NORTH FALLS

Offshore Wind Farm

ENVIRONMENTAL STATEMENT

Chapter 23 Onshore Ecology

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Glossary of Acronyms

ASNW	Ancient Semi Natural Woodland
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BEIS	Department for Business, Energy & Industrial Strategy
BEP	Biodiversity Enhancement Plan
BNG	Biodiversity Net Gain
BoCC4	Birds of Conservation Concern 4
BPM	Best Practical Means
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CLoWS	Candidate Local Wildlife Site
CRoW	Countryside and Rights of Way
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
EclA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
EFC	Essex Field Club
EIA	Environmental Impact Assessment
EMP	Ecological Management Plan
EPP	Evidence Plan Process
EPS	European Protected Species
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
GI	Green Infrastructure
HDD	Horizontal Directional Drilling
IAQM	Institute of Air Quality Management
ILP	Institute of Lighting Professionals
INNS	Invasive Non-Native Species
IPC	Infrastructure Planning Commission

IRZ	Impact Risk Zone
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
EMP	Ecological Management Plan
LPA	Local Planning Authority
LoWS	Local Wildlife Site
NERC	Natural Environment and Rural Communities
NFOW	North Falls Offshore Wind Farm Limited
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NVC	National Vegetation Classification
OLEMS	Outline Landscape and Ecological Management Strategy
PAWS	Plantations on Ancient Woodland Sites
PEIR	Preliminary Environmental Information Report
RWE	RWE Renewables U Swindon Limited
SPA	Special Protected Area
SSSI	Site of Special Scientific Interest
SSER	SSE Renewables Offshore Windfarm Holdings Limited
TCC	Temporary Construction Compound
UKFS	UK Forestry Standard
UKHPI	UK Habitats of Principal Importance
UXO	Unexploded Ordnance
UK	United Kingdom
WTG	Wind turbine generator
ZoI	Zone of Influence

Glossary of Terminology

400kV onshore cable route	Onshore route within which the onshore substation to national grid connection point onshore export cables and associated infrastructure would be located.
Haul road	The track along the onshore cable route used by construction traffic to access different sections of the onshore cable route.
Horizontal directional drill (HDD)	Trenchless technique to bring the offshore cables ashore at the landfall. The technique will also be used for installation of the onshore export cables at sensitive areas of the onshore cable route.
Landfall	The location where the offshore export cables come ashore at Kirby Brook.
Landfall compound	Compound at landfall within which HDD or other trenchless technique would take place.
Landfall search area	Locations being considered for the landfall, comprising the Essex coast between Clacton-on-Sea and Frinton-on-Sea.
National grid connection point	The grid connection location for the Project. National grid are proposing to construct new electrical infrastructure (a new substation) to allow the Project to connect to the grid, and this new infrastructure will be located at the national grid connection point.
National grid substation connection works	Infrastructure required to connect the Project to the national grid connection point.
Onshore export cables	The cables which take the electricity from landfall to the onshore substation. These comprise High Voltage Alternative Current (HVAC) cables and auxiliary cables, buried underground.
Onshore cable corridor(s)	Onshore corridor(s) considered at PEIR within which the onshore cable route, as assessed at ES, is located.
Onshore cable route	Onshore route within which the onshore export cables and associated infrastructure would be located.
Onshore project area	The boundary within which all onshore infrastructure required for the Project will be located (i.e. landfall; onshore cable route, accesses, construction compounds; onshore substation and cables to the national grid substation).
Onshore scoping area	The boundary in which all onshore infrastructure required for the Project will be located, as considered within the North Falls EIA Scoping Report.
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the national grid.
Onshore substation construction compound	Area set aside to facilitate construction of the onshore substation. Will be located adjacent to the onshore substation.
Onshore substation works area	Area within which all temporary and permanent works associated within the onshore substation are located, including onshore substation, construction compound, access, landscaping, drainage and earthworks.
Onshore substation zone	The area considered at PEIR, within which the onshore substation will be located.

Temporary construction compound (TCC)	Area set aside to facilitate construction of the onshore cable route. Will be located adjacent to the onshore cable route, with access to the highway where required.
The Applicant	North Falls Offshore Wind Farm Limited (NFOW).
The Project Or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.
Trenchless crossing	Use of a technique to install limited lengths of cable below ground without the need to excavate a trench from the surface, used in sensitive areas of the onshore cable route to prevent surface disturbance. Includes techniques such as HDD.
Trenchless crossing compound	Areas within the onshore cable route which will house trenchless crossing (e.g. HDD) entry or exit points.

23 Onshore Ecology

23.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the likely significant effects of the North Falls offshore wind farm (hereafter 'North Falls' or 'the Project') on onshore ecology. The chapter provides an overview of the existing environment for the onshore project area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Project.

2. This chapter has been written by Royal HaskoningDHV, with the assessment undertaken with specific reference to the relevant legislation and guidance, of which the primary sources are the National Policy Statements (NPS). Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) are presented in Section 23.4.

3. The assessment should be read in conjunction with following ES chapters (Volume 3.1):

   - ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21);
   - ES Chapter 20 Air Quality (Document Reference: 3.1.22);
   - ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23);
   - ES Chapter 22 Land Use and Agriculture (Document Reference: 3.1.24);
   - ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26); and
   - ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).

4. Additional information to support the Onshore Ecology assessment includes the following appendices (Volume 3.3):

   - ES Appendix 23.1 Extended Phase 1 Habitat Survey Report (Document Reference: 3.3.30);
   - ES Appendix 23.2 Great Crested Newt eDNA Survey Report (Document Reference: 3.3.31);
   - ES Appendix 23.3 Riparian Mammals (Water Vole and Otters) Survey Report (Document Reference: 3.3.32);
   - ES Appendix 23.4 Reptile Survey Report (Document Reference: 3.3.33);
   - ES Appendix 23.5 Hazel Dormouse Survey Report (Document Reference: 3.3.34);
   - ES Appendix 23.6 Terrestrial and Aquatic Invertebrate Survey Report (Document Reference: 3.3.35);
   - ES Appendix 23.7 National Vegetation Classification (NVC) Survey Report (Document Reference: 3.3.36);
   - ES Appendix 23.8 Bat Emergence/ Re-entry Survey Report (Document Reference: 3.3.37);

- ES Appendix 23.9 Bat Activity Survey Report (Document Reference: 3.3.38); and
- ES Appendix 23.10 Green Infrastructure Plan (Document Reference: 3.3.39).

23.2 Consultation

5. Consultation with regard to onshore ecology has been undertaken in line with the general process described in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8). The key elements have included scoping, responses to the Preliminary Environmental Information Report (PEIR) and the ongoing technical consultation via the Onshore Ecology and Ornithology Expert Topic Group (ETG). Table 23.1 provides a summary of how the consultation responses received to date have influenced the approach that has been taken.

6. Full details of the consultation process will also be presented in the Consultation Report (Document Reference: 4.1) as part of the Development Consent Order (DCO) application.

Table 23.1 Consultation responses

Consultee	Date / Document	Comment	Response / where addressed in the ES
Essex County Council (Places Services)	06/07/2021, North Falls Onshore Ecology and Ornithology ETG.	Noted that Essex County Council could also help with providing information on Roadside Verges which would not be available in existing biological records check.	NFOW added Essex Field Club and Essex County Council to data records search (see Section 23.4.2.2 and 23.5.2).
Essex County Council (Places Services)	06/07/2021, North Falls Onshore Ecology and Ornithology ETG.	Recommended both local and national district licencing teams are involved in the call with the EPS licencing team because the EPS team is not always aware of action on the ground.	Natural England's European Protected Species (EPS) Licensing team and the National District Level Licensing team held a discussion on 19th August 2021 regarding licensing approaches for great crested newts (see Section 23.6.1.12).
Natural England	06/07/2021, North Falls Onshore Ecology and Ornithology ETG.	Natural England support the use of the Defra biodiversity net gain (BNG) 3.0 metric. NE has a list of BNG projects in Essex which could be considered by the project. They also emphasised the potential to consider offshore BNG to be discussed in an appropriate ETG.	NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project, as articulated within the Environment Act 2021. A BNG Strategy (Document Reference: 7.22) has been submitted alongside the DCO application, using the latest version of the Defra Biodiversity Metric, to

Consultee	Date / Document	Comment	Response / where addressed in the ES
			provide a preliminary value of the potential BNG that could be delivered by the Project. The final BNG delivered would be determined following completion of another Defra Biodiversity Metric at the detailed design stage post-consent. Natural England provided a list of BNG projects for NFOW for future consideration on 29.09.21. These have been taken into account for BNG by the Project as potential compensation if required. The outcomes of the Early Design BNG assessment are set out in the BNG Strategy (Document Reference: 7.22).
Environment Agency	16/08/2021, North Falls Scoping Opinion (p. 130).	Concerned that scoping has excluded the potential for saline intrusion with HDD at the landfall, and of overtly noting the potential for localised changes to groundwater flow in terms of barriers e.g., excavations proximal to shallow groundwater abstractions.	This is addressed in ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23), and in Section 23.6.1.1.
Environment Agency	16/08/2021, North Falls Scoping	Concerns regarding the recording of wildlife sites and the use of HDD. Horizontal Direct Drilling is referred to: whilst this can help to avoid sensitive surface features, there remains some serious concern about this approach. There have been serious, recent incidents where bentonite breakout from HDD operations have resulted in long term	NFOW requested further information on preferred safeguards from the

Consultee	Date / Document	Comment	Response / where addressed in the ES
	Opinion (p. 131).	habitat contamination issues on two Sites of Special Scientific Interest (SSSIs) and Special protection Areas (SPAs) in East Anglia. Although inert, bentonite is considered a pollutant due to its ability to smother sensitive receptors such as intertidal feeding areas and such incidents cannot be allowed to happen again. The Environment Agency will seek assurances that method, geology and best practice will all be investigated, evaluated and mitigated at an early stage to ensure that such a pollution event is safeguarded against for this project. We are raising this issue at an early stage to ensure that all potential problems are raised and eliminated. The Environment Agency can provide more information concerning some preferred safeguards in due course.	Environment Agency and received a response on 09.12.21. Potential effects arising from the use of HDD are assessed in Section 23.6.1
Essex County Council	16/08/2021, North Falls Scoping Opinion (pg. 138)	We note that proposed surveys for Hazel Dormice will still be restricted to "all suitable woodland habitats that may be affected by the project" despite highlighting that a small population of these European Protected Species was found to be present in non-woodland habitat (on the embankment to the south of the existing A120 and the population was considered to be of value at a County level. This is a live application with ECC (CC/TEN/31/21) within the onshore scoping area. We therefore recommend that the details for the Phase 2 ecology surveys scheduled for 2022 are amended to include all suitable habitats that may be affected by the project. The timing for these surveys is also critical as East Anglian Dormice have been found to breed later in the year so optimal survey window is later and this change in methodology is to be published soon (pers comm, Essex & Suffolk Dormouse Group). We welcome the inclusion of Hazel Dormice to the list of species of key concern for the onshore EIA of this NSIP. Please note that any section relating to badgers should be clearly marked on the front cover as confidential due to its sensitive information so that it will not be widely available. If this information is contained within the ES ecology chapter, the above requirements applies so that the sensitive section can be redacted before it goes into the public domain.	Section 23.5.4.6 details the hazel dormice baseline within the habitat and species study area based on the 2022 field surveys, and Section and 23.6.1.14 provides an assessment of the potential impacts on hazel dormice. With additional mitigation, hazel dormice will likely experience a long-term moderate beneficial significance of effect. Full survey results from the hazel dormouse surveys are detailed in ES Appendix 23.5 (Document Reference: 3.3.34). Sections 23.5.4.1 and 23.6.1.9 in this chapter relate directly to badgers, although contain no location-specific information and so have

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			been retained within the public-facing version of this chapter. The badger field survey results detailed in ES Appendix 23.1 (Document Reference: 3.3.30) do contain full details of the locations of badger field signs and as such this Annex ('Appendix D' of ES Appendix 23.1 (Document Reference: 3.3.30)) is marked as confidential and will be removed from public versions of the ES. No significant effects are predicted to occur to badgers.
Essex County Council	16/08/2021, North Falls Scoping Opinion (paragraph 4.2.4)	The report mentions that there will be some habitat fragmentation and impact on local ecology (Section 3.5.3 pages 171-173) through the installation of cables and onshore substations. These impacts need to be minimised by mitigation measures and habitats or vegetation should be reinstated where appropriate. Any habitat enhancements, whether boundary hedgerow, field margin, grassland or wildflower meadow, grass strips, or woodlands all need to be connected to landscape wide GI network to prevent fragmentation and promote biodiversity migration. It is recommended that the Ecological Management Plan incorporates the mitigation measure for habitat/ GI removal, fragmentation and potential impact on protected designated sites (i.e., Holland Haven Marshes and Weeleyhall Wood SSSI's) to be identified in the EIA. There should also be the inclusion of a 'Landscaping and Screening Proposal' for the onshore substation that could result in a beneficial impact.	Section 23.6.1 assesses the impacts of habitat fragmentation on local ecological receptors (and where required additional mitigation needs) including designated sites, protected and notable species, and habitats. Table 23.5 sets out embedded mitigation in North Falls Project design. No significant adverse effects are predicted to occur on EPS.

Consultee	Date / Document	Comment	Response / where addressed in the ES
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 134).	Noted that the offshore elements of this proposal appear well developed and researched, however concern was raised that the onshore implications are vague and un-proven at this time, as the submission itself does acknowledge.	A broad onshore scoping area only was provided within Scoping Report, this has since been revised down to onshore project area for assessment in this ES (see Sections 23.5 for description of existing environment and 23.6 for assessment of significance).
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 137).	In accordance with Regulation 14 of the EIA Regulations, the ES should provide a statement about the relevant expertise or qualifications of the competent experts involved in its preparation.	This has been provided in ES Chapter 1 Introduction (Document Reference: 3.1.3).
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 137).	It will be necessary to provide sufficient information on non-significant impacts on protected and Priority species and habitats. This information should be included in the EIA submission as a specific chapter or attached as a separate document. This is necessary in order that the local planning authorities (LPAs) have certainty of all likely impacts, not just significant ones, and can issue a lawful decision with any mitigation and compensation measures needed to make the development acceptable.	Assessment of the significance of effect is provided in Section 23.6 and summary Table 23.44, as required by the EIA regulations 2011.
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 137).	Planning application will need to be supported by adequate ecological surveys and assessments to enable the SoS to determine any application submitted in line with national and local policy and its statutory duties. This will include likely impacts on designated sites (international, national and local), Protected species and Priority habitats and species - not just significant ones.	See Sections 23.5 for description of existing environment and 23.6 for assessment of significance.
Essex County Council	16/08/2021, North Falls Scoping	Ecological assessments should take data search records & survey information and use professional judgement to come to reasoned conclusions as to the likelihood of species being present and affected by the proposed development. All surveys must be undertaken by suitably qualified ecologists at the appropriate time of year, using standard methodologies.	See Section 23.5 for a description of existing environment.

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	Opinion (p. 138).		
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 138).	Effective and robust measures, in line with the mitigation hierarchy, must also be proposed which have a high degree of certainty for their deliverability in the long term. If there are residual impacts, these will need to be compensated for on site or offsite with long term management secured, and appropriate enhancements included to ensure measurable BNG from development.	Embedded mitigation is summarised in Table 23.5 and Section 23.6 includes additional mitigation. Table 23.44 is summary of potential effects.
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 138).	Welcome the addition of Essex Field Club as a data source in Table 3.13 for records of protected, notable and invasive non-native species as recommended at the Onshore Ecology Expert Topic Group meeting on 6 July. However, this data source still needs to be added to Table 3.16 for ornithological datasets.	Essex Field Club has also been included as a data source in ES Chapter 23 Onshore Ecology (Document Reference: 3.1.25). For ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26) it was considered that for birds, primary source were the Essex Birdwatching Society and the British Trust for Ornithology.
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 139).	Highlight that Defra Biodiversity Metric v 3.0 (2021) is now available so should be used for the BNG calculations instead of v 2.0. We recommend that this report demonstrates the baseline assessment and details of losses and compensatory habitat as well as biodiversity enhancements to demonstrate net gain of habitats. As there is no Local Nature Recovery Network for Essex as yet, we would support improving the condition of existing Priority habitat as enhancements particularly in relation to losses from the cable landfall and onshore substation. We also expect this report to include details of enhancements for relevant species on the site and any need for off-site habitat provision and its long-term management and monitoring. Full Metric calculations should also be provided.	NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project. All current information on the BNG baseline for the onshore project area is detailed in ES Appendix

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		We recommend that the applicant thoroughly explores all reasonable options to deliver additionality for the measurable BNG to restore biodiversity networks & their ecological functionality and also provide enhancements for Priority species affected by the development. We look forward to the BNG report to be submitted which shows how these species will benefit from these new habitats created and enhanced.	23.1 (Document Reference: 3.3.30). The Project is engaging with ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering this BNG. Habitat condition for the habitats within the study area is set out in Table 23.18. This was recorded in accordance with the most up to date condition assessment criteria at the time of survey, namely, the Biodiversity Metric 3.0 Auditing and accounting for biodiversity: User Guide [1] (Panks et al., 2021). For use in the Project's BNG Strategy (Document Reference: 7.22), the outputs of

[1] At the time of the Extended Phase 1 Habitat Survey, the Defra Biodiversity Metric versions 3.1, 4.0 and the Statutory Biodiversity Metric had not yet been released, therefore this stage of the assessment was based on Version 3.0.

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			condition assessments were updated in line with the Defra Statutory Biodiversity Metric.
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 142).	Essex County Council currently provides advice on green infrastructure (GI) schemes for major developments. Essex County Council have been a consultee on GI since the 2018. Although there are no statutory requirements for GI, the 25-Year Environment Plan and emerging Environment Bill will place significant importance on protecting and enhancing GI, accessibility and BNG.	Noted - no specific actions.
Essex County Council	16/08/2021, North Falls Scoping Opinion (paragraph 4.1.3)	Having reviewed the Environment Impact Assessment Scoping report, we would advise the following recommendations are considered for enhancements to the scheme that would improve the GI network and help achieve net environmental gains.	North Falls have not undertaken an audit of GI across the onshore project area as part of the habitat survey. An audit as requested by ECC involves several other disciplines, for example socio-economic, tourism and recreation. Existing GI policy in Essex has been used to feed into our overall BNG Strategy (Document Reference: 7.22), which will be submitted as part of the DCO application. A GI Plan is set out in ES Appendix 23.10 (Document Reference: 3.3.39).
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 142)	Essex County Council look to ensure that adequate provision, protection and improvements of high-quality GI comply with the objectives and planning principles set out in the following documents: - Tendring's Infrastructure Delivery Plan (2017), Tendring's Open Spaces Strategy (2008)) and associated Infrastructure Delivery Plan, as well as Tendring's Local Development Plan policies regarding the Council's approach to GI provision in the local authority area. - Essex Green Infrastructure Strategy, 2020 aims to enhance the urban and rural environment, through creating connected multi- functional GI that delivers multiple benefits to people and wildlife. It meets the Council's aspirations to improve GI and green spaces in our towns, cities and villages, especially close to areas of deprivation.	
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 142).	The Environment Impact Assessment (EIA) and Environment Statement (ES) will need to identify appropriate measures for avoiding or reducing significant adverse effects on the functionality of GI assets. It can also assist in identifying measures for compensating/off-setting unavoidable significant adverse effects on GI assets to protect the overall integrity of the surrounding and wider landscape scale GI network. Existing habitats green and blue features should be considered as GI *Essex GI Strategy, 2020, Chapter 8.5) and designed and managed correctly to improve the environmental benefits of the wider landscape.	

Consultee	Date / Document	Comment	Response / where addressed in the ES
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 143).	Recommend that the habitat survey includes an audit of existing GI within the site boundary. The audit should include, existing GI assets, areas for improvement and opportunities to meet gaps in provision in response to local need.	
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 143).	The Essex and South Suffolk Shoreline Management Plan has noted that Holland Haven Marshes SSSI represents an outstanding example of a freshwater to brackish water transition and includes a number of nationally and locally scarce species. Holland Haven country park, situated on the flood plain of Holland Brook, is important both for conservation and recreational value. The reclaimed Holland Haven marshes are likely to contain well-preserved paleoenvironmental deposits. Internationally important Palaeolithic remains are known to exist on the Clacton Cliffs and foreshore SSSI. There are also important links to be made between historic freshwater grazing marshes, for example, and the rare plants and animals they support. Finally, the historic environment makes an important economic contribution to the area, through tourism associated with heritage assets and historic landscapes.	Noted - no specific actions (see Section 23.5.2).
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 143).	Recommend that following the publication of the EIA that a biodiversity enhancement plan (BEP) is developed. The purpose of the BEP is to lay out the specific objectives for biodiversity and the means by which these objectives will be achieved, including the protection of existing species and habitats (GI), the establishment of specific enhancements (including net gain), their maintenance and monitoring. Biodiversity enhancements should be selected to fit the physical attributes of the site and should tie in with existing habitats and species of value on and around the site. Furthermore, they should be compatible with the primary purpose of the site – to generate wind power (all be it mainly onshore substations and underground cables). If agricultural production is also planned for the site, biodiversity enhancements should aim to dovetail with these goals.	NFOW have captured this in Outline Landscape and Ecological Management Strategy (OLEMS) (Document Reference: 7.14), rather than a separate BEP, submitted as part of the Project's DCO application (Section 23.3.3). The OLEMS also details any mitigation identified within the EIA in relation to onshore ecological receptors. The Early Design BNG Assessment in the BNG Strategy (Document Reference: 7.22) includes proposal for achieving

Consultee	Date / Document	Comment	Response / where addressed in the ES
			BNG for the onshore elements of the Project.
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 144).	Documents such as the Construction Environmental Management Plan (CEMP), Landscape and Ecological Management Plan (LEMP) and BEP will help ensure appropriate tasks, mitigating measures and methods are in place to: Protect the retained trees and hedgerows; Develop a schedule of advanced planting to create a landscape structure or evidence is shown that substantive GI is secured as early as possible in subsequent phases; Develop a landscape management and maintenance plan and work schedule for a minimum of 10 years including how management company services for the maintenance of GI assets and green spaces shall be funded and managed for the lifetime of the development; Address recommendations within the habitat and ecology survey to enhance the ecological value through the proposed development; and Demonstrate measurable net gains for biodiversity, as outlined under paragraph 8[C], 153, 174[a][d] and 179 of the National Planning Policy Framework (NPPF) updated 2021.	This has been captured in the OLEMS. Note suggested 10 years planting aftercare requirement (see Section 23.3.3 embedded mitigation).
Essex County Council	16/08/2021, North Falls Scoping Opinion (p 144).	Phased implementation within the CEMP of new GI and protecting of retained vegetation of the development during construction will allow for the GI to mature and it will provide the further benefit of reducing/buffering the aesthetic impact from the construction work. The LEMP will ensure appropriate management and maintenance arrangements and funding mechanisms are put in place to maintain high- quality value and benefits of the GI assets.	This has been captured in the OLEMS (Section 23.3.3).
Essex County Council	16/08/2021, North Falls Scoping Opinion (p. 145).	The BEP will provide opportunities for biodiversity and environmental net gains through the development, enhancing the current value of the site. This can contribute positively to reversing the long-term decline in biodiversity and enhance quality of life for people. Ultimately, the best Landscape/GI/ biodiversity plans will be those developed through engagement with the local community, the landowner and local and national conservation organisations. Although we recommend these are submitted early in the planning process, these documents can be conditioned or submitted at the reserved matters stage.	These measures are captured in the OLEMS (see Section 23.3.3).
Essex County Council	16/08/2021, North Falls Scoping	EIA Scoping report mentions the potential decommissioning of the site and it should be capable of removal and reversible. However, it is important that any benefits created are maintained, this includes any gains in biodiversity, habitat creation, multifunctional GI assets, sustainable drainage features, improvement in land and soil quality, etc. We would welcome the EIA recommending the development of Restoration plans. These can provide significant	Restoration plans - as above, this are discussed in OLEMS (see Section 23.3.3).

