i></p> <p>The SPA is noted for its internationally important populations of wintering wigeon, pink-footed goose, Brent goose, knot and avocet <i>Recurvirostra avosetta</i>, and internationally important breeding populations of bittern <i>Botaurus stellaris</i>, marsh harrier <i>Circus aeruginosus</i>, avocet, little tern, common tern and sandwich tern. The site also qualifies as an SPA because of its internationally important assemblage of birds, with an average of 91,536 waterfowl supported by the site over winter (including pink-footed goose, Brent goose, wigeon, avocet and knot).</p> <p>As a SSSI, this site is designated for its intertidal sands and muds, saltmarshes, shingle banks and sand dunes, plus extensive areas of brackish lagoons, reedbeds and grazing marshes. The site supports a wide range of coastal plant communities with many rare species. The site is of great ornithological interest, with nationally and internationally important breeding colonies of several species. It is also a valuable site for migratory birds, particularly Brent goose and pink-footed goose.</p>
Weybourne Cliffs SSSI	The DCO order limits overlaps the westernmost extents of this SSSI at the landfall, directly on the coastline.	This SSSI is designated principally for its geological and paleontological interest. Ecological interest is provided by colonies of sand martins <i>Riparia</i> in the cliff face and fulmars <i>Fulmaris glacialis</i> on the cliff ledges (based on 1980s data).
Weybourne Town Pit SSSI	Approximately 600m west of the DCO order limits in Weybourne.	The site is designated for geological interest.



Designated Site Name and NBIS Reference Number (for CWSs only)	Location and Proximity to/Relationship with DCO order limits	Summary of Reasons for Site Designation
Kelling Heath SSSI	Approximately 210m west of the DCO order limits near Kelling.	The site is an area of dry acid heath with small areas of acidic grassland, bracken, woodland and scrub. The site supports common lizards <i>Zootoca vivipara</i> and adders <i>Vipera berus</i> , and heathland bird species including breeding nightjar <i>Caprimulgus europaeus</i> plus whitethroat <i>Sylvia communis</i> , nightingale <i>Luscinia megarhynchos</i> and linnet <i>Linaria cannabina</i> . The heath supports a hen harrier <i>Circus cyaneus</i> roost in winter.
Cawston and Marsham Heaths SSSI	Approximately 970m south-east of the DCO order limits near Cawston.	The site is an area of heathland with some areas of wet heath and secondary woodland. The site is noted for its assemblage of lichens and for its heathland birds including tree pipit <i>Anthus trivialis</i> , whinchat <i>Saxicola rubetra</i> , nightjars, and as a winter roost for hen harriers.
Alderford Common SSSI	Approximately 180m west of the DCO order limits near Swannington.	The site is noted for its species-rich chalk grassland, scrub, woodland, marshy grassland and ponds. The ponds support amphibians including great crested newts. The site also supports a range of breeding birds including nightingales, lesser whitethroat <i>Sylvia curruca</i> , whitethroat <i>Sylvia communis</i> , turtle dove <i>Streptopelia turtur</i> , woodcock <i>Scolopax rusticola</i> and hawfinch <i>Coccothraustes</i> . The citation also notes that the site has an old lime kiln which supports winter hibernating and summer roosting bats.
Swannington Uppgate Common SSSI	Approximately 510m south-east of the DCO order limits near Swannington.	The site supports a wide range of habitats including dry acid heath, wet heathland with acidic flushes, fen, birch <i>Betula</i> sp. and alder <i>Alnus glutinosa</i> woodland, scrub, bracken, rough grassland and ponds. The ponds, which support a rich assemblage of water-plants are also used by great crested newts. The variety of habitats also supports a wide range of birds including teal <i>Anas crecca</i> , woodcock, lesser whitethroat, sedge warbler and redpoll <i>Carduelis flammea</i> .
Shotesham Common SSSI	Approximately 1.98km south-east of the DCO order limits near the OnSS.	This common occupies part of the valley of the River Tas. It is dominated by unimproved grassland habitats including wet marshy grassland, wet neutral grassland, dry grassland on the valley slopes and small areas of improved and



Designated Site Name and NBIS Reference Number (for CWSs only)	Location and Proximity to/Relationship with DCO order limits	Summary of Reasons for Site Designation
		semi-improved grassland. There is a small stream flowing through the site, with a small area of basic flush on the valley side. The site supports a rich flora with several uncommon species.
Marston Marshes LNR	Approximately 1.8km north of the DCO order limits near the OnSS.	The site comprises floodplain grazing marsh on the north side of the River Yare. There are numerous dykes throughout the site, and small areas of damp woodland. Species of interest include water voles <i>Arvicola amphibius</i> , otter, orchids, dragonflies, geese and snipe <i>Gallinago gallinago</i> .
Eaton Common LNR	Approximately 1.88km north of the DCO order limits near the OnSS.	The site which is bordered by the River Yare to its south is noted for its neutral grassland which is marshy in places, with ditches and areas of tall herb and broad-leaved woodland.
Dunston Common LNR	Approximately 420m east of the DCO order limits near Dunston.	The site is noted for its grassland, semi-mature woodland and a small pond.
Non-statutory sites		
Yare Valley (Marlingford Hall) CWS no. 229	The DCO order limits overlaps the western part of this CWS at the crossing point of the River Tiffey near Barford. The river flows in an easterly direction.	An area of woodland, marshy (mostly neutral) grassland and fen bordering the River Yare.
Yare Valley (Colton Woods) CWS no. 228	The DCO order limits crosses the eastern arm of this CWS south-east of Colton.	An area of low-lying marshy grassland and tall fen bordering the River Yare. The site also supports areas of wet semi-natural woodland and scrub.
River Tud at Easton and Honingham: 250	Part of the western section of this CWS is within the DCO order limits, near Easton	An area of species-rich aquatic, marginal and emergent riverine flora. The site also supports otter and water vole.
Hall Hills/Ringland Covert CWS no. 2105	The DCO order limits crosses the northern part of this CWS south-west of Ringland.	An area of woodland listed as an Ancient Woodland, with widespread replanting.
Wensum Pastures at Morton Hall CWS no. 2070	The DCO order limits crosses the northern part of this CWS south of Attlebridge.	An area of predominantly improved cattle-grazed pasture within the floodplain of the River Wensum and crossed by a network of drains supporting diverse aquatic flora. The site is subject to periodic flooding. There are small areas of neutral and damp grassland.
Marriott's Way CWS no. 2176	The DCO order limits crosses this linear CWS (which follows the course of a disused railway line) in two locations; north of	A disused railway line with ecological interest in the linear cuttings and embankments which are mostly dominated by woodland or scrub habitats.



Designated Site Name and NBIS Reference Number (for CWSs only)	Location and Proximity to/Relationship with DCO order limits	Summary of Reasons for Site Designation
	Attlebridge and north-east of Cawston.	
Kelling Heath Park and 100 Acre Wood CWS no. 1150	The DCO order limits overlaps the western edge of this CWS south of Weybourne.	A semi-natural broadleaved woodland with dry heath and associated scrub.
Beach Lane, Weybourne CWS no. 1156	This CWS is entirely within the DCO order limits at the landfall north of Weybourne.	An area of reed-bed within a shallow pool just inland of the shingle sea defences. It is fed by a stream so is part freshwater and part brackish,
Brook House Marshes: 2315	The eastern part of this CWS is within the DCO order limits.	This site comprises three fields of relatively species-poor grassland lying in the floodplain of the River Tud.

88. In accordance with the criteria set out in **Table 20-7**, all statutory designated sites for nature conservation are considered to be of high importance and all non-statutory designated sites are considered to be of medium importance.
89. The sensitivity of both statutory and non-statutory sites is considered to be medium, reflecting that there is some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.2 Habitats

90. The baseline information presented in this section has been informed from the findings of the 2019, 2020 and 2021 EP1HS. 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 Norfolk 'Living Map'. Full details of the habitats present are provided in **Appendix 20.1 Extended Phase 1 Habitat Survey Report**. **Figure 20.3** shows the UK Habitats of Principal Importance.
91. The EP1HS recorded that the DCO order limits runs through a predominantly arable landscape with most field boundaries marked by hedgerows. Some boundaries are marked by ditches (dry/seasonal and wet), verges/field margins, fences and tree-lines/shelter-belts (**Figure 20.4**).
92. 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 hares *Lepus europaeus* also use arable fields for foraging and shelter.
93. Water bodies, predominantly ponds, are widespread, although are outwith the SEP and DEP DCO order limits. They are located in the south and far north where there are high densities of ponds. Many of these ponds are located within or around the edges of arable fields and have associated scrub or trees around them.



94. The DCO order limits also passes through a number of woodlands, most of which are either semi-natural or plantation broad-leaved woodland. There are also some mixed (broad-leaved and conifer) or conifer woodlands. However, in general, the DCO order limits avoids woodland, with the order limits bypassing woodlands such as Mossymere Wood near Saxthorpe, Colton Wood (near Colton) and Smeeth Wood near Ketteringham.
95. There are occasional areas of grasslands within the DCO order limits, most of which are classified as improved or poor semi-improved grasslands and are mostly used for grazing livestock. There are a small number of semi-improved neutral and acid grasslands.
96. The DCO order limits passes through the river corridors of the Rivers Yare, Tiffey, Tud, Wensum and Bure, including tributaries and drainage ditches associated with them. These river corridors are amongst the more diverse mosaics of habitat within the DCO order limits, with various grasslands, woodlands, scrub, hedgerows, ditches and ponds (amongst other habitats) often recorded within proximity to river channels and floodplains. All these rivers are either classified as chalk streams or are tributaries of/part of the same river systems as rivers which are classified as such. The DCO order limits also runs adjacent to the source/headwaters of the River Glaven (also a chalk stream) near Bodham.
97. Other habitat types are present within the DCO order limits and typically occupy small, linear and disused parcels of land such as along roadsides, beside railways (including disused railways) and within and around villages. These disused areas of land support a range of habitat classifications including scrub, tall herb and ruderal, bare ground and poor semi-improved grassland.
98. The presence of Himalayan balsam was recorded during the EP1HS and predominately located along watercourses such as tributaries of the Wensum at Swannington and on the Rivers Tud and Bure.
99. The Norfolk Living Map data provided by NBIS reflects the mosaic of habitat identified by the EP1HS, with arable farmland the dominant habitat type and small areas of various other habitats such as woodland and grassland.
100. A focussed NVC survey was undertaken at the landfall as this was the only area within the DCO order limits where it was noted that rare vegetation communities or vegetation communities of elevated conservation status may be present. The NVC survey of this area was undertaken in June 2021 and in accordance with industry accepted NVC survey methodology (Rodwell et al, 1991-2000).
101. Thirty-eight terrestrial quadrats were sampled, all of which were assigned to an NVC community. A total of nine NVC sub-communities were recorded within the NVC survey area, with one mesotrophic grassland community (MG1a), two sand-dune communities (SD8d and SD19), one acid grassland community (U1d), two woodland/scrub communities (W22 and W24), two swamp communities (S4 and S28) and one open vegetation community (OV25). Two species with elevated conservation status were recorded.
102. The area subject to the NVC survey holds habitats that are important in a county/regional context, together with two plant species with elevated conservation status. The most important communities in this respect are:

- SD8d Festuca rubra – Galium verum fixed dune grassland, Bellis perennis – Ranunculus acris sub-community
- SD19 Phleum arenarium – Arenaria serpyllifolia dune annual community
- U1d Festuca ovina – Agrostis capillaris - Rumex acetosella grassland, Anthoxanthum odoratum – Lotus corniculatus sub-community
- S4 reedbed.

103.

104. In accordance with the criteria set out in **Table 20-7**, the habitats recorded within the DCO order limits are considered to be:

- Areas of woodland – medium importance;
- Areas of scrub and tall ruderals – medium importance;
- Hedgerows – medium importance;
- Areas of grassland (all habitat types) – medium importance;
- Standing and running water – medium importance;
- Arable land – low importance; and
- Areas of bare ground and/or hard standing – negligible importance.

105. The sensitivity of all habitats recorded within the DCO order limits are considered to be medium, reflecting that they all have some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

106. Table 20-11 presents a summary of the key habitats and their area/linear length that has been recorded within the DCO order limits.

107. In accordance with the criteria set out in **Table 20-7**, the habitats recorded within the DCO order limits are considered to be:

- Areas of woodland – medium importance;
- Areas of scrub and tall ruderals – medium importance;
- Hedgerows – medium importance;
- Areas of grassland (all habitat types) – medium importance;
- Standing and running water – medium importance;
- Arable land – low importance; and
- Areas of bare ground and/or hard standing – negligible importance.

108. The sensitivity of all habitats recorded within the DCO order limits are considered to be medium, reflecting that they all have some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

Table 20-11: Summary of key habitats recorded within the DCO order limits

JNCC habitat code	Habitat type	Area (ha) or Length (m) within the DCO order limits	Percentage (%) within DCO order limits
Habitat areas			



JNCC habitat code	Habitat type	Area (ha) or Length (m) within the DCO order limits	Percentage (%) within DCO order limits
A1.1.1	Broadleaved woodland - semi-natural	6.08	1.20
A1.1.2	Broadleaved woodland - plantation	5.26	1.04
A1.2.2	Coniferous woodland - plantation	11.19	2.20
A1.3.1	Mixed woodland - semi-natural	3.03	0.60
A1.3.2	Mixed woodland - plantation	2.04	0.40
A2.1	Scrub - dense/continuous	0.71	0.14
A2.2	Scrub - scattered	0.97	0.19
A3.1	Broadleaved Parkland/scattered trees	0.56	0.11
B2.2	Neutral grassland - semi-improved	4.11	0.81
B4	Improved grassland	23.14	4.55
B5	Marsh/marshy grassland	0.66	0.13
B6	Poor semi-improved grassland	13.00	2.56
C3.1	Other tall herb and fern - ruderal	0.71	0.14
E3.3	Fen - flood plain mire	0.07	0.01
F1	Swamp	0.02	0.00
G1	Standing water	0.08	0.02
G2	Running water	0.53	0.10
H3	Shingle above high tide mark	1.00	0.20
H8.4	Coastal grassland	2.04	0.40
J1.1	Cultivated/disturbed land - arable	366.40	72.13
J1.2	Cultivated/disturbed land - amenity grassland	0.63	0.12
J1.3	Cultivated/disturbed land - ephemeral/short perennial	3.75	0.74
J4	Bare ground	0.29	0.06
J6	Hard standing	1.04	0.20
Linear habitats			
A1.1	Broadleaved line of trees	2,187.42	6.63
G1	Wet ditch	2,033.94	6.16
H8.2	Soft cliff	177.58	0.54

JNCC habitat code	Habitat type	Area (ha) or Length (m) within the DCO order limits	Percentage (%) within DCO order limits
J2.1.1	Intact hedge - native species-rich	2,305.36	6.98
J2.1.2	Intact hedge - species-poor	2,142.69 2052.69	6.2349
J2.2.1	Defunct hedge - native species-rich	1,066.84	3.23
J2.2.2	Defunct hedge - species-poor	639.36	1.94
J2.3.1	Hedge with trees - native species-rich	8,082.15	24.48
J2.3.2	Hedge with trees - species-poor	1,154.57	3.50
J2.3.3	Defunct hedge with trees - native species-rich	5,733.26	17.37
J2.3.4	Defunct hedge with trees - species-poor	1,682.70	5.10
J2.4	Fence	4,021.93	12.18
J2.6	Dry ditch	1,436.71	4.35
J2.8	Earth bank	350.47	1.06

20.5.3 Protected and Notable Species

109. This section provides a summary of the key species recorded within the EP1HS survey area, drawing on the information obtained from the following sources:

- NBIS Biological Records;
- Environment Agency fish data;
- **Appendix 20.1 Extended Phase 1 Habitat Survey Report;**
- **Appendix 20.2 Great Crested Newt Survey Report;**
- **Appendix 20.3 Bat Activity Survey Report;**
- **Appendix 20.4 Wintering Bird Survey Report;**
- **Appendix 20.5 Breeding Bird Survey Report;**
- **Appendix 22.6 Initial Biodiversity Net Gain Assessment Report;**
- **Appendix 20.7 Onshore Ecology Desk Study Report;**
- **Appendix 20.8 Reptile Survey Report;**
- **Appendix 20.9 White Clawed Crayfish Survey Report;**
- **Appendix 20.10 Bat (Roosting) Survey Report;**
- **Appendix 20.11 Invertebrate Survey Report;**
- **Appendix 20.12 National Vegetation Classification (NVC) Survey Report;**
- **Appendix 20.13 Riparian Mammals (Water Vole and Otter) Survey Report;**
- **Appendix 20.14 Badger Confidential Appendix;** and