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	Opinion (p. 145).	opportunities for habitat creation, biodiversity, climate change mitigation, GI and blue infrastructure enhancements and can include elements of public access for recreation. Restoration plans will need to be identified at early stage of planning and regularly updated.	
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 180).	Particularly concerned about any impact on Ancient Semi Natural Woodland (ASNW) and will expect to see careful consideration of any impact and any weightings which might be applied to any assessments of route options/or site choice.	Impacts on ASNW are included in Section 23.6.1.2 and Section 23.6.1.5. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 180).	Ancient woodland is an irreplaceable habitat. As highlighted in the para 175 NPPF, whilst Nationally Significant Infrastructure Projects are not subject to the NPPF it sets out the importance of these irreplaceable habitats. This applies both to ASNW and Plantations on Ancient Woodland Sites (PAWS). The scoping document does list a number of Ancient Woodlands, and these will be woodlands above 2 ha which is the smallest size currently defines as ancient by Natural England, however this does not mean there are not others. Also we would wish to see all woodland included in any assessment this includes any new planting. Given the Climate change imperatives and the government policy towards tree planting it is imperative that we endeavour to protect what we have.	Assessment of the impact on all woodland (as recorded in the Extended Phase 1 Habitat Survey (ES Appendix 23.1 (Document Reference: 3.3.30)) is provided in Section 23.6.1.2 and Section 23.6.1.5). No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 180).	Suggested using the National Forest Inventory data sets to identify irreplaceable woodland on site. https://data.gov.uk/dataset/cd748245-e68c-41e4-bb1a-4728bc64163c/national-forest-inventory-woodland-england-2018 (last updated 2020) these go down to 0.5 ha.	Section 23.4.2 lists the sources of data and Section 23.5.3.4 describes the woodland resource across the onshore project area. No significant effects are predicted on woodland habitats.

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Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 180).	Forestry Commission expects the applicants to avoid all irreplaceable habitats, and other woodland wherever possible. One of the most important features of Ancient Woodlands is the quality and inherent biodiversity of the soil; being relatively undisturbed physically or chemically it is also a major seed bank. Direct impacts of development that could result in the loss or deterioration of ancient woodland or ancient and veteran trees include: Damaging or destroying all or part of them (including their soils, ground flora or fungi) Damaging roots and understorey (all the vegetation under the taller trees) Damaging or compacting soil around the tree roots Polluting the ground around them Changing the water table or drainage of woodland or individual trees Damaging archaeological features or heritage assets	Effects on ancient woodland assessed in Section 23.6.1.2. No significant effects are predicted on ancient woodlands.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	By thorough mapping and identifying woodland it can be considered appropriately to avoid any of the above impacts. e.g., rerouting pipes, moving temporary stockpiles and balancing ponds. It is also essential that fuels, chemicals, or waste materials such as topsoil, minerals or hard-core are not stored on ancient woodland soils or under the woodland canopy.	Effects on woodland are assessed in Section 23.6.1.5. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	Refer NFOW to further technical information set out in Natural England and Forestry Commission's Standing Advice on Ancient Woodland – plus supporting Assessment Guide and Case Decisions.	Guidance taken into consideration - see Section 23.4.3.1.2.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	UK Forestry Standard (UKFS) sets out the United Kingdom (UK) government's approach to sustainable forestry and woodland management, including standards and requirements as a basis for regulation, monitoring and reporting requirements. The UKFS has a general presumption against deforestation. Page 23 of the Standard states that: "Areas of woodland are material considerations in the planning process…."	Effects on woodland have been assessed in Section 23.6.1.5. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls	Lowland mixed deciduous woodland is on the Priority Habitat Inventory (England). This recognises that under the UK Biodiversity Action Plan (BAP) they were recognised as being the most threatened and requiring conservation	Lowland mixed deciduous woodland has been

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	Scoping Opinion (p. 181).	action. The UK BAP has now been superseded by the UK Post-2010 Biodiversity Framework but this priority status remains.	considered in Section. 23.6.1.5. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	Expected that there will be a thorough assessment of any loss of all trees and woodlands within the project boundary and the development of mitigation measures to minimise any risk of net deforestation. A scheme that bisects any woodland will not only result in significant loss of woodland cover but will also reduce ecological value and natural heritage impacts due to habitat fragmentation, and a huge negative impact on the ability of the biodiversity (flora and fauna) to respond to the impacts of climate change. Woodland provides habitat for a range of Section 41 Priority Species including all bats.	Effects on woodland have been assessed in Section 23.6.1.2 and Section 23.6.1.5. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	Where woodland loss is unavoidable, it is expected that there will be significant compensation and the use of buffer zones to enhance the resilience of neighbouring woodlands. These zones could include further tree planting or a mosaic of semi-natural habitats.	Buffer zones have been considered when assessing impacts on woodland (Section 23.6.1.2 and Section 23.6.1.5). For example, where practicable works will not occur within 15m of ancient woodland. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	For any woodland within the development boundary, land required for temporary use or land where rights are required for the diversion of utilities you must take into consideration the Root Protection Zone. The Root Protection Zone (as specified in British Standard 5837) is there to protect the roots of trees, which often spread out further than the tree canopy. Protection measures include taking care not to cut tree roots (e.g., by trenching) or causing soil compaction around trees (e.g., through vehicle movements or stacking heavy equipment) or contamination from poisons (e.g., site stored fuel or chemicals). Therefore in scoping it is useful to set a buffer area around woodland to enable cable routing to be far enough away.	Buffer zones have been considered when assessing impacts on woodland (Section 23.6.1.2 and Section 23.6.1.5). Where cable infrastructure cannot be

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			avoided in design, cable ducts will be installed at least 2m below ground level to avoid the root protection areas of woodland habitats. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 181).	If it becomes necessary, the mitigation hierarchy (set out in Paragraph 175 of the NPPF) sets out a useful structure for considerations of mitigation and compensation. Whilst the NPPF does not apply to NSIPs this ethos remains the same.	Effects on woodland are assessed in Section 23.6.1.2 and Section 23.6.1.5. No significant effects are predicted on woodland habitats.
Forestry Commission	10/08/2021, North Falls Scoping Opinion (p. 182).	Some of the previous comments will become more relevant once the onshore cable route and infrastructure locations are determined.	Noted - no specific actions.
Natural England	16/08/2021, North Falls Scoping Opinion (p. 233).	Section 1.5.3 Figure 1.5 The location of Site of Special Scientific Interest (SSSI) should also be clearly identified within Environment Impact Analysis (EIA) Figures. Consideration should also be given to Impact Risk Zones for each SSSI as available from Magic. Include SSSIs in relevant ES Figures and consider impacts within any EIA.	Impacts on Holland Haven Marshes SSSI are assessed in Section 23.6.1.1. No significant effects are predicted on the Holland Haven Marshes SSSI.
Natural England	16/08/2021, North Falls Scoping	Section 1.5.3 Figure 1.5	Impacts on statutory and non-statutory designated

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	Opinion (p. 234).	There may also be a number of Candidate Local Wildlife Site (CLoWS) throughout the scoping area, and these should be illustrated within Figures and given due consideration in EIA. Include CLoWS in relevant ES figures and consider impacts to these sites within any EIA.	sites are assessed in Section 23.6.1.2. No significant effects are predicted on statutory and non-statutory designated sites.
Natural England	16/08/2021, North Falls Scoping Opinion (p. 234).	Section 1.5.3 Figure 1.5 There are a number of areas of Ancient Woodland within the scoping area which are not currently identified in the Figure. Identify and include all areas of Ancient Woodland, including appropriate buffers, in relevant ES figures and provide an assessment within any subsequent EIA.	Section 23.5.3.4 describes the woodland resource across the onshore project area and has included all ancient woodland. No significant effects are predicted on ancient woodlands.
Natural England	16/08/2021, North Falls Scoping Opinion (p. 234).	Section 1.6.3 Points 70 + 76 Much of the scoping area is being considered for woodland creation and we suggest that the Applicant contact the Forestry Commission for further information regarding this and possible consideration within the EIA. Contact Forestry Commission to obtain information regarding woodland creation proposals.	The Forestry Commission's website [2] [Accessed 13 January 2023] has been reviewed for potential areas of woodland creation within the onshore project area. These have been considered in Section 23.5.3.4.

[2] https://www.forestergis.com/Apps/MapBrowser/

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Natural England	16/08/2021, North Falls Scoping Opinion (p. 235).	Section 1.8.2.4 Point 98 "Embedded mitigation will be incorporated into the project design…" This statement could go further. Ideally, most potential impacts could be avoided, or effects reduced at the design stage of the project, through early consideration of ecological constraints, which along with consideration of other environmental features would be used to refine scheme layout, siting and design. Further impacts could also be avoided through micro-siting of infrastructure at the construction stage. We advise that the ES demonstrates that the mitigation hierarchy has been followed wherever appropriate.	Table 23.5 details the embedded mitigation for North Falls.
Natural England	16/08/2021, North Falls Scoping Opinion (p. 256).	Section 3.5.3.1.3 We welcome HDD under important hedgerows. Should the creation of any gaps in hedgerows be necessary during construction or operation Natural England would advise that they are as small as possible with hedges either side of gaps allowed to thicken up during construction and operation to facilitate use as feeding and commuting corridors for wildlife. The ES should commit to this mitigation measure.	Where practicable, all 'important' hedgerows, and those hedgerows potentially suitable for supporting dormice and/or commuting / foraging bats will be crossed using trenchless techniques (e.g. HDD). Where trenchless techniques are not practical, the working width at hedgerows has been narrowed to 30m to minimise the length of hedgerow which needs to be removed. Further details on this commitment are addressed in Section 23.3.3. With additional mitigation, long term moderate beneficial effects are anticipated for hedgerows.

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Natural England	16/08/2021, North Falls Scoping Opinion (p. 256).	Section 3.5.1.3 Protected Species Licence- Please contact the Natural England Case Officer and the Licensing team as early in the process as possible regarding information required for a protected species Licence and the possibility of a Letter of No Impediment. The Applicant to contact Natural England regarding Protected Species Licences at an early stage.	Meeting held with Licensing Team on 19th August 2021 specifically to discuss great crested newt licencing. ETGs were held on the 29th February and 1st March 2024, confirming the Project's EPS licence requirements and commitment to the use of great crested newt district level licensing. All licensing is addressed in Section 23.6. The only licence required by the Project pre-consent will be a great crested newt district level license.
Natural England	16/08/2021, North Falls Scoping Opinion (p. 256).	Section 3.5.1.3 Point 471 HDD- We would welcome a detailed specification to be included in EIA of the HDD process and protocols to be put in place to prevent breakouts or Frack-outs from occurring or minimise impacts should this occur. Further detail on these matters should be presented in the ES.	An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been submitted alongside the DCO (Document Reference: 7.15), which includes details of managing breakouts during drilling.
Natural England	16/08/2021, North Falls Scoping	Section 3.5.1.1 Point 511	Explanation for basis for buffers used to scope in sites is provided in Section 23.3.1.

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	Opinion (p. 256).	It is not clear why the Applicant has selected a 5km radius as a screening tool for designated sites. The screening area should be based on Impact Risk Zone (IRZ) for designated sites as available on Magic, and the ecology, i.e. foraging areas of designated species of sites in proximity to the proposed development area. Scoping area to be based on designated sites IRZ rather than an arbitrary 5km.	It is noted that the IRZ for designated sites is 5km.
Natural England	16/08/2021, North Falls Scoping Opinion (p. 256).	Section 3.5.4 Point 541 Net Gain- Natural England are delighted that NFOW are keen to ensure BNG is included within the projects design and support this approach.	Noted - no specific actions.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p.71).	White-clawed crayfish. It's stated that white-clawed crayfish are recorded as being present within the onshore scoping area and surveys are planned for 2022. The Inspectorate notes the potential for hydrological / ecological connectivity from the Proposed Development to protected sensitive habitats and species. As part of its assessment of spread of INNS, the Applicant should consider the potential for the Proposed Development to facilitate the spread of non-native crayfish and crayfish plague, which could impact native crayfish and their habitats.	Whilst records of white-clawed crayfish were found within 2km of the onshore scoping area and therefore highlighted within the Scoping Report, no records were found within 2km of the onshore project area (see ES Appendix 23.1 Extended Phase 1 Habitat Survey Report (Document Reference: 3.3.30)), nor was suitable habitat noted within the report. As such no targeted white-clawed crayfish surveys were undertaken to inform the ecological baseline, and white-clawed crayfish are considered likely absent from the onshore habitats and species study area.

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Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p.72).	Mitigation measures - timing of works. The ES should explain the timing of the proposed construction and / or operational activities and any measures to avoid key / sensitive periods for species, such as spawning / breeding and migration periods. The ES should assess the duration of impacts in relation to the ecological cycles (e.g. life cycles, breeding / spawning seasons, migration periods, etc.) of the receptors being assessed.	Table 23.5 details embedded mitigation as part of North Falls Project design. Impacts on individual ecological receptors, including seasonality and timings of species life cycles, are addressed in Section 23.6.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.2).	Paragraph 86 of the Scoping Report (detailing the overarching assessment methodology for the EIA) states that study areas defined for each receptor are based on the Zone of Influence (ZoI) and relevant characteristics of the receptor (e.g., mobility / range). Inspectorate notes that for many of the aspect chapters included, study areas and ZoIs have not been stated. Where this detail has been provided, it is not clear how these study areas relate to the extent of the impacts and likely significant effects associated with the Proposed Development, how they have been used to determine a ZoI, and what receptors have been identified within the ZoI. The ES should provide a robust justification as to how study areas have been defined and why the defined study areas are appropriate for assessing potential impacts.	Explanation for basis for buffers used to scope in sites is provided in Section 23.3.1.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.3).	Where aspect chapters and assessments of the ES are separated into onshore and offshore assessments, it is unclear to what extent such assessments consider the potential for impacts to overlap and interrelate. Furthermore, there are instances whereby cross- references are made to impacts that have not been addressed in the appropriate aspect(s) of the Scoping Report. For example, the Ground Conditions and Contamination aspect chapter highlights the potential for direct impacts to surface water receptors and associated ecological habitats from contamination, however, this impact is not addressed within Onshore Ecology. There are similar examples of other cross-cutting matters (e.g., Unexploded Ordnance (UXO) clearance, underwater noise, spread of invasive non-native species (INNS), etc.) that have not been appropriately cross- referenced. The ES should assess impacts that overlap or interrelate between offshore and onshore receptors where there is a likely significant effect and consider the potential for such impacts to act cumulatively. Where appropriate, study areas should be refined based on the results of updated survey data.	Interactions (where effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects with different disciplines as a result of that interaction) are discussed in Section 23.9. Interrelationships (where effects identified and assessed in this chapter have the potential to interrelate with each other)

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			are addressed in Section 23.10.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.6).	Figures presented in the ES and used to support the assessment should be legible and show all relevant information, including receptors considered in the assessment. The ES should include figures illustrating designated and non-designated ecological sites, including SSSIs and Impact Risk Zones where relevant, ancient woodland, and receptors used in the assessment of air quality, noise and vibration.	See ES Chapter 23 Figures (Document Reference: 3.2.19).
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.9).	Some aspect sections of the Scoping Report have identified specific receptors, whereas others identify broad categories of receptors only. Specific receptors should be identified within the ES, alongside categorisation of their sensitivity and value. Section 1.8.2.1 of the Scoping Report explains the generic approach to defining receptor sensitivity in order to assess the potential impacts upon each receptor. The inspectorate expects a transparent and reasoned approach to be applied to assigning receptor sensitivity to be defined and applied across the aspect chapters.	See importance definitions in Section 23.4.3.1.1.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.14).	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.	See Section 23.4.6.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.17).	Section 1.7.2 and Table 1.4 of the Scoping Report explains that an Evidence Plan Process (EPP) with specialist stakeholders commenced in 2021 to agree the 'detailed methodologies for data collection and undertaking the impact assessments' in respect of certain aspects to be scoped into the ES. This approach to agreeing the finer details of the assessment is welcomed. Other aspects, including fisheries, aviation and radar, and shipping and navigation, would fall outside of the EPP but the Applicant has committed to consultation at an early stage of the assessment process. The Applicant should ensure that any agreements reached during EPP, or other consultation process are evidenced within the ES.	Noted – responses to points made during the EPP are detailed in this section.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion	Section 1.9.3 of the Scoping Report sets out the planning policy and legislation context for the Proposed Development. It would be beneficial for the aspect chapters of the ES to also include reference to aspect specific planning policy and legislation, where this has been used to inform the methodology used for assessment.	See Section 23.4.1 for details of planning and

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	(paragraph 3.3.18).		legislative context relevant to this chapter.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.20).	The Inspectorate notes that in a number of instances the potential for impacts to ecological receptors (including offshore ornithology, onshore ecology and onshore ornithology) arising from the use of new lighting during the construction, operational and decommissioning phases of the Proposed Development are identified. The Scoping Report states that in respect of onshore receptors, the risk of disturbance from lighting is low. In addition, the Inspectorate notes that there is potential for night-time lighting, which could result in effects to the setting of cultural heritage receptors, as well as seascape, landscape and visual receptors. The ES should include a description of the expected lighting emissions, appropriate visual representations and an assessment of effects, where significant effects are likely to occur. The ES should include details of any measures proposed to mitigate significant effects, including the use of lighting controls, and how this would be secured within the DCO.	See Section 23.6 for consideration of lighting on different receptors.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (paragraph 3.3.23).	Any mitigation relied upon for the purposes of the assessment should be explained in detail within the ES. The likely efficacy of the mitigation proposed should be explained with reference to residual effects. The ES should also address how any mitigation proposed is secured, with reference to specific DCO requirements or other legally binding agreements.	See Section 23.3.3 for embedded mitigation and Section 23.6 for additional mitigation in relation to each receptor. See also Summary Table 23.44.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 61).	Paragraph 444 Ecological receptors. The Inspectorate notes that no reference is made to Riddles Wood SSSI and Stour and Copperas Wood, Ramsey SSSI, which are located to 0.5km south and 3km northwest of the scoping boundary respectively, and whether these designated sites would be potentially sensitive to air quality changes including from construction traffic movements once the onshore components of the Proposed Development are refined. This should be confirmed in the ES and where there is potential for likely significant effects, these receptors should be scoped into the assessment.	The study area for construction vehicle movements has been defined based on the Traffic and Transport assessment and then effects upon designated sites within 500m of the network has been considered in this Ecological Impact Assessment (EcIA) (see Section 23.6.1.2).

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Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 64).	Paragraph 470 Potential impacts – heritage and ecological receptors. The Inspectorate considers that there is potential for indirect effects to below ground heritage assets arising from flood risk and drainage impacts. The ES should set out the method for defining the sensitivity of both heritage and ecological receptors to flood risk and drainage impacts where significant effects are likely to occur.	ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23) has defined potential study area for groundwater impacts. The effects of changes to groundwater resources is considered upon ecological receptors is considered in Sections 23.6.1.1 and 23.6.1.2. Effects upon heritage receptors are considered separately in ES Chapter 25 Onshore Archaeology and Cultural Heritage (Document Reference: 3.3.27).
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 69).	No matters have been proposed to be scoped out.	Noted – no specific actions.

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Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 69).	Potential impacts during construction. The Inspectorate notes that geotechnical survey (including sample boreholes and test pits) is proposed to be undertaken within the onshore scoping area. Given the potential proximity of the Proposed Development to the Stour Estuary and Hamford Water Ramsar sites, the ES should assess the potential for drawdown effects upon wetland habitat and the site's qualifying features, where significant effects are likely to occur. The ES should also fully assess the risks associated with the proposed construction techniques and excavations (including HDD and the potential for bentonite breakout and habitat contamination) on protected/ sensitive habitats and species where significant effects are likely to occur, including impacts upon Local Wildlife Sites (LoWS).	An assessment of the effects upon the designated features of Hamford Water SAC and Ramsar site and Stour and Orwell Estuaries Ramsar site are provided in Section 23.6. An assessment of the potential adverse effect upon the integrity of European designated sites and Ramsar sites has been provided separately in the Report to Inform Appropriate Assessment, published alongside this ES. No significant effects are predicted on statutory and non-statutory designated sites. An assessment of the risk posed by effects of construction techniques and excavations (including HDD) is presented in see Section 23.6.
Planning Inspectorate	26/08/2021, North Falls Scoping	Section 3.5.3.1.2 Potential impacts - permanent and temporary loss of terrestrial habitats. Where significant effects are likely to occur, the ES should consider not only the direct effects of habitat loss (i.e., on species mortality and abundance), but also consider the effective areas of habitats subject to disturbance and	Section 23.6 considers impacts of permanent and temporary habitat loss.

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	Opinion (p. 69).	displacement effects (including from noise / vibration, lighting, footfall and presence of workforce, and the presence and operation of the Wind turbine generator (WTGs)) that may serve to diminish the functional size of sensitive and / or protected habitats.	No significant adverse effects are predicted on habitats within the onshore project area.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 70).	Paragraph 417 Existing environment - Ancient Woodland. The Scoping Report states that there are 28 areas of ancient woodland located within the onshore scoping area; however, it's not known which woodland inventories have been relied upon to identify ancient and veteran trees. The ES should reference the source(s) of this data. The ES should assess likely significant effects on all relevant ancient woodland receptors, explain the effort made to avoid direct impacts on ancient woodland and veteran trees, and increased fragmentation of these habitats.	This is considered in Section 23.5. Effects on ancient woodland are assessed in Section 23.6.1.2 and veteran trees in Section 23.6.1.5. No significant effects are predicted on ancient woodlands or veteran trees.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 70).	Air quality effects. Chapter 3.5 does not refer to any potential air quality effects (e.g., from dust or nitrogen deposition from construction vehicles) on the ecological receptors identified and it's not indicated whether there are any designated sites within proximity of the Proposed Development that would potentially be sensitive to air quality changes. The Inspectorate expects the ES to include an assessment of these effects where significant effects are likely to occur.	Section 23.6.1 considers potential air quality effects on different receptors.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 70).	Paragraph 541 BNG It's stated that an assessment of BNG will be appended to the Onshore Ecology ES chapter. The ES should clearly differentiate between essential mitigation and enhancement that is proposed as part of the DCO.	The Early Design BNG Assessment and Strategy are detailed in the BNG Strategy (Document Reference: 7.22). The Project has been engaging with ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans

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			for exploring opportunities to deliver BNG.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 70).	Table 3.8 Watercourses and the Water Framework Directive (WFD). Table 3.8 (Water Resources and Flood Risk) suggests that crossings of main rivers or other sensitive watercourses may be required as part of the proposed works. The ES should describe the nature of any proposed works within or in proximity of watercourses and demonstrate that there is sufficient detail regarding the design as to inform a meaningful assessment of likely significant effects on watercourse hydraulics and ecology, including consideration of impacts upon migrating and / or spawning fish. The ES should consider the potential of such works to negatively impact the ecological status of watercourses under the WFD and the results of the WFD Assessment should be reported in the ES and / or associated Technical Appendix.	Details of effects of the Project upon watercourses and their WFD status are provided in ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.3.32), and ES Appendix 21.3 Water Environment Regulations Compliance Assessment (Document Reference: 3.3.29). Fish have been also included as a receptor in this EcIA (see Section 23.6.1.15). No significant effects are predicted on fish.
Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 71).	Paragraph 528 Invasive non-native species (INNS). The ES should assess the potential for construction and operational activities within proximity of watercourses and / or drainage ditches to facilitate the spread of INNS. Where significant effects are likely to occur, the ES should also consider the potential for climate change- related effects to facilitate the spread and exacerbate the impacts of INNS. The ES should describe any necessary mitigation and / or biosecurity precautions required to prevent the spread of INNS. Any measures relied upon in the ES should be discussed with relevant consultation bodies, including NE and the EA, in effort to agree the approach. Measures relied upon in the ES should be adequately secured e.g., through a CEMP.	This has been considered in Section 23.6.1.16. No significant effects are predicted as a result of INNS.

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Planning Inspectorate	26/08/2021, North Falls Scoping Opinion (p. 73).	Section 3.6.3 Potential impacts - habitat loss. Chapter 3.5 (Onshore Ecology) states that the ES will include an assessment of temporary and permanent terrestrial habitat loss. The Inspectorate considers that this assessment should interrelate with, and include appropriate cross-reference to, other relevant assessments of the ES. This should include consideration of the impacts of temporary and long-term terrestrial habitat loss on Onshore Ornithology, including those qualifying features of onshore designations that may rely on terrestrial habitats for nesting, roosting, breeding, foraging, etc. Where significant effects are likely to occur, the ES should consider not only the direct effects of habitat loss (i.e., on species mortality and abundance), but also consider the effective areas of habitats subject to disturbance and displacement effects (including from noise / vibration, lighting, and the presence and operation of the WTGs) that may serve to diminish the functional size of sensitive and / or protected habitats.	This has been considered in Section 23.6. Interactions (where effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects with different disciplines as a result of that interaction) are discussed in Section 23.10. No significant effects are predicted on habitats within the onshore project area.
Essex County Council (Places Services)	15/11/2022, North Falls Onshore Ecology and Ornithology ETG.	Tendring District Council are looking for potential ways to improve the biodiversity of Holland Haven Country Park and Local Nature Reserve [through BNG]	As noted above, NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project. All current information on the BNG baseline for the onshore project area is detailed in ES Appendix 23.1 (Document Reference: 3.3.30). The Project is engaging with ecological stakeholders and members of the Onshore

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			Ecology ETG to identify suitable projects and plans for delivering this BNG. An Onshore Ecology ETG was held 5th February 2024, where North Falls' overall approach to BNG was discussed. The findings of the Early Design BNG assessment are detailed in the BNG Strategy (Document Reference: 7.22).
Essex County Council (Places Services)	15/11/2022, North Falls Onshore Ecology and Ornithology ETG.	Were the last dates for bat transects late enough for picking up any migrating Nathusius pipistrelles?	The last bat transect surveys were completed in the last two weeks of October, including some closer to the coast so they could pick up migrating Nathusius pipistrelles. Some transects do not have an October visit due to Avian flu concerns, in which case the last survey would be late September, however, sufficient information has been collected to enable an assessment of their usage. The bat activity survey results are set out in ES Appendix 23.9 (Document Reference: 3.3.38).

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			No significant adverse effects are predicted on bat.
Natural England	15/11/2022, North Falls Onshore Ecology and Ornithology ETG.	It is important to state that [BNG] within the Holland Haven Marshes SSSI] can only occur where the SSSI site is not impacted (directly or indirectly) by the development. Secondly, we have consulted our BNG team who have advised us that there will be an update on this matter in the forthcoming UK Government BNG consultation response, which means that information on this could change. However, in the meantime, we would advise that if enhancement is on the non-designated features and, if Natural England consent the proposal, then BNG could be delivered this way.	Noted. The Project will continue to engage with Natural England and other ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering BNG. Off-site BNG compensation will not be required to compensate for any habitat losses for the Project. Full details on the Early Design BNG assessment are detailed in the BNG Strategy (Document Reference: 7.22).
Essex Wildlife Trust	15/11/2022, North Falls Onshore Ecology and Ornithology ETG.	Have NFOW considered protected species the Project can provide habitat creation for e.g. hazel dormice (mature hedgerows and woodland), ditch network for water vole habitat (Holland Haven Marshes) – and including within written landscaping scheme what type of habitat and potential location.	All habitat creation proposed as part of BNG for the Project will include consideration of the local protected species, for example hazel dormice and water vole. Further details of BNG proposals are provided in the BNG Strategy (Document Reference: 7.22).

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Essex Wildlife Trust	15/11/2022, North Falls Onshore Ecology and Ornithology ETG.	How close is the onshore project area to Great Holland Pits Essex Wildlife Trust reserve?	The reserve is located 10m outside of the onshore project area (see ES Figure 23.3c, (Document Reference: 3.2.19) at its closest point.
Natural England	14/07/2023, PEIR Consultation Cover letter Section 2 Key Concerns	We advise that a complete set of ecological surveys should be carried out, according to our standing advice and industry standard guidance. For Hamford Water SPA, we would wish to see 24 months of ornithology data collected for functionally linked land (FLL). Survey results should be provided within the ES. Furthermore, potential impacts identified following the ecological surveys, will need to be fully assessed and suitable mitigation provided, where necessary. We also advise that, depending on the survey results, the requirement to submit a draft protected species licence application may be required. Natural England's Wildlife Licensing team should be consulted on this matter. We also advise that Horizontal Directional Drilling (HDD) exit pits and associated operations should not be located within, or immediately adjacent to, Holland Haven Marshes SSSI. Survey data should be used to inform the siting of the onshore works compound, minimising environmental damage and disturbance to flora and fauna as much as possible within the SSSI. Appropriate mitigation measures should be identified to avoid/minimise disturbance arising from impacts due to noise, vibration, lighting, hydrological effects, and drill fluid contamination.	Impacts relating to ornithology are set out in ES Chapter 24 Onshore Ornithology (Document Reference: 3.3.26). Potential impacts identified during the ecology surveys as well as additional mitigation are assessed in Section 23.6. Further mitigation measures are set out in the OLEMS. Embedded mitigation is summarised in Section 23.3.3.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 1	We note that the Applicant is yet to undertake all required ecological surveys including those for bats and over-wintering birds. We advise that a complete set of surveys are carried out according to our standing advice and industry standard guidance, and that the results are included within the Environmental Statement (ES). Including 24 months of ornithology data within areas of functional linked land to coastal Special Protection Areas (SPAs). Any potential impacts that emerge from these surveys will need to be identified and suitable mitigation provided where required. This will be key to the application, and we advise that the Applicant consults NE on this.	Natural England were consulted on results of bat surveys in Onshore Ecology and Ornithology ETG (October 2023). The project's Bat Activity Survey and Bat Emergence Survey are considered adequate to

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			define the ecological baseline for bat species for the Project.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 2	We note that the precise landfall location is not yet known (5.7 – ES Chapter 5 Project Description) but cables will be installed using Horizontal Directional Drilling (HDD) to drill under the sea defences and sensitive ecological designations at the coast. We are unable to comment further on indirect effects on particular SSSI features in the direct locality until the location of the landfall HDD is further refined. Natural England advises that HDD exit pits and associated operations are not located within or immediately adjacent to Holland Haven Marshes SSSI. Survey information obtained to locate the works compound should be used to identify where the least damage and disturbance would be caused to flora and fauna associated with the SSSI. Suitable mitigation measures should be identified to avoid/minimise disturbance arising from noise and vibration, lighting, hydrological impacts, and pollution arising from 'breakout' of drilling fluid etc. These should be documented in the various mitigation plans proposed. We advise that and Ecological Clerk of Works should be part of any mitigation plan presented and present during the works.	Provision of an Ecological Clerk of Works (ECoW) for to landfall HDD has been included in the Project's embedded mitigation. Embedded mitigation is summarised in Section 23.3.3. Impacts relating to Holland Haven Marshes SSSI are set out in Section 23.6.1.1. This is also considered in ES 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 3	It needs to be determined whether any protected species licences will be required and the potential need for a Letter of no Impediment (LONI) to accompany the application. Mitigation for impacts on Great Crested Newt through NE's District Level Licensing (DLL) Scheme, should be considered where necessary. NE advises that based on the findings of species surveys, the Applicant may need to submit a draft protected species licence application where necessary including necessary mitigation measures. We advise consultation with NE's licensing team should be sought. We advise consultation with NE's licensing team should be sought and a DLL application submitted for review where required.	NFOW have reviewed conclusions regarding protected species licences following identification of the final onshore project area for DCO application. Apart from in relation to great crested newts (considered separately, under DLL) no licenses are considered required, as described in Section 23.6.1.9 - 23.6.1.15.

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Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 4	Natural England have concerns regarding the intertidal cable protection impact assessment. It is concluded that intertidal cable protection will act as additional groynes. However, no evidence is provided to support the overall conclusions nor any in combination impact assessment with Five Estuaries (VE) potential onshore connection as a separate project requiring cable protection. Natural England advise further evidence is provided as coastal defences along this length of coast are already impacting upon saltmarsh in Colne Estuary SSSI/SPA. Natural England also advises that all options to avoid potential additional impacts are explored in the first instance, including avoiding cable protection in this area entirely. The potential cable protection has not been assessed as part of the HRA which states there is no impact on the intertidal zone. We seek clarity on whether cable protection will be included within the intertidal as well as the closure depth.	Intertidal impacts are assessed in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 5	Any requirement for works access across the foreshore, which is in proximity to Holland Haven Marshes SSSI, may give rise to significant adverse impacts (e.g., noise, lighting, visual disturbance) on the SSSI. Provide further details of any anticipated works located on the foreshore and intertidal areas. Consider and assess potential impacts on the SSSI, as the project is further refined and include in the Application submissions.	Intertidal impacts are assessed in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 6	In combination and cumulative effects with other projects, notably Five Estuaries and East Anglia GREEN (EAG) [*now Norwich to Tilbury*], should be fully explored. The temporary disturbance impacts to habitats, species and soils would be reduced by constructing the onshore cable route for Five Estuaries OWF at the same time as North Falls. Similarly, for both OWF substations which will feed into the National Grid at the EAG substation. However, we understand that the projects are currently being assessed as progressing separately.	The CEA is set out in Section 23.7.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 7	The BNG of the development should be assessed using the Biodiversity Metric 4.0. Note BNG is pre-mandatory, so this is advisory only at present, but this will become mandatory.	The Project has used the most up to date version of the Defra Statutory Biodiversity Metric at the time of writing. The Early Design BNG assessment and strategy is set out in the BNG Strategy (Document Reference: 7.22).

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Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 8	The project description is as defined as possible at this stage, but we note currently that there is no commitment yet for a final route/ micrositing, and that all relevant surveys have not yet been completed. How will the project design be refined prior to submission to help avoid, reduce, and mitigate impacts? All relevant surveys to be completed and reported in the ES. Provide details on final cable route and any necessary mitigation measures including but not exclusively micrositing.	All ornithology surveys are now complete and are included in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 9	We advise that the desk-based data search is satisfactory.	Noted.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 10	Based on the assessment of the impacts on breeding birds from the onshore cable corridor, it appears that data for skylarks should be available, but impacts on them are not currently sufficiently assessed. We advise that skylarks are included as a target species for onshore ornithology.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 11	As detailed further in our comment above in table 2 [Annex 6, Ref 4], we note the potential impacts on coastal processes from cable protection in the intertidal area acting as groynes. We advise that further information is required as detailed in table 2 [Annex 6, Ref 4] above.	Intertidal impacts are assessed in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 12	We note that further survey data will be provided for bats and non-breeding birds. We advise that the survey data should be provided when it is available, and the assessment updated.	All bat surveys are now complete and their findings are summarised in Section 23.5.4.2 (and ES Appendix 23.8 (Document Reference: 3.3.37) and 23.9 (Document Reference: 3.3.38). All ornithology surveys are now complete and will be

Consultee	Date / Document	Comment	Response / where addressed in the ES
			included in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). No adverse significant effects are predicted to occur to bats.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 13	We note that no nocturnal surveys have been provided for non-breeding birds. We advise that consideration is given to carrying out nocturnal surveys using thermal imaging for species such as golden plover if night-time working will be required.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 14	There is no calculation of BNG provided. We advise that a calculation is provided using Metric 4.0, when habitat data is available.	This has been addressed in the BNG Strategy (Document Reference: 7.22).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 15	We note that some areas have not been surveyed due to lack of landowner access permission. We advise that these ground-truthing surveys are carried out once access can be arranged.	Additional surveys have been carried out on such areas where access permission was able to be obtained. These have been added into the ES ecological baseline assessment in Sections 23.5 and 23.6.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 16	We note that bat survey results are not yet reported. Any trees/buildings to be removed will require a bat assessment. Additionally, habitat which may be foraging/commuting habitat will need to be assessed. We advise consideration is given to surveys for Nathusius'	All bat surveys are now complete and are summarised in Sections 23.5.4.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		pipistrelle (*Pipistrellus nathusii*), which migrates across the North Sea. Any surveys will need to be carried out at an appropriate time and in appropriate locations.	This ES Chapter includes considerations of potential effects upon migrating Nathusius' pipistrelle in Section 23.5.4.2.3. This includes data provided by the BCT's National Nathusius' Pipistrelle Project. No adverse significant effects are predicted to occur to bats.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 17	We advise following our standing advice for protected species; any departures from survey protocols should be fully justified and the implications for departure fully assessed. Please refer to our standing advice.	Noted.
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 18	We note that the precise landfall location will be determined following PEIR. We also note that the Project has committed to HDD at landfall and the onshore drilling location will be set back approx. 400m from the coast. We do have concerns, however, regarding the consideration of noise, light and visual disturbance from the indicative landfall compound. We are also concerned about potential in-combination impacts (with other projects such as Five Estuaries) to SPA birds and breeding birds using the SSSI. It is also not stated whether any works or access will be required on the foreshore or across the intertidal. This should be clarified, and further details provided. Provide further details regarding the landfall compound location. Fully consider and assess any impacts to SPA birds that use the SSSI and potentially breeding birds. Furthermore, if works or access to the foreshore or intertidal zone are required, then further information should be provided, and potential impacts assessed. We also advise that potential in-combination effects due to the landfall compound and any intertidal works should be fully considered and assessed in the ES.	Full consideration of impacts of landfall compound and intertidal works on birds are included in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). Intertidal impacts are assessed in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12).

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Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 19	The criteria for selection for target breeding bird species includes Red-listed species. Skylarks are listed but not considered a target species in the report (para 68) as it is suggested they are not inherently rare and are less sensitive. Natural England advises that as well as being listed as a species of principal importance in Section 41 of the NERC Act, Skylark are considered a species in decline in Essex and their nesting habitat (arable farmland) will be impacted. We note that overwintering populations have been recorded in the corridor area, so there is likely to be nesting within this area. Therefore, we advise that they are sensitive to 'disturbance' and there is the potential for permanent loss of their habitat for substation(s). We advise that they are included as a target species.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 20	The Tendring coast is assessed as having medium sensitivity to cable protection in inshore areas, whereby existing coastal protection restricts sediment transport, and the addition of cable protection would act as additional groynes, benefiting that existing protection. We note that there is no discussion of the impacts of further restricting sediment transport on those habitats in Colne Estuary designated areas. These areas are already experiencing coastal squeeze because of the existing defences. It is important that this is fully considered, evidenced and assessed. We advise this is also considered in-combination with the impact of VE also having to put cable protection in.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, PEIR Consultation Annex 6, Ref 21	Coastal Invasive Non-Native Species (INNS) are not considered (only marine and terrestrial ones have been included). The mitigation for INNS risk focuses on the marine risks/pathways and not risks in the intertidal area. We note there is no discussion about working in the intertidal area or on the foreshore, so potential pathways for INNS are not considered. If intertidal cable protection is required or physical work in intertidal area is required, then this should be assessed.	Intertidal works and associated INNS are included in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12).
Natural England	14/07/2023, ES Consultation Annex 6, Ref 22	We note that there is no assessment of the use of the intertidal area by waterbirds in the Onshore Ornithology or the Offshore Ornithology reports. Birds were mapped in the area as part of the surveys, so it is unclear why this assessment has not been included. We advise that reference is made to the potential impacts on birds using the intertidal and foreshore areas and that this is thoroughly assessed.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, ES Consultation	We note that the mitigation for vegetation clearance in the nesting season is following best practice i.e., surveying a maximum of 48 hours before the works take place. It is stated that the survey will be conducted by an Ecological Clerk of Works (ECoW) and that there will be one ECoW for the project. Natural England seek confirmation that this person will this be a suitably qualified ECoW for	The ECoW will be suitably qualified to conduct nesting bird surveys. This is addressed in ES

Consultee	Date / Document	Comment	Response / where addressed in the ES
	Annex 6, Ref 23	nesting bird surveys. We also seek further consideration of all possible mitigation measures to ensure that all viable options have been thoroughly considered.	Chapter 24 Onshore Ornithology (Document Reference: 3.1.26), and the OLEMS.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 24	There is mitigation proposed which involves avoiding working in areas used by geese and waders in overwintering period. We note this mitigation potentially conflicts with the mitigation to not undertake vegetation clearance in nesting season. We note the mitigation proposed will be further clarified when the cable corridor etc. is finalised. Natural England may have further comments at that stage.	This Chapter has been cross-referenced with ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26) to ensure there are no conflicts. The OLEMS and Schedule of Mitigation address the seasonality of mitigatory measures.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 25	We agree with the onshore Special Area of Conservation (SAC) site screened in to the HRA in relation to onshore ecology.	Noted.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 26	We note the avoidance of land within designated site boundaries, although we note that the onshore project area is in close proximity to Hamford Water SAC, SPA/Ramsar site (300m at closest point). Consideration will therefore be required of impacts on Annex I birds that are utilising functionally linked land surrounding the SPA. As advised for all OWF Nationally Significant Infrastructure Projects (NSIPs) two years of data is required to support Applications to take account of interannual variation.	Impacts on SPAs are fully considered as part of the HRA.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 27	We note that the potential effects considered do not appear to include cable protection in the intertidal area. The offshore considerations go up to MLWS. If the Holland Haven Marshes SSSI is functionally linked to Hamford Water SPA/Ramsar, then the intertidal area has the potential to provide a feeding resource, so potential hard structures and working in that area should be considered. We advise that the potential for intertidal working (including any additional compound) and placement of rock changing the habitat conditions should be included in the screening process.	Intertidal works are included in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.10).

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Natural England	14/07/2023, ES Consultation Annex 6, Ref 28	Reference is included to Chapter 24- Onshore Ornithology and that embedded mitigation for onshore ornithology includes that monitoring will be carried out to 'ensure' no significant disturbance to overwintering birds. We note that no reference is included to avoiding (where possible) work in land identified as potentially important to Hamford Water SPA features during key periods of the non-breeding season or keeping hedgerows etc. for visual screening (Chapter 24, para 249-251). We note that this mitigation could conflict with embedded mitigation around not removing vegetation, which relates to ground nesting birds, in the nesting season. We advise that any mitigation included in the chapters, should be included in the HRA where it relates to impacts on designated sites. This includes the mitigation included in chapter 24. We advise that consideration is given to functional links to Hamford Water SPA.	The OLEMS and Schedule of Mitigation address the seasonality of mitigatory measures. This Chapter has been cross-referenced with ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26) to ensure there are no conflicts.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 29	We agree with the methodology that has been used to assess potential impact pathways to international notified features e.g. wintering and breeding birds, and Fishers Estuarine Moth as a feature of Hamford Water SAC.	Noted.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 30	We agree that key impacts are: Temporary loss of feeding habitat for wildfowl and waders which is functionally linked to SPA/Ramsar sites and permanent loss of feeding habitat at substation site. Pollution entering watercourses connected to designated sites and functionally-linked land arising from 'breakout' incidents during HDD. Light spill from artificial lighting during construction affecting ecology of the SAC Fisher's Estuarine Moth. Operational lighting at substation site causing disturbance to SPA birds. We advise that avoid, reduce and mitigation hierarchy will need to be implemented which includes (but not exclusively) the following: Avoid construction works in functionally linked land during sensitive periods for Annex I birds Explore collaborative working with Five Estuaries if both projects are impacting on functionally linked areas. We advise shared cable routing and/or installing ducting for both when the first project installs is explored. Ecological Clerk of Works (ECoW) during construction. Noting this may need to be different people, depending on the specialism required to ensuring a suitably qualified ECoW is present.	List of mitigation relating to onshore ecology is set out within the OLEMS and Schedule of Mitigation. Measures relating to ornithology are addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

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		Consideration of planting unsuitable crops in advance of construction in order to deter dark-bellied brent geese for the winters that construction will take place. Agreed Landscape and Ecological Management Plan. Agreed HDD Method Statement and 'Breakout' Contingency Plan. Agreed Sensitive lighting scheme.	
Natural England	14/07/2023, ES Consultation Annex 6, Ref 31	There is no mention in the HRA of embedded mitigation relating to not carrying out works in overwintering period. We advise that any mitigation measures in the Chapters relevant to Natura 2000 sites should be included in the HRA.	Noted. Embedded and additional mitigation is included in the HRA.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 32	We agree with the plans and projects which have been identified for potential in-combination effects, namely Five Estuaries and East Anglia GREEN. These are both subject to separate Development Consent Order (DCO) permissions which may or may not be granted to allow construction within the same timeframe and/or consecutive timeframes. There would be less disturbance if Five Estuaries OWF and North Falls OWF construction activities took simultaneously along the same construction route. If they were to pursue individual connections, particularly in the same area, for example consecutively, this could lead to continual impacts over an elongated period. We note that the grid connection is dependent on EAG substation being constructed.	The scenario of joint construction of North Falls and Five Estuaries Offshore Wind Farm (herein 'Five Estuaries') is considered in this ES chapter.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 33	We note that there is embedded mitigation in relation to Holland Haven Marshes SSSI, which involves the use of HDD to avoid direct impacts from trenching across the SSSI. We advise that it is essential that this mitigation is achievable and adhered to ensure there will be no temporary or permanent habitat loss within HHM SSSI. Please note that vehicle movement across the SSSI in support of the HDD should also be excluded with an alternative route found. Consideration will also need to be given to any drilling fluid (Bentonite) frackout.	Mitigation measures in the event of bentonite breakouts are included in this ES chapter, as described in Sections 23.3.3 and 23.6, and in the OLEMS.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 34	Holland Haven Marshes SSSI should be considered of high importance when taken as a whole. We advise this is taken into consideration.	Noted. Section 23.6.1.1 reflects our position that individual species and habitats are of different importance depending on