- **Appendix 20.15 Arboricultural Survey Report.**

20.5.3.1 Breeding Birds

110. The NBIS data search returned thousands of records relating to dozens of bird species which could feasibly breed within the DCO order limits; the records themselves do not specifically state whether breeding activity was recorded, only that the bird itself was observed/heard.
111. The results of the breeding bird survey are provided in full in **Appendix 20.5: Breeding Bird Survey Report.**
112. The 2020 and 2021 breeding bird surveys recorded nine Red list species, nine Amber list species and four Schedule 1 species territories within the DCO order limits, as well as significant numbers of sand martins breeding in the cliffs at Weybourne and a colony at Mangreen Quarry. The four Schedule 1 species with breeding territories recorded within the DCO order limits were Cetti’s warbler in Weybourne Hope reedbeds, crossbill and firecrest in Weybourne Wood, and little ringed plover at Mangreen Quarry. These are summarised in **Table 20-12.**

Table 20-12: Breeding Bird Survey Results Summary

Species Common Name	Species Latin Name	Conservation Status	Number of Breeding Territories Wholly or Partly Within the DCO order limits
Firecrest	<i>Regulus ignicapilla</i>	Schedule 1 listed	9
Cetti’s warbler	<i>Cettia cetti</i>	Schedule 1 listed	1
Nightjar	<i>Caprimulgus europaeus</i>	Schedule 1 listed	1
Skylark	<i>Alauda arvensis</i>	Red listed	c.80 – 115
Grey partridge	<i>Perdix perdix</i>	Red listed	1
House sparrow	<i>Passer domesticus</i>	Red listed	3
Lesser redpoll	<i>Passer domesticus</i>	Red listed	1
Yellowhammer	<i>Emberiza citrinella</i>	Red listed	39
Mistle thrush	<i>Turdus viscivorus</i>	Red listed	4
Linnet	<i>Linaria cannabina</i>	Red listed	25
Grey wagtail	<i>Motacilla cinerea</i>	Red listed	1
Song thrush	<i>Turdus philomelos</i>	Red listed	5
Marsh tit	<i>Poecile palustris</i>	Red listed	2
Yellow wagtail	<i>Motacilla flava</i>	Red listed	1
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber listed	7
Kestrel	<i>Falco tinnunculus</i>	Amber listed	7



Species Common Name	Species Latin Name	Conservation Status	Number of Breeding Territories Wholly or Partly Within the DCO order limits
Stock dove	<i>Columba oenas</i>	Amber listed	5
Reed bunting	<i>Emberiza schoeniclus</i>	Amber listed	3
Dunnock	<i>Prunella modularis</i>	Amber listed	53
Tawny owl	<i>Strix aluco</i>	Amber listed	3
Mallard	<i>Anas platyrhynchos</i>	Amber listed	2
Meadow pipit	<i>Anthus pratensis</i>	Amber listed	2
Mute swan	<i>Cygnus olor</i>	Amber listed	2
Oystercatcher	<i>Haematopus ostralegus</i>	Amber listed	2

113. The majority of territories of Red and Amber listed species recorded in the DCO order limits were of farmland breeding birds such as skylark, dunnock, linnets and yellowhammer, which reflects the predominance of arable habitat throughout the onshore cable corridor.
114. Small numbers of territories of a mix of woodland breeding Red and Amber listed bird species were also recorded. Very few wetland and riverine species were recorded in the survey area, with one grey wagtail territory recorded on the River Wensum during the surveys and mallard and mute swan recorded breeding at both Weybourne and at the River Wensum.
115. Numbers of skylark territories has been estimated as their nests are inconspicuous and nesting territories are difficult to define within arable landscapes.
116. Cetti's warbler were recorded in scrub near the landfall location. Firecrests were recorded exhibiting breeding behaviour with Weybourne Wood, also near the landfall location.
117. In accordance with the criteria set out in [Table 20-7](#), all breeding bird species are considered to be of high importance.
118. The sensitivity of breeding bird species is considered to be medium, reflecting that the species have some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.2 Over-Wintering Birds

119. The NBIS data search returned a large number of records relating to dozens of bird species which could feasibly over-winter within the DCO order limits; the records themselves do not all state the time of year the bird was recorded so it is not known if they were over-wintering.
120. The results of the over-wintering bird survey are provided in full in [Appendix 20.4 Wintering Bird Survey Report](#).

121. The 2019/20 and 2020/21 over-wintering bird surveys recorded all Red and Amber listed Birds of Conservation Concern (BoCC), Schedule 1 species, and qualifying species for the relevant SPAs. Numbers of target species recorded during the surveys were low, comprising individuals and small groups of Red and Amber listed farmland species. There were no significant flocks of wintering waders and wildfowl recorded within the DCO order limits, and no significant species or concentrations were observed.
122. Peak counts recorded were of farmland bird species such as fieldfare *Turdus pilaris* (70 birds), meadow pipit *Anthus pratensis* (50 birds) and starling *Sturnus vulgaris* (18 birds).
123. The presence of suitable feeding/foraging habitat, namely harvested sugar beet fields or fields with stubble (harvested but not ploughed-in cereal crops), was closely associated with the presence of over-wintering bird activity. Peak-counts of flocks of geese and waders were recorded at a sugar beet field which has been excluded from the refined DCO order limits, so these records are not relevant to this assessment.
124. In accordance with the criteria set out in **Table 20-7**, all over-wintering bird species are considered to be of high importance.
125. The sensitivity of over-wintering bird species is considered to be medium, reflecting that the species have some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.3 Reptiles

126. A total of 54 records of species of reptiles within and up to 2km of the DCO order limits were returned during the desk study. Nineteen of these records are of slow worm, 15 are of common lizard, another 15 are of grass snake and five are of adder.
127. During the EP1HS, all habitats suitable for reptiles were assessed for their suitability to support reptiles. Habitats such as scrub, tall herb and ruderal vegetation, grasslands (especially if tussocky with an established and varied sward structure, and not subject to intensive management), woodland edge, mature hedgerows, railway embankments/cuttings, allotments, heathland and the banks/peripheries of waterbodies were amongst the types of habitats recorded within the DCO order limits which were considered suitable for reptiles. The presence of suitable features for reptiles was also a factor in determining the suitability of an area. Reptiles require the following: open/unshaded areas for basking; cover for sheltering (usually in the form of dense vegetation); food sources such as invertebrates, amphibians and small mammals; and hibernacula such as woodpiles, rootstocks, banks or piles of various materials. Features such as compost heaps or other piles of vegetation which can be used as hibernacula can also provide breeding/egg-laying sites for grass snake.

128. A total of 15 sites within the DCO order limits formed the basis of the reptile presence/absence surveys that were undertaken in April and/or May 2021. Reptile presence was confirmed at 11 of the 15 sites, where adder was recorded at two sites, common lizard was recorded at three sites, grass snake at five sites and slow worm at five sites. Four of the sites were found to support two reptile species each, with the other seven sites supporting a single species each. The numbers of animals recorded during the 2021 reptile surveys was generally low (fewer than five, which is indicative of a 'Low' population classification, in accordance with the industry accepted reptile guidance), although at one site bordering the A140 and railway line near the onshore substation, a 'Good' population of slow worms was recorded (with a maximum count of 10 adult animals during a single survey). Full survey results are provided in [Appendix 20.8 Reptile Survey Report](#).
129. In accordance with the criteria set out in [Table 20-7](#), reptiles are considered to be of medium importance and of medium sensitivity, reflecting that this species has some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.4 Great Crested Newt

130. A total of 18 records of great crested newts were returned from NBIS. These records are clustered around Bodham, with 12 of the 18 great crested newt records attributed to five ponds in and around Pond Farm south of Bodham. All these ponds were included in the 2020 and/or 2021 great crested newt eDNA survey effort.
131. A total of 171 ponds were identified to be within, and up to 250m from the onshore Order Limits. These 171 ponds formed the basis of the 2020 and 2021 great crested newt eDNA survey.
132. Of the 171 ponds,
- 138 ponds were subject to a Habitat Suitability Index (HSI) assessment HSI appraised and subsequently subject to an eDNA survey;
 - 14 ponds were found to be dry in 2020 and/or 2021 and therefore were scoped out from any further survey;
 - four ponds were physically inaccessible due to barriers such as fences or dense vegetation and therefore were scoped out from any further survey; and,
 - 15 ponds were not surveyed due to landowner access not being granted at the time of either the 2020 or 2021 survey.
133. The HSI appraisals of the 140 ponds which were accessible and surveyed (comprising the 138 fully accessible ponds plus two ponds which could be viewed remotely but not accessed for an eDNA survey) produced the following suitability classifications of the ponds as GCN breeding ponds:
- Excellent: 26 ponds;
 - Good: 35 ponds;
 - Average: 29 ponds;
 - Below average: 35 ponds; and,
 - Poor: 15 ponds.



134. An eDNA survey of all accessible ponds was undertaken in accordance with approved field and laboratory protocols (Briggs et al. 2014) between March and June 2020 and between April and June 2021, within the appropriate survey seasons and by great crested newt licensed ecologists or Accredited Agents. This is an approved valid method for great crested newt presence/absence survey and this approach was agreed with stakeholders at the ETG meeting held in January 2019.
135. Of the 138 ponds subject to an eDNA survey, 14 returned a positive result indicating GCN presence. GCN presence was visually confirmed by surveyors at one pond prior to the eDNA survey (GCN were seen in the pond so eDNA sampling and analysis was deemed unnecessary). The other 123 ponds returned negative results indicating the likely absence of GCN.
136. Suitable terrestrial habitat for supporting foraging and hibernating great crested newts was observed throughout the DCO order limits. Part of the HSI assessment includes an assessment of the habitat surrounding a potential breeding pond for its suitability to support foraging and hibernating newts. Full survey results are provided in [Appendix 20.2 Great Crested Newt Survey Report](#).
137. It should be noted that no known ponds would be lost during the construction of SEP and DEP. The ponds with confirmed great crested newt presence suggest the presence of great crested newt metapopulations in the areas around Bodham, Marlingford and Colton and Hethersett, Ketteringham and Swardeston.
138. SEP and DEP will adopt a District Level Licence (DLL) approach prior to construction to ensure compliance with the legal status of GCN and mitigate for potential impacts on this species. DLL involves providing a Conservation Payment to fund a net increase in habitat for GCN at a county level, rather than mitigate for impacts specifically within and around the DCO order limits. Further GCN surveys are not necessarily required to inform a DLL application prior to the commencement of construction works associated with onshore elements of SEP and DEP. However, updated survey data could be used (if available) to refine the DLL Conversation Payment calculation.
139. A provisional DLL certificate was provided by NE on 15th August 2022 and is included as an appendix to the Planning Statement (document reference 9.1); full procurement of the DLL will be undertaken within no more than 12 months prior to the commencement of onshore construction works.
140. All of the ponds located within and up to 250m of the DCO order limits that have not been surveyed or have been surveyed more than two years prior to the commencement of construction, would be re-surveyed prior to the commencement of construction in order to determine the presence or likely absence of great crested newts, as outlined in the [Outline Ecological Management Plan](#) (document reference 9.19).
141. GCN are a European Protected Species (EPS) and therefore in accordance with the criteria set out in [Table 20-7](#), are considered to be of high importance.
142. The sensitivity of great crested newts is considered to be medium, reflecting that the species has some ability to tolerate an effect but the species can recover to an acceptable status over the short term to medium term.

20.5.3.5 Badgers

143. A total of 157 records of badger within and up to 2km from the DCO order limits were returned from the desk study. Of these, an estimated 106 records appear to relate to road-traffic accident (RTA) fatalities; the uncertainty arises because some records of badger carcasses do not specify or know if the cause of death was RTA. The locations of these records align with major transport routes within the DCO order limits, particularly the A11 near Wymondham/Hethersett, the A47 near Easton/Honingham, the B1149 near Cawston/Oulton and the A148 near Bodham/High Kelling. These records and other, non-fatality records, are spread throughout the DCO order limits, indicating that badgers are widespread in this region.
144. A total of 29 badger field signs were recorded during the EP1HS, consisting of 13 active and/or disused setts plus additional field signs such as snuffle holes, pathways and tracks. Further details of the survey findings are provided in [Appendix 20.14 Badger Confidential Appendix](#).
145. Refinement of the DCO order limits has avoided the majority of the 13 sett locations, allowing for appropriate stand-off distances (i.e. 30m), with the exception of a single sporadically used subsidiary sett near the onshore substation site. This sett will require closure under a badger mitigation licence from Natural England. The remaining 12 setts would be retained (and not impacted by the works).
146. Information regarding mitigation measures and procedures pertaining to badger mitigation licences is provided in the [Outline Ecological Management Plan](#) (document reference 9.19).
147. As a regularly occurring population of a nationally important species which is not threatened or rare in the Norfolk County, in accordance with the criteria set out in [Table 20-7](#), badgers are considered to be of low importance. The sensitivity of badgers is considered to be medium, reflecting that badgers have some ability for this species to tolerate an effect but its population status can recover to an acceptable status over the short term to medium term.

20.5.3.6 Water Voles and Otters

148. A total of 28 records of water vole and 53 records of otter were returned from NBIS to be within 2km of the DCO order limits. One of the records of otter and one of the records of water vole are located within the DCO order limits; both are records of spraints/droppings on the River Bure and date from 2005. Records of both species are clustered along certain watercourses in the vicinity of the DCO order limits, including Spring Beck at Weybourne, the River Bure and the River Wensum. Other watercourses such as The Quag (north of Kelling), the River Yare and its tributaries and the River Tas have records of otters but not water voles, and the River Tud has records of water voles but not otters.

149. All watercourses within the DCO order limits were noted during the EP1HS and subsequently assessed for their suitability to support water voles and/or otters. A total of 10 watercourses were assessed as providing optimal habitat for water voles and/or otters and therefore formed the basis of the 2021 presence/absence survey effort. Full survey results and methodology is provided in **Appendix 20.13 Riparian Mammals (Water Vole and Otter) Survey Report**.
150. The 2021 surveys confirmed the presence of water vole in nine of the ten surveyed watercourses, with only the unnamed tributary of the River Yare at Furze Meadow showing no signs of water vole presence.
151. Otter signs were found only at the River Tiffey.
152. In accordance with the criteria set out in **Table 20-7**, in combination with both being an EPS, water voles and otters are considered to be of high importance.
153. The sensitivity of water voles and otters is considered to be medium, reflecting that both of these species have the ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.7 White Clawed Crayfish

154. NBIS returned four records of white clawed crayfish within and up to 2km from the DCO order limits. Three of these records are located in the River Glaven around Bodham (dating from 2006), which is outside the DCO order limits. The other record is from the River Wensum at Attlebridge (dating from 2009). The precise location of these records are all outside of the DCO order limits. However, the DCO order limits does cross the River Wensum near Attlebridge, approximately 1.6km west (upstream) of the location of this record.
155. All watercourses within the DCO order limits were noted during the EP1HS and subsequently assessed for their suitability to support white clawed crayfish. A total of seven watercourses formed the basis of the white clawed crayfish eDNA survey undertaken in July 2021. Full survey results and methodology is provided in **Appendix 20.9 White Clawed Crayfish Survey Report**.
156. The 2021 white clawed crayfish eDNA survey confirmed the likely absence of white clawed crayfish from six of the seven surveyed watercourses and confirmed presence in one: namely the River Tiffey.
157. White clawed crayfish are a species afforded protection under Annex II species of the Habitats Directive and Schedule 5 of the Wildlife and Countryside Act (1981 – as amended). White-clawed crayfish are a local species of interest and have a Norfolk Biodiversity Action Plan dedicated to them. Therefore, and in accordance with the criteria set out in **Table 20-7**, they are considered to be a species of high importance.
158. The sensitivity of white clayed crayfish is considered to be medium, reflecting that this species has some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.8 Invertebrates

159. During the EP1HS of all accessible areas of the DCO order limits, key areas of habitat were noted to potentially support rare invertebrates. In addition, a desk study was undertaken which included obtained invertebrate records from NBIS. NBIS returned records of 60 moth species and seven aculeate hymenoptera (bees, wasps), but no other invertebrates.
160. Using the NBIS invertebrate data in combination with the findings from the EP1HS, a single area was noted as having high potential to support rare invertebrates or important assemblages of invertebrates. This area was limited to the habitats within the proposed landfall site at Weybourne. Consequently, an invertebrate survey was undertaken between April and September 2021.
161. The 2021 surveys recorded 432 species of invertebrate using the habitat subject to the survey, of which 41 had elevated conservation status. Full survey results and methodology is provided in [Appendix 20.11 Invertebrate Survey Report](#).
162. The habitats considered to be of greatest importance for invertebrates comprise fixed dunes, dune annual communities, bare sandy ground, scrub and the restored pond. In accordance with the criteria set out in [Table 20-7](#), the invertebrate community is considered to be of medium importance.
163. The sensitivity of habitats supporting invertebrate species is considered to be medium, reflecting that the species have some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.9 Fish