Consultee	Date / Document	Comment	Response / where addressed in the ES
			their current status within Holland Haven Marshes SSSI. Therefore, these are assessed separately.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 35	We note that Fisher's estuarine moth's food plant, hog's fennel, has been found at HHM SSSI. Fisher's Estuarine moth is protected under Schedule 5 of the Wildlife and Countryside Act 1918, under which it is an offence to intentionally kill, injure, or take, possess, or trade in them. Therefore, no direct vehicle access should be permitted in the SSSI during HDD activities. Any access track will need to be full considered and designed so recovery can occur in the short time. If this is not considered at the time of consent, then separate/additional planning and MMO (Marine Management Organisation) consents will be required.	Noted.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 36	We note that the extent of temporary habitat loss at the landfall area cannot yet be determined, and we are therefore unable to fully determine any in direct impacts on the designated features of Holland Haven Marshes (HHM) SSSI. The indirect effects of HDD through Holland Haven Marshes SSSI identified include effects from HDD breakout and road traffic emissions. We advise that indirect effects should also include noise, vibration, construction dust, human disturbance, lighting etc. In relation to potential impacts on surrounding saltmarsh from HDD it is stated in the documents that it is considered that any dust or impacts from HDD breakout will be cleaned by next high tide. The saltmarsh is only covered by Spring High Tides (HTS) so only 'cleaned' twice monthly. Therefore, we advise further consideration is given to the efficacy of this mitigation measure. We also advise that careful consideration is given to locating the exit points away from areas of sensitive habitats.	Mitigatory measures for habitats potentially affected by the Project are addressed in Sections 23.3.3 and 23.6, and in the OLEMS.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 37	We note that there is a risk of impacts on HHM SSSI during construction from breakout during HDD, i.e., release of drilling fluids. We note that as part of "embedded mitigation, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable." Table 23.5 refers to an "Outline Horizontal Directional Drill Method Statement and Draft Contingency Plan that will be submitted as part of the DCO Application." We advise in relation to Holland Haven Marshes SSSI, that robust measures should be put in place to minimise the risk of HDD frack outs directly into water bodies. Due to their formation, sediments associated with marsh habitats have unconsolidated layers which often include water filled air pockets, thus resulting in a 'squidgy' consistency. If, as has been found in other areas along the East Coast of England, these layers interact with the HDD, there is an increased risk of the drilling holes not being maintained and bentonite (drilling mud) frackouts and, in some worst	Mitigation measures in the event of bentonite breakouts are included in this ES chapter in Sections 23.3.3 and 23.6, and in the OLEMS.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		case scenarios, considerable sinkholes occurring. Both of which would be a concern to the notified vascular plant and aquatic invertebrate communities within Holland Haven Marshes SSSI. Therefore, further geotechnical data is required within an HDD risk assessment to provide certainty that these issues will not occur. We advise that remediation options are unlikely to be feasible due the associated significant impacts.	
Natural England	14/07/2023, ES Consultation Annex 6, Ref 38	Natural England note that the HDD will have to go under hard sea defences in front of HHM SSSI. Natural England queries if an engineering assessment has been undertaken to ensure that the defences can be drilled under or through without necessitating the lowering of the defences, including the provision of temporary defence mechanisms in the intertidal and/or the shortening of the HDD as a result of increased depth. Both scenarios could potentially lead to negative environmental implications because: the locations of the exit pits terrestrially are paramount to determining no significant impacts to the SSSI by ensuring that they are within adjacent arable land and all relevant infrastructure and construction activities remain outside of the notified site. Any sea defence work has the potential to impact upon the SSSI and wider environment. We recommend that if an HDD risk assessment is not available, then this should be provided alongside the submitted ES and evidence provided to address NE's concerns.	This is addressed in ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.26).
Natural England	14/07/2023, ES Consultation Annex 6, Ref 39	To ensure minimal disturbance to SSSI features during construction, there should be monitoring of wintering and breeding birds and other features during construction, which is agreed with NE prior to construction. We advise that an Ecological Clerk of Works (EcoW) is instructed, and works are conducted based on an agreed SSSI Mitigation and Monitoring Plan.	An ECoW will be present to identify potential disturbance on SSSI features. This is addressed in Section 23.6.1.1 and in the OLEMS.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 40	Natural England highlight the potential for disturbance of Overwintering and breeding birds at the landfall at Holland Haven Marshes SSSI. Wherever possible preparation and HDD works should avoid sensitive periods for breeding and overwintering birds, if these cannot be avoided: The location of the exit pits should be made unsuitable for nesting birds either through the use of bird scarers in the form of kites and/or vegetation clearance. An Ecological Clerk of Works (ECoW) should undertake walk over surveys prior to and during construction to identify any nesting birds and implement an agreed protocol for implementing disturbance free buffer zones around active nests; screening/fencing of HDD pits and other working areas at landfall.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

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Natural England	14/07/2023, ES Consultation Annex 6, Ref 41	Red-listed/priority farmland breeding birds, such as corn bunting, grey partridge, could be temporarily disturbed by construction. We advise avoidance of important breeding locations, and adoption of suitable mitigation measures. For example (but not exclusively) the construction duration should be minimised in sensitive locations/times, alongside minimised disturbance due to lighting, noise etc. We advise farmland habitats should be reinstated as soon as possible, and all work carried out under EcoW supervision. Consideration should be given to how winter works might impact on breeding bird habitat for the following year.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Natural England	14/07/2023, ES Consultation Annex 6, Ref 42	We advise that Red-listed/priority birds may be permanently affected by loss of habitat due to substation construction. We advise that suitable habitat for such species should be incorporated into the landscaping design scheme for substations.	This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26) and landscape design.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 43	We agree with Five Estuaries and East Anglia GREEN being taken forward for CIA (Cumulative Impact Assessment). The Applicant should seek to continue to gain the most up to date information on these projects to consider in the ES.	Noted.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 44	Natural England has produced standing advice to help planning authorities understand the impact of particular developments on protected species. We advise you to refer to this advice. Natural England will only provide bespoke advice on protected species where they form part of a SSSI or in exceptional circumstances. Standing advice: https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications. The ES should assess impacts on protected species in line with Natural England's standing advice. Any departures from standing advice will need to be clearly highlighted, justified, and associated risks should be assessed and appropriately mitigated.	Noted.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 45	Development should provide net gains for biodiversity in line with the NPPF paragraphs 174(d), 179 and 180. Development also provides opportunities to secure wider environmental gains, as outlined in the NPPF (paragraphs 8, 73, 104, 120,174, 175 and 180). We advise you to follow the Mitigation Hierarchy as set out in paragraph 180 of the NPPF and firstly consider what existing environmental features on and around the site can be retained or enhanced or what new features could be incorporated into the development proposal.	Noted. This is addressed in the BNG Strategy (Document Reference: 7.22) and the OLEMS (Document Reference: 7.14).

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		Where onsite measures are not possible, you should consider off site measures. Opportunities for enhancement might include: Restoring a neglected hedgerow. Creating a new pond as an attractive feature on the site. Planting trees characteristic to the local area to make a positive contribution to the local landscape. Using native plants in landscaping schemes for better nectar and seed sources for bees and birds. Incorporating swift boxes or bat boxes into the design of new buildings. Designing lighting to encourage wildlife. Adding a green roof to new buildings. Natural England's Biodiversity Metric 4.0 may be used to calculate biodiversity losses and gains for terrestrial and intertidal habitats and can be used to inform any development project. For small development sites the Small Sites Metric may be used. This is a simplified version of Biodiversity Metric 4.0 and is designed for use where certain criteria are met. Natural England's Environmental Benefits from Nature tool may be used to identify nature and to avoid and minimise any negative impacts. It is designed to work alongside Biodiversity Metric 4.0 and is available as a beta test version. Biodiversity metric 4.0: https://publications.naturalengland.org.uk/publication/6049804846366720 Small metric sites: https://publications.naturalengland.org.uk/publication/6047259574927360 NE's Environmental Benefits from Nature tool: https://nepubprod.appspot.com/publication/6414097026646016	
Natural England	14/07/2023, ES Consultation Annex 6, Ref 46	Local planning authorities are responsible for ensuring that they have sufficiently detailed agricultural land classification (ALC) information to apply NPPF policies (Paragraphs 174 and 175). This is the case regardless of whether the proposed development is sufficiently large to consult Natural England. Further information is contained in GOV.UK guidance (https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land). Agricultural Land Classification information is available on the Magic website on the Data.Gov.uk website. If you consider the proposal has significant implications for further loss of 'best and most versatile' agricultural land, we would be pleased to discuss the matter further. Guidance on soil protection is available in the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf), and we recommend its use in the design and construction of development, including	This is addressed in the OCoCP. Cumulative impacts relating to Norwich to Tilbury are described in Section 23.8.3.2.

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		any planning conditions. For mineral working and landfilling separate guidance on soil protection for site restoration and aftercare is available on Gov.uk website. Detailed guidance on soil handling for mineral sites is contained in the Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings (https://www.quarrying.org/soils-guidance). Should the development proceed, we advise that the developer uses an appropriately experienced soil specialist to advise on, and supervise soil handling, including identifying when soils are dry enough to be handled and how to make the best use of soils on site. We recommend that a Soil Management Plan (SMP) is a requirement of the DCO. The SMP should identify best practice for the handling of soils subject to temporary disturbance during construction, the protection of soils which may be affected by compaction etc. during construction and other issues. We advise that the construction of North Falls at the same time as Five Estuaries and East Anglia GREEN onshore structures, as one cable route could minimise the damage and disturbance to soils.	
Natural England	14/07/2023, ES Consultation Annex 6, Ref 47	You should consider any impacts on ancient woodland and ancient and veteran trees in line with paragraph 180 of the NPPF. Natural England maintains the Ancient Woodland Inventory (https://publications.naturalengland.org.uk/map?category=552039) which can help identify ancient woodland. Natural England and the Forestry Commission have produced standing advice (https://www.gov.uk/guidance/ancient-woodland-ancient-trees-and-veteran-trees-advice-for-making-planning-decisions) for planning authorities in relation to ancient woodland and ancient and veteran trees. This should be taken into account by planning authorities when determining relevant planning applications. Natural England will only provide bespoke advice on ancient woodland, ancient and veteran trees where they form part of a SSSI, supporting habitat for European protected species or in exceptional circumstances. An Ancient woodland and Ancient/Veteran Tree management plan should be included with the Application.	This is addressed in Section 23.6.1.5 and in the OLEMS.
Natural England	14/07/2023, ES Consultation Annex 6, Ref 48	Paragraphs 100 and 174 of the NPPF highlight the important of public rights of way and access. Development should consider potential impacts on access land, common land, rights of way and coastal access routes in the vicinity of the development. Consideration should also be given to the potential impacts on the any nearby National Trails. The National Trails website www.nationaltrail.co.uk provides information including contact details for the National Trail Officer. Appropriate mitigation measures should be incorporated for any adverse impacts. A Public Rights of Way management plan should be included within the Outline Landscape and Ecology Management plan.	This is addressed in the OLEMS.

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Natural England	14/07/2023, ES Consultation Annex 6, Ref 49	There are possible implications for users of King Charles III England Coast Path (ECP) depending on timing of opening of ECP. We advise due regard to scheme design and timings of project works are given to avoid impacts as far as practicable to coastal access. England Coast Path is likely to be open this area by summer 2025 at the earliest.	This is considered in ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34).
Zoe Fairley (Ardleigh & Little Bromley Councillor)	10/07/2023, Statutory Consultation Feedback.	The negative impact of yours and others development on the environment, bird and wildlife is major with an unwarranted loss of habitat. Also, onshore infrastructure is not a suitable solution for getting energy produced offshore, onshore, with ongoing delivery of this energy to London, the Midlands or even further North.	Impacts related to the local bird assemblage are assessed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). Impacts related to habitats, and protected and notable species are addressed in Section 23.6.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Thank you for consulting the Woodland Trust on the second stage of consultation for the proposed scheme. We remain concerned regarding potential detrimental impact to Simon's Wood LoWS (grid reference: TM1601624022) and Holland Mill Wood WT site (grid reference: TM200195) due to their proximity to the scheme boundary. Further information is outlined below.	Noted.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Ancient Woodland Natural England and the Forestry Commission, the Government's respective bodies for the natural environment and protecting, expanding and promoting the sustainable management of woodlands, define ancient woodland as follows within their standing advice: "Ancient woodland takes hundreds of years to establish and is defined as an irreplaceable habitat. It is a valuable natural asset important for: wildlife (which include rare and threatened species); soils; carbon capture and storage; contributing to the seed bank and genetic diversity; recreation, health and wellbeing; cultural, historical and landscape value. It has been wooded continuously since at least 1600AD. It includes: ASNW mainly made up of trees and shrubs native to the site, usually arising from natural regeneration.	Noted.

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		PAWS replanted with conifer or broadleaved trees that retain ancient woodland features, such as undisturbed soil, ground flora and fungi". Both ASNW and PAWS woodland are given equal protection in government's NPPF regardless of the woodland's perceived condition, its size, or features it contains.	
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Veteran Trees Natural England's standing advice on veteran trees states that they "can be individual trees or groups of trees within wood pastures, historic parkland, hedgerows, orchards, parks or other areas. They are often found outside ancient woodlands. They are also irreplaceable habitats. A veteran tree may not be very old, but it has significant decay features, such as branch death and hollowing. These features contribute to its exceptional biodiversity, cultural and heritage value."	Noted.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Planning Policy Paragraph 5.3.14 of the Overarching NPS for Energy (EN-1) states: "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 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." The NPPF, paragraph 180, states: "When determining planning applications, local planning authorities should apply the following principles: c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists;"	Noted.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	The proposed corridor boundary is sited adjacent to our Holland Mill Wood site, plus an area of ancient woodland known as Simon's Wood LoWS. As previously outlined, we are specifically concerned about the following impacts to the ancient woodland/Woodland Trust Site: Permanent fragmentation due to the removal of adjacent semi-natural habitats, such as small wooded areas, hedgerows, individual trees and wetland habitats if continued access to the cable once constructed is required.	The outlined impacts are addressed in Sections 23.6.1.2 and 23.6.1.5. Related mitigation is outlined in the OLEMS.

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		Noise and dust pollution impact to woodlands within close proximity of the cable installation area. Root damage to woodland boundary trees during installation of the cable. The potential for trampling of sensitive ancient woodland flora and soils if access is required within any ancient woodland.	
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Natural England and Forestry Commission have identified impacts of development on ancient woodland within their standing advice (please see the annex at the foot of this document for the full range of impacts outlined). This guidance should be considered Government's position with regards to development impacting ancient woodland, although Natural England and Forestry Commission should still be consulted for specific comment on this proposal.	Noted. Impacts relating to ancient woodland are addressed in Sections 23.6.1.2 and 23.6.1.5. No significant effects are predicted to occur on ancient woodlands.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Furthermore, we hold concerns with regards to potential nitrogen deposition to several ancient woodlands within the surrounding area. The Trust is of the opinion that all developments should ensure that the process contribution of ammonia/nitrogen does not exceed 1% of the critical level and load. We would therefore recommend that the cable's location should be designed using detailed ammonia modelling to achieve insignificant process contributions on the surrounding ancient woodlands.	The onshore cable route has been designed incorporating environmental considerations including sites designated for nature conservation. Air quality impacts upon ancient woodlands assessed in Section 23.6. With regards to the comment below, Holland Hall Wood is located over 200 m from the onshore cable route and roads used by project traffic and therefore has been scoped out of the assessment. Simon's Wood has been included

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			in Sections 23.6.1.2 and 23.6.1.5. No significant effects are predicted to occur on ancient woodlands. ES Chapter 20 Air Quality (Document Reference: 3.1.22) provides further detail.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Buffering ancient woodland can be an ideal mitigation measure as buffer zones can be used to establish distance between the development and habitat, which helps to alleviate harmful impacts, while also creating new areas of habitat around the woodland. This development should allow for a buffer zone of at least 30 metres to prevent adverse impacts such as pollution and disturbance and ensure avoidance of root damage. Although not ancient, we would also request that a 30-metre buffer is afforded to Holland Mill Wood to ensure detrimental impacts to our site are avoided. Additional mitigation approaches are also outlined in our Planners' Manual; these measures would help ensure that the development meets policy requirement and guidance and include: - Retaining and enhancing natural habitats around ancient woodland to improve connectivity with the surrounding landscape. - Measures to control noise, dust and other forms of water and airborne pollution. - Implementation of an appropriate monitoring plan to ensure that proposed measures are effective over the long term and accompanied by contingencies should any conservation objectives not be met.	It is not possible for the Project to cross Little Clacton Road without being within 30 m of Holland Mill Wood (part of the Great Holland Pits site) The boundary is approximately 10m from the Holland Mill Wood at its closest point. This was raised in the October 2023 ETG, where EWT confirmed they are satisfied with the proposals. No significant effects are predicted to occur on ancient woodlands. This is addressed in Sections 23.6.1.2 and 23.6.1.5.

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Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Paragraph 265 (23.6.1.5) of the Preliminary Environmental Information Report (PEIR) outlines that 11 veteran trees are located within the project boundary. It is essential that no veteran trees are lost as part of the proposals. The loss of any such trees can have a significant impact on local wildlife, particularly those which depend on the habitat provided by veteran trees.	No veteran trees are to be lost as part of the Project's development. This is addressed in Section 23.6.1.5. No significant effects are predicted to occur on veteran trees.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Trees are susceptible to change caused by construction/development activity. As outlined in 'BS5837:2012 - Trees in relation to design, demolition and construction' (the British Standard for ensuring development works in harmony with trees), construction work often exerts pressures on existing trees, as do changes in their immediate environment following construction of any new infrastructure. Root systems, stems and canopies, all need allowance for future movement and growth, and should be taken into account in all proposed works on the scheme through the incorporation of the measures outlined in the British Standard.	Noted. This is addressed in Section 23.6.1.5 and in the OLEMS.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	While BS5837 guidelines state that trees should have a root protection area (RPA) of 12 times the stem diameter (capped at 15m), this guidance does recognise that veteran trees need particular care to ensure adequate space is allowed for their long-term retention. It is imperative that Natural England and Forestry Commission's standing advice on root protection areas for veteran trees is taken into account as the proposals progress. This advice states: "For ancient or veteran trees (including those on the woodland boundary), the buffer zone should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5 metres from the edge of the tree's canopy if that area is larger than 15 times the tree's diameter. This will create a minimum root protection area. Where assessment shows other impacts are likely to extend beyond this distance, the proposal is likely to need a larger buffer zone."	All veteran trees are more than 15m from the onshore project area. Impacts relating to woodlands and veteran trees are addressed in Section 23.6.1.5. No significant effects are predicted to occur on woodland habitats.
Woodland Trust	14/07/2023, North Falls Statutory Consultation Response Letter.	Ancient woodland is an irreplaceable habitat, once lost it is gone forever. Any development resulting in loss or deterioration of ancient woods and trees must consider all possible measures to ensure avoidance of adverse impact. We hope our comments are of use to you. Should you wish to discuss our response further, please do not hesitate to contact us.	Noted.

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RWS Netherlands	14/07/2023, Consultation Response Email.	Effects on bats. Bats are only mentioned in relation to effects on ecology on land (linked to the planned infrastructure on land). The effects of offshore wind farms on migrating bats are not included in the assessment.	Migratory bats are considered in this ES chapter, as described in Section 23.5.4.2.3.
Tendring District Council	14/07/2023, Consultation Response Letter.	It is the onshore implications that are of greatest concern to the Council. From Tendring District Council's perspective, it firmly believes that much greater consideration should be given to an offshore powerline route that would avoid the need for the cables to make landfall through / under the SSSI and LNR designations. Whilst the grounding of the cables through the SSSI / LNR would bring about temporary disruption that could be mitigated over time, it would also cause significant damage to the area and greatly affect the tourism industry during the construction period. These issues could all be resolved through a route around the coast as suggested in this and previous responses. The Council will not accept the need for the onshore elements of the North Falls scheme until such time that the alternative offshore route has been properly considered and duly discounted through a full and transparent process for Norwich to Tilbury.	This is addressed in ES Chapter 4 Assessment of Alternatives (Document Reference: 3.1.6), ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34), and in this Chapter in Section 23.6.1.1. No significant effects are predicted to occur on Holland Haven Marshes SSSI/LNR. Cumulative effects with Norwich to Tilbury are assessed in Section 23.8.3.2.
Tendring District Council	14/07/2023, Consultation Response Letter.	The Council, as previously stated, is extremely concerned about the health risks posed to residents within proximity to electro-magnetic fields - as demonstrated through considerable research and peer-reviewed scientific data in relation to childhood cancer. There will be considerable noise emanating from substations - again raising concern about proximity to people's homes. The sterilisation of agricultural land along the route of the underground power connections seems to have been given little weight in consideration of the preferred options for both Norwich to Tilbury and, consequently, this project – which could be avoided through achieving an offshore solution. These significant landscape concerns mean there is a clear need for landscape impact and mitigation plans in respect not only of the SSSI and LNR at landfall, but also along the length of the route through the district to either of the proposed substations. The Council appreciates the approach to BNG and encourage increases that exceed the current 10% national requirements. The long-term commitment (30yrs in line with BNG regs), to the planting around	This is addressed in ES Chapter 28 Human Health (Document Reference: 3.1.30), ES Chapter 22 Land Use and Agriculture (Document Reference: 3.1.24), in the OLEMS (Document Reference: 7.14), and in the BNG

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		the substation is supported and should be replicated for all other areas of planting that occur as a result of the project. TDC would welcome the inclusion of other stakeholders, such as Essex Wildlife Trust, Farming Wildlife and Agriculture Group when long term discussions on planting maintenance are taking place with landowners along the route. Opportunities to assess any positive contributions that can be made to the Local Nature Recovery Strategy should be assessed.	Strategy (Document Reference: 7.22). No significant effects are predicted to occur on Holland Haven Marshes SSSI/LNR.
Suffolk County Council	14/07/2023, Consultation Response Letter Section 5	5. Landscape, Seascape and the AONB 5.1 Given the need for accurate assessment of direct and cumulative impacts, the County Council's view is that the preliminary position of the promoter has not adequately addressed the potential harm on the Suffolk Coast & Heaths Area of Outstanding Natural Beauty. 5.2 The County Council, jointly with East Suffolk Council and the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Partnership, commissioned White Associates to provide an update to the Seascape Sensitivity Study originally commissioned in 2020. The original sensitivity study does not take into account the parameters (larger turbines etc.) of the North Falls project (see Map 1 appended). 5.3 The County Council will provide the developer with a copy of this addendum as soon as work is completed. However, early indications show that the conclusions of the report will be different to that of the opinion provided by the developer. 5.4 Taking this into account, it appears that the north-eastern most portion of the project will have significant impacts on the Suffolk Coast and Heaths AONB. These impacts could be eliminated by this small part of the project being removed. 5.5 The removal of this part would only lead to a reduction in seven turbines.	This is addressed in ES Chapter 29 SLVIA (Document Reference: 3.1.31) and ES Chapter 30 LVIA (Document Reference: 3.1.32).
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Green Infrastructure (GI) ECC currently provides advice on green infrastructure schemes (GI) for major developments. Whilst there are no statutory requirements for GI, the 25 Year Environment Plan and Environment Act (2021) place significant importance on protecting and enhancing GI, accessibility and BNG. Having reviewed this statutory consultation, ECC raise the following points.	This is addressed in the BNG Strategy (Document Reference: 7.22).
Essex County Council	14/07/2023, Consultation Response	GI Audit and Strategy As stated in Table 23.1, we would welcome the proposed further engagement on GI to maximise opportunities for GI delivery alongside BNG through this development. Moving forward, ECC would ask for the production of a Green	This is addressed in the BNG Strategy (Document Reference: 7.22).