164. The Environment Agency National Fish Population Database returned records of bullhead, brook lamprey, brown trout and European eels *Anguilla*. These species have been recorded within the watercourses within the DCO order limits (refer to [Chapter 18 Water Resources and Flood Risk](#) for further information).
165. No baseline data has been collected to identify the presence/likely absence of fish species in watercourses within the DCO order limits.
166. In accordance with the criteria set out in [Table 20-7](#), bullhead and brook lamprey, as qualifying features of the River Wensum SAC, are considered to be of high importance.
167. In accordance with the criteria set out in [Table 20-7](#), and as a nationally important species which is uncommon in the region, brown trout is considered to be of medium importance.
168. The sensitivity of fish is considered to be medium, reflecting that all fish species have some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.3.10 Bats

20.5.3.10.1 Roosting bats

169. All features (i.e. trees, buildings, structures) noted during the EP1HS were assessed in accordance with Bat Conservation Trust (BCT) guidance (Collins, 2016), from ground level and using binoculars, for their suitability to support roosting bats. Each feature where present was assessed for its suitability to support roosting bats and assigned the following category:
- Negligible;
 - Low;
 - Moderate; and
 - High.
170. A total of 13 trees with moderate bat roost potential were scoped in for nocturnal bat activity surveys that were undertaken in August and September 2021. These consisted of 12 oak trees and one ash tree. There were no trees with high bat roost potential within the DCO order limits which were likely to be impacted. Full details of the roost assessments and survey findings are presented in **Appendix 20.10 Bat (Roosting) Survey Report**.
171. In accordance with BCT guidance (Collins, 2016), all features assessed as providing low suitability for roosting bats were trees and therefore were not subject to the 2021 survey effort. However, appropriate mitigation measures would be implemented and are outlined in the **Outline Ecological Management Plan** (document reference 9.19).
172. Each tree assessed as providing moderate suitability was subject to two separate survey visits that were undertaken in August and September 2021, with at least two weeks between each visit. Confirmed bat roosts were recorded in seven of the oak trees (namely BRT0013, BRT0016J, BRL0003-02, BRL0005-01, BRL0005-02, BRL0010-04 and BRL0010-07). The majority of these seven confirmed roosting sites were found to support either a day roost of one common pipistrelle or soprano pipistrelle, with the exception of up to three soprano pipistrelles in BRT0013 and one barbastelle bat in BRL0003-02.
173. Of these seven confirmed bat roost trees, only two will require removal (specifically BRT0016J and BRL0010-07). The removal of these two trees would be undertaken in accordance with a bat mitigation licence from Natural England. The remaining five trees would be retained.
174. All suitable trees and/or features identified within, and up to a 50 m buffer of the DCO order limits would be subject to a further pre-construction survey effort. These would be undertaken during the appropriate part of the active bat season, as outlined in the **Outline Ecological Management Plan** (document reference 9.19).

20.5.3.10.2 *Commuting and foraging bats*

175. In addition to trees and structures, all linear features (e.g. watercourses, hedgerows) and areas of woodland within the DCO order limits, were assessed in terms of their suitability to support commuting or foraging bats, in accordance with the BCT guidance. This categorisation was based on the habitat type, qualified by how well connected to surrounding habitat feature was. The categorisation used was as follows:
- Defunct hedgerows and field drains typically provided low suitability for commuting and foraging bats;
 - Intact species-rich hedgerows, areas of scrub and small watercourses typically provided moderate suitability for commuting and foraging bats; and
 - Species-rich hedgerows with trees and large watercourses well connected to the wider landscape typically provided high suitability for commuting and foraging bats.
176. The NBIS data search returned over 3,500 records relating to at least 15 bat species within the DCO order limits and surrounding 2km area. The biological records included Brandt's bat *Myotis brandtii*, Daubenton's bat *M. daubentonii*, whiskered bat *M. mystanicus*, Natterer's bat *M. nattereri*, Leisler's bat *Nyctalus leisleri* and parti-coloured bat *Vespertilio murinus* (a single record from Kelling Heath, likely of an off course migrating bat as this is not a species native to the UK).
177. A suite of monthly activity transect surveys, including the deployment of static bat detectors, were undertaken from June to October 2020 and April to September 2021. The full results from the 2020 and 2021 bat activity surveys are provided in [Appendix 20.3 Bat Activity Survey Report](#).
178. Weybourne Woods was surveyed across 2020 and 2021, with a number of static bat detector survey and transect surveys. The surveys found that common pipistrelle and soprano pipistrelle were the most commonly recorded species, with the average earliest and latest registration times suggesting that there could be roosts located in the vicinity. A number of rarer species were also recorded at Weybourne Woods, including *Myotis* species, barbastelle, serotine and Nathusius's pipistrelle. The data search also showed a number of barbastelle and noctule records within the woodland. The rarer species were not consistently recorded throughout the surveys but given their presence and overall use of the woodland by bats, the site is considered to be of low importance for bats.

179. At the River Bure, a suite of static bat detector surveys was undertaken across 2020 and 2021. The surveys focussed on the north side of the river where there are small pockets of woodland and meadows which provide suitable foraging habitat for bats. Common pipistrelle was the most frequently recorded bat species, with average earliest and latest registration times close to sunset/sunrise times, indicating there could be roosts located nearby. Of particular note are the levels of barbastelle and serotine records at this location. The River Bure has the second highest average registrations per night recorded for barbastelles across the 10 target sites. In addition, there were low levels of other rarer species including Brandt's bat and Natterer's bat. Given the high levels of barbastelle recorded and the presence of other rarer species, the River Bure is considered to be of medium importance for bats.
180. For the static bat detector surveys undertaken at Swannington in 2020 and 2021, the surveys focussed on two key areas: a pocket of woodland located within grazing pasture and a meadow with varied structure which included a small stream and was adjacent to a plantation woodland. Across 2020, common pipistrelle was the most frequently recorded bat species compared to 2021 where noctule was the most frequently recorded. For both species, the average earliest and latest registration was close in time to the sunset/sunrise time, suggesting roosts could be located nearby. There were low levels of rarer species recorded including barbastelle, serotine and Myotis species.
181. Both static bat detector surveys and transect surveys were undertaken across 2020 and 2021. Surveys focussed on collecting data for bats using the River Wensum for commuting and for the surrounding floodplains. The static detectors recorded a high frequency of calls by soprano pipistrelle, with a peak of over 11,000 registrations in the first static deployment of 2020. Across all surveys soprano pipistrelle was the most frequently recorded species. The earliest/latest registration times are similar to sunset/sunrise times, suggesting there could be a roost located nearby. A range of rarer species were recorded at this site including barbastelle, serotine, Nathusius's pipistrelle and Myotis species. Given the high number of registrations of soprano pipistrelles and the range of rarer bats recorded at the site, the site is considered to be of District scale conservation importance for bats. Data searches and unseen data from Wild Wings Ecology purports to show a meta-population of barbastelle bats, considered to be of international importance, located around the River Wensum corridor and nearby woodlands in the general area between Lenwade and the A47. Given the summary maps from Wild Wing Ecology highlights the use of the river and surrounding woodlands as important for foraging and commuting bats and within core substance zones of barbastelle maternity roosts, the River Wensum is considered to be of high importance for bats.

182. Static bat detectors were placed in a range of locations centrally within the Ringland Covert woodland. The most frequently recorded bat species was common pipistrelle, with high levels of soprano pipistrelle also recorded. Given the earliest and latest registration times for both species closely align with sunset/sunrise times, there are likely roosts located nearby. Of particular note are the significant number of barbastelle registrations, particularly in July 2021 when over 600 registrations were recorded. This site recorded the highest number of registrations for barbastelle across all sites surveyed for bats. Timings suggest there could be a maternity roost or roosts nearby. There were also a number of rarer species recorded including serotine, Nathusius's pipistrelle, Brandt's bat and Natterer's bat. Given the significant levels of barbastelle recorded and the range of other rare species recorded at Ringland Covert this site is considered to be of medium importance for bats.
183. Static bat detector surveys were undertaken at the River Tud, with detectors mainly deployed along banks of the river either in grazing pasture or woodland. The highest number of registrations recorded during the surveys related to soprano pipistrelle, with common pipistrelle and noctule also frequently recorded. At the River Tud there were also high levels of both serotine and Daubenton's bat registrations. Given the earliest and latest times for all of these species, it is conceivable that there are roosts located in the vicinity. There were also other rarer species recorded including barbastelle, Nathusius's pipistrelle, Brandt's bat and Natterer's bat. Given the high frequency of registrations recorded for serotine and Daubenton's bats and the range of other species present at the River Tud, this site is considered to be of medium importance for bats.
184. Both banks of the River Yare and surrounding woodland habitat were surveyed across 2020 and 2021. Common pipistrelle was the most frequently recorded species, with the earliest and latest registration suggesting that roosts may be located nearby. There were rarer species recorded, including a significant number of Nathusius's pipistrelle registrations. Other rarer species recorded include serotine, Daubenton's bat, Natterers bat and Brandt's bat. Given the number of Nathusius's pipistrelle registrations and range of other rarer species recorded, the River Yare is considered to be of medium importance for bats.
185. The River Tiffey and surrounding floodplains were surveyed across 2020 and 2021. The surveys recorded registrations from a range of species, with common pipistrelle the most frequently recorded species. Earliest and latest registration times suggests that there could be roosts located nearby. Some rarer species were recorded using the site including Daubenton's bat, barbastelle, serotine and *Myotis* species. However, there were relatively low numbers of registrations, indicating that the site is not frequently used by these species. Given that common species of bat appear to use this site frequently, but rarer bats only use the site occasionally, the River Tiffey is considered to be of low importance for bats.

186. Furze Meadow was surveyed across 2021. The static bat detectors were deployed to the south of Furze Meadow, along a small stream within the woodland. The most frequently recorded bat species was common pipistrelle, with soprano pipistrelle also regularly recorded. There were low numbers of registrations relating to noctule, brown long-eared bat, serotine, barbastelle and Daubenton's bat. Given the site is mainly used by common species of bat, Furze Meadow is considered to be of low importance for bats.
187. The substation site was surveyed across 2021, with both static bat detector surveys and transect surveys undertaken. The surveys mainly recorded common pipistrelle as the most frequently registered bat species during the surveys. The surveys did record some rarer species including barbastelle, serotine and *Myotis* species but these were in low numbers. As such, the substation site is considered to be of low importance for bats.
188. In accordance with the criteria set out in **Table 20-7**, all bat species are an EPS and therefore are considered to be of high importance. The sensitivity of bat species is considered to be medium, reflecting that all bat species has some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.5.4 Climate Change and Natural Trends

189. In general, most species of conservation concern which have been subject of targeted ecological surveys in relation to the onshore ecology and ornithology assessment 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.
190. 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 below.

20.6 Potential Impacts

191. This impact assessment is completed with reference to the CIEEM EclA Guidelines (CIEEM 2018). Throughout, technical assessment terminology is taken from definitions within the CIEEM guidance. This refers to the contexts of the impact in terms of its geographical scale, magnitude, reversibility, permanence and significance.

20.6.1 Potential Impacts during Construction

20.6.1.1 Impact 1: Construction Disturbance to Statutory Designated Nature Conservation Sites

192. There is one statutory designated site overlapping with part of the coastline where landfall works are expected, namely Weybourne Cliffs SSSI. This SSSI is notified primarily for its geological interest associated with the exposed cliff faces, but nesting birds (sand martins and fulmars) provide ecological interest.
193. The landfall works comprise HDD drilling activities that will launch from an onshore HDD entry pit temporary working area (located outside the Weybourne Cliffs SSSI) to an exit point approximately 1000m from the coastline (refer to **Chapter 4 Project Description**). SEP and DEP have committed to HDD at the landfall, which avoids any interaction with Weybourne Cliffs SSSI. As such, the features of this SSSI would not be directly affected by landfall construction. Consequently, no change to Weybourne Cliffs SSSI is predicted during the landfall construction works.
194. The River Wensum SSSI and SAC is also present within the DCO order limits. In addition, the associated area of floodplain and ditches are also functionally linked habitats even though they are beyond the SSSI and SAC designated site boundaries.
195. Where the onshore cable corridor crosses the River Wensum, HDD would be employed. Temporary working areas (located outside of the River Wensum SSSI and SAC) would be used to launch and receive the cables as they are drilled beneath the designed feature (refer to **Chapter 4 Project Description**). Through this commitment, the use of HDD would avoid any interaction with the River Wensum SSSI and SAC. As such, the features of this SSSI and SAC would not be directly affected by the proposed crossing works. Consequently, no change to River Wensum SSSI and SAC is predicted.
196. During construction, there is potential for the accidental release of lubricants, fuels and oils from construction machinery. This can occur as a result of spillages, leakage from vehicle storage areas and direct release from construction machinery working directly in or adjacent to water bodies. There is also potential for accidental leakages of foul water from welfare facilities, and construction materials including concrete and inert drilling fluids. A significant leakage or spillage has the potential to cause adverse impacts to water quality if contaminants enter the surface drainage network and can adversely affect the ecology of the water bodies.
197. The use of HDD is embedded within the scheme design to avoid direct impacts, however during the drilling process there is the potential for the release/breakout of inert drilling fluids (typically bentonite which is comprised of 95% water and 5% natural clays) which may itself impact the watercourse and in turn result in impacts to the designated sites. Therefore, the HDD design would be designed appropriate to the ground conditions to minimise the risk of a breakout where possible.
198. The assessment of the potential indirect effects on statutory designated sites arising from changes in hydrology is presented in **Chapter 18 Water Resources and Flood Risk**.

199. Potential indirect effects as a result of increased traffic numbers as well as in-combination effects arising from other developments is presented in **Chapter 22 Air Quality**. The construction road traffic emissions assessment has considered all ecological receptors within 200m of the affected road network, as per Highways England 'DMRB LA105 Air Quality' (2019), IAQM 'A guide to the assessment of air quality impacts on designated nature conservation sites' (2020) and 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations' (2018) guidance and has applied Decision-making Thresholds (DMTs) as per the recently released Joint Nature Conservation Committee (JNCC) reports (Chapman & Kite, 2021a and 2021b). From an ecological perspective, there are fourteen sites that are predicted to experience impacts in excess of 1% of the Critical Load or Level, the air quality assessment shows that only a small percentage of impacts at almost all sites is due to the contribution from SEP and DEP in isolation, which would be temporary and equally only experienced during the construction phase.
200. The impacts associated with increased acid deposition, nutrient nitrogen deposition and ammonia within the air or the deposition of nitrogen on to vegetation can result in the degradation of habitats through nitrification or direct toxicity. Increases could result in harmful effects and changes in habitat quality across the construction phase.

20.6.1.1.1 *Magnitude of Effect – SEP or DEP all scenarios*

201. The worst-case project parameters for undertaking SEP or DEP in isolation, or SEP and DEP concurrently, or sequentially are broadly the same in terms of potential impacts to designated sites, since SEP and DEP have a commitment to cross both Weybourne Cliffs SSSI and the River Wensum using HDD. With this commitment there is no mechanism for direct impacts to occur to the designated sites. In addition, the refinement of the DCO order limits has sought to maximise the distance between the physical works and the River Wensum, by siting features such as compounds and temporary access routes as far from its designated site boundaries (including any functionally linked habitat) as possible.
202. However, without mitigation, any potential breakout of inert drilling fluids associated with the implementation of HDD would itself represent a temporary, minor negative magnitude of impact to both statutory designated sites, which are both considered to be of high importance.

20.6.1.1.2 *Impact Significance – all scenarios*

203. In the absence of mitigation, the impact is considered to be temporary and reversible and would be of up to **moderate adverse** significance to both the River Wensum and to Weybourne Cliffs SSSI which are features of high ecological importance.

20.6.1.1.3 Mitigation

204. In relation to the risk of drilling fluid breakout, SEP and DEP have committed to a minimum depth of 2m below the bed level of watercourses at trenchless crossings, and a deeper installation may be suggested during detailed design to minimise the risk further by locating the drills within more consolidated geology, i.e. clays. In addition, a bentonite breakout mitigation plan (as detailed in the **Outline Code of Construction Practice** (document reference 9.17) would be developed adhering to industry best practice during construction, which will help to control and minimise the likelihood of a breakout. This will include ensuring effective removal of the cuttings from the borehole which is a key component of avoiding breakouts.
205. There would be other mitigation measures that can be adopted to mitigate specific impacts once such impacts are discernible following detailed design of the cable corridor and finalisation of the Code of Construction Practice. For the River Wensum SSSI/SAC and Weybourne Cliffs SSSI this will 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 18 Water Resources and Flood Risk**).
206. Other mitigation measures (set out in the **Outline Code of Construction Practice** document reference: 9.17) will also be implemented to minimise air emissions, such as the development of a Dust Management Plan, with measures including, but not limited to:
- Undertake daily on-site and off-site dust inspection, where dust sensitive receptors are nearby;
 - Plan the site layout so that machinery and dust causing activities are located away from sensitive receptors, as far as is practicable and
 - Ensuring all vehicles switch off engines when stationary, i.e. no idling vehicles.

20.6.1.1.4 Residual Impacts – SEP or DEP all scenarios

207. Following the implementation of the mitigation measures as outlined above, there would be a reduction in the magnitude of effect from temporary minor (for both the River Wensum and Weybourne Cliffs) negative to negligible/no change on high importance receptors, representing a temporary residual impact of **minor adverse** significance.

20.6.1.2 Impact 2: Habitat Destruction or Damage, or Construction Disturbance to Non-Statutory Designated Nature Conservation Sites

208. There are nine non-statutory designated nature conservation sites wholly or partially within the DCO order limits, as presented in **Table 20-13**, listed from south to north. Their locations are shown on **Figure 20.2**.

Table 20-13: Summary of CWS' (non-statutory designated sites) within the DCO Order Limits

Designated Site Name and NBIS Reference Number	Proximity to/relationship with DCO order limits and potential for impacts
Yare Valley (Marlingford Hall) CWS no. 229	DCO order limits overlaps the western part of this CWS at the DCO order limits' crossing point of the River Tiffey. The river flows in an easterly direction, so flows from the DCO order limits crossing point into the CWS. Direct impacts are to be avoided by aligning the final cable corridor outside of the CWS boundary, or by adopting HDD installation beneath the CWS.
Yare Valley (Colton Woods) CWS no. 228	DCO order limits crosses the eastern arm of this CWS. Direct impacts are to be avoided by adopting HDD installation beneath the CWS.
River Tud at Easton and Honingham: 250	Part of the western section of this CWS is within the DCO order limits, near Easton. No excavation works are planned for within the CWS, but it may be impacted by disturbance from construction activity at the landfall location. As part of the DCO order limits refinement, construction areas would be refined to avoid direct impacts to this CWS.
Hall Hills/Ringland Covert CWS no. 2105	DCO order limits crosses the northern part of this CWS. Direct impacts are to be avoided by adopting HDD installation beneath the CWS.
Wensum Pastures at Morton Hall CWS no. 2070	DCO order limits crosses the northern part of this CWS. Direct impacts are to be avoided by adopting HDD installation beneath this CWS (and the adjacent River Wensum SSSI/SAC)
Marriott's Way CWS no. 2176	The DCO order limits crosses this linear CWS (which follows the course of a disused railway line) in two locations; north of Attlebridge and north-east of Cawston. Direct impacts are to be avoided by adopting HDD installation beneath this CWS.
Kelling Heath Park and 100 Acre Wood CWS no. 1150	The DCO order limits overlaps the western edge of this CWS. Direct impacts are to be avoided by aligning the final cable corridor outside of the CWS boundary, or by adopting HDD installation beneath the CWS.
Beach Lane, Weybourne CWS no. 1156	This CWS is entirely within the DCO order limits at the landfall location. No excavation works are planned for within the CWS, but it may be impacted by disturbance from construction activity at the landfall location. As part of the DCO order limits refinement, construction areas would be refined to avoid direct impacts to this CWS.
Brook House Marshes: 2315	The eastern part of this CWS overlaps with the DCO order limits near Euston. No excavation works are planned for within the CWS, but it may be impacted by disturbance from construction activity at the landfall location. As part of the DCO order limits refinement, construction areas would be refined to avoid direct impacts to this CWS.

- 209. Those CWS which cross/overlap the DCO order limits would be avoided through the implementation of an HDD crossing technique, resulting in no direct land-take impacts and therefore neutral direct impacts to those CWS' identified in the table above.
- 210. In addition, the refinement of the DCO order limits has sought to maximise the distance between physical works and the designated sites, including siting features such as construction compounds and temporary access routes as far from the site boundaries as possible.



211. Despite the commitment to the embedded mitigation measures of avoidance, there may remain a risk of temporary indirect disturbance impacts (e.g. from noise and lighting) to species known or likely to use the habitat within these CWSs, such as, but not limited to, nesting birds and bats. Impacts to these protected species are assessed below, as they are for all other designated sites in which such species may be present.

20.6.1.2.1 *Magnitude of Effect – SEP or DEP all scenarios*

212. The worst-case project parameters for undertaking SEP or DEP in isolation, or SEP and DEP concurrently, or sequentially are broadly the same in terms of potential impacts to non-designated sites. Without mitigation, a temporary minor negative magnitude of impact is predicted on CWSs habitats and species as a result of construction related disturbance from SEP and DEP.

20.6.1.2.2 *Impact Significance – SEP or DEP all scenarios*

213. Given the importance of non-statutory designated sites is medium and their sensitivity is medium, the effect of the unmitigated magnitude of effects on CWSs would be of **minor adverse** levels of significance.

20.6.1.2.3 *Mitigation*

214. In addition to the embedded mitigation measures of avoiding these sites through the adoption of HDD, artificial lighting requirements associated with the onshore construction works will only be used where it is required and designed in accordance with BCT guidance for artificial lighting (**Outline Code of Construction Practice** document reference: 9.17). Appropriate hydrological pollution prevention measures will also be adopted (as outlined in **Chapter 18 Water Resources and Flood Risk**).

20.6.1.2.4 *Residual Impacts – SEP or DEP all scenarios*

215. Depending on the precise construction programme in proximity to CWSs, these measures would likely reduce the magnitude of effect in a RWCS from temporary, minor negative to negligible/no change, thereby resulting in the residual impact remaining to be of **minor adverse** significance.

20.6.1.3 **Impact 3: Loss of or Damage to Arable Habitat**

216. The vast majority of construction related activities associated with the onshore elements of SEP and DEP are located within arable habitat. 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. However, they do support some wildlife including ground-nesting birds, such as skylark, and some terrestrial animals, such as brown hare. Arable habitat is by far the most widespread and abundant habitat type in Norfolk, so even at the maximum extent of the construction footprint, a negligible proportion of arable habitat at the county scale would be impacted.

217. 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 sensitivity.
219. The Extended Phase 1 Habitat Survey does not include a habitat classification for field margins so these are not mapped and cannot be quantified using this survey approach. However, estimates of the prevalence of field margins have been made in completing this impact assessment, based on knowledge of the surveyors who completed the EP1HS, and the typical abundance of this habitat type within arable landscapes.
220. SEP and DEP also include embedded mitigation measures related to the working width at field boundary crossing points. This would be reduced from 60m to a typical working width of 20m (two project scenarios). This commitment would equally apply to arable field margins as well as to hedgerows, ditches and other boundary features.

20.6.1.3.1 *Magnitude of Effect – SEP and DEP all scenarios*

221. SEP and DEP would have a construction corridor width wider than SEP or DEP in isolation and there is the flexibility to introduce two haul roads (one for each project) in the sequential scenarios. Whilst this would represent an increase in the total area of arable and arable field margin habitat affected between scenarios, the magnitude of effect is considered to be no different between scenarios.
222. Overall, the temporary loss of arable habitat to accommodate the onshore cable working corridor would be expected to have a temporary, minor negative impact, and this would be considered to be an effect of minor magnitude.
223. The temporary loss of arable field margin habitat to accommodate the onshore cable working corridor would be expected to have a temporary, minor negative impact, and this would be considered to be an effect of minor magnitude.

20.6.1.3.2 *Impact Significance – SEP or DEP all scenarios*

224. The effect of the above impact on arable habitat and arable margin habitat (both habitat types being of medium importance) would be of **minor** significance from temporary construction impacts associated with SEP and DEP.

20.6.1.3.3 *Mitigation*

225. Arable field margins would be reinstated, either by retaining stripped turfs and reinstating them after construction, or by re-sowing with a suitable grassland and/or wildflower mix.

226. Further details of proposals to reinstate and, where possible, enhance habitats such as arable field margins impacted by SEP and DEP are presented in the **Outline Ecological Management Strategy** (document reference 9.19).

227. No other mitigation for impacts to arable habitats are considered necessary.

20.6.1.3.4 *Residual Impacts – SEP or DEP all scenarios*

228. The implementation of the appropriate mitigation measures (i.e. reinstatement of the habitat on completion of the works) is likely to reduce the magnitude from minor to negligible/no change. However, despite this reduction in magnitude, the residual impact would remain as being of **minor adverse** significance given the medium sensitivity of these habitats (i.e. the arable fields and associated field margins).

20.6.1.4 **Impact 4: Loss of or Damage to Grassland Habitats**

229. The footprint of the DCO order limits passes through areas of grassland habitats, the majority of which have been recorded as improved (23.14ha) or poor semi-improved grassland (13ha). Construction impacts to these grasslands would be temporary, and therefore reversible in the medium-term, as the working areas within this habitat would be reinstated to their baseline conditions on completion of works.

230. There are eight locations where semi-improved neutral grassland has been recorded within the DCO order limits and predominately within the landfall area. These grassland habitats are less common than improved grasslands and may be more vulnerable to damage from groundworks because they typically have a well-defined sward which historically has not been substantively impacted by management such as ploughing or fertilizing. Any ground disturbance therefore risks disturbing and destroying the grassland habitat by altering the seed bank, species, structure and soil nutrients.

231. 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. This process could take longer for poor semi-improved grasslands as these typically have a botanically and structurally more varied sward, so as a whole all grassland habitats within the DCO order limits are considered to be of medium importance and of medium sensitivity.

20.6.1.4.1 *Magnitude of Effect – SEP or DEP all scenarios*

232. There are eight locations of semi-improved grassland (4.11ha) that have been recorded within the DCO order limits, 2.76ha of this habitat type has been avoided through the adoption of HDD. The remaining 1.35ha of semi-improved grassland will be crossed using an open cut trenching technique.

233. Without mitigation, a temporary moderate negative magnitude of effect is predicted for the 1.35ha of semi-improved grassland habitat as a result of temporary habitat loss and damage due to construction activities within these areas of grassland. Although areas of semi-improved grassland occupy a small proportion of land within the DCO order limits, they are uncommon at district level, and they are more sensitive, with longer recovery periods, than more improved grasslands.
234. With regards to areas of poor semi-improved and/or improved grassland habitat, a temporary, minor negative magnitude of impact is predicted for both improved and poor semi-improved grassland habitat as a result of habitat loss and damage due to construction activities within these areas.

20.6.1.4.2 Impact Significance – SEP or DEP all scenarios

235. The effect of the above impact on semi-improved grassland would be of **moderate adverse** significance and for improved and poor semi-improved grassland it would be of **minor adverse** significance.

20.6.1.4.3 Mitigation

236. As with all other valued habitats, the footprint of works within grasslands, particularly those which are not improved grasslands, would be minimised and the duration of works within these habitats kept as short as possible.
237. In areas comprising well-established and ecologically valued grassland swards that cannot be avoided by the footprint of the works, seeds or green hay from the existing and surrounding vegetation would be collected and spread once the works are complete. This is expected to be the best solution to reinstate affected areas of grassland, particularly at the landfall area where the coastal grassland generally consists of open, short turf. Further details relating to reinstatement of such habitats is provided in the **Outline Landscape Management Plan** (document reference 9.18).

20.6.1.4.4 Residual Impacts – SEP or DEP all scenarios

238. Depending on the precise construction footprints and programme relevant to improved and poor semi-improved grassland, these measures would be likely to result in a small reduction in the magnitude of effect (from minor to negligible/no change), but the residual impact would remain as being of **minor adverse** significance.
239. For semi-improved grasslands the mitigation measures set out above will reduce the magnitude of the effect from temporary moderate negative to temporary minor negative, thereby resulting in the residual impact being reduced from moderate adverse to **minor adverse** significance.

20.6.1.5 Impact 5: Loss of or Damage to Woodland Habitats

240. The DCO order limits passes through a number of woodland habitats including semi-natural broadleaved woodland and mixed woodland, both of which qualify as the Priority Habitat lowland mixed deciduous woodland. However, the onshore cable corridor route does not pass directly through any Ancient Woodland. The total woodland area within the DCO order limits is 28.16ha, 20.05ha of which will be avoided through the adoption of HDD. Therefore, the remaining 8.11ha will be crossed via an open trench technique.
241. Woodland is an ecologically valued habitat of medium sensitivity. In addition, reinstatement of the soils may unavoidably cause soil compaction, rendering the ground sub-optimal for re-establishment of trees and ground flora. In any case, the ground directly above the cable must be kept clear of trees due to the potential for damage to the cable from tree roots.
242. The primary (embedded) mitigation measure for avoiding direct impacts to woodland habitats has been their avoidance and therefore no impacts are predicted on the majority of this habitat. For the 8.11ha of woodland that will be crossed via an open trench technique, whilst this habitat will be lost and unable to be reinstated, replacement woodland habitat will be replanted.

20.6.1.5.1 Magnitude of Effect – SEP or DEP all scenarios

243. Without mitigation, a permanent, moderate negative magnitude of impact to woodlands (all types) is predicted due to construction related impacts, namely habitat loss and damage. The impact is judged as being permanent, even though much of the woodland would be reinstated. This is because the recovery/reversibility of the impact in woodland habitat would be longer than for any other habitat type within the DCO order limits. In addition, woodland will not be reinstated along the wayleave of the onshore cable.

20.6.1.5.2 Impact Significance – SEP or DEP all scenarios

244. The effect of the above impact would be of **moderate adverse** significance, which is not significant in EIA terms.

20.6.1.5.3 Mitigation

245. As described above, the primary (embedded) mitigation measure for avoiding direct impacts to woodland habitats has been the avoidance of this habitat wherever possible. This has included reducing the width of the working corridor as far as practical where woodland areas cannot be avoided. Where woodland habitat cannot be avoided, trenchless techniques (i.e. HDD) have been selected to avoid the loss of woodland habitat, which has resulted in 20.05ha of the 28.16ha of woodland (all types) being avoided. An **Outline Landscape Management Plan** (document reference 9.18) and an **Outline Ecological Management Plan** (document reference 9.19), which both form part of the DCO application, outlines the preferred approach to clearance of each section of woodland and proposed appropriate measures for reinstatement of woodland habitat. There would be options for enhancement of woodlands, especially plantations which can often have limited structural and species diversity that could be ecologically enhanced after the works.
246. A pre-construction walkover survey would be undertaken by an appropriately qualified arboriculturist. This survey will define specific mitigation measures that would be implemented to protect trees that are located adjacent to the working areas. This will include the identification of root protection areas. The arboricultural report would be submitted to and agreed with the Local Planning Authority prior to the commencement of any construction works. In addition, the following mitigation measures will also be undertaken:
- The roots of retained trees along the edge of the working width would be protected from soil compaction by the enforcement of Root Protection Areas that would be fenced off from the construction (the extent of which would be calculated using guidance from BS5837:2012); and
 - Facilitation pruning may be recommended where tree crowns are at risk from impact by machinery or high sided vehicles.

20.6.1.5.4 Residual Impacts – SEP or DEP all scenarios

247. The adherence of the mitigation measures outlined above will reduce the magnitude of effect from permanent moderate negative to permanent minor negative, thereby reducing the significance of the impact to be **minor adverse** significance at multiple district scales. However, mitigation, compensation and enhancement measures (e.g. replacement and additional planting) will be implemented, as presented in the **Outline Landscape Management Plan** (document reference: 9.18) and **Outline Ecological Management Plan** (document reference: 9.19). These measures on their implementation will further reduce the significance of this impact, and for individual woodlands, mitigation, compensation and enhancement could achieve low or medium positive magnitude impacts of up to moderate positive significance. However, the extent of enhancements will largely rely on agreement with landowners so definitive commitments to woodland enhancement are not known at this stage.

20.6.1.6 Impact 6: Loss of or Damage to Scrub Habitats

248. The total area of scrub (dense and scattered) is 1.68ha, 0.49ha of which will not require removal due to the adoption of HDD techniques of these areas. The remaining 1.19ha of scrub will require removal, which are of medium sensitivity valued habitats. This habitat is able to recover quickly following reinstatement of the soil. In some cases, clearance of a linear path through pockets of dense scrub could enhance structural and possibly species diversity, so habitat clearance does not necessarily equate to a negative impact.
249. Any immediate loss of habitat impacts in the short-term, as a result of ground clearance and construction activities, would therefore likely be offset by medium-term gains in the structural diversity of scrub habitat, as it recovers.

20.6.1.6.1 Magnitude of Effect – SEP or DEP all scenarios

250. Whilst the total area of scrub affected differs, the magnitude of effect is assessed to be broadly similar across all the construction scenarios. Without mitigation, a temporary, minor negative impact to multiple local resources of scrub habitat would be expected.

20.6.1.6.2 Impact Significance – SEP or DEP all scenarios

251. The loss of 1.19ha of scrub would be an effect of minor magnitude on a receptor of medium sensitivity, representing an impact of **minor adverse** significance.