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	Letter, Appendix One	Infrastructure Strategy for the route, based on the Essex Green Infrastructure Strategy (2020) and Essex Green Infrastructure Standards (2022) to provide a more detailed an assessment of the ecological context of the development. The scheme should include but not be limited to: The design of the development to deliver BNG and wider environmental net gain. This forms an important component of nature recovery networks and the wider landscape scale GI network. A Green Infrastructure Plan outline the implementation of green infrastructure across the proposed preferred option corridor, the timescale for the implementation of each aspect and, the details of the quality standard of construction, management and maintenance that will occur.	
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Essex Local Nature Partnership ECC has now established a Local Nature Partnership (LNP) covering Greater Essex. The LNP contains three working groups – a community engagement group, a planning and BNG working group and, a Local Nature Recovery Strategy (LNRS) group. The works of this group, including the upcoming LNRS, will need to be supported and acknowledged moving forward.	Noted.
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	OLEMS We welcome the proposed 10-year planting aftercare as stated in Table 23.1 and note the OLEMS will contain all ecological mitigation measures proposed within the ES (Table 23.5). However, we would also highlight that the OLEMS should include who is responsible for GI assets (including any surface water drainage system) and the maintenance activities/frequencies. We would also expect details on how management company services for the maintenance of GI assets and green spaces shall be funded and managed for the lifetime of the development to be included. This is to ensure appropriate management and maintenance arrangements and funding mechanisms are put in place to maintain high-quality value and benefits of the GI assets.	The OLEMS and GI Plan includes details of management of GI assets.
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Climate Focus Area (CFA). The proposed development is situated within the Essex Climate Action Commission's (ECAC) recommended Climate Focus Area (CFA), which is formed of the Blackwater and Colne River catchment areas (please see Figure 1 on the following page for further details). The objective of this recommendation is for the CFA to "accelerate [climate] action and provide exemplars, for learning and innovation: adopting Sustainable Land stewardship practices: 100% by 2030 and Natural Green Infrastructure: 30% by 2030" (ECAC, 2021). Among the objectives of the CFA are to achieve net zero carbon, BNG, improve soil health and air quality, reduce flooding and urban heat island effect, and enhance amenity, liveability and wellbeing of Essex communities. It will achieve this by wholesale landscape change in rural areas and urban areas and it will look to developments to contribute to these targets.	This is addressed in ES Chapter 33 Climate Change (Document Reference: 3.1.35) and in the BNG Strategy (Document Reference: 7.22).

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Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	The CFA require developments to consider the following requirements in line with meeting the requirements outlined in NPPF: a) BNG to enhance biodiversity and the natural environment by creating Natural Green Infrastructure contributing to the CFA 30% by 2030 target and the wider Local Nature Recovery Network/Strategy. b) flood and water management, for those properties at risk of flooding to include Integrated Water Management and Natural Flood Management techniques. c) New developments to improve urban greening of our towns, and villages through the provision of street trees for example. New developments are necessary in terms of increasing greenspace creation, naturalizing existing green spaces, greening the public realm, and implementing sustainable drainage systems (SuDS).	This is addressed in ES Chapter 33 Climate Change (Document Reference: 3.1.35) and in the BNG Strategy (Document Reference: 7.22).
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Essex Local Nature Partnership ECC has now established a Local Nature Partnership (LNP) covering Greater Essex. The LNP contains three working groups – a community engagement group, a planning and BNG working group and, a Local Nature Recovery Strategy (LNRS) group. The works of this group, including the upcoming LNRS, will need to be supported and acknowledged moving forward.	Noted.
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Ecology Place Services on behalf of the Joint Councils has reviewed onshore ecology and ornithology chapters of the PEIR and its appendices and figures and note that Chapter 23 will be updated in the ES once the onshore project area is further refined and the data analysis for all remaining baseline ecological surveys has been completed and reported upon. We welcome the amendments that have been made since the EIA Scoping Opinion consultation and from ongoing technical consultation via the Onshore Ecology and Ornithology Expert Topic Group (ETG). The provision of confidential reports for sensitive species is noted though we request that unredacted versions are provided to appropriate key stakeholders when the DCO application is submitted. We look forward to reviewing draft Ecological Management Plan with embedded mitigation and best practice measures and further details for the Project to deliver a minimum of 10% BNG for the onshore elements in the ES.	Noted. This is addressed in the OLEMS (Document Reference: 7.14) and BNG Strategy (Document Reference: 7.22).
Essex County Council	14/07/2023, Consultation Response Letter,	Chapter 23, Paragraph 17 - The Conservation of Habitats and Species Regulations 2017 should have (as amended) added.	This has been addressed in Section 0.

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Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Paragraph 21 and Table 23.7 - References to CWS and RNR are incorrect for Essex as the correct terms are LoWS and Special Roadside Verge (SRV)	This has been amended throughout this chapter.
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	Paragraphs 139, 153, 185, 289, 332, 384, 38, Tables 23.2, 23.7, 23.37, and the Glossary- All references to the Essex Biodiversity Action Plan (BAP) and LBAP are not relevant as this was archived many years ago.	These have been amended throughout this chapter. In the October ETG this comment was raised by North Falls. Natural England advised North Falls to use the National BAP list instead (as set out below in this table). This has been reflected throughout this Chapter.
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	An Arboricultural Impact Assessment (AIA) will need to be undertaken to assess the quality of the existing trees along the length of proposed cabling route. All reports and plans must comply with 'British Standard 5837:2012 Trees in relation to design demolition and construction – Recommendations' and should provide details on all existing trees and vegetation to be retained and/or removed to facilitate the scheme, outlining any Arboricultural impacts and constraints. This will identify any trees within the site that would pose a constraint to this development and if they are of sufficient quality to merit protection and/or retention. An Arboricultural Method Statement (AMS) and associated tree protection plans will be required to ensure retained vegetation is adequately protected throughout the course of the development.	The baseline environment and impacts in relation to woodland and trees are addressed in Sections 23.5.3.4 and 23.6.1.5.
Essex County Council	14/07/2023, Consultation Response	Where existing trees pose a constraint or their removal is required to facilitate this development, replacement planting opportunities should be incorporated into the design through methods such as native hedgerows and SUDs schemes and should be presented with the submission of a Soft Landscaping Plan. Good species selection would	This is addressed in the OLEMS.

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	Letter, Appendix One	allow for an enhanced provision for wildlife and bring long term ecological benefits to the area to potentially mitigate any disturbance during construction.	
Essex County Council	14/07/2023, Consultation Response Letter, Appendix One	The area of land chosen passes closely to residential areas and there may be trees on site that hold special cultural or personal value to the local residents. This could prove a source of contention if trees are seen to have high amenity value. Consultation with the local residents should be undertaken once the tree impacts and methods has been established.	This is assessed in ES Chapter 25 Onshore Archaeology and Cultural Heritage (Document Reference: 3.1.27) and ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34).
Ardleigh Parish Council	13/07/2023, Consultation Response Letter	We endorse the concerns raised by our neighbours in Little Bromley around wildlife and environmental impact. 'The countryside in the affect area has a rich and varied wildlife population as identified by wildlife surveys. This includes many species of waterbirds and non-waterbirds. We are very close to the Stour Estuary SSI and Ramsar site, and surveys indicate bird species present which are related to those sites. Badgers, hares, foxes, deer, bats and other mammals can be found in the parish. Grass snakes are regular seen in the summer. These all thrive as we have woodland, extensive hedgerows and arable margins some of which will be affected by your planned development. The migratory bird route across East Anglia, the East Atlantic Flyway, has gained Government backing to bid to become a UNESCO World Heritage Site. Major developments such as planned by Five Estuaries, North Falls, National Grid and Tarchon, will have serious impact. Potential exists for protected or notable species to be impacted by construction activities either physically via permanent or temporary habitat loss or by inadvertent injury or killing or from disturbance via light, noise and human presence. There is potential for permanent habitat fragmentation and species isolation as a result of four substation construction and also from construction of the cable route. The substation construction together with the additional temporary construction compound (TCC) areas and the cable route during construction will bring a permanent loss of habitat.'	Impacts on named species, mitigation, and how losses are being minimised and avoided are addressed in this ES, namely in Section 23.6. Main migratory locations are designated sites and are fully assessed in the HRA and in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). Mitigation measures are also addressed in the OLEMS and Schedule of Mitigation.
Environment Agency	14/07/2023, Consultation	We welcome the commitment to develop a plan to prevent the spread of invasive non-native species in the Code of Construction Practice.	Noted.

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	Response Letter		
Environment Agency	14/07/2023, Consultation Response Letter	We note the proposed enhancements and look forward to more details and evaluation. We suggest that enhancements could be extended to riparian locations by replacing lost gravel to restore benthic habitats, as well as varied and diverse tree/scrub planting to provide shading and riverbank habitat for mammals. We look forward in due course to a full BNG plan showing net gain of at least 10%.	Riparian habitats are considered in this ES in Sections 23.5.3.10 and 23.6.1.7. BNG is addressed in the BNG Strategy (Document Reference: 7.22).
Forestry Commission	07/06/2023, Consultation Response E-Mail.	As a Non-Ministerial Government Department, the Forestry Commission provide no opinion supporting or objecting to an application. We provide advice on the potential impact that the proposed development could have on trees and woodland including ancient woodland. The links below are to the Government guidance on the protection of ancient woodlands and veteran trees etc. Having reviewed the North Falls Offshore Wind Farm documents it is clear that there are no ancient woodlands ancient or veteran trees at the proposed site of landfall, none along the route of the cabling, and none at the proposed site of the substation. Therefore the Forestry Commission has no comment to make.	Noted.
Frinton and Walton Town Council	13/07/2023, Consultation Response E-Mail.	The Government has made a tentative submission for all wetland sites on the east coast, the application was submitted in July 22 by the RSPB, WWT (Wetlands Wildlife Trust) and NT (National Trust), to UNESCO for consideration as a World Heritage Site. The Hamford Backwaters are considered to be the 2nd most important site in Europe for over wintering birds. It is well known that pylons and overhead cables are not compatible with migrating birds.	Main migratory locations are designated sites and are fully assessed in the HRA and in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).
Little Bromley Parish Council	August 2023 Consultation Response Letter	Wildlife and Environmental Impact - Little Bromley parish has a rich and varied wildlife population as identified by wildlife surveys. This includes many species of waterbirds and non-waterbirds. We are very close to the Stour Estuary SSI and Ramsar site, and surveys indicate bird species present which are related to those sites. Badgers, hares, foxes, deer, bats and other mammals can be found in the parish. Grass snakes are regular seen in the summer. These all thrive in the parish, as we have woodland, extensive hedgerows and arable margins some of which will be affected by your planned development. The migratory bird route across East Anglia, the East Atlantic Flyway, has gained Government backing to bid to become a UNESCO World Heritage Site. Major developments such as planned by Five Estuaries, North Falls and National Grid will have serious impact. Potential exists for	Impacts on named species, mitigation, and how losses are being minimised and avoided are addressed in this ES, namely in Section 23.6. Main migratory locations are designated sites and

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		protected or notable species to be impacted by construction activities either physically via permanent or temporary habitat loss or by inadvertent injury or killing or from disturbance via light, noise and human presence. There is potential for permanent habitat fragmentation and species isolation as a result of the substation construction and also from construction of the cable route. The substation construction will bring a permanent loss of an estimated 8Ha of habitat together with the additional loss of the TCC areas and the cable route during construction.	are fully assessed in the HRA and in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). Mitigation measures are also addressed in the OLEMS and Schedule of Mitigation.
Essex County Council	10/10/2023, Onshore Ecology and Ornithology ETG.	ECC stated that NF and VE have gone from four cables to two per project, and asked if the cumulative impact of NF and VE would be reduced to four cables combined?	This is correct and that the worst case is four cables combined across both North Falls and Five Estuaries, which means two cables per project. Details of the Project parameters assessed within this chapter is described in Section 23.3.2.
Essex County Council	10/10/2023, Onshore Ecology and Ornithology ETG.	ECC further asked what impact this reduction of the number of cables has on the cable corridor.	The cable width has been reduced from 82m for one project (i.e. 164m for two projects) m to 90 m across the two projects (and narrower down to 72m in some locations) which is a substantial reduction in the impact. This is described in Section 23.3.2 and ES Chapter 5 Project Design.

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Environment Agency	10/10/2023, Onshore Ecology and Ornithology ETG.	The Environment Agency raised concerns that spoil heaps are stored well away and outside of floodplains.	This is detailed up in the Outline Code of Construction Practice (OCoCP) (Document Reference: 7.13) and the soil management plan. The OCoCP will also detail measures to manage sediment runoff, sediment loss and pollution in the adjacent watercourse.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England queried how the HDD exit pit TCC fits with VE, and asks if both projects will have launch pits in same area?	There is sufficient space for the HDD equipment of both projects as they are looking to use the same area, although it may happen at different times.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	We have considered this information with the Responsible Officer for Holland Haven Marshes SSSI. With regards to a 5 m standoff, our advice is that where works are carried out seaward of the seawall and, thus, constrained by the seawall and/or the sea, this would be acceptable. However, on the north side of the SSSI, we would expect to see a much larger buffer implemented, of at least 20m. This is key to breaking the linkage between any potential pollutant and receptor. We would also wish to see further information on how this might be achieved.	Noted.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England asked for the percentage of the HDD exit pit TCC area is to be taken up by construction.	This is an area of 150 x 200 m, including for material storage for HDD. This is described in Section 23.3.2 and ES Chapter 5 Project Description (Document Reference: 3.1.7).

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			Both North Falls and Five Estuaries have enough space for the drilling required for both projects.
Essex County Council	10/10/2023, Onshore Ecology and Ornithology ETG.	ECC asked North Falls to explain how the TCCs will work, if it will be a 24/7 compound and if it will be lit and security fenced. ECC also asked about hours in terms of stand offs.	Drilling has the potential for 24 hour working as it must continue until it is complete. NFOW confirmed that only the drill itself has the potential for 24-hour work, not vehicle movement. For each individual drill, there is the potential to go beyond the 24-hour period (e.g. 48 hours). There is one drill per cable so two in total and one spare, therefore there are six drills as a worst case for both projects. Light will be required from Monday to Saturday, and temporary fencing will be used around site and removed post construction. This is described in Section 23.3.2 and ES Chapter 5 Project Description (Document Reference: 3.1.7).

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Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England asked what the blue triangle at the top of map presented in the October 2023 ETG was outside the RLB.	This is a TCC required for additional material storage during landfall works. This is described in Section 23.3.2 and ES Chapter 5 Project Design (Document Reference: 3.1.7).
Essex County Council	10/10/2023, Onshore Ecology and Ornithology ETG.	ECC asked about 24 hour working under exceptional circumstances.	This is addressed in ES Chapter 5 Project Description, and all exceptions to set working hours described.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England asked North Falls to confirm that they will not need beach access.	Beach access is not required for North Falls. Details on the impacts on intertidal habitats are detailed in ES Chapter 10 Benthic and Intertidal Ecology (Document Reference: 3.1.12).
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England asked if Nathusius' pipistrelles were trapped during the bat surveys or if this was done with a bat detector. Natural England asked how close the project is to the coast.	Sound analysis was used, not trapping. Findings of the bat surveys can be ES Appendices 23.8 (Document Reference: 3.3.37) and 23.9 (Document Reference: 3.3.38). The Project runs up to edge of the SSSI, but most

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			Nathusius' pipistrelle were from Great Holland Pits and the reservoir which is 1-2km inland.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England suggested getting in touch with the Nathusius project as they might be interested in the North Falls site for trapping. Natural England said they should be able to find a contact who can put North Falls in touch with the Essex group who may have more knowledge of Nathusius' pipistrelle and if they are resident or migratory.	Data was acquired from the BCT's National Nathusius' Pipistrelle Project to inform this assessment. Baseline presence of Nathusius' pipistrelles and potential impacts on their migrating population are set out in Sections 23.5.4.2.3, 23.6.2.4 and 23.8.3.1.3.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England advises that we do not attribute different weight to different components of the SSSI. They are all SSSI features. The effect of the compounds and any other operations required should, therefore, be considered in relation to all the SSSI notified features. In other words, the proposed development should be assessed against any notified feature.	North Falls noted that the PEIR assessments found that the terrestrial invertebrate assemblage and the botanical aspects were of high importance, part of the ditch network and aquatic assemblages in the SSSI were of low and medium importance respectively. The assessments of individual components of the SSSI and is the approach taken in this ES, although the corridor has reduced

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			further and so different parts of the SSSI have been subject to assessment. Baseline conditions and potential impacts on Holland Haven Marshes SSSI/LNR are set out in Sections 23.5.2.1 and 23.6.1.1. No significant effects are predicted to occur on Holland Haven Marshes SSSI/LNR.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	North Falls noted Natural England's Section 42 response in relation to saltmarshes in the intertidal area, and said there are no works happening in the saltmarsh. Natural England said they will take this point away.	Noted and no further response was received from Natural England at the submission.
Essex Wildlife Trust	10/10/2023, Onshore Ecology and Ornithology ETG.	North Falls pointed out a comment in relation to the HDD risk assessment to inform the assessment and said that the project has not undertaken geotechnical surveys to date around the SSSI, as it will be undertaken post-consent as part of the detailed design. North Falls stated that the risk assessment would be looked at using the British Geological Survey data. North Falls also stated that it is unlikely that the project will be able to get to a point of certainty but can produce a risk assessment to identify the likelihood of this happening and present mitigation in the event it did occur. Essex Wildlife Trust agreed this was a reasonable approach.	Noted.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	North Falls said that based on the PEIR boundary, there was one occasion where they were adjacent to Ancient Woodland but this has now moved more than 50m away. North Falls has made a commitment to avoiding Ancient Woodland through route selection and there isn't expected to be effects on Ancient Woodland or veteran trees, so no management plan is needed. North Falls said there are some measures for managing dust / drainage effects in the OCoCP.	Noted.

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		Natural England responded that this is reasonable if the project is avoiding direct impacts, and to be sure that indirect impacts are mitigated.	
Essex Wildlife Trust	10/10/2023, Onshore Ecology and Ornithology ETG.	North Falls pointed out that where Holland Mill Wood (part of the Great Holland Pits site) crosses with Little Clacton Road, there is no way for the project to cross Little Clacton Road without being within 30 m of Holland Mill Wood. Essex Wildlife Trust stated they are satisfied with the proposals.	Noted.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England advise that a buffer of 15m is required around ancient woodland, so it would depend how close the works are to Holland Mill Wood within the 30m.Therefore, Natural England would need further details to be provided before they are able to agree.	Noted.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England said to refer to the National BAP list, rather than the now rescinded Essex BAP and LBAP.	Noted. This has been reflected throughout this Chapter.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England stated that an AIA is related to the quality of trees and not ecological reports, so it is not something that Natural England wanted to comment on	Noted
Essex County Council	10/10/2023, Onshore Ecology and Ornithology ETG.	ECC asked North Falls when an AIA would be done.	North Falls clarified the AIA would be produced post-consent.
Essex County Council	10/10/2023, Onshore Ecology and	ECC said that the Examining Authority may say that the project does not have enough evidence and that ECC is not in a position to say that the recommendation is not wrong, but it is a decision that North Falls has to make a decision on. ECC said the DCO is evidence based so questioned how can impact be assessed if there is no evidence.	Noted.

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	Ornithology ETG.		
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England said they will take advice on hedgerow requirements in BNG calculations if they cannot be maintained for 30 years.	Noted.
Natural England	10/10/2023, Onshore Ecology and Ornithology ETG.	Natural England commented that skylarks and other nesting birds may hold up construction, so asked if the habitat will be made unsuitable for nesting, states that skylarks are hard to account for.	North Falls clarified the Project would target specific areas and the ECoW would have to pick up nesting attempts and introduce restrictions as required. This is addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26) and in the OLEMS (Document Reference: 7.14)
Essex County Council	05/02/2024, Onshore Ecology BNG ETG	ECC questioned if there would be any additional consultations.	North Falls confirmed that a targeted landowner consultation has taken place in March 2024. It is noted that Five Estuaries have already carried out the additional consultation.
Natural England	05/02/2024, Onshore Ecology BNG ETG	Natural England raised a query regarding existing guidance on information requirements (for BNG) and whether these will align with the requirements North Falls will use. Natural England also highlighted that there are BNG templates that should be used when writing the BNG report.	North Falls noted that where practicable the template will be used, however if deviated from,

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			this will be justified. Due to the nature of consenting a Rochdale envelope for the Project, there is a degree of flexibility to ensure we can update what North Falls are seeking to consent for post-consent. North Falls have provided numbers within the BNG Strategy (Document Reference: 7.22) which are indicative calculations based on best understanding of how the Project will be built out. Final BNG values will be provided post-consent at the detailed design stage.
Places Services	05/02/2024, Onshore Ecology BNG ETG	Places Services raised concern in terms of the of how much compensation is needed to get back to no net loss, before it tips in to BNG and noted that there needs to be more clarification as to what compensation and net gain actually is.	North Falls asked if Places Services could provide examples of where other projects have clearly shown how much compensation is needed to get back to no net loss. At the time of submission no list has been provided.
Essex County Council	05/02/2024, Onshore Ecology BNG ETG	ECC also raised a concern how North Falls will avoid double counting BNG, when the project is working in combination with another (Five Estuaries).	North Falls and Five Estuaries have sought to align approaches as far as possible, but will

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			unavoidably have different approaches due to slightly different baseline datasets, project footprints, etc. There is an acceptance between the two projects that the end result, in terms of the numbers, will slightly differ. What the Projects have instead focussed on therefore is as far as possible aligning assumptions, strategy etc., so that when it comes to the post-consent phase, BNG can be potentially assessed jointly for both projects. Further details on North Falls BNG strategy and assessment are set out in the BNG Strategy (Document Reference: 7.22).
Natural England	05/02/2024, Onshore Ecology BNG ETG	Natural England noted that for consistency throughout all projects, everything within the redline boundary should be included in the BNG baseline, which should also include retained habitats.	North Falls believe such an approach does not suit an NSIP consented using a Rochdale envelope, where a wider area than will be directly affected will be located within the onshore project area. To use the onshore project area as the basis of the

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			calculation at this stage will give an unrepresentative conclusion regarding the BNG required. Compensation cannot yet be agreed until land rights have been secured and the final Landscape Plan is produced post-consent. Further details on North Falls BNG strategy and assessment are set out in the BNG Strategy (Document Reference: 7.22).
Natural England	05/02/2024, Onshore Ecology BNG ETG	Natural England noted North Falls position regarding the use of the Project redline boundary for BNG calculations and stated that this is a new issue and it will be for the Examining Authority to decide upon.	Noted. Further details on North Falls BNG strategy and assessment are set out in the BNG Strategy (Document Reference: 7.22).
Essex County Council	05/02/2024, Onshore Ecology BNG ETG	ECC raised concern that North Falls' position of arable areas being classed as retained once they are returned to active agricultural use will affect landowners if land is not put back to original condition and use.	North Falls stated that this will be highlighted at consultation as agricultural use will mean different things to different landowners. Discussion will need to take place directly with affected landowners as to what

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			condition the land will be returned to, seeking agreement with the landowner post-consent.
Natural England	05/02/2024, Onshore Ecology BNG ETG	Natural England stated that where North Falls cannot secure the 30-year management in terms of hedgerows, the precautionary principles should apply and may have to be treated as habitat loss. Natural England raised concern whether North Falls are expecting 30-year management by the landowner or leave it up to the landowners to do what they want, raising a query over what security North Falls have over this, to keep the 30 years management going.	Security of hedgerow management would depend on agreements between the individual landowners, where some maybe more willing than others. This will be determined post-consent.
Environment Agency	05/02/2024, Onshore Ecology BNG ETG	The Environment Agency raised concerns over watercourses and that horizontal drilling that maybe involved as previously this has gone drastically wrong (for example, with leaks).	North Falls are assuming that where habitats are crossed using trenchless techniques, these are retained. Due to the low likeliness of a breakout, if this were to happen there is a contingency plan in place that will manage this if it were to occur. The draft Outline Horizontal Directional Drill Method Statement and Contingency Plan has been submitted alongside the DCO application (Document Reference: 7.15)

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Essex County Council	05/02/2024, Onshore Ecology BNG ETG	ECC queried whether North Falls were in a position to begin implementing compensation for BNG early when the project commences, rather than all post-construction.	As a worst case scenario planting will not begin pre-construction, however this will be re-addressed post-consent when more detailed design information is available.
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England raised concern regarding the time frames of the construction of North falls and Five Estuaries, and questioned which project will bury cables first, or if both projects will carry this work out at the same time.	North Falls' preferred construction scenario assumes both projects receive consent and will be a coordinated build out. However, this may not be possible within the Project time frame, in which case each project will have to build their cable ducts out separately. Construction scenarios in relation to Five Estuaries are addressed in Section 23.8.3.1.
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England questioned if the red line boundary is the same for each project.	North Falls confirmed they are almost entirely the same, with some minor differences only, such as particular techniques for cable duct installation that might require different boundaries in a small number of areas.