20.6.1.6.3 Mitigation

252. Where areas of scrub have been removed, these will be reinstated with like-for-like species. Ecological enhancements and opportunities for BNG associated with SEP and DEP will also include replanting areas of scrub.
253. Further details on scrub removal, retention, replacement and management are presented in the **Outline Landscape Management Plan** (document reference 9.18) and the **Outline Ecological Management Plan** (document reference 9.19) that are being submitted with the DCO.
254. Details relating to the proposed BNG opportunities are presented in **Appendix 22.6 Initial Biodiversity Net Gain Assessment**.

20.6.1.6.4 Residual Impacts – SEP or DEP all scenarios

255. The mitigation measures outlined above would ensure that any loss of scrub is temporary and would be replaced like for like. With these commitments in place the magnitude of effect would reduce from temporary minor negative to negligible; on a receptor of medium sensitivity, representing a residual impact of **minor adverse** significance.

20.6.1.7 Impact 7: Loss of or Damage to Hedgerow Habitats

256. Hedgerows are a Priority Habitat, reflecting their ecological importance. In general, they are considered to be of medium importance and of medium sensitivity.

257. The DCO order limits crosses approximately ~~2367~~ hedgerows which in total equates to ~~22,807m-717m~~ in length. Through the commitment to HDD, ~~7,778m-705m~~ of these hedgerows have been avoided. The remaining ~~15,029m-012m~~ of hedgerows, would be subject direct impacts as a result of short-term construction activity involving the excavation of cable trenches, introduction of haul road etc. A reduced working width has been committed to at hedgerow crossings (20m wide for two projects and 12m wide if either SEP or DEP is constructed in isolation).
258. However, the removal of short stretches of hedgerow habitat to accommodate the onshore cable corridor associated with SEP and DEP would result in a temporary loss of the hedgerow habitat and temporarily reduce the ecological function of hedgerows that are retained, which provide ecologically important linear connections within the landscape. The significance of this impact including proposed mitigation (namely reinstatement of hedgerows post-construction) is considered further below.

20.6.1.7.1 *Magnitude of Effect – SEP or DEP all scenarios*

259. Under the two-project scenarios the extent of hedgerow affected would be longer and under the sequential scenario temporary impacts would occur over a longer timeframe. However, the construction effects across all the scenarios are not considered to result in impacts of notably different magnitude due to their being no changes in either their importance or sensitivity.
260. Without mitigation the magnitude of effect on hedgerow habitat would be temporary moderate negative. The unmitigated impact to hedgerows would be considered permanent, rather than temporary, because hedgerows would not necessarily grow back without a targeted replanting and management effort. This would also apply to hedgerow trees.

20.6.1.7.2 *Impact Significance – SEP or DEP all scenarios*

261. With embedded mitigation measures, the effect of this impact would be of **moderate adverse** significance at multiple district scales.

20.6.1.7.3 *Mitigation*

262. Replacement planting of removed hedgerows would be implemented during the first planting season following completion of the construction works, except for tree / woodland removal which would not be re-planted within the 20m (SEP and DEP concurrently or sequentially) or 10m (SEP or DEP in isolation) operational easement. Gaps in hedges with new planting would be visible for a number of years following completion of construction (medium-term duration) until planting matures.
263. Where hedgerow trees have been removed the approach would be to replant them within the hedgerow adjacent to the operational easement but still within the DCO order limits, subject to agreement with the landowners.

264. A suitable list for planting (that comprises UK and local provenance species) would be provided for each section of hedgerow or hedgerow tree to be reinstated, to ensure continuity and suitability. In general, hedgerow planting will use native hedgerow species such as hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, field maple *Acer campestre*, dog-rose *Rosa canina*, hazel *Corpus avellana*, dogwood *Cornus sanguinea*, crab apple *Malus Sylvestris* and holly *ilex aquifolium*. It is likely that most replanting of hedgerow trees will use pedunculate oak *Quercus robur*, although the species selected will depend in part on the species of tree being removed, with like for like replacement considered where ecologically suitable.
265. Ecological enhancements and opportunities for BNG associated with SEP and DEP will focus in part on hedgerow habitat. Where landowners are agreeable, existing gaps in hedgerows would be in-filled and new hedgerows would be planted along currently un-hedged boundaries. This planting would use a range of suitable native species, such as those listed above. Further details on hedgerow and tree removal, retention, replacement and management are presented in the **Outline Landscape Management Plan** (document reference 9.18) and the **Outline Ecological Management Plan** (document reference 9.19) that are being submitted with the DCO.

20.6.1.7.4 Residual Impacts – SEP or DEP all scenarios

266. The mitigation measures outlined above will reduce the magnitude of effect from moderate to negligible/no change. However, the residual impact remains to be **minor adverse** significance until such time the replacement hedgerows (once established) are considered to become a **minor positive** impact as the replaced hedgerow matures.

20.6.1.8 Impact 8: Loss of or Damage to Watercourse Habitats

267. The proposed onshore cable infrastructure and associated temporary haul road will directly cross Main Rivers and ordinary watercourses (including IDB maintained drains) within the DCO order limits.
268. Trenchless crossing techniques such as HDD are embedded in the scheme design for Main Rivers and IDB watercourses (**Section 20.3.3**). The cable would be installed at least 2m below the bed of the watercourse and, although ground disturbance would 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.
269. Trenched crossings would be carried out on the majority of the ordinary watercourses (which intersect with SEP and DEP). This method has the potential to directly alter the habitats of the watercourses. Trenched crossings of watercourses involve installing temporary dams (composed of sandbags, straw bales and ditching clay, or another suitable technique) 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. The working width at ecologically sensitive areas, such as watercourse crossings, would be reduced to 8m in all scenarios).

270. 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 may comprise temporary bridges (such as Bailey bridges) at larger watercourse / Main Rivers. Depending on local site conditions, ordinary watercourses are likely to be crossed using temporary culverts.
271. Further information is provided in **Chapter 18 Water Resources and Flood Risk**.
272. The watercourses within the DCO order limits (other than those which are assessed above as a designated site, such as the River Wensum) are considered to be of medium sensitivity.

20.6.1.8.1 *Magnitude of Effect – SEP and DEP all scenarios*

273. The construction of SEP or DEP in isolation, or SEP and DEP concurrently, or sequentially are considered to have a similar magnitude of effect as changes are temporary and reversible and the working width at watercourse crossings would be no greater than 20m for SEP and DEP or 10m for SEP or DEP in isolation. Trenched crossings of ordinary watercourses along the cable corridor could potentially result in short-term degradation of habitats within those water bodies due to direct disturbance of the banks and bed.
274. In the sequential scenario culverts required to maintain the haul road across watercourse may remain in place for up to eight years. Whilst a greater area of each watercourse may be affected for SEP and DEP and over a longer timescale is the magnitude of effect is considered to be temporary moderate negative for all construction scenarios.

20.6.1.8.2 *Impact Significance – SEP or DEP all scenarios*

275. All Main Rivers and IDB watercourses would be crossed using trenchless techniques (e.g. HDD) and therefore direct impacts would be avoided and/or impacts to surrounding habitats minimised.
276. The impact on ordinary watercourses through the use of trenched crossing techniques would be of **moderate adverse** significance at multiple local scales.

20.6.1.8.3 *Mitigation*

277. Trenchless crossing techniques (e.g. HDD) are embedded into the scheme design for Main Rivers and there is therefore no mechanism for direct impacts to occur to these water bodies or their surrounding habitats. Therefore, no further mitigation is proposed at trenchless crossing locations.
278. Where temporary dams are required during the trenched crossing works, the length of time that these would be in place would be kept to a minimum. Furthermore and prior to dewatering the area between the temporary dams, a fish rescue would be undertaken, as detailed within the **Outline Code of Construction Practice** (document reference: 9.17). Flumes or pumps would be adequately sized to ensure that flows downstream are maintained whilst minimising upstream impoundment. Scour protection will also be used to protect the riverbed (and its associated habitats) downstream of the dam from high energy flow at the outlets of flumes and pumps.

279. The cable ducts will typically be installed 2m below the bed of the water body (dependent on local geology and geomorphological risks) to avoid exposure during periods of higher energy flow when the bed could be mobilised. This depth takes into consideration anticipated climate-change related changes in fluvial flows and erosion that will occur over time. In addition, vegetation would not be removed from the banks unless necessary to undertake the works, in which case removal would be restricted to the smallest practicable footprint and any habitats removed would be reinstated on completion of all construction activities.
280. Any culverts installed to maintain access across watercourses would be adequately sized to avoid impounding flows (including an allowance for potential increases in winter flows as a result of projected climate change). Culverts would be installed below the active bed of the channel, so that sediment continuity and movement of fish and aquatic invertebrates can be maintained.

20.6.1.8.4 Residual Impacts – SEP or DEP all scenarios

281. Following the implementation of the agreed mitigation measures, as outlined above, the magnitude of the impacts to watercourses and their associated habitats in which trenched crossings are proposed would be reduced (from temporary moderate negative to temporary minor negative), thereby resulting in the residual impact to be of **minor adverse** significance.

20.6.1.9 Impact 9: Potential Spread of Invasive, Non-Native Species

282. The EP1HS recorded two occurrences of Himalayan balsam within and around the DCO order limits, namely one location along the banks of an unnamed stream which is a tributary of the River Wensum and the second location being along the banks of the River Bure. Whilst Himalayan balsam is not a valued ecological receptor, it 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).
283. The locations where Himalayan balsam has been recorded are along banks of either an unnamed stream or main river, both of which are considered to be of medium sensitivity, whereas other watercourses such as agricultural ditches (the banks of which Himalayan balsam could also colonise) are generally considered to be of low sensitivity.
284. 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.

20.6.1.9.1 Magnitude of Effect – SEP or DEP all scenarios

285. Whilst neither location would be subject to open cut trenching of these watercourses, construction vehicles and personnel would be working in proximity to areas that support INNS. Without the adoption of careful control/prevention measures, as a RWCS (such as if machinery or equipment transported INNS to multiple new sites), 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 rivers and could impact protected species such as white-clawed crayfish (if present). The magnitude is therefore considered to be major.

20.6.1.9.2 Impact Significance – SEP or DEP all scenarios

286. The long-term effect of this impact could represent an effect of major magnitude on running water habitats which are considered to be medium sensitivity. At worst this would represent an impact of **major adverse** significance, particularly if it impacts multiple major river catchments.

20.6.1.9.3 Mitigation

287. Prior to the commencement of construction works, an INNS Management Plan would be developed for approval by the relevant stakeholders, as detailed in the **Outline Code of Construction Practice** (document reference: 9.17). This plan will likely include the following measures:

- A plan of all INNS locations and extents;
- A protocol for removing INNS and for managing the waste generated;
- Good site practice measures for managing the spread of INNS during works at watercourses; and
- A requirement for an Ecological Clerk of Works (ECoW) and details of their responsibilities with respect to INNS.

20.6.1.9.4 Residual Impacts – SEP or DEP all scenarios

288. Through the implementation of the mitigation measure outlined for INNS, it is predicted that there would be a reduction in the magnitude of effect from a RWCS of major magnitude to minor thereby resulting in the residual impact being of **minor adverse** significance.

20.6.1.10 Impact 10: Potential Mortality, Harm or Disturbance to Badgers, or Destruction, Damage or Disturbance of Badger Habitat

289. Evidence of badgers within the DCO order limits has been recorded during the surveys undertaken to date. Active setts and other signs of activity have been recorded and due to the sensitivity of this species, the specific locations have not been listed here, but are presented in the **Appendix 20.14 Badger Confidential Appendix**.

290. As presented in **Section 20.5.3.5**, a number of badger field signs (including active setts) have been recorded within and up to 50m of the DCO order limits. through refinement of the cable corridor, the majority of active setts have been avoided; however, one single sett would be subject to a badger mitigation licence application prior to construction, if the pre-construction surveys confirm it remains present and in use by badgers, to ensure no adverse harm to badgers during the construction period.
291. Construction works associated with SEP and DEP also have the potential to affect habitats that are within badger territories and therefore likely to result in disruption to their feeding and foraging routes.

20.6.1.10.1 *Magnitude of Effect – SEP or DEP all scenarios*

292. The magnitude of effect that construction activities from SEP and DEP could have on badgers is considered to be minor, indicating that the potential disturbance is localised and would not threaten the long-term viability or function of the habitat for which badgers could use.

20.6.1.10.2 *Impact Significance – SEP or DEP all scenarios*

293. The ecological sensitivity of badgers is low, and the magnitude is minor, therefore the effect is of **minor adverse** significance.

20.6.1.10.3 *Mitigation*

294. As presented in the **Outline Ecological Management Plan** (document reference 9.19), pre-construction badger surveys would be undertaken to confirm the location and status of badger setts within and up to 30m from the DCO order limits. These surveys would be completed within no more than one year of the proposed construction start dates, and ideally during the appropriate survey season (October and/or February to April, inclusive, according to NatureScot (formerly SNH) best practice badger survey guidance note, or during “winter months” according to the Mammal Society guidance) although surveys are possible throughout the year). The findings from the pre-construction surveys will inform precise mitigation requirements, including any necessary badger licences to close any active setts which could be damaged or disturbed by proposed works. Disused setts which have shown no signs of activity for at least 12 months can be closed without a badger Development Licence. Alternatively, if a sett shows no signs of current use and it can be thoroughly monitored for 21 consecutive days during which no badger activity is recorded, it can then also be considered disused. Monitoring in this scenario would involve ‘soft-blocking’ all entrance holes (such as with sticks, which will be dislodged by badgers if entering/exiting the holes) and use of automated trail cameras to monitor the entrance holes.

20.6.1.10.4 Residual Impacts – SEP or DEP all scenarios

295. Following the implementation of the mitigation measures and adherence to the obtained badger mitigation licence, the impacts to badgers would be reduced (magnitude reducing from minor to negligible/no change). The residual significance of effect to badgers due to the construction of SEP or DEP in all scenarios would be reduced to **negligible**.

20.6.1.11 Impact 11: Potential Mortality, Harm or Disturbance to Roosting Bats, or Destruction, Damage or Disturbance to Bat Roosts

296. Bat roost surveys (emergence/re-entry) were undertaken in 2021 for a total of 13 features assessed as having moderate potential for roosting bats, as identified during the EP1HS.

297. The 2021 survey recorded roosting bats within seven of the 13 surveyed trees. Five of these trees were found to support a day roost of one common pipistrelle or soprano pipistrelle, one was found to support up to three soprano pipistrelle and one was found to support a single barbastelle.

298. The risks posed by the onshore cable corridor works to tree-roosting bats include potential destruction of or damage to roosts in trees, and disturbance of roosting bats in trees such as from noise, lighting or vibration. It is also possible that the works could cause long-term damage to trees, such as from root damage during soil excavation, which would shorten the lifespan of trees and thereby result in eventual loss of or degradation to bat roosts in a shorter timeframe than would naturally have occurred.

299. Roosting bats are of high sensitivity due to bats' fairly low reproductive rate and their longevity relative to other small mammals. These characteristics mean any losses to a bat population of individual bats or roosting sites can have long-term effects from which recovery can take many years. Certain types of bat roosts, such as maternity roosts, can be extremely important and of very high sensitivity for bat populations. Such roosts are particularly important and therefore highly sensitive for rarer species, which often have specific roost requirements relating to factors such as the size of the roost feature, its thermal properties and its proximity to feeding grounds.

300. Two of these seven trees (supporting day roosts of one common pipistrelle) are at risk of removal, the others have been avoided through embedded mitigation measures, i.e. commitment to HDD. Construction works may also require the removal of a number of mature trees which have bat roost potential and may be found to support roosting bats in advance of construction. The ongoing creation of opportunities for roosting bats within trees is a natural cyclical process, often associated with trees maturing and developing features such as rot-holes, tear-outs and hazard beams which are usually absent from younger trees. The removal of a number of trees could therefore interrupt this cycle, leading to a potential future reduction in the availability of bat roosting habitat as trees which would have developed into suitable bat roost trees are instead removed.

20.6.1.11.1 *Magnitude of Effect – SEP or DEP all scenarios*

301. The trees in question are assumed to require removal in both the single and two-project scenarios. Without mitigation, a permanent, moderate negative impact to multiple district populations of roosting bats is possible due to lost, damaged or disturbed bat roosts resulting from construction activities. Impacts could be permanent due to irreversible damage to bat populations which could feasibly arise due to loss of important roosts (such as maternity or hibernation roosts) or substantial mortality of individual animals, particularly where this relates to rarer species such as barbastelle, *Myotis* species or serotine.

20.6.1.11.2 *Impact Significance – SEP or DEP all scenarios*

302. In the absence of mitigation, the effect of losing trees known to support roosting bats and trees with the potential to support roosting bats would represent an impact of **major adverse** significance.

20.6.1.11.3 *Mitigation*

303. The primary (embedded) mitigation measures for avoiding direct impacts to bats has been achieved through the refinement of the DCO order limits to avoid woodland habitat and trees with bat roost potential wherever possible and a commitment to use trenchless techniques in most instances where woodland is present in the DCO order limits.

304. For the two trees confirmed to support roosting bats a draft EPS Mitigation Licence from Natural England has been sought to legally permit destruction of these two single bat roosts.

305. As detailed in the draft EPS Mitigation Licence, the mitigation measures that would be undertaken comprise:

(a) inspection of bat roost features through a climbing inspection by a licenced ecologist either the day before or the day of felling. Employing exclusion devices and blocking unoccupied roosts prior to the commencement of works;

(b) provision of appropriate replacement roosts (i.e. one bat box per confirmed bat roost, i.e. two bat boxes in total) installed on nearby trees prior to felling. These will provide a roost for any bats translocated following soft felling and will also provide short/medium term compensation for the lost roosts. Longer term compensation will be achieved by planting one new oak trees near to each felled tree;

(c) an ecologist providing the tree surgeon(s) with an induction on bat presence, legal protection and the Method Statement protocol prior to felling;

(d) carrying out tree removal under the supervision of a licensed bat worker when the temperature is suitable (i.e. not in freezing conditions);

(e) soft felling the relevant bat roost feature (if they cannot be confirmed to be vacant), by carefully rigging the feature and lowering it to the ground whereby the relevant features will be inspected by an ecologist; and

(f) capture and release of any bats encountered during works by a Level 2/3/4 licensed bat worker into replacement roosts positioned away from the proposed works on nearby suitable trees.

20.6.1.11.4 *Residual Impacts – SEP or DEP all scenarios*

306. Following the implementation of the mitigation measures prescribed within the draft EPS Mitigation Licence, the impacts to roosting bats would be reduced (magnitude reducing from moderate to negligible/no change). The residual impact to roosting bats is **minor adverse**.

20.6.1.12 **Impact 12: Potential Mortality, Harm or Disturbance to Non-Roosting Bats, or Destruction, Damage or Disturbance to Non-Roosting Bat Habitats (Foraging or Commuting Habitats)**

307. Bat activity has been recorded along the entire length of SEP and DEP, albeit localised to linear features such as hedgerows or along watercourses or within and around areas of woodland. As the majority of the habitat within the onshore cable corridor is arable, there would be minimal impact on foraging/commuting bat corridors. However, construction activities associated with SEP and DEP have the potential to affect habitats that may be used by foraging/commuting bats. Whilst there are a number of crossings that have been identified as potentially affecting habitats utilised by bats (i.e. hedgerows and/or watercourses), the maximum width of any hedgerow crossing will be 20m for both projects concurrently/sequentially and 10m for a project in isolation. With regards to foraging/commuting bats, potential impacts are likely to comprise degradation of key habitats used by foraging/commuting bats and temporary disturbance to their foraging/commuting routes. Given the duration of SEP and DEP either in isolation or concurrently/sequentially, there may arise potential disruption of commuting and/or foraging bats being experienced across more than one active bat season and therefore may affect access to feeding locations or potentially temporary or maternity roosts that may be located outside the SEP and DEP DCO order limits.

20.6.1.12.1 *Magnitude of Effect – SEP or DEP all scenarios*

308. Through the adherence of the embedded mitigation measures, the impact on foraging/commuting bats is predicted to consist of localised disturbance and/or loss of habitat, that does not threaten the long-term viability or function of the receptor. The magnitude of effect is therefore considered to be minor.

20.6.1.12.2 *Impact Significance – SEP or DEP all scenarios*

309. Bats are of high importance, and whilst the sensitivity of foraging/commuting bats is considered to be medium, the magnitude is minor. Therefore, the impact significance is **moderate adverse**.

20.6.1.12.3 *Mitigation*

310. Additional mitigation measures to those embedded within SEP and DEP include:



- Lighting required during the construction phase will only operate where necessary and will be directional to avoid unnecessary illumination.
- Within areas where high or very high foraging/commuting bat activity has been recorded, works within these areas will be restricted to daylight hours only where possible between April to October inclusive.

20.6.1.12.4 *Residual Impacts – SEP or DEP all scenarios*

311. Through the implementation of the mitigation measures outlined above, the magnitude of the effect will be reduced from minor to negligible/no change, thereby the residual impact would be reduced to **minor adverse** significance.

20.6.1.13 **Impact 13: Potential Mortality, Harm or Disturbance to Breeding Birds, or Destruction, Damage or Disturbance of Active Birds' Nests or Other Breeding Bird Habitat**

312. SEP and DEP have the potential to impact breeding birds (e.g. skylark, yellowhammer, linnet, Cetti's warbler and firecrest) due to habitat loss associated with construction activities. The risk is highest for ground-nesting farmland birds, such as skylark, which have been recorded within arable and/or areas of grassland within the DCO order limits. Loss of hedgerows, scrub and woodland also has the potential to impact a range of breeding species. The aforementioned species may be highly sensitive to impacts based on anticipated, RWCS for construction works. Other species which are widespread and occur at low levels within the DCO order limits are considered to be of low sensitivity.

313. All areas of temporary works associated with the onshore cable corridor, i.e. arable fields and hedgerows, would be reinstated following installation of the onshore export cables. Therefore, the potential impact would be temporary on birds using these areas. However, given the amount of arable habitat within the wider area, it is considered that birds would be displaced into adjacent areas and therefore significant impacts (i.e. reduced numbers) are unlikely to occur.

314. In addition to direct impacts on habitat loss, the activities associated with the construction of SEP and DEP are likely to deter birds from breeding within the DCO order limits. The distance of this disturbance would be dependent on the species involved.

20.6.1.13.1 *Magnitude of Effect – SEP or DEP all scenarios*

315. As a RWCS, without mitigation, construction activities could be expected to have a temporary, moderate negative impact on multiple district populations of certain bird species (those most abundant within the DCO order limits and therefore most sensitive) such as skylark, yellowhammer, linnet, dunnock and meadow pipit. There are not considered to be significant differences in the potential impacts to breeding birds between the various construction scenarios and therefore the magnitude of effect is considered to be moderate.

20.6.1.13.2 *Impact Significance – SEP or DEP all scenarios*

316. The effect of the impact on bird species of elevated conservation concern which are most abundant within the DCO order limits (such as skylark and yellowhammer) would be of **major adverse** significance at multiple local or district scales.
317. The effect of the impact on rarer bird species of conservation concern which are more vulnerable to permanent displacement would be, at worst, of **major adverse** significance at district scale/s. For Cetti's warbler and firecrest, the impact significance would be restricted to North Norfolk District as this is the only district within the DCO order limits which supports breeding activity by these species.

20.6.1.13.3 *Mitigation*

318. 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 1st March to 31st August, as presented in the **Outline Ecological Management Plan** (document reference: 9.19). 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 a few days 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.
319. In addition to the above, the following mitigation measures would 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 ECoW or suitably qualified ornithologist, who would seek to ensure compliance with the Wildlife and Countryside Act 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.

20.6.1.13.4 *Residual Impacts – SEP or DEP all scenarios*

320. Following the implementation of mitigation measures (as outline above), the magnitude of the effect for birds of elevated conservation concern which are widespread throughout the DCO order limits would be reduced from moderate to minor, thereby reducing the significance of the impact to **moderate adverse** significance.
321. For more common bird species and/or those present in low numbers within the DCO order limits, the mitigation measures would reduce the importance of these receptors from high to low as well as reducing the magnitude of the effect from moderate to negligible/no change, thereby reducing the significance of the impact to **negligible**.

20.6.1.14 **Impact 14: Potential Mortality, Harm or Disturbance to Over-Wintering Birds, or Destruction, Damage or Disturbance of Over-Wintering Bird Habitats.**

322. The over-wintering bird surveys recorded the presence of over-wintering birds in selected parts of the DCO order limits. The distribution of over-wintering bird activity is closely linked with the presence of suitable habitat, namely arable fields with ground cover of stubble or sugar beet crop. The impact of construction activities on over-wintering birds is therefore intrinsically linked with the impact on this specific type of habitat. Arable farming practices and cropping rotations are the decisions of farmers and landowners, and typically will change on an annual basis. The quantity and distribution of arable habitat at the time construction works cannot be predicted, which is a notable constraint to the impact assessment on over-wintering birds.

323. Whilst the 2019-20 over-wintering bird survey effort recorded a flock of up to 3,500 pink-footed geese foraging within a harvested sugar beet field sought of Weybourne cliffs, following the refinement of the DCO boundaries since this survey, this area is now over 800m from where works associated with SEP and DEP would be undertaken. Therefore, based on the over-wintering bird survey results to date, direct or indirect impacts to pink-footed geese are unlikely to occur. However, given that this species are linked to the location of sugar beet fields, it may be likely that should sugar beet crops be present at the time of construction, temporary habitat loss and/or disturbance impacts to this (and any other bird species) may occur. It is, however, considered that birds may habituate to construction activities and/or associated noise levels. Nevertheless, and should construction works take place over winter and sugar beet fields are present within the onshore cable corridor, there remains the potential for disturbance, albeit temporary and of short-term duration, to occur.
324. Given the extensive, wide ranges of most over-wintering wildfowl and waders, and the relatively concentrated land-take impacts within the DCO order limits, species such as pink-footed geese are considered to be of low sensitivity. There are not considered to be significant differences in the potential impacts to wintering birds between the various construction scenarios.

20.6.1.14.1 *Magnitude of Effect – SEP or DEP all scenarios*

325. As a RWCS and if the construction works are undertaken without the adoption of mitigation measures, there is the potential to impact suitable habitat (i.e. stubble or sugar beet fields in which wintering birds had not exploited the feeding resources) in dozens of fields throughout the DCO order limits, including in areas close to over-wintering bird roosts such as at the landfall location, and potentially across multiple winters. In this scenario, a temporary moderate negative magnitude of effect to some international populations of over-wintering birds (such as pink-footed goose) may occur.
326. For other species such as lapwing and thrushes, temporary minor negative magnitude of effect would be expected to relate to county or even district/local bird populations.
327. Realistically, this impact would be of a lower magnitude than this because there is extremely unlikely to be a substantially increased quantity of over-wintering bird habitat within the DCO order limits than was available during the 2019-20 surveys.

20.6.1.14.2 *Impact Significance – SEP or DEP all scenarios*

328. Unmitigated, the effect of the impact on over-wintering birds is predicted to be of **major adverse** significance. However, there is an abundant supply of suitable fields for foraging adjacent to the DCO order limits and throughout Norfolk and beyond, which would be expected to be able to support any temporarily displaced foraging demands. The magnitude of effect would arise from increased energy expenditure of birds having to search for alternative foraging grounds due to the losses of those within the DCO order limits, especially those close to the coast.

20.6.1.14.3 Mitigation

329. Where construction works are undertaken within sugar beet fields or functionally linked habitat between November and January, a pre-construction survey will be undertaken to record the distribution and abundance of pink-footed geese and the distribution of harvested sugar beet 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.
330. During the construction works and should pink-footed geese 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, as presented in the **Outline Ecological Management Plan** (document reference: 9.19).

20.6.1.14.4 Residual Impacts – SEP or DEP all scenarios

331. Through the implementation (and adherence) of the mitigation measures, the magnitude of the effect on over-wintering bird species would be reduced from temporary moderate negative to negligible/no change and therefore the residual significance of the impact would equally be reduced to be of **minor adverse** significance.

20.6.1.15 Impact 15: Potential Mortality, Harm or Disturbance to Great Crested Newts, or Destruction, Damage or Disturbance of Great Crested Newt Habitat

332. No ponds would be lost as a result of SEP and DEP. As presented in **Section 20.5.3.4**, 14 ponds returned a positive eDNA result which indicates GCN presence. The potential impacts to GCN as result of SEP and DEP include the following:
- Risk of killing or injuring foraging GCNs during the construction phase; and
 - Temporary terrestrial habitat loss for the duration of the onshore construction works.

20.6.1.15.1 Magnitude of effect – SEP or DEP all scenarios

333. Although no ponds will be lost, there will be temporary short-term impacts on GCN terrestrial habitat. The magnitude of effect is therefore considered to be minor in the absence of mitigation, indicating that the potential disturbance is immeasurable, undetectable or within the range of normal natural variation change to the extent and condition of the habitat.

20.6.1.15.2 *Impact Significance – SEP or DEP all scenarios*

334. 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. Overall, it is therefore concluded that that as the importance of GCN is high, and the magnitude is minor, the significance of effect is of **moderate adverse** significance, which is not significant in EIA terms.

20.6.1.15.3 *Mitigation*

335. SEP and DEP will adopt a District Level Licence (DLL) approach prior to construction to ensure compliance with the legal status of GCN and mitigate for potential impacts on this species. DLL involves providing a Conservation Payment to fund a net increase in habitat for GCN at a county level, rather than mitigate for impacts specifically within and around the DCO order limits. Further GCN surveys are not necessarily required to inform a DLL application prior to the commencement of construction works associated with onshore elements of SEP and DEP. However, updated survey data could be used (if available) to refine the DLL Conversation Payment calculation. A provisional DLL certificate was provided by NE on 15th August 2022 and is included as an appendix to the **Planning Statement** (document reference 9.1); full procurement of the DLL would be undertaken within no more than 12 months prior to the commencement of onshore construction works.

20.6.1.15.4 *Residual Impacts – SEP or DEP all scenarios*

336. With the obtainment of a GCN DLL, the magnitude of impacts on GCNs would be reduced from minor to negligible/no change. However, given the importance of GCNs remains high, the impact significance to GCNs due to the construction of SEP and DEP in isolation would be reduced to **minor adverse** significance.

20.6.1.16 **Impact 16: Potential Mortality of Rare Invertebrates/Fish or Destruction of or Damage to Rare Invertebrate/Fish Habitats**

337. Whilst no baseline fish surveys have been undertaken, fish species are known to use a number of the watercourses within the DCO order limits. However, the watercourses which fish are likely to use (such as Main Rivers) would be avoided through the implementation of trenchless crossing techniques (e.g. HDD). Therefore, no direct impacts on fish populations or their habitats will occur for watercourses. This conclusion also applies to terrestrial and/or aquatic invertebrates that may be present within Main Rivers.
338. Invertebrates and/or fish may experience indirect impacts (e.g. increased sediment supply) from construction related activities; however, it is anticipated that these would be short term and localised.

20.6.1.16.1 *Magnitude of Effect – SEP or DEP all scenarios*

339. As a RWCS invertebrates and/or fish may experience impacts on a short term, temporary and localised basis. There are not considered to be significant differences in the potential impacts to invertebrates and/or fish between the various construction scenarios, particularly due to the habitats for where these species are likely to be present will be crossed using trenchless techniques (i.e. HDD). Consequently, the magnitude of effect on these species is considered to be negligible.

20.6.1.16.2 *Impact Significance – SEP or DEP all scenarios*

340. As invertebrate/fish species are assigned an importance of high or medium, the effect of the above impact would be of **minor adverse** significance.

20.6.1.16.3 *Mitigation*

341. The following mitigation measures would be employed at all locations where invertebrates and/or fish are present, i.e. main rivers:

- In order to ensure that there are no adverse impacts resulting from the installation of temporary dams, the amount of time that temporary dams are in place would be restricted to a reduced programme where possible, and flumes or pumps would be adequately sized to maintain flows downstream of the obstruction whilst minimising upstream impoundment. Furthermore, a fish rescue (as presented in the **Outline Code of Construction Practice**) would be undertaken in the area between the temporary dams prior to dewatering; and
- Bed and bank habitats would be reinstated and where possible improved following the completion of the works.

20.6.1.16.4 *Residual Impacts – SEP or DEP all scenarios*

342. Following implementation of mitigation measures, the risk of direct and indirect effects on invertebrates and fish, would remain to be of a negligible magnitude. As a consequence, the residual impact of **minor adverse** significance would also remain.

20.6.1.17 **Impact 17: Potential Mortality, Harm or Disturbance of Reptiles, or Destruction, Damage or Disturbance of Reptile Habitats**

343. Targeted reptile presence/absence surveys were undertaken in 2021 and confirmed the presence of slow worms and common lizards within a small number of localised areas within the DCO order limits – typically mosaics of grassland and scrub. reptiles are considered to be of medium importance and of medium sensitivity, reflecting that this species has some ability to tolerate an effect but can recover to an acceptable status over the short term to medium term.

20.6.1.17.1 *Magnitude of Effect – SEP or DEP all scenarios*

344. As a RWCS the loss of habitat supporting reptile species could represent a permanent moderate negative magnitude effect to multiple district reptile populations, This would be the magnitude whether SEP or DEP are constructed in isolation or concurrently or sequentially.