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			The onshore project area for North Falls is set out in ES Chapter 5 Project Description (Document Reference: 3.1.7).
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England raised a query regarding if there were any ponds that North Falls did not survey during the great crested newt surveys, as they were not considered suitable within the red line boundary.	Sixteen water bodies were not subject to eDNA testing due to access restrictions or they were unsuitable at the time of survey. The baseline results of the great crested newt eDNA surveys are set out in Section 23.5.4.4 and ES Appendix 23.2 (Document Reference: 3.3.31).
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England queried whether Five Estuaries and North Falls eDNA survey data correlate with each other?	The data was collected as part of two separate survey campaigns so there will be some differences in the results. North Falls and Five Estuaries have surveyed the same set of ponds. The baseline results of the great crested newt eDNA surveys are set out in Section 23.5.4.4 and ES Appendix 23.2 (Document Reference: 3.3.31).

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Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England highlighted that if there are different great crested newt eDNA survey results between the two projects, under a precautionary approach Natural England will use the dataset returning a positive result of a pond/waterbody.	Noted. As North Falls and Five Estuaries have surveyed the same set of ponds, both projects will collate their datasets for the purposes of DLL application, using the precautionary approach described by Natural England.
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England stated that the DLL Impact Assessment and Conservation Payment Certificate (IACPC) would mention when the first payment is necessary but cannot guess what this payment will be due to the scale of this project. Given there are no ponds within the red line and only temporary impacts, Natural England suggested it should not be expensive. Natural England noted post-meeting that it is roughly 30% of the total Conservation Payment that is requested as a First Stage Payment.	Noted.
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England confirmed that with a normal scheme the turnaround time for reviewing the DLL enquiry form and provide the IACPC would be 10 days, however with more complicated cases this will take a longer. For North Falls, Natural England assumed there would be temporary and permanent impacts, which need to be considered when North Falls decide whether it applies for the whole onshore project area or sections. North Falls should consider whether they are submitting the entire DCO boundary with the substation in or not, as Natural England will consider the whole area under DLL. Therefore, if North Falls do not need a license for the substation, due to there being no ponds within this and the surrounding area, then this section can be excluded from the enquiry boundary. However, this would need to be explained within the Environmental Statement (ES) for clarification.	Noted. North falls confirmed that they will be applying for DLL for the whole onshore project area, minus the onshore substation where no ponds were recorded within 250m.

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Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	North Falls noted that the footprint of the works will be refined post-consent during detailed design, and questioned whether after joining the DLL scheme and submitting further information, if it is best to submit something for the process of the consenting stage that covers North Falls entire project area to allow maximum flexibility? Natural England stated that it is up to North Falls how they wish to proceed, noting that there are opportunities to change the red line boundary, being able to get a new certificate if needed by running the IACPC again. Natural England suggested providing the worst cases initially, which can then be reduced later down the line.	Noted.
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	Natural England's preference is for North Falls and Five Estuaries to submit the same red line boundary within their enquiries, which should be the worst case of the combined boundary for both projects.	Noted. As North Falls and Five Estuaries have surveyed the same set of ponds, both projects will collate their datasets for the purposes of DLL application, using the precautionary approach described by Natural England. The boundaries used by both projects in their individual DLL applications will be a combined red line boundary if possible taking into account the worst case scenario for both projects.
Natural England	29/02/2024, Onshore Ecology	Natural England can split out temporary and permanent impacts, where there will be separate requirements for both, so they would not consider the whole site as a loss as the majority of the site is temporary. However, North Falls would need to provide different shapefiles for both temporary and permanent, with one boundary for the entire site.	Noted.

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	Great Crested Newt District Level Licensing ETG	Natural England also accepts up to five phases for developments and can provide phased licenses and phased payments. If the boundary changes and these changes are minor, Natural England may decide not to run the assessment again, but they would provide a new license for the new boundary. Natural England's certificate will still be valid if changes to the boundary are minor.	
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	North Falls queried the fees associated with the IACPC for more complex projects, which Natural England confirmed that for more complicated projects, these take approximately 5/6 times longer to run the impact assessment, noting that while a cost is not currently known, but there is a £2.5k payment cap.	Noted.
Natural England	29/02/2024, Onshore Ecology Great Crested Newt District Level Licensing ETG	North Falls raised concern over the licence only being valid for 2 years and noted that North Falls predict the construction of the onshore substation to take 27 months. Natural England confirmed that the licence can be extended by submitting a form to Natural England.	Noted.
Natural England	01/03/2024, Onshore Ecology European Protected	Natural England asked North Falls if the second suite of roosting bat surveys post-consent would be comprehensive or if it would be closer to a single check.	North Falls clarified a full suite of surveys would be conducted, and that by the time construction starts in 2027, five years will have

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	Species Licensing ETG		passed, so RHDHV proposes to give a full update to the surveys. The current baseline results of the roosting bat surveys are detailed in Section 23.5.4.2.1 and in ES Appendix 23.8 (Document Reference: 3.3.37).
Environment Agency	01/03/2024, Onshore Ecology European Protected Species Licensing ETG	The Environment Agency queried if the existing culvert over Tendring Brook to be used for haul road crossing will need to be replaced/reinforced to accommodate the type of machinery accessing the site?	There is no current expectation that there will be any works needed to the existing culvert. The culvert is being targeted since it is designed to withstand existing farm equipment use. Detailed tests have not yet been conducted, therefore strengthening works may be required but it is not currently anticipated.
Natural England	01/03/2024, Onshore Ecology European Protected Species Licensing ETG	North Falls explained that for the one hedgerow with hazel dormouse presence that requires haul road crossing, they are proposing 6m of vegetation removal while the dormice are in hibernation (November to March) and temporary hedgerows put in place across the haul road overnight during the dormice active period. Construction of the temporary hedges will be defined post-consent, but initial ideas include dead hedgerows or containerised hedges. Natural England commented that North Falls proposed mitigation for hazel dormice in this particular are pragmatic and reasonable.	Hazel dormouse mitigation is described in Section 23.6.1.14.4.
Forestry Commission	19/04/2024, Targeted	Having reviewed the North Falls Offshore Wind Farm documents and maps, we can confirm there are no Ancient semi natural woodlands within the project area. However, we note there are several other fragmented woodlands	All woodland parcels located within the onshore

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	consultation response	within the proposed corridor. These are mixed deciduous woodlands on the Priority Habitat Inventory (England). This recognises that under the UK BAP they were recognised as being the most threatened and requiring conservation action. The UK BAP has now been superseded by the UK Post-2010 Biodiversity Framework but this priority status remains. We note the PEIR Addendum references removal of a small, 0.13ha area of woodland, although this is planned to be reinstated after works are completed.	project area have been avoided through the use of trenchless crossing techniques, therefore the only residual effects are related in indirect impacts. Further details are provided in section 23.6.1.5. NFOW are not seeking consent within their DCO application for vegetation removal within the national grid connection works, only for connection works within a new substation consented and built by national grid. It will be for national grid to determine the nature of the East Anglia Connection Node (EACN) substation, and any vegetation removal required in relation to this.
Little Bromley Parish Council	21/04/2024, Targeted consultation response	We have major concerns about the widening of Bentley Road. It is the entrance to the village and the widening of the road will alter the character forever, and the setting of what is a small village. In order to widen the road it would involve removing mature hedging which is over 30 years old. This would cause considerable environmental damage as it is a habitat for local wildlife. Little Bromley has a rich and varied wildlife population as identified by wildlife surveys. This includes many species of waterbirds and non-waterbirds. We are very close to the Stour Estuary SSI and Ramsar site, and surveys indicate bird species present which are related to those sites. Badgers, hares, foxes, deer, bats and other mammals can be	Details of the results of the extensive ecological surveys undertaken to inform the Project can be found in ES Appendices 23.1 – 23.9 (Document Reference: 3.3.30 –

Consultee	Date / Document	Comment	Response / where addressed in the ES
		found in the parish. Grass snakes are regular seen in the summer. These all thrive in the parish, as we have woodland, extensive hedgerows and arable margins some of which will be affected by your planned development. The migratory bird route across East Anglia, the East Atlantic Flyway, has gained Government backing to bid to become a UNESCO World Heritage Site. Major developments such as planned by FE, NF and NG will have a serious impact. Potential exists for protected or notable species to be impacted by construction activities either physically via permanent or temporary habitat loss or by inadvertent injury or killing or from disturbance via light, noise and human presence. There is potential for permanent habitat fragmentation and species isolation as a result of the substation construction and also from construction of the cable route. The substation construction will bring a permanent loss of an estimated 8Ha of habitat together with the additional loss of theTCC areas and the cable route during construction. TCC on Bentley Road and visibility splays means loss of established hedgerows/trees. There are a number of mature trees covered by Tree Preservation Orders along the route which need to be seriously considered.	3.3.38). In addition, detail of the ornithological surveys and assessment of impact upon designated sites for ornithology can be found in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). Impacts upon protected or notable species can be found in sections 23.6.1.9 - 23.6.1.15. Effects on hedgerows are described in section 23.6.1.6, and all tree preservation orders (TPOs) are shown on the TPO and Hedgerow plan (Document Reference: 5.12).
Natural England	22/04/2024, Targeted consultation response	We note that following ongoing design refinement since submission of the PEIR, a series of proposed localised changes to the Project's design have been identified which require additional land outside of the onshore project area that was consulted on within the PEIR (2023). We have reviewed the Addendum to the PEIR and accompanying targeted consultation documents and reiterate our earlier concerns at PEIR (May 2023) regarding potential disturbance to Holland Haven Marshes SSSI during construction. In particular, we note the proximity of the TCC to the SSSI and advise that suitable mitigation measures should be identified to avoid/minimise disturbance arising from noise and vibration, lighting, hydrological impacts, and pollution arising from a potential 'breakout' of drilling fluid etc. These measures should be documented in the mitigation plan. We also refer the Project to our detailed advice provided	Measures to minimise indirect effects upon Holland Haven Marshes SSSI are outlined in Table 23.5 and the OCoCP (Document Reference: 7.13) submitted with the DCO application, and section 23.6.1.1 below. These include moving the TCC away from sensitive

Consultee	Date / Document	Comment	Response / where addressed in the ES
		at PEIR regarding likely significant effects on onshore ecology, onshore ornithology, protected sites and species, and landscape visual impacts.	areas of the SSSI and including the provision of the Outline Horizontal Directional Drill Method Statement and Contingency Plan (Document Reference: 7.15) with the DCO application.

23.3 Scope

23.3.1 Study area

7. The study area for onshore ecology has been defined on the basis of the onshore project area, within which relevant impacts would be concentrated. Different study areas have been used for different receptors depending on their importance and their habitat preferences. These study areas were selected according to standard industry guidance (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018) as well as using professional judgement and experience. These study areas were agreed with stakeholders during the EPP and set out in Table 23.2. The study areas are also shown in ES Figures 23.1 – 23.11 (Document Reference: 3.2.19).

Table 23.2 Study areas for onshore ecology receptors

Data/ survey	Study area	Justification	Study area name used in the remainder of this document
Statutory designated sites	Within and up to 5km of the onshore project area.	Reasonable worst case maximum extent of ex-situ habitat for qualifying features of sites (e.g., habitat use by bats, where all bat species core sustenance zones, with the exception of barbastelle [3], are below 5km (Bat Conservation Trust (BCT), 2016) / extent of indirect effects (e.g., downstream fluvial connectivity)).	Statutory designated sites study area
Non-statutory designated sites	Within and up to 2km of the onshore project area.	Reasonable worst case maximum extent of indirect effects (e.g., downstream fluvial connectivity).	Non-statutory designated sites study area
UK Habitats of Principal Importance (UKHPI) and habitats identified in local policy.	Within and up to 50m of the onshore project area.	Reasonable worst case maximum extent of direct and local indirect effects (e.g., run off from construction works).	Habitats and species study area
Protected and notable species (excluding great crested newts)	Within and up to 50m of the onshore project area.	Reasonable worst case maximum extent of direct and local indirect effects (e.g., run off from construction works).	Habitats and species study area
Great crested newts	Within and up to 250m of the onshore project area.	Extent of species foraging zone from breeding ponds.	Great crested newt study area

[3] Core sustenance zone for barbastelle is 6.47km. Sites designated for barbastelle within this buffer zone from the onshore project area have also been considered.

8. The survey areas (i.e., the areas where field surveys have been undertaken) have not always directly corresponded with the study area. This is due to the refinement of the onshore project area during the course of the ecological surveys as a result of engineering feasibility studies and also limits to land access at the time of the surveys. This has resulted in some surveys being undertaken within areas that are now excluded from the onshore project area and a very small number of areas that have either not been surveyed or have not been fully surveyed.

9. Table 23.3 describes the survey areas for each receptor, as agreed through consultation with the ETG, are as follows.

Table 23.3 Survey area of each ecological receptor

Data/ survey	Survey area	Survey date	Survey area name used in the remainder of this document
Extended Phase 1 habitat survey	Within and up to 50m of the onshore project area.	Autumn 2021, Spring 2022, Summer 2023.	Extended Phase 1 habitat survey area.
Terrestrial and aquatic invertebrate survey	Within and up to 250m of the Holland Haven Marshes SSSI.	Summer 2021.	Terrestrial and aquatic invertebrate survey area.
NVC survey	Within and within up to 250m of the Holland Haven Marshes SSSI.	Summer 2021.	NVC survey area.
Great crested newt eDNA surveys	All ponds within and up to 250m from the onshore project area.	Spring/Summer 2022.	Great crested newt survey area.
Bat emergence/ re-entry surveys	All features (buildings, trees) within and up to 50m of the onshore project area.	Summer 2022.	Bat emergence/ re-entry survey area.
Water vole and otter surveys	All suitable watercourses within and up to 50m of the onshore project area.	Spring/Summer 2022.	Water vole and otter survey area.
Hazel dormouse surveys	All suitable habitats within and up to 50m of the onshore project area.	Spring – Autumn 2022.	Hazel dormouse survey area.
Reptile surveys	All areas of suitable habitats that may support significant populations of reptiles within and up to 50m of the onshore project area.	Spring and Autumn 2022.	Reptile survey area.
Bat activity surveys	Key linear features (e.g., hedgerows) and suitable commuting/foraging habitats within and up to 50m of the onshore project area.	Spring/Summer 2022.	Bat activity survey area.

23.3.2 Realistic worst case scenario

10. The final design of the Project will be confirmed through detailed engineering design studies that will be undertaken post-consent. 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 (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 other scenarios within the design envelope will have less impact. Further details are provided in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

11. The realistic worst case scenarios for the likely significant effects scoped into the EIA for the onshore ecology assessment are summarised in Table 23.4. These are based on project parameters described in ES Chapter 5 Project Description (Document Reference: 3.1.7), which provides further details regarding specific activities and their durations.

12. The main grid connection options considered in the ES are outlined below:

- Option 1: Onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, with a project alone onshore cable route and onshore substation infrastructure;
- Option 2: Onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, sharing an onshore cable route and onshore duct installation (but with separate onshore export cables) and co-locating separate project onshore substation infrastructure with Five Estuaries; or
- Option 3: Offshore electrical connection, provided by a third party.

13. Grid connection Option 2 is considered the realistic worst case scenario for the onshore ecology assessment because the build out requires four sets of cable ducts and associated joint bays to be installed, impacting upon the largest footprint of the three grid connection options.

14. Under Option 2, the Project's onshore infrastructure comprises the following elements:

- Landfall, where the offshore export cables are brought ashore;
- Onshore cable route, which includes space for temporary works for the installation of cable ducts and buried onshore export cables, including areas for TCCs, construction and operation and maintenance accesses (including Bentley Road improvement works);
- Onshore substation, proposed to be located west of Little Bromley;
- Onshore substation works area, which includes land required for temporary construction, export cables, means of access, drainage, landscaping and environmental mitigation for the onshore substation;
- The search area for the East Anglia Connection Node (EACN) (the Project's national grid connection point), within which will be located the Project's national grid substation connection works.

15. Collectively, the footprint of the Project's onshore infrastructure is referred to herein as the 'onshore project area' and is shown on ES Figure 5.2 (Document Reference: 3.2.3). The Project's onshore infrastructure outlined above is proposed to be located entirely within the Tendring peninsula of Essex.

Table 23.4 Realistic worst case scenario of effects arising from development of North Falls alone – Option 2 (installation of ducts for a second project).

Potential impact	Parameter	Notes
Construction		
Impacts relating to the landfall	Landfall HDD (temporary works) physical parameters: Maximum No. of Transition Joint Bays (TJB) = 2 Individual TJB dimensions / permanent landtake = 4 x 15m Maximum indicative HDD spacing onshore = 40m Maximum HDD depth = 20m Maximum indicative length of HDD = 1.1km HDD temporary works area = 75 x 150m Drill exit location = subtidal exit below MHWS (up to 8m depth)	Duration includes compound establishment, HDD, transition bays, and reinstatement.
	Duration: 13 months (of which HDD = 6 months) HDD to include 24 hour / 7 days working where required	
Impacts relating to the onshore cable route	Cable route construction physical parameters: Route length = up to 24km Jointing bays = Up to 192 (approximately every 500m) buried below ground Joint bay dimensions = 4 x 15m Maximum cable trench depth = 2m Minimum cable burial depth (to top of protection tile) = 0.9m Indicative cable route width = 72m (open cut trenching), 90m (trenchless crossings), 130m (complex trenchless crossings) Cable construction compound dimensions = 150 x 150m (main) to 100 x 100m (satellite) No. of trenches = 4 Cable trench dimensions = 3.5 – 1.2 x 2m (tapered top to bottom) Haul road width = 6m wide road, 10m wide total including verges, drainage and passing places. Haul road spacing at passing places = 500m	Overall duration includes establishing / reinstating TCCs and haul roads, cable installation (trench excavation, duct installation, cable jointing), HDD (includes compound establishment, HDD, and reinstatement).

Potential impact	Parameter	Notes
	Hedge replanting restrictions = shrubs max 5m high within 6m of each cable centre.	
	Trenchless crossings physical parameters: Maximum width of buried cable = 130m Maximum trenchless crossing depth = 20m HDD compound dimensions = 75 x 150m	
	Durations: Bentley road widening = 6 - 9 months Cable route works = 18 – 27 months Cable installation = 12 months Major HDD (each location) = 8 months (of which HDD = 4 months) Minor HDD crossings = 2 months Major HDD crossings to include 24 hour / 7 days working where required.	
Impacts relating to the onshore substation	Onshore substation (temporary works) physical parameters: Indicative area of the AIS substation = 280 x 210m Construction compound footprint = 250 x 150m National grid connection works physical parameters: All enabling worth / platform constructed by national grid Cable installation works as described above. Equipment may include: Cable sealing ends, surge arrestors, earth switch, disconnectors, circuit breakers, current transformers, voltage transformers, busbars.	
	Durations: Substation construction duration = 21 - 27 months.	
Operation		
Impacts relating to the onshore cable route	Cable route operational physical parameters:	

Potential impact	Parameter	Notes
	No. of link boxes = up to 96 Link box footprint (per box) = 0.6 x 1 x 1.5m Cross-sectional area of buried cement-bound sand = 0.6m^2	
Impacts relating to the onshore substation	Onshore substation physical parameters: Indicative area of the AIS substation = 280 x 210m	Normal operating conditions would not require lighting at the onshore substation, although low level movement detecting security lighting may be utilised for health and safety purposes. Temporary lighting during working hours would be provided during maintenance activities only. Low level continuous noise emissions would also be generated by the onshore substation during operation.
Decommissioning		
No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable route, 400kV cable route and onshore substation. It is also recognised that legislation and good industry practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused, or recycled where practicable and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the purposes of a worst case scenario, the impacts will be no greater than those identified for the construction phase.		

23.3.3 Summary of mitigation embedded in the design

16. This section outlines the embedded mitigation relevant to the onshore ecology assessment, which has been incorporated into the design of North Falls (Table 23.5). Where other mitigation measures are proposed, these are detailed in the impact assessment (Section 23.6), where applicable.

Table 23.5 Embedded mitigation measures

Parameter	Mitigation measures embedded into North Falls design
Ecological Management Plan	Prior to works commencing, North Falls will prepare an Ecological Management Plan (EMP), secured by DCO Requirement, setting out full details of the ecological mitigation measures which will be adhered to during the Project's construction. This will include: • A programme of works; • A list of roles and responsibilities for ecological mitigation, including the role of an ecological clerk of works (ECoW); • A plan showing ecological constraints; • Full details of good industry practice mitigation required in relation to all species and habitats affected by the Project; • Full details of any project-specific mitigation identified within this chapter, including habitat creation or protected species mitigation programmes. Any such programmes will be accompanied by mitigation layout plans; • A list of protected species licences and site consents required to facilitate construction; • Habitat reinstatement method statements for all habitats proposed to be reinstated following the completion of construction (including grassland, hedgerows, watercourses and arable field margins – see below). • Any associated standalone mitigation plans, e.g., reptile precautionary method of works, invasive species management plan, etc. as required. • An OLEMS has been developed as is being submitted as part of the Project's DCO application (Document Reference: 7.14). The OLEMS sets out the ecological mitigation requirements identified within the ES that must be incorporated into the EMP for delivery during the Project's construction. The OLEMS acts as the single source for all ecological mitigation measures proposed within the ES.
Good industry practice	The EMP will include details of good industry practice for minimising impact to notable habitats and legally protected and notable species, including (but not limited to): • Avoid sensitive times of the year for construction activities, including: • Avoid undertaking vegetation removal during the bird nesting season (March – August inclusive, although weather dependent) (see ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26)) where practicable. Where this cannot be achieved, a pre-construction check of all nesting habitat is required no more than 48 hours prior to removal. Should a nest be found, a buffer zone (minimum 5m) around the nest must be created, and no works must be undertaken within the buffer zone until the young have fledged. This mitigation also applies to suitable habitat for ground nesting birds. • Avoid undertaking above ground vegetation removal during the reptile active period (March – October inclusive) wherever practicable and avoiding undertaking below ground vegetation removal e.g., roots and coppice stools

Parameter	Mitigation measures embedded into North Falls design

	during the reptile hibernation period (November – February inclusive) where practicable. If not practicable, above ground vegetation identified as suitable to support reptiles removed during the reptile active period must be done so whilst adhering to a precautionary method of working (PMoW) for reptiles, supervised by a suitably qualified ecologist. A precautionary methodology for vegetation removal will involve cutting vegetation to a minimum height of 150mm, allowing reptiles to vacate the area as the habitat would be unsuitable for them at such a short vegetation height, allowing an ecologist to search for any reptiles, then once cleared further cutting can take place. For any reptiles found during construction, a suitable translocation area will be decided upon to re-release the reptiles away from construction activities.
	• Undertaking pre-construction checks of all habitats identified of being of conservation importance prior to works, to ensure that the ecological constraints identified prior to consent have not changed.
	• Ensuring security lighting used during construction adheres as far as practicable to accepted lighting guidance (BCT and Institute of Lighting Professionals (ILP), 2023, This will include the following measures:
	  ○ Ensure lighting is cowled and angled downwards and does not shine directly on sensitive habitats;
	  ○ Ensure lighting is motion activated to minimise unnecessary light spill;
	  ○ Ensure lighting is localised and limited during construction.
	• Ensuring good industry practice pollution prevention measures are adhered to at all times to minimise the risk of pollutant release to sensitive habitats (see also ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23)).
	• Best Practical Means (BPM) to be employed during construction to limit dust, odour, and exhaust emissions during construction works, to reduce potential effects upon air quality-sensitive habitat (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)).
	• All habitats temporarily disturbed during construction are reinstated in full upon completion of construction.
	• A 20m standoff will be in place where works on the north side of the SSSI/LNR, to avoid direct impacts on the designated site during construction.
	• Protective fencing will be installed around retained UKHPIs.
	• A 15m buffer zone will be in place surrounding most areas of ancient woodland to avoid direct impacts during construction, except for Holland Mill Wood where this distance is not possible.

Mitigation by site selection	The onshore project area and onshore substation works area have been defined following an extensive site selection process, which has sought to take account of environmental, engineering, planning and land requirements to seek to identify the most sensitive project location. The site selection process is described in detail in ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6). The site selection process has included consideration of the following ecological criteria as part of the process: • Avoidance of statutory and non-statutory designated sites for conservation and associated buffer zones for indirect effects, as far as practicable; • Avoidance of ancient woodland and associated buffer zones for indirect effects, as far as practicable;

Parameter	Mitigation measures embedded into North Falls design
	• Avoidance of UKHPI as far as practicable; • Avoidance of habitat potentially suitable for supporting legally protected and notable species as far as practicable. As part of this process, the onshore project area presented in ES Chapter 5 Project Description (Document Reference: 3.1.7) does not overlap with any European sites designated for nature conservation nor ancient woodlands. The onshore project area does cross one SSSI (Holland Haven Marshes). However, the SSSI will be crossed using HDD techniques thereby avoiding any direct impacts on habitat.
Mitigation by construction method selection	North Falls has committed to seeking to use trenchless techniques (e.g., HDD) where practicable at all key sensitive linear features, including the following: • All 'important' hedgerows, and those hedgerows potentially suitable for supporting dormice and/or commuting / foraging bats; • Main Rivers and watercourses potentially suitable for supporting water voles / otters; • Veteran trees; • Woodland UKHPI; • Ponds UKHPI. At this stage in the Project's design trenchless techniques cannot be committed to at all locations, where the engineering feasibility of using such techniques needs further assessment before it can be confirmed. The list of crossings where trenchless techniques are committed to is described in ES Chapter 5 Project Description (Document Reference: 3.1.7), ES Appendix 5.1 Crossing Schedule (Document Reference: 3.3.2).
	At all trenched watercourse crossings, good industry practice measures will be in place to minimise disturbance of the beds, banks and downstream habitats (see ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23)). Where temporary dams are used: • The onshore export cables would typically be a minimum of 3 m below the channel bed (dependent on local geology and geomorphological risks). This would 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; • The amount of time that temporary dams or flumes are in place will be kept to a reasonably practicable minimum; • Flumes or pumps would be adequately sized to ensure that flows downstream are maintained whilst minimising upstream impoundment; • Scour protection would also be used to protect the river bed downstream of the dam from high energy flow at the outlets of flumes and pumps; • If a diversion channel is required, geotextiles or similar techniques will be used to line the channel and prevent sediment entering the watercourse; • 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; • Channel bed and banks would be sympathetically reinstated (e.g. by replacing re-sectioned banks with more natural profiles that are typical of the natural geomorphology of the watercourse); and

Parameter	Mitigation measures embedded into North Falls design
	• Prior to dewatering the area between the temporary dams, a fish rescue would be undertaken.
Outline Horizontal Directional Drill Method Statement and Contingency Plan	As advised by Natural England during the EPP, an Outline Horizontal Directional Drill Method Statement and Contingency Plan (Document Reference: 7.15) has been submitted with the Project's DCO application. This outline plan sets out the steps will be taken to minimise the risk of effects upon interest features of the Holland Haven Marshes SSSI as a result of a bentonite, an inert clay, 'breakout' during the landfall HDD beneath the SSSI, including the provision of an ECoW during landfall HDD. It details both the measures proposed to reduce the risk of a breakout occurring, and the contingency plans steps to reduce the extent of the breakout and to clean up the spill should it occur. In summary, these steps include: • Pre-drilling ground conditions assessment and hydrofracture modelling to target formations with lower risk of breakout; • Use of drill casing in softer, surface deposits; • Constant fluid monitoring during drilling, so that a breakout can be identified as soon as it occurs; • Provision of appropriate spill management supplies and staff training on breakout management on site; • Process of containment and spill removal once a spill has been identified. Please refer to the Outline Horizontal Directional Drill Method Statement and Contingency Plan (Document Reference: 7.15) for full details of the measures proposed.
Mitigation by design	NFOW have committed to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the cable route working width at hedgerow crossings. Hedgerows will be replanted following construction but note that canopy tree species cannot be replanted within 6m of the buried cables, which will restrict tree planting for a 37m swathe during hedgerow reinstatement (as the maximum width of hedgerow removal is 30m, in practice this restriction will only apply for a maximum 30m swathe). Hedgerow planting would be undertaken in the first winter season following construction.
Habitat reinstatement	As noted above, where practicable all habitats subject to temporary disturbance during construction, will be reinstated in full following the completion of construction. The specific details of the reinstatement will be set out within the EMP for each habitat. The following core principles for habitat reinstatement would be included within the EMP: ***Grassland habitats*** All topsoil stripped in grassland areas would be stored separately and reinstated following the completion of construction. Topsoil storage would be subject to a Soil Management Plan (secured through a DCO Requirement), which would also detail measures for soil storage and handling. Grassland reseeding would be undertaken using a local seed mix, to be agreed in advance with Natural England and Essex Wildlife Trust. Where practicable, harvesting a green hay crop from the grassland areas being lost will be carried out, for use as seed on the reinstatement and compensation areas. Where practicable the salvage of turves from grasslands areas being lost will be carried out for re-use on the reinstatement and compensation areas.

Parameter	Mitigation measures embedded into North Falls design
	Trees and hedgerows As advised by Essex County Council during the EPP, all tree and shrub planting undertaken by NFOW will be subject to an up to 10 year after care period. As advised by Natural England during the EPP, all hedgerows within the onshore project area not removed for construction to be allowed, where practicable, to thicken up during construction and operation to facilitate use as feeding and commuting corridors for wildlife. All reinstated hedgerows will be replanted using locally important and native species, as advised by Essex Wildlife Trust. Pre-planting will be carried out where practicable so hedgerows and trees can establish as close as possible to the time of initial habitat loss. ***Arable field margins*** Efforts will be made to reinstate this habitat, in consultation with Essex Wildlife Trust and the local landowner, to ensure the optimum benefits can be gained from each margin affected. Prior to construction, the arable field margins will be re-surveyed to assess their conservation value. Attempts will then be made to ensure habitat reinstatement takes the form of one of the following (Joint Nature Conservation Committee (JNCC), 2008f): • Cultivated, low-input margins (land managed specifically to create habitat for annual arable plants); • Margins sown to provide seed for wild birds (margins or blocks sown with plants that are allowed to set seed and which remain in place over the winter); • Margins sown with wildflowers or agricultural legumes and managed to allow flowering to provide pollen and nectar resources for invertebrates; • Margins providing permanent, grass strips with mixtures of tussocky and fine-leaved grasses. The precise nature of the reinstatement will be based on agreement with landowners made post-consent and detailed in the final EMP.
BNG	NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project, as articulated within the Environment Act 2021. The Project is engaging with Natural England and other ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering this BNG. Further details regarding the location of the Project's BNG are set out within the BNG Strategy (Document Reference: 7.22). As part of NFOW's BNG targets, habitat creation will be required to off-set losses in biodiversity value within the onshore project area. Habitat creation will be detailed in the EMP and post-consent BNG Assessment Report.
Habitat creation	As part of the landscaping, EMP and BNG commitments, habitat creation will be carried out as compensation. Habitat creation will be detailed in the EMP, and will include measures such as: • Increase habitat connectivity, with a specific focus on providing habitat for notable species which may be present in the relevant areas; • New woodland creation and maintenance, to link and/ or fortify the existing habitat network; • Drainage features designed to meet wildlife needs as well as water management requirements. • Hibernacula for reptiles, amphibians and small mammals. • Attenuation pond creation and maintenance for use by amphibians, reptiles and water vole;

Parameter	Mitigation measures embedded into North Falls design
	• Wildflower meadow creation and maintenance; • Installation of bird and bat boxes at appropriate trees/ woodland; and • Ecological improvements to watercourses. The OLEMS (Document Reference: 7.14) provides further details on the proposed habitat creation at the onshore substation.
Arboricultural Management Plan	An Arboricultural Impact Assessment (AIA) will be undertaken to assess the quality of the existing trees along the length of proposed onshore cable route. All reports and plans must comply with 'British Standard 5837:2012 Trees in relation to design demolition and construction – Recommendations' and should provide details on all existing trees and vegetation to be retained and/or removed to facilitate the Project, outlining any Arboricultural impacts and constraints. This will identify any trees within the onshore project area that would pose a constraint to the Project and if they are of sufficient quality to merit protection and/or retention. An Arboricultural Method Statement (AMS) and associated tree protection plans will be required to ensure retained vegetation is adequately protected throughout the course of the Project's construction. Pre-construction tree survey will be undertaken by an appropriately qualified arboriculturist. This survey will define specific mitigation measures that will be implemented to protect trees that are located adjacent to the construction working areas. This will include the identification of root protection areas. The arboricultural report will be submitted to and agreed with the local authority prior to the commencement of any construction works. The AIA and pre-construction walkover will be used to inform the Arboricultural Management Plan provided post-consent. Further details are provided in the OLEMS (Document Reference: 7.14).

23.4 Assessment methodology

23.4.1 Legislation, guidance and policy

23.4.1.1 National Policy Statements

17. The assessment of likely significant effects upon onshore ecology has been made with specific reference to the relevant NPS. These are the principle policy documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to the Project are:

    - Overarching NPS for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ2023a);
    - NPS for Renewable Energy Infrastructure (EN-3) (DESNZ 2023b); and
    - NPS for Electricity Networks Infrastructure (EN-5) (DESNZ 2023c).

18. The specific assessment requirements for onshore ecology, as detailed in the NPS, are summarised in Table 23.6 together with an indication of the section of the ES chapter where each is addressed.

Table 23.6 NPS assessment requirements

NPS Requirement	NPS Reference	ES Reference
Overarching NPS for Energy (EN-1)		
'Where the development is subject to EIA, the applicant should ensure that the ES clearly sets out any effects on internationally, nationally, and locally designated sites of ecological or geological conservation importance (including those outside England), on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity, including irreplaceable habitats.'	Section 5.4.17	Potential impacts on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity are considered in Section 23.6.
'The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Secretary of State consider thoroughly the potential effects of a proposed project. The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests. Applicants should consider wider ecosystem services and benefits of natural capital when designing enhancement measures. '	Section 5.4.18 – 5.4.20	Embedded mitigation measures are provided in Section 23.3.3 and where applicable, additional mitigation measures are outlined in Section 23.6.
'As set out in Section 4.7, the design process should embed opportunities for nature inclusive design. Energy infrastructure projects have the potential to deliver significant benefits and enhancements beyond BNG, which result in wider environmental gains (see Section 4.6 on Environmental and BNG). The scope of potential gains will be dependent on the type, scale, and location of each project. The design of energy NSIP proposals will need to consider the movement of mobile/migratory species such as birds, fish and marine and terrestrial mammals and their potential to interact with infrastructure. As energy infrastructure could occur anywhere within England and Wales, both inland and onshore and offshore, the potential to affect mobile and migratory species across the UK and more widely across Europe (transboundary effects) requires consideration, depending on the location of development.'	Section 5.4.21 – Section 5.4.22	Site selection decisions and embedded mitigation measures have sought to minimise impacts to features of biodiversity and geological interest. Embedded mitigation measures are provided in Section 23.3.3 and where applicable, further mitigation measures are outlined in Section 23.6. Details of the BNG delivered by the Project are detailed in the BNG Strategy (Document Reference: 7.22).

NPS Requirement	NPS Reference	ES Reference
'The highest level of biodiversity protection is afforded to sites identified through international conventions. The Habitats Regulations set out sites for which an HRA will assess the implications of a plan or project, including Special Areas of Conservation and Special Protection Areas. As a matter of policy, the following should be given the same protection as sites covered by the Habitats Regulations and an HRA will also be required: (a) potential Special Protection Areas and possible Special Areas of Conservation; (b) listed or proposed Ramsar sites; and (c) sites identified, or required, as compensatory measures for adverse effects on any of the other sites covered by this paragraph.'	Section 5.4.4 – 5.4.5	Designated sites are presented in Section 23.5.2. Note that SPAs and pSPAs are considered in the Project's Habitats Regulations Assessment (HRA) Screening Report and Report to Inform Appropriate Assessment, published alongside this ES, and qualifying features of SPAs and pSPAs are considered in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26). Site selection decisions will be made to minimise impacts to interest features within designated sites.
'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. Most National Nature Reserves are notified as SSSIs.'	Section 5.4.7	Designated sites are presented in Section 23.5.2. Site selection decisions will be made to minimise impacts to interest features within designated sites.
'Development on land within or outside a SSSI, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits (including need) of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs.	Section 5.4.8	Designated sites are presented in Section 23.5.2. Site selection decisions will be made to minimise impacts to interest features within designated sites.
'Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and LoWS, are areas of substantive nature conservation value and make an important contribution to ecological networks and nature's recovery. They can also provide wider benefits including public access (where agreed), climate mitigation and helping to tackle air pollution.	Section 5.4.12 – 5.4.13	Designated sites are presented in Section 23.5.2. Site selection decisions will be made to minimise impacts to interest features within designated sites.

NPS Requirement	NPS Reference	ES Reference
National planning policy expects plans to identify and map LoWS, and to include policies that not only secure their protection from harm or loss but also help to enhance them and their connection to wider ecological networks. ’		
‘Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Keepers of Time, the government's policy for ancient and native trees and woodlands in England sets out the government's commitment to maintain and enhance the existing area of ancient woodland, maintain and enhance the existing resource of known ancient and veteran trees, excluding natural losses from disease and death, and to increase the percentage of ancient woodland in active management. Ancient and veteran trees found outside ancient woodland are also particularly valuable. Other types of irreplaceable habitats include blanket bog, limestone pavement, coastal sand dunes, spartina salt marsh swards, Mediterranean saltmarsh scrub, and lowland fen.’	Section 5.4.15	The onshore cable route does not cross areas of ancient woodland. However, ancient woodland is present within the ES boundary and information relating to this is presented in Section 23.5.2.
‘Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. The Secretary of State should give appropriate weight to environmental and biodiversity enhancements, although any weight given to gains provided to meet a legal requirement (for example under the Environment Act 2021) is likely to be limited.’	Section 5.4.46	Enhancement measures will be considered and discussed with stakeholders through the development of North Falls.
‘Many individual species receive statutory protection under a range of legislative provisions. Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales, as well as for their continued benefit for climate mitigation and adaptation and thereby requiring conservation action ‘	Sections 5.4.16	Information on protected species and habitats is provided in Section 23.5 and the outcome of the assessment process is provided in Section 23.6.
‘Applicants should include appropriate avoidance, mitigation, compensation and enhancement measures as an integral part of the proposed	Section 5.4.35	Embedded mitigation measures are presented in Section 23.3.3. Mitigation measures associated with potential impacts are presented in Section 23.6.

NPS Requirement	NPS Reference	ES Reference
development. In particular, the applicant should demonstrate that: During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; The timing of construction has been planned to avoid or limit disturbance; 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; Opportunities will be taken to enhance existing habitats rather than replace them, and where practicable, create new habitats of value within the site landscaping proposals. Where habitat creation is required as mitigation, compensation, or enhancement, the location and quality will be of key importance. In this regard habitat creation should be focused on areas where the most ecological and ecosystems benefits can be realised; mitigations required as a result of legal protection of habitats or species will be complied with.'		
'The Secretary of State will need to take account of what mitigation measures may have been agreed between the applicant and the SNCB and the MMO/NRW (where appropriate). The Secretary of State will also need to consider whether the SNCB or the MMO/NRW has granted or refused, or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'	Section 5.4.45	Embedded mitigation measures are presented in Section 23.3.3. Mitigation measures associated with potential impacts are presented in Section 23.6.
NPS for Renewable Energy Infrastructure (EN-3)		
'Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage.'	Section 2.5.2	Project design has avoided sensitive features where practicable. Embedded mitigation measures are presented in Section 23.3.3 and further mitigation measures are set out in Section 23.6.

NPS Requirement	NPS Reference	ES Reference
'Applicants must develop an ecological monitoring programme to monitor impacts during the pre-construction, construction and operational phases to identify the actual impacts caused by the project and compare them to what was predicted in the EIA/HRA. Should impacts be greater than those predicted, an adaptive management process may need to be implemented and additional mitigation required, to ensure that so far as possible the effects are brought back within the range of those predicted.'	Section 2.8.221 – 2.8.222	Monitoring is discussed in mitigation and is set out in Sections 23.6 and 23.11.
'Applicants should set out what would be decommissioned and removed from the site at the end of the operational life of the generating station, considering instances where it may be less harmful for the ecology of the site to keep or retain certain types of infrastructure, for example underground cabling, and where there may be socio-economic benefits in retaining site infrastructure after the operational life, such as retaining pathways through the site or a site substation.'	Section 2.10.69	Decommissioning is discussed in Section 23.6.2.4.
NPS for Electricity Networks Infrastructure (EN-5)		
'The applicant will need to consider whether the proposed line will cause such problems at any point along its length and take this into consideration in the preparation of the ES (see Section 4.3 of EN-1). Particular consideration should be given to feeding and hunting grounds, migration corridors and breeding grounds, where they are functionally linked to sites designated or allocated under the 'national site network' provisions of the Conservation of Habitats and Species Regulations.'	Section 2.9.5 – 2.9.6	Embedded mitigation measures are presented in Section 23.3.3. Mitigation measures associated with potential impacts are presented in Section 23.6.

23.4.1.2 Other legislation, policy and guidance

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

- The Conservation of Habitats and Species Regulations 2017 (as amended) (or 'the Habitats Regulations 2017');
- Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;

- Natural Environment and Rural Communities (NERC) Act 2006;
- The Hedgerows Regulations 1997;
- The Environment Act 2021 (as amended);
- Marine and Coastal Access Act 2009;
- The Commons Act 2006;
- Countryside and Rights of Way Act 2000 (CRoW);
- NPPF;
- Natural Environment White Paper 2011;
- Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services;
- Tendring's Infrastructure Delivery Plan (2017);
- Tendring's Open Spaces Strategy (2009);
- Tendring District Local Plan 2013-2033 and Beyond (2021; 2022);
- Essex Green Infrastructure Strategy (2020);
- Natural England and Forestry Commission's Standing Advice on Ancient woodland, ancient trees and veteran trees: advice for making planning decisions (2022).

20. Further detail is provided in ES Chapter 3 Policy and Legislative Context (Document Reference: 3.1.5).

23.4.2 Data sources

23.4.2.1 Site-specific

21. To provide site-specific and up to date information on which to base the impact assessment, site-specific ecological surveys have been conducted. The surveys were undertaken in the period from September 2021 and August 2023, and include:

- Extended Phase 1 habitat survey;
- Terrestrial and aquatic invertebrate survey;
- NVC survey;
- Great crested newt eDNA survey;
- Hazel dormouse survey;
- Reptile survey;
- Bat emergence/ re-entry surveys;
- Bat activity surveys; and
- Water vole and otter surveys.

22. The surveys reports for each of these surveys can be found in ES Appendices 23.1 – 23.9 (Document Reference: 3.3.30 – 3.3.38).

23. Further detail of the dates and methodology for the field surveys carried out are detailed in Section 23.5.

23.4.2.2 Other available sources

24. A desk study including a data search with the local biological records centre, the Essex Field Club (EFC[4]), was completed in November 2021. EFC holds biological records and information on non-statutory designated nature conservation sites such as LoWS and Special Roadside Verges (SRV) within Essex.

25. Other sources that have been used to inform the assessment are listed in Table 23.7.

Table 23.7 Other available data and information sources

Data source	Data Set	Spatial Coverage	Year
JNCC and MAGIC Website	Statutory designated sites[5]: Ramsar sites Local Nature Reserve (LNR) Special Areas of Conservation (SAC) SSSI National Nature Reserve (NNR)	Within 5km of the onshore project area.	2021 - 2023
Essex Wildlife Trust Biological Records Centre	Non-statutory designated sites: Essex LoWS Special Roadside Verges Buglife – The Invertebrate Conservation Trust 'B-lines' - Pollinator corridors	Within 2km of the onshore project area.	2021
Essex Wildlife Trust Biological Records Centre	Protected' species includes all those listed under The Conservation of Habitats and Species Regulation 2017 (as amended), the Wildlife and Countryside Act 1981 (as amended) and the Protection of Badgers Act 1992: NERC Act 2006 Section 41 species (UK species of principal importance) Essex BAP species International Union for Conservation of Nature (IUCN) 'Red List' species Birds of Conservation Concern (BoCC4) 'Red list' species Locally or nationally rare or scarce species Veteran trees	Within 2km of the onshore project area.	2021
JNCC	UKHPI	Within 50m of the onshore project area.	2008

[4] Note EFC had only recently taken over the running of the local biological records centre at the time of making the request, which was formerly 'Essex Wildlife Trust Biological Records Centre' at the time of submission of an initial request for records was made in July 2021.
[5] Please note that SPAs are considered in Chapter 24 Onshore Ornithology

Data source	Data Set	Spatial Coverage	Year
Essex County Council	Special roadside verges.	County level.	2021
Forestry Commission	National Forest Inventory Woodland England.	National level.	2020
BCT	National Nathusius' Pipistrelle Project (Essex)	County level	2014 - 2019

23.4.3 Impact assessment methodology

26. ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) explains the general impact assessment methodology applied to North Falls. The following sections describe the methods used to assess the likely significant effects on onshore ecology.

27. The EcIA methodology that has been applied in relation to onshore ecology 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.

28. 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.

29. The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where practicable, quantifying the importance, 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.

30. The EcIA 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 practicable as per the CIEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix detailed below.

23.4.3.1 Definitions

31. For each potential impact, the assessment identifies receptors within the study area which are sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts (i.e., magnitude) on given receptors. The definitions of importance and magnitude for the purpose of the onshore ecology assessment are provided in Table 23.8 and Table 23.9.

23.4.3.1.1 Importance

32. CIEEM identifies 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;
- UKHPI; and
- Red listed, rare or legally protected species.

33. 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.

Table 23.8 Definition of importance for an onshore ecological receptor

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

34. In addition to the features listed in Table 23.8 and Table 23.9, 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.

35. 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.

23.4.3.1.2 Magnitude

36. 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 practicable within a reasonable timescale or there is no intention to reverse the impact; and
- The timing and frequency of the impact, i.e., conflicting seasons or increasing impact through repetition.

Table 23.9 Definition of magnitude for onshore ecology.

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

23.4.3.1.3 Duration

37. The definitions of duration used within this EcIA 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.
38. The duration of an activity may differ from the duration of the resulting effect caused by the activity. An example provided in CIEEM's EcIA guidance (CIEEM, 2018) states "*if short-term construction activities cause disturbance to birds during their breeding period, there may be long-term implications from failure to reproduce that season*". Duration is in Section 23.6 for relevant receptors where the significance of effect may differ in the long, medium and short term.

23.4.3.2 Significance of effect

39. The assessment of significance of an effect is a function of the importance of the receptor and the magnitude of the impact (see ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) for further details). The determination of significance is guided by the use of a significance of effect matrix, as shown in Table 23.10. Definitions of each level of significance are provided in Table 23.11.

40. Likely significant effects identified within the assessment as major or moderate are regarded within this chapter as significant. Appropriate mitigation has been identified, where practicable, in consultation with the regulatory authorities and relevant stakeholders. The aim of mitigation measures is to avoid or reduce the overall significance of effect to determine a residual effect upon a given receptor.

41. 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.

42. 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 2016a).

43. Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in Table 23.10 below and knowledge of the ecological features affected.

44. 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 23.10 Significance of effect matrix

Importance	Adverse magnitude				Beneficial magnitude			
	High	Medium	Low	Negligible	Negligible	Low	Medium	High
High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
Low	Moderate	Minor	Negligible	Negligible	Negligible	Minor	Minor	Moderate
Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Table 23.11 Definition of effect significance

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

45. Note that for the purposes of the EIA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.

23.4.3.3 Approach to mitigation

46. This EcIA will propose mitigation according to the mitigation hierarchy set out by CIEEM in their *Guidelines for Ecological Impact Assessment* (CIEEM 2018).

47. To minimise the impacts of a project the mitigation hierarchy follows, in order, the below mitigation strategies:

- **Avoidance**: Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
- **Mitigation**: Negative effects should be avoided or minimised through mitigation measures, either through the design of the Project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- **Compensation**: Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- **Enhancement**: Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

23.4.4 Cumulative effects assessment methodology

48. The CEA considers other plans, projects and activities that may result in cumulation with North Falls. ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) provides further details of the general framework and approach to the CEA; and Section 23.8.3 provides more specific detail about how the CEA has been undertaken for this chapter.

49. For onshore ecology, these activities include:

- Other offshore wind farms (general operation and construction of onshore elements);
- Roadworks (corridor improvements and traffic management schemes); and
- Residential projects (construction of dwellings).

23.4.5 Transboundary effects assessment methodology

50. The transboundary assessment considers the potential for transboundary effects to occur on onshore ecology receptors as a result of North Falls; 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. ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) provides further details of the general framework and approach to the assessment of transboundary effects.

51. For onshore ecology, no potential for transboundary effects has been identified and therefore do not need to be considered for this chapter.

23.4.6 Assumptions and limitations

52. The 2021, 2022 and 2023 Extended Phase 1 Habitat Surveys (herein the 'Extended Phase 1 Habitat Survey') collectively covered approximately 96.6% of the onshore project area (as defined at the time of writing).

53. In the absence of field survey data, the habitats present within the unsurveyed areas have been digitised using aerial mapping, and these habitats are also shown on ES Figure 23.3 (Document Reference: 3.2.19) using a separate colour scheme to those habitats which have been identified in the field.

54. Some areas of habitats could not be fully accessed during the 2021 survey due to the presence of physical barriers, such as (but not limited to) dense scrub, which prevented safe entry for the surveyors. However, such areas were small and discrete and were encountered infrequently. In the few locations where they were encountered, they were noted as potentially providing field signs which could not be confirmed during the 2021 survey.

55. The 2021 survey was undertaken in April, July, September, and early-October, the 2022 survey in March and the 2023 survey in August. These months are considered to be within the optimal surveying window for identifying ground flora species and habitat communities. Therefore, sufficient evidence of key indicator species was found which in turn has enabled the successful identification of habitat communities present within the survey area. Additionally, the majority of habitats encountered within the survey area is consistent with those expected

of agricultural landscapes and colonised by identifiable species, for example scrub dominated by bramble *Rubus fruticosus* and hawthorn *Craetagus monogyna*. Therefore, it is considered that the survey (and its findings) is robust in being used to characterise the existing site conditions and in turn be used to inform and support the ecological impact assessment presented in this ES.

56. The ecological data presented within this chapter does by its nature not present absolute certainty regarding of the presence or absence of species within in given suitable habitat but does represent our best understanding of the baseline environment at the time of writing this ES, and the data collected is considered to be adequate to undertake a valid and robust EcIA.

57. Constraints regarding individual surveys are detailed in ES Appendices 23.1 – 23.9 (Document Reference: 3.3.30 – 3.3.38).

23.5 Existing environment

23.5.1 Overview

58. The onshore project area is dominated by arable fields interspersed with field margin drains, rivers and areas of scattered and dense scrub. Field boundaries are typically hedgerows (species-poor intact and/or defunct) and dominated by hawthorn and/or blackthorn *Prunus spinosa*. Other small areas of habitat present which are considered to be of a higher ecological value include semi-improved grassland, marshy grassland, woodland (broadleaved and mixed semi-natural and plantation) and woodland/scrub successional habitats.

59. Species such as common pipistrelle *Pipistrellus pipistrellus*, hazel dormice *Muscardinus avellanarius* and common nesting birds are associated with hedgerows within the onshore project area. Trees and woodland are also valuable to badgers *Meles meles*, bats and hazel dormice for nesting and foraging resources. Other terrestrial habitats such as grassland support notable species including reptiles and, in particular within Holland Haven Marshes SSSI, terrestrial invertebrates.

60. Water vole *Arvicola amphibius*, otter *Lutra lutra*, great crested newts *Triturus cristatus* and, notably within Holland Haven Marshes SSSI, aquatic invertebrates are associated with waterbodies within the onshore project area.

23.5.2 Designated sites for nature conservation

61. Statutory and non-statutory designated sites that are located within the study area are presented in Table 23.12 and shown in ES Figure 23.1 (Document Reference: 3.2.19). Table 23.12 also provides a summary of the qualifying features/reasons for notification of these designated sites.

62. Please note that European sites have been assessed separately as part of the Project's HRA Screening Report and Report to Inform Appropriate Assessment, published alongside this ES. Where their qualifying features may be affected by the development of the Project, they have been assessed individually within this chapter. Please also note that SPAs have not been included in the table below and are instead described and assessed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

Table 23.12 Designated sites for nature conservation

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Holland Haven Marshes	Located within onshore project area	SSSI	An area of reclaimed estuarine saltmarsh and freshwater marsh situated between Holland-on-Sea and Frinton-on-Sea. The site is bisected by Holland Brook and its tributaries, from which an extensive ditch system radiates. The citation states that the ditch network represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, which include several nationally and locally scarce species. The adjoining grasslands are of botanical importance as well as acting as a buffer zone to the ditch system. Further interest is provided by the aquatic and terrestrial invertebrates and the birds which frequent the area, especially in winter. Given the location of this site in relation to the onshore project area, detailed baseline surveys have been undertaken for the site to inform this EcIA. Further details on the results of these surveys are presented in Section 23.5.2.1.
Simon's Wood	0.01	LoWS Ancient Woodland	A designated ancient woodland, which has been densely replanted with conifers, particularly Pines *Pinus* spp. with scattered Larch *Larix decidua*, as well as UKBAP Priority Habitat lowland mixed deciduous woodland.
Little Bromley Churchyard	0.11	LoWS	This small churchyard represents a remnant of the dry acid grassland that would formerly have been widespread on the Tendring plateau. It is now the only such grassland, other than the nearby Great Bromley churchyard, that remains in an otherwise intensively cultivated landscape. Includes UKBAP priority habitat lowland acid grassland.
Great Holland Pits	0.01	LoWS	The varied habitats of this ex-gravel pit include heathy grassland, pasture, a remnant of old woodland, large and small pools, and wet depressions. Contains UKBAP priority habitat open mosaic habitat on previously developed land, and Tendring District LoWS brownfield sites.
Frinton Cliffs	0.86	LoWS	Frinton Cliffs represent a significant extent of maritime slope grassland of varying quality and with scattered scrub adding to the habitat diversity. The flat top part of the cliff is managed as amenity grassland. Includes UKBAP maritime cliff and slopes habitat.
Manning Grove	0.47	LoWS Ancient Woodland	A designated ancient woodland as well as UKBAP priority habitat lowland mixed deciduous woodland.
Tendring Grove	0.30	LoWS Ancient Woodland	This is an ancient woodland with a variety of woodland species, and also includes UKBAP priority habitat lowland mixed deciduous woodland.

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Hollandhall Wood	0.09	LoWS Ancient Woodland	Much of this wood canopy is characterised by Pedunculate Oak standards. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Thorpe Green	0.41	LoWS	Thorpe Green contains a good mix of grass and herb species. Includes UKBAP priority habitat lowland meadows.
Gravel Wood	0.38	LoWS Ancient Woodland	Gravel Wood is an ancient coppice-with-standards wood. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Stonehall Wood	0.46	LoWS Ancient Woodland	This woodland was last actively managed around 1990. The close proximity of Gravel Wood adds to the value of this site. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
St. Michael's Churchyard	0.72	LoWS	This extensive, well-managed churchyard contains both areas of mown and long sward grassland.
Goose Green Verge	0.65	LoWS	This roadside bank is unusual in that it has plants along its entire 85m length.
Far Thorpe Green	0.95	LoWS	This essentially grassland site also supports a few ponds, a small planted broadleaved copse and scrub, mainly along the site boundaries. Includes UKBAP priority habitat lowland meadows and county significant lowland grassland habitat.
Pilcox Wood	0.84	LoWS Ancient Woodland	This is a fine example of NVC community W10 Oak-Bracken-Bramble woodland that is probably very close to the natural climax vegetation type for the light soils of the Tendring plateau. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Home Wood	1.15	LoWS Ancient Woodland	Extensively damaged by the October 1987 storm, this ancient woodland has a coppice-with-standards structure. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Beaumont Marsh	1.55	LoWS	This section of grassland is the only remnant of grazing marsh in the area, although formerly all of the surrounding land would have been such a grassland. This site is currently grazed by sheep. Includes UKBAP priority habitat coastal and floodplain grazing marsh.
Beaumont Bridge Verge	0.65	LoWS	This site is designated as a Special Roadside Verge, with species of particular interest.

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Great Bromley Churchyard	1.41	LoWS	This site represents a small remnant fragment of relatively unimproved acid grassland (UKBAP priority habitat) in a local landscape that is dominated by agriculture, with no other significant areas of grassland.
Killgrove Wood	1.28	LoWS Ancient Woodland	Killgrove is one of a small cluster of ancient woods in the area. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Wignall Street Grassland	1.65	LoWS	Thick hedgerows to the east and south bound this undulating, west-sloping area of old grassland. Includes UKBAP priority habitat lowland acid grassland.
Glebe Wood	1.66	LoWS Ancient Woodland	Glebe Wood is one of a number of closely grouped ancient woods in an otherwise poorly wooded part of the district. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Upper Holland Brook	0.36	LoWS	This Site comprises grassland, scattered trees, secondary woodland, scrub, and reservoir along the upper reaches of the Holland Brook, beyond the SSSI downstream. Near Hunters Bridge (at the downstream end) the first part of this site is flood plain grazing marsh, currently grazed by cattle. This includes UKBAP priority coastal and floodplain grazing marsh.
Bursville Park	2.64	LoWS	The Site is designated for the presence of UKBAP lowland meadow, lowland grassland and urban habitats. The stream section of Picker's Ditch is being developed by Tendring District Council as an amenity/wildlife area, with important roles in terms of countryside access and environmental education.
Burrsville Park Cemetery	2.62	LoWS	This Site has encapsulated and helped to preserve an area of old grassland that would formerly have been more widespread in the countryside. The cemetery also provides a habitat extension to the grasslands of the Burrsville Park Site to the West.
Dedham Old River Marshes	2.88	LoWS	This Site is a series of pastures represents one of the largest blocks of remnant flood plain grassland in northeast Essex. Although not especially species-rich, the pastures, in association with the wet ditches and tree-lined hedgerows, form an important grassland resource that extends over the county boundary into Suffolk and also adjoins the Cattawade Marshes SSSI. The Old Dedham River channel remains wet through the summer and supports varied aquatic and marginal vegetation. This Site contains UKBAP habitat coastal floodplain grazing marsh.
Dengewell Wood	2.15	LoWS Ancient Woodland	This site is the northernmost of a cluster of ancient woods (including Killgrove, Broadmeadow, Gravel, Glebe and Stonehall Woods) in an otherwise poorly wooded part of the district which may act as a woodland corridor for birds and some invertebrates between Stour/Copperas woods and the woods of central Tendring.

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Furze Hill Complex	2.55	LoWS	This site comprises grassland to the west with woodland and a lake to the east. The variable topography of the area results in a mosaic of different habitat types. This Site is designated for the presence of veteran trees and lowland grassland.
Hillands Wood	1.60	LoWS Ancient Woodland	This site contains UKBAP lowland mixed deciduous woodland and ancient woodland.
Judas Gap Marsh	2.68	LoWS	This site contains UKBAP coastal floodplain grazing marsh, as well as a mosaic of wet and dry grassland types.
Lawford Churchyard	2.32	LoWS	The grassland surrounding the church of St Mary the Virgin, Lawford, is relatively unimproved and supports a wide variety of plant species. This site contains UKBAP priority habitats lowland dry acid grassland.
Little Bentleyhall Wood	1.65	LoWS Ancient Woodland	This site contains UKBAP lowland mixed deciduous woodland and ancient woodland.
Lower Botany Farm	2.12	LoWS	This site contains UKBAP lowland meadows.
Mill Wood	2.82	LoWS Ancient Woodland	This site contains UKBAP lowland mixed deciduous woodland and ancient woodland.
Pedlars Wood	2.71	LoWS	This site contains UKBAP lowland mixed deciduous woodland, which has been sympathetically managed in an effort to restore traditional habitats essential to woodland flora and fauna.
Shair Wood	2.70	LoWS Ancient Woodland	This site contains UKBAP lowland mixed deciduous woodland and ancient woodland.
Shir Burn Wood and Meadow	1.42	LoWS	The wood Aldercar is a well-managed broadleaved woodland with several spring-fed streams. This site has UKBAP habitats lowland mixed deciduous woodland and lowland dry acid grassland.
The Grove	0.46	LoWS	Although this site is not listed in the Ancient Woodland Inventory for Essex, the structure and composition of the central Alder stand has characteristics typical of ancient woodland, although the surrounding woodland may be of more recent origin. This site contains the UKBAP habitat lowland mixed deciduous woodland.

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Weeley Bypass	2.89	LoWS	This Site comprises the A133 road verges and a small woodland north of Dead Lane, where the woodland canopy is notably dense.
Island and Roger's Grove	1.66	LoWS Ancient Woodland	Island Grove is a neglected ancient wood. Roger's Grove, divided by a railway line, comprises neglected ancient wood and surrounding secondary woodland. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Springhead Corner Meadow	1.81	LoWS	This site is a remnant tussocky acid grassland, in which rabbit grazing is helping to maintain a short sward.
Manor House Meadow	1.91	LoWS	This site species-rich grasslands of a type which are particularly rare in Tendring district, thus emphasising the need to conserve all remaining sites.
Wignall Brook Grasslands	1.92	LoWS	This is an extensive series of stream valley grasslands either side of Wignall Brook, Lawford. The character of the site varies from dry semi-acid, through dry neutral to marshy grassland. Includes UKBAP priority habitats lowland acid grassland and lowland meadows.
Broadmeadow Wood	1.62	LoWS Ancient Woodland	Broadmeadow is ancient coppice-with-standards woodland with an open understorey structure. Includes UKBAP priority habitat lowland mixed deciduous woodland and ancient woodland.
Weeleyhall Wood	2.53	SSSI Ancient Woodland	One of the largest ancient woods in the Tendring peninsula. It contains one of the best examples in Essex of base-poor springline alder woodland, a type of woodland which is rare in the county, as well as good examples of lowland hazel-pedunculate oak and some wet ash-maple woodland, and chestnut coppice-with-standards derived from these last two.
Holland Haven	Located within onshore project area	LNR	Comprises of mown amenity grassland, hawthorn scrub, rough grassland, wet grazing marsh, scrape area and ponds. This site is known to support invertebrates such as the ruddy darter dragonfly *Sympetrum sanguineum*, larger carder bee *Bombus muscorum*, and Roesel's bush cricket *Metrioptera roeselii*. Plants include birds foot trefoil *Lotus corniculatus*, birds foot fenugreek *Trigonella foenum-graecum* and soft hornwort. Many bird species have also been recorded on site including purple sandpiper, avocet, and short eared owl.
Ardleigh Gravel Pits	1.74	SSSI	Geological SSSI (see ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21)).

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Hamford Water	0.80	Ramsar	Qualifies under Criterion 6 (A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird): Species with peak counts in spring/autumn: Ringed plover, *Charadrius hiaticula* (Europe/Northwest Africa) Common redshank, *Tringa totanus tetanus* Species with peak counts in winter: Dark-bellied brent goose, *Branta bernicla bernicla*, Black-tailed godwit, *Limosa limosa islandica* (Iceland/W Europe) Grey plover, *Pluvialis squatarola* (E Atlantic/W Africa -wintering)
		SAC	Annex II species that are a primary reason for selection of the site: 4035 Fisher's estuarine moth *Gortyna borelii lunata*.
		NNR	Classified as a coastal embayment that has been formed due to a natural dip in the underlying geology of the area, unlike most other NNRs in the local area. The bird life that this variety of habitats attracts is outstanding, especially the waders and waterfowl that can be seen in winter. Main habitats: salt marsh, intertidal mud flats, coastal, grazing marsh, sands, shingle, small freshwater ponds, and ditches.
		SSSI	Hamford Water is a tidal inlet whose mouth is about three miles south of Harwich. It is a large and shallow estuarine basin comprising tidal creeks, intertidal mud and sand flats, saltmarshes, islands, beaches, and marsh grasslands. The site is of international importance for breeding Little Terns and wintering Dark-bellied Brent Geese, wildfowl, and waders, and of national importance for many other bird species. It also supports communities of coastal plants which are rare or extremely local in Britain, including Hog's Fennel *Peucedanum officinale* which is found elsewhere only in Kent.

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Stour and Orwell Estuaries	3.15	Ramsar	Qualifies under Criterion 2 (A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities): Contains nationally scarce plants and British Red Data Book invertebrates. Qualifies under Criterion 5 (A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds): Species with peak counts in winter: 51,285 waterfowl Qualifies under Criterion 6 (A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird): Species with peak counts in winter: Black-tailed godwit, *Limosa limosa islandica* (Iceland/W Europe) Common redshank, *Tringa totanus totanus* Dark-bellied brent goose, *Branta bernicla bernicla,* Dunlin, *Calidris alpina alpina* (W Siberia/W Europe) Grey plover, *Pluvialis squatarola* (E Atlantic/W Africa -wintering) Red knot, *Calidris canutus islandica* (W & Southern Africa)
Stour Estuary	3.31	SSSI	The Stour Estuary is nationally important for 13 species of wintering waterfowl and three species on autumn passage. The estuary is also of national importance for coastal saltmarsh, sheltered muddy shores, two scarce marine invertebrates and a vascular scarce plant assemblage.
Holland on Seacliff	1.74	SSSI	Geological SSSI (see ES Chapter 19 Ground Conditions and Contamination, (Document Reference: 3.1.21)).
Cattawade Marshes	3.15	SSSI	The grazing marshes with associated open water and fen habitats are of major importance for the diversity of their breeding bird community, which includes species that have become uncommon throughout lowland Britain because of habitat loss. The site has benefited from a sympathetic management regime aimed at enhancing the ornithological interest. The marshes are also of value as a complement to the adjacent Stour Estuary SSSI where breeding habitats for birds are relatively scarce.

Designated site name	Distance from onshore project area (km)	Designation	Summary of reasons for site designation
Pickers Ditch Meadow	2.98	LNR	Meadow surrounding Pickers Ditch tributary, representing a valuable green space in the Great Clacton area. Hedge planting along the border helps screen the site, whilst tree planting in the adjacent area provides a copse area surrounding the existing footpath.
Wrabness	4.33	LNR	The reserve is located on the southern bank of the River Stour between Manningtree and Harwich, and is a mixture of unimproved grassland, wooded areas and marshland with extensive intertidal