20.6.1.17.2 *Impact Significance – SEP or DEP all scenarios*

345. Whilst unlikely, the moderate magnitude effect on reptile populations considered to be of medium sensitivity represents an impact of **moderate adverse** significance, particularly if reptiles are killed and habitats destroyed. This would result in reptile populations being permanently lost from multiple sites.

20.6.1.17.3 *Mitigation*

346. The potential risks to reptile populations would be addressed by the adherence of best-practice, and industry accepted, measures at the small number of localised areas known to support reptiles. Further details are presented in the **Outline Ecological Management Plan** (document reference 9.19) These measures would include; the implementation of habitat manipulation works to temporarily displace reptiles from the proposed construction footprint. Alternatively, where this would not sufficiently mitigate risks, a reptile translocation exercise would be undertaken. Reptile exclusion fencing may need to be installed around areas of suitable habitat to ensure reptiles do not re-enter these areas during and after the translocation effort. This would involve capture of reptiles from within the area of works and translocation of any captured animals would be moved by a suitably qualified ecologist to a pre-identified area of suitable habitat (i.e. receptor site) that is located outwith the working area. On completion of the works, the reptile exclusion fencing would be removed, and reptiles allowed to naturally return to the area.

20.6.1.17.4 *Residual Impacts – SEP or DEP all scenarios*

347. Following the implementation of the mitigation measures, whilst the impacts to common reptile species would be reduced to be of a temporary negligible/no change magnitude, the residual impact would be reduced to be of **minor adverse** significance.

20.6.1.18 **Impact 18: Potential Mortality, Harm or Disturbance to Other Priority Species, or Destruction, Damage or Disturbance of Habitats Supporting Other Priority Species**

348. Priority species such as hedgehog, common toad and brown hare are known to be present within the DCO order limits, based on occasional observations during various field surveys. Targeted surveys for these species are not justified given the relatively limited legal protection and conservation statuses of these species compared to those assessed above. However, they warrant consideration because they are Priority Species, reflecting more conservation importance than other widespread animal species.

349. The construction works associated with installation of the onshore export cables risk impacting these species through direct harm and mortality from the operation of excavating/other machinery, destruction of or damage to key habitats, severance of connective features, entrapment within excavations and disturbance from noise, light, air pollution and ground vibration.

20.6.1.18.1 Magnitude of Effect – SEP or DEP all scenarios

350. If works were completed insensitively and without mitigation, construction works could have permanent moderate negative impacts to county populations of these species. A lower magnitude and geographical scale of impact is likely to be experienced as the installation works include embedded mitigation that would minimise many of the potential impacts. For example, the onshore construction works would be undertaken during daylight hours where these species are typically more active during night-time. Also many habitat that support these species are being avoided by using trenchless crossing techniques or by reducing the construction corridor width at hedgerow crossings. Consequently, the magnitude of effect pre-mitigation is assessed as minor. There are not considered to be significant differences in the potential impacts to these species between the various construction scenarios.

20.6.1.18.2 Impact Significance – SEP or DEP all scenarios

351. The effect of this impact could be of **minor adverse** significance at up to the county scale.

20.6.1.18.3 Mitigation

352. In general, likely risks to these species can be addressed, at least in part, by adopting industry accepted best-practice measures, as presented in the **Outline Ecological Management Plan** (document reference: 9.19).

20.6.1.18.4 Residual Impacts – SEP or DEP all scenarios

353. The implementation of the identified mitigation measures will reduce the magnitude of effect from permanent medium negative to temporary low negative thereby reducing the significance of the impact to **negligible** significance.

20.6.2 Potential Impacts during Operation

354. Once installed, there is no requirement for ongoing maintenance of the operational onshore export cables other than periodic visits to the link boxes (one per circuit every 1,000m along the cable corridor), which will be mainly located at field boundaries. Periodic maintenance will be required during the operational phase of the substation, and as such this will require frequent visits to be undertaken. The requirement for any security lighting will be designed in accordance with industry guidance relating to artificial lighting and bats, which will manage any potential lighting impacts on this species.



355. Taking into the account the adoption of industry guidance and measures outlined in the **Outline Landscape Management Plan** (document reference 9.18) and **Outline Ecological Management Plan** (document reference 9.19), it is predicted that impacts on protected species will be minimal and localised only to those locations where a maintenance visit is required. It is predicated that any impacts would be immeasurable, undetectable or within the range of tolerance. Therefore, impacts are expected to be negligible for all valued ecological receptors and are not assessed any further.
356. The impacts associated with EMF are assessed within **Chapter 19 Land use, Agriculture and Recreation** as well as **Chapter 28 Health** and **Appendix 28.1 EMF study**.
357. The potential for soil heating emanating from the operational, buried onshore export cables is assessed in **Chapter 19 Land use, Agriculture and Recreation**. In summary, topsoil temperatures are not predicted to be significantly impacted.

20.6.3 Potential Impacts during Decommissioning

358. No decision has yet been made regarding the final decommissioning policies for either SEP or DEP as it is recognised that industry best practice, rules and legislation change over time. The detail and scope of decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and would be agreed with the regulator with decommissioning programme provided.
359. However, it is considered likely that the proposed onshore substation would be removed and would be reused or recycled and that the onshore cables would also be removed and recycled, with the transition bays and cable ducts (where used) left in situ. For the purposes of a worst-case scenario, it is considered that impacts associated with the decommissioning phase would be no greater than those identified for the construction phase.

20.7 Cumulative Impacts

20.7.1 Identification of Potential Cumulative Impacts

360. The first step in the cumulative assessment is the identification of which residual impacts assessed for SEP and/or DEP on their own have the potential for a cumulative impact with other plans, projects and activities (described as ‘impact screening’). This information is set out in **Table 20-14** below. Only potential impacts assessed in **Section 20.6** as negligible or above are included in the CIA (i.e. those assessed as ‘no impact’ are not taken forward as there is no potential for them to contribute to a cumulative impact).
361. **Table 20-14** concludes that in relation to onshore ecology and ornithology, all impacts identified in **Section 20.6** have the potential to act cumulatively with other projects.

Table 20-14: Potential Cumulative Impacts (Impact Screening)

Impact	Potential for Cumulative Impact	Rationale
Construction		
Disturbance to River Wensum SAC/SSSI and Weybourne Cliffs SSSI	Yes	Impacts to these designated sites could act cumulatively with other plans or projects in the nearby areas if they also cause impacts to these sites, particularly if they are completed contemporaneously. The likelihood of a temporal overlap may increase with the sequential scenario where construction would take place over a longer period.
Disturbance to multiple CWSs within or close to the DCO order limits	Yes	Impacts to this CWS could act cumulatively with other plans or projects in the nearby area if these also cause impacts to it, particularly if they are completed contemporaneously. The likelihood of a temporal overlap may increase with the sequential scenario where construction would take place over a longer period.
Destruction/damage of habitats	Yes	Impacts to this habitat could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if they are completed contemporaneously. The likelihood of a temporal overlap may increase with the sequential scenario where construction would take place over a longer period.
Destruction/damage of watercourse habitats	Yes	Impacts to this habitat could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if they are completed contemporaneously. The likelihood of a temporal overlap may increase with the sequential scenario where construction would take place over a longer period.
Mortality, harm or disturbance to legally protected and/or notable species and/or their habitat	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact badgers, particularly if they are completed contemporaneously. The likelihood of a temporal overlap may increase with the sequential scenario where construction would take place over a longer period.
Mortality, harm or disturbance to other priority species (such as hedgehog, brown hare and common toad) and/or their habitats	Yes	Impacts to these species could act cumulatively with other plans or projects in the same area if these also impact such species, particularly if they are completed contemporaneously. The likelihood of a temporal overlap may increase with the sequential scenario where construction would take place over a longer period.



20.7.2 Other Plans, Projects and Activities

362. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative impacts for inclusion in the CIA (described as 'project screening'). This information is set out in **Table 20-15** below, together with a consideration of the relevant details of each, including current status (e.g. under construction), planned construction period, closest distance to SEP and DEP, status of available data and rationale for including or excluding from the assessment.
363. The project screening has been informed by the development of a CIA Project List which forms an exhaustive list of plans, projects and activities in a very large study area relevant to SEP and DEP. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects and activities to be screened in or out.
364. Following an initial review those projects that are located more than 5km have been excluded from **Table 20-15** (unless an exception is stated) as there is no mechanism for impacts to act cumulatively on onshore ecology and ornithology receptors beyond 5km.
365. In addition, the following types of applications which are included on the CIA Project List, have been screened out and are not included in **Table 20-15**:
- Tree works as there is no mechanism for cumulative impact;
 - Projects that are now operational and more than 500m away as there would be no cumulative construction impacts, and at that distance there are unlikely to be any cumulative operational effects on onshore ecology or ornithology receptors; and
 - Small scape residential extensions and change of use applications that have no mechanism for cumulative construction impacts and are likely to have been completed by the time construction on SEP and DEP commences have also been screened out.

Table 20-15: Summary of Projects Considered for the CIA in Relation to Onshore Ecology and Ornithology (Project Screening)

Project	Status	Construction Period	Closest Distance from the Project (km)	Confidence in Data	Included in the CIA (Y/N)	Rationale
Norfolk Vanguard Offshore Wind Farm	DCO consented	2023-2029	0 – onshore cable corridor crosses the SEP and DEP onshore cable corridor	High	Y	The onshore cable route for the Norfolk Vanguard offshore wind farm crosses the SEP and DEP DCO order limits. There may be concurrent construction activities and therefore may result in cumulative impacts and effects on valued ecological receptors such as designated nature conservation site and protected/valued species.
Hornsea Project Three Offshore Wind Farm	DCO consented	2023-2025 (single phase) 2023-2031 (two phase)	0km, direct intersection of the two cable corridors 0.8km between onshore substations	High	Y	There is potential that this project could be constructed in two phases meaning that the entire construction period could be either ten years or six years. Therefore, there could be temporal overlap of construction with SEP and DEP which could lead to cumulative impacts to multiple valued ecological receptors included designated nature conservation sites and protected/valued species. The onshore infrastructure for this project follows a very similar route to that of SEP and DEP; therefore, there is high potential the same receptors would be cumulatively impacted.
Norfolk Boreas Offshore Wind Farm	DCO consented	2023-2029	0km – onshore cable corridor crosses the SEP and DEP	High	Y	The onshore cable route for the Norfolk Boreas offshore wind farm crosses the SEP and DEP DCO order limits. There may be concurrent construction activities and therefore there may be



Project	Status	Construction Period	Closest Distance from the Project (km)	Confidence in Data	Included in the CIA (Y/N)	Rationale
			onshore cable corridor			cumulative impacts and effects on valued ecological receptors such as designated nature conservation site and protected/valued species.
Norwich Northern Distributor Road (NDR) (A1067 between Taverham and Attlebridge to A47 at Postwick)	Construction completed	N/A	1.8km from DCO order limits	High	Y	Operational impacts of the NDR, such as on foraging bats, would overlap with the construction period of SEP and DEP. There may, therefore, be cumulative impacts on these ecological receptors.
A47 North Tuddenham to Easton	Examination	January-March 2022/2023-2024-2025	0 – A47 intersects DCO order limits	Medium	Y	There is a possibility that there would be temporal overlap in the construction of this project and SEP and DEP. There may, therefore, be cumulative impacts and effects on valued ecological receptors such as nearby designated nature conservation sites and any protected and notable species occurring in this area.
Proposed Norwich Western Link road (NWL)	Scoping opinion given	2023	0 intersects DCO order limits	High	Y	Due to the nature and scale of the development there is the potential for the onshore elements of the project to have direct and / or indirect cumulative effects on the receptors identified. There is a possibility that there will be a temporal overlap between the NWL project and SEP and DEP during the construction phase. However, the NWL project will be subject to a planning process requiring appropriate mitigation

Project	Status	Construction Period	Closest Distance from the Project (km)	Confidence in Data	Included in the CIA (Y/N)	Rationale
						measures to be implemented therefore limiting the potential for cumulative effects to occur.
Improvement of the Thickthorn A11/A47 junction	Pre-application DCO	January – March 2023 until 2024-2025. Duration likely to be 26 months	2.3 from DCO order limits	Low	Y	There is a possibility that there would be temporal overlap in the construction of this project and SEP and DEP. There may, therefore, be cumulative impacts and effects on valued ecological receptors such as nearby designated nature conservation sites and any protected and notable species occurring in this area.
East Anglia GREEN	Site selection / pre-scoping	2027-2031		Low	N	Screened out as insufficient details available about this proposal to undertake any meaningful cumulative impact assessment.



20.7.3 Assessment of Cumulative Impacts

366. Having established the residual impacts from SEP and/or DEP with the potential for a cumulative impact, along with the other relevant plans, projects and activities, the following sections provide an assessment of the level of impact that may arise.

20.7.3.1 Cumulative Impacts on Designated Nature Conservation Sites

367. The only statutory designated nature conservation sites that overlaps with the DCO order limits are the River Wensum SAC/SSSI and Weybourne Cliffs SSSI. HDD has been embedded into the scheme design to cross both features and direct impacts would be avoided, and overall residual impacts are assessed as **minor adverse**.
368. Hornsea Project Three also crosses the River Wensum approximately 600m further upstream of the SEP and DEP crossing. Hornsea Project Three has similarly committed to use HDD at this crossing to avoid direct impacts. Residual impacts relate to the potential for bentonite (an inert clay-based material used during drilling works) to escape into the river channel and potentially smother habitats. The effects of this would be extremely localised and given the distance of separation between the SEP and DEP crossing and the Hornsea Project Three crossing no cumulative impacts are predicted. No other projects cross Weybourne Cliffs SSSI.
369. The SEP and DEP DCO order limits also overlap with a number of CWSs. However, given the spatially and potentially temporally overlapping impacts arising from a number of the above listed projects, there is potential for cumulative impacts.
370. All residual impacts to CWSs from SEP and DEP are predicted to be temporary and of minor magnitude. The effects of these impacts are anticipated to be of no greater than negligible or **minor adverse** significance for all but one designated site; Hall Hills/Ringland Covert CWS may experience a **moderate adverse** level of significance, but a residual effect of minor positive significance is possible depending on the level of post-construction enhancement that can be agreed with the landowner. There are no CWSs within the SEP and DEP DCO order limits that are also crossed by any of the other identified projects and so there is no mechanism for direct cumulative impacts.
371. It is conceivable that the magnitude and significance of indirect impacts for some of these sites could be elevated due to cumulative impacts. However, given the overall predicted low magnitudes and significances of residual impacts for SEP and DEP on these CWSs, the likelihood of cumulative impacts is low.

20.7.3.2 Cumulative Impacts on Habitats

372. There is potential for cumulative impacts on multiple habitat types associated with the project listed above. In particular, there is potential for cumulative impacts on those habitats which are widespread within the DCO order limits and elsewhere in the surrounding landscape, such as arable fields and margins, hedgerows, woodland and watercourses.
373. Residual impacts to most habitats from SEP and DEP are predicted to be temporary and of medium, low or negligible magnitudes, and the effects of these impacts are anticipated to be of no greater than **minor adverse** significance.

374. Most of the SEP and DEP construction footprint is located within habitats which are replaceable or recoverable, such as arable farmland, scrub and improved grasslands. Any other plans or projects impacting these types of habitats are unlikely to lead to cumulative impacts in combination with SEP and DEP as it is generally possible for residual impacts to be avoided or comprehensively mitigated at an individual project level.
375. Habitats which are less able to recover or be quickly replaced, such as woodlands and hedgerows, are predicted to experience permanent minor negative and temporary moderate negative residual impacts as a result of SEP and DEP, and the effects of these would be of **moderate adverse** significance for both habitat types. There is, therefore, potential for cumulative impacts to these specific habitat types at a district or county level that would be exacerbated by other plans and projects, especially given the common occurrence of these habitat types throughout the DCO order limits and within the surrounding landscape.
376. Hedgerow replacement/reinstatement is considered best-practice and following a review of the available documents associated with all of the projects screened into this CIA has confirmed that this is a commitment across all projects, in a similar approach to that which will be implemented as part of the construction of SEP and DEP and presented in the **Outline Landscape Management Plan** (document reference: 9.18) and **Outline Ecological Management Plan** (document reference: 9.19). There could still be temporary cumulative impacts due to the lag-time between established hedgerows being removed and newly planted hedgerows maturing and beginning to provide the same ecological functions as the removed hedgerows. Such impacts would be expected to be comprehensively mitigated within around 10-20 years; within which time any replanted hedgerows should begin functioning as well-established hedgerow habitat. Permanent cumulative impacts to hedgerow habitat are therefore considered extremely unlikely. Furthermore, the proposed ecological mitigation and enhancement package for SEP and DEP is anticipated to lead to long-term positive effects on hedgerow habitat as a result of hedgerow creation (such as by infilling existing hedgerow gaps and replacing sections of poor quality removed hedgerows with higher quality hedgerows, for example); this would negate any potential for cumulative impacts.
377. Impacts to woodland from SEP and DEP have been avoided wherever possible. This has been achieved through the onshore cable corridor refinement process. The only other plans or projects (from those listed in **Table 20-15**) realistically likely to impact woodland habitat would be the other offshore wind farm grid connection proposals. Those plans also aim to minimise impacts to woodland habitat (through careful routing of their construction footprints), and comprehensive mitigation (i.e. habitat reinstatement, compensation and/or enhancement) is proposed wherever impacts have not been avoided. Overall, therefore, the risk of cumulative residual long-term impacts to woodland habitat is predicted to be very low.
378. There are opportunities for ecological enhancement to habitats such as hedgerows and woodlands to be amalgamated with other plans' or projects' enhancement proposals to achieve a positive outcome for biodiversity and habitats. Details of which are presented in the **Initial Biodiversity Net Gain Assessment (Appendix 22.6)**.

20.7.3.3 Cumulative Impacts on Protected and Other Priority Species

379. Given the spatially and potentially temporally overlapping impacts arising from a number of the above listed projects, there is potential for cumulative impacts on multiple protected and other priority species. In particular, there is potential for cumulative impacts on those species which are widespread within the DCO order limits and elsewhere in the surrounding landscape, which may include badgers, bats (roosting and non-roosting), breeding birds, over-wintering birds, GCN, reptiles, riparian mammals, white-clawed crayfish and other priority species such as hedgehog, brown hare and common toad. Such impacts could include, but not limited to, the loss/fragmentation of habitat, indirect impacts from lighting, noise and/or dust. However, as each of the projects include mitigation measures for such potential impacts, it is not considered necessary that additional mitigation measures would be required.
380. There are opportunities for ecological enhancement aimed at benefitting protected and other priority species (such as breeding birds, roosting bats, GCN and reptiles, amongst others) to be amalgamated with other plans' or projects' enhancement proposals. Details of which are presented in the **Initial Biodiversity Net Gain Assessment (Appendix 22.6)**.

20.8 Transboundary Impacts

381. There are no transboundary impacts with regard to onshore ecology and ornithology as the onshore project area is not located in proximity to any international boundaries. Transboundary impacts are therefore scoped out of this assessment and are not considered further.

20.9 Inter-relationships

382. Most valued onshore ecological receptors are intrinsically linked to hydrology, soils and air quality. Noise, lighting, ground vibration and traffic movements can also impact protected and notable species.
383. A summary of the potential inter-relationships between onshore valued ecological receptors and hydrology, air quality, noise and other relevant aspects of SEP and DEP are listed in **Table 20-16**..

Table 20-16: Onshore Ecology and Ornithology Inter-Relationships

Impact / Receptor	Related chapter	Where addressed in this chapter	Rationale
Construction			
Impact 1: Construction Impacts to Statutory Designated Nature Conservation Sites	NA	NA	No additional inter-related effects on Statutory Designated Nature Conservation Sites have been identified.
Impact 2: Habitat	Chapter 18 Water	Section 20.6.1.2	Potential changes to ground conditions (including chemical

Impact / Receptor	Related chapter	Where addressed in this chapter	Rationale
Destruction or Damage, or Construction Disturbance to Non-Statutory Designated Nature Conservation Sites	Resources and Flood Risk		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). These impacts are fully assessed in Section 20.6.1.1.
Impact 2: Habitat Destruction or Damage, or Construction Disturbance to Non-Statutory Designated Nature Conservation Sites	Chapter 22 Air Quality	Section 20.6.1.2	Impacts relating to air quality are presented in Chapter 22 Air Quality , with further information regarding the significance of those impacts on ecological receptors (i.e. through acid and nitrogen deposition on habitats) presented in Section 20.6.1.2.
Impact 3-8: Loss of or Damage to valued Habitats.	Chapter 22 Air Quality	Section 20.6.1.3 - 20.6.1.8	Impacts relating to air quality are presented in Chapter 22 Air Quality , with further information regarding the significance of those impacts on ecological receptors (i.e. through acid and nitrogen deposition on habitats) presented in Section 20.6.1.3 - 20.6.1.10.
Impact 8: Loss of or Damage to Watercourse Habitats	Chapter 18 Water Resources and Flood Risk	Section 20.6.1.8	Potential changes 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. The results of the impact assessment for the loss or damage to watercourse habitats are presented in Section 20.6.1.8.
Impact 10-18: Potential mortality, harm	Chapter 22 Air Quality	Section 20.6.1.10 - 20.6.1.18	Impacts relating to air quality are presented in Chapter 22 Air Quality , with further



Impact / Receptor	Related chapter	Where addressed in this chapter	Rationale
<p>or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat</p> <p>Impacts on habitats through increased acid and nitrogen deposition from machinery during the construction phase</p>			<p>information regarding the significance of those impacts on ecological receptors (i.e. through acid and nitrogen deposition on habitats) presented in Section 20.6.1.3 - 20.6.1.10. 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. The results of the impact assessment on protected species, or destruction, damage or disturbance to protected species' habitat are presented in Section 20.6.1.10 - 20.6.1.18.</p>
<p>Impact 10-18: Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat</p> <p>Impacts on protected and/or notable species from changes in noise and ground vibration during construction.</p>	<p>Chapter 23 Noise and Vibration</p>	<p>Section 20.6.1.10 - 20.6.1.18</p>	<p>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.</p> <p>It has been assumed that all construction works along the onshore cable corridor will be undertaken during daylight hours and appropriate mitigation measures (e.g. temporary screening around working areas, use of silences and/or enclosures around noisy equipment) will be implemented.</p> <p>The predicted noise level at the landfall location is 50dB LAeq,T which represents a negligible magnitude of effect. Mitigation measures will be implemented at the landfall location that will include turning off of plant when not in use, ensuring equipment is in good working order and installation of</p>



Impact / Receptor	Related chapter	Where addressed in this chapter	Rationale
			screening to further reduce noise levels where required.
Operation			
Impacts on water-dependent habitats and designated sites	Chapter 18 Water Resources and Flood Risk	Section 20.6.1.8	Potential changes to the hydrology and water quality of the River Wensum SAC and SSSI during construction could impact on the onshore ecological receptors (habitats and species) known to be present (including the designated interest features).
Decommissioning			
Inter-relationships and the identified impacts associated with the decommissioning phase would be no greater than those identified for the construction phase.			

20.10 Interactions

384. The impacts identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between impacts are presented in **Table 20-17**. This provides a screening tool for which impacts have the potential to interact. **Table 20-18** provides an assessment for each receptor (or receptor group) as related to these impacts.
385. Within **Table 20-18**, the impacts are assessed relative to each development phase (Phase assessment, i.e. construction, operation or decommissioning) to see if (for example) multiple construction impacts affecting the same receptor could increase the level of impact upon that receptor. Following this, a lifetime assessment is undertaken which considers the potential for impacts to affect receptors across all development phases.
386. The significance of each individual impact is determined by the sensitivity of the receptor and the magnitude of effect; the sensitivity is constant whereas the magnitude may differ. Therefore, when considering the potential for impacts to be additive it is the magnitude of effect which is important – the magnitudes of the different effects are combined upon the same sensitivity receptor.



Table 20-17: Interaction Between Impacts - Screening

Potential Interaction 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	Impacts 3-8: Loss of or damage to valued habitats	Impact 19: Potential spread of INNS	Impacts 10-18: Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat
Impact 1: Construction disturbance to statutory designated nature conservation sites	-	Yes – there are multiple ecological connections between statutory and non-statutory designated nature conservation sites, particularly where sites are in close proximity to each other.	Yes – there are multiple ecological connections between statutory designated sites and nearby valued habitats (e.g. hedgerows and watercourses connected to a SSSI)	Yes – there is potential for the spread of INNS such as Himalayan balsam or crayfish plague to statutory designated sites (namely the River Wensum SAC/SSSI).	Yes – many statutory designated nature conservation sites will support a range of protected and valued species, so impacts to the designated site will likely impact protected and valued species present here.
Impact 2: Habitat destruction or damage, or construction disturbance to non-statutory designated nature conservation sites	Yes – there are multiple ecological connections between statutory and non-statutory designated nature conservation sites, particularly where sites are in close proximity to each other.	-	Yes – there are multiple ecological connections between non-statutory designated sites and nearby valued habitats (e.g. hedgerows and watercourses connected to a CWS).	Yes – there is potential for the spread of INNS such as Himalayan balsam or crayfish plague to non-statutory designated sites, particularly those with aquatic or semi-aquatic habitats.	Yes – many non-statutory designated nature conservation sites will support a range of protected and valued species, so impacts to the designated site will likely impact protected and valued species present here.



Potential Interaction between Impacts					
Impacts 3-8: Loss of or damage to valued habitats	Yes – there are multiple ecological connections between statutory designated sites and nearby valued habitats (e.g. hedgerows and watercourses connected to a SSSI).	Yes – there are multiple ecological connections between non-statutory designated sites and nearby valued habitats (e.g. hedgerows and watercourses connected to a CWS).	-	Yes – there is potential for the spread of INNS such as Himalayan balsam or crayfish plague to valued habitats, particularly aquatic or semi-aquatic habitats.	Yes – all protected and valued species are reliant on various habitat so impacts to the habitat will impact the species present here.
Impact 9: Potential spread of INNS	Yes – there is potential for the spread of INNS such as Himalayan balsam or crayfish plague to statutory designated sites (namely the River Wensum SAC/SSSI).	Yes – there is potential for the spread of INNS such as Himalayan balsam or crayfish plague to non-statutory designated sites, particularly those with aquatic or semi-aquatic habitats.	Yes – there is potential for the spread of INNS such as Himalayan balsam or crayfish plague to valued habitats, particularly aquatic or semi-aquatic habitats.	-	Yes – some native protected and valued species could be negatively impacted by the spread of INNS.
Impacts 10-18: Potential mortality, harm or disturbance to protected species, or destruction, damage or disturbance to protected species' habitat	Yes – many statutory designated nature conservation sites will support a range of protected and valued species, so impacts to the designated site will likely impact protected and valued species present here.	Yes – many non-statutory designated nature conservation sites will support a range of protected and valued species, so impacts to the designated site will likely impact protected and valued species present here.	Yes – all protected and valued species are reliant on various habitat so impacts to the habitat will impact the species present here.	Yes – some native protected and valued species could be negatively impacted by the spread of INNS.	-



Table 20-18: Interaction Between Impacts – Phase and Lifetime Assessment

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
Designated Nature Conservation sites (statutory and non-statutory)	Minor adverse	Negligible	TBC	No greater than individually assessed impact The impacts are considered to have no to minor 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 SEP and DEP to increase the significance level of any impacts.
Valued habitats	Moderate adverse	Negligible	TBC	No greater than individually assessed impact Notable impacts to valued habitats are only predicted during the construction and possibly during the decommissioning phases; during operation valued habitats are expected to experience negligible impacts. During decommissioning, any impacts to valued habitats are likely to be of no more than equivalent significances for valued habitats because the decommissioning	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



Highest significance level					
				<p>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 (e.g. scrub which grows up overhead of the installed export cables) 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 valued habitats (woodlands, hedgerows, grasslands and wetlands/ watercourses, for example) 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</p>	<p>significance which would be greater than those assessed at individual (i.e. construction) phases. It is possible that some quickly regenerating habitats such as scrub could experience cumulative impacts over the course of SEP and DEP (if such a habitat becomes established within the decommissioning footprint), but the overall impact during the lifetime of SEP and DEP would not be considered any more significant than during individual phases because these types of habitat would recover similarly quickly post-decommissioning.</p> <p>The most ecologically valued habitats (woodlands, hedgerows, grasslands and wetlands/ watercourses, for example) 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.</p> <p>Impacts significances throughout the lifetime of SEP and DEP are therefore judged to be of no greater significances than are predicted during any one phase.</p>



Highest significance level					
				interactions resulting in greater impacts than are assessed individually are expected.	
INNS (potential spread of)	Negligible	Negligible	TBC	<p>No greater than individually assessed impact</p> <p>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 interaction between impacts in various stages of SEP and DEP.</p>	<p>No greater than individually assessed impact</p> <p>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 SEP and DEP.</p>
Protected and valued species	Minor adverse	Negligible	TBC	<p>No greater than individually assessed impact</p> <p>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 negligible impacts</p>	<p>No greater than individually assessed impact</p> <p>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 SEP and</p>



Highest significance level					
				<p>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 impacted across multiple phases of SEP and DEP.</p>	<p>DEP. 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.</p>



20.11 Potential Monitoring Requirements

387. The potential for the spread of INNS will need to be monitored in areas currently affected by INNS. If SEP and DEP are concluded to have resulted in the spread of INNS (e.g. of Himalayan balsam to previously unaffected watercourses), remedial action would be required in the form of an eradication effort.
388. Monitoring for badgers and bats would be required as part of the obtained EPS Mitigation Licences. Where such monitoring is required, it will likely be very focussed, such as to the relevant trees (in the case of roosting bats where replacement bat roosting sites have been created) or active setts (in the case of newly constructed badger setts).
389. Monitoring requirements for ecological receptors is presented in the [Outline Ecological Management Plan](#) (document reference 9.19)

20.12 Assessment Summary

390. This chapter has provided a characterisation of the existing environment for onshore ecology and ornithology based on both existing and site-specific survey data.
391. The EclA has established those onshore ecological receptors that could be affected as a result of direct and indirect impacts during the construction, operational and decommissioning phases. The residual impacts on the majority of receptors during these phases would be **negligible** or **minor adverse**. Where there are multiple possible outcomes depending on, for example, whether construction works would involve trenchless or open-trench installation in a relevant area, the worst-case scenario (which involves the greater magnitude of impact) is listed in the summary table, below.

Table 20-19: Summary of Potential Impacts on Onshore Ecology and Ornithology

Potential impact	Project	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Mitigation measures proposed	Residual impact	Cumulative Residual Impact
Impact 1: Damage to statutory designated sites	SEP	River Wensum SAC/SSSI and Weybourne Cliffs SSSI	High	Temporary minor negative	Moderate adverse	SEP and DEP have committed to a minimum depth of 2m below the bed level of watercourses at trenchless crossings. A bentonite breakout mitigation plan would be developed adhering to industry best practice during construction. 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	Minor adverse	None predicted
	DEP							
	SEP & DEP							



Potential impact	Project	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Mitigation measures proposed	Residual impact	Cumulative Residual Impact
						prevention measures will also be adopted.		
Impact 2: Damage to non-statutory designated sites	SEP	CWS	Medium	Temporary minor negative	Minor adverse	Avoidance of CWS, sensitive working methods nearby.	Minor adverse - negligible	No direct Impacts, potential for indirect impacts is low.
	DEP							
	SEP & DEP							
Impact 3 – 8: Loss or Damage to Valued Habitat	SEP	Valued habitats	Medium - negligible	Temporary minor or moderate negative	Moderate/minor adverse - Negligible	Avoidance where possible. Minimisation of construction footprint within habitat, reinstatement post-construction.	Minor adverse - Negligible	No impact if avoided or mitigated.
	DEP							
	SEP & DEP							



Potential impact	Project	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Mitigation measures proposed	Residual impact	Cumulative Residual Impact
Impact 9: Spread of INNS	SEP	Himalayan balsam (and possibly other INNS)	Medium	Permanent major negative	Major adverse	Implementation of an INNS spread prevention policy during construction	Minor adverse	No Impact
	DEP							
	SEP & DEP							
Impact 10-18: Potential Mortality, harm, disturbance to protected species and/or their habitat	SEP	Protected species	High - Low	Temporary minor-moderate negative	Major – Minor adverse	Avoidance and retention of setts, roosts and important habitats, best-practice during construction, licensed mitigation where necessary. Sensitive timing of works.	Minor adverse - Negligible	There is potential for cumulative impacts on those species which are widespread within the DCO order limits and elsewhere in the surrounding landscape.
	DEP							
	SEP & DEP							
Operational								
Operational impacts	SEP	All receptors	Various	Negligible	Negligible	None	Negligible	No Impact
	DEP							



Potential impact	Project	Receptor	Sensitivity	Magnitude	Pre-mitigation impact	Mitigation measures proposed	Residual impact	Cumulative Residual Impact
	SEP & DEP							
Decommissioning								
<p>No decision has been made regarding the final decommissioning policy, as it is recognised that industry best practice, rules and legislation change over time. The decommissioning methodology would need to be finalised nearer to the end of the lifetime of SEP and DEP so as to be in line with latest and current guidance, policy and legislation at that point. Any such methodology would be agreed with the relevant authorities and statutory consultees. It is anticipated that the decommissioning impacts could be similar in nature to those of construction, depending on the extent and depths to which any further intrusive sub-surface decommissioning groundworks may occur.</p>								



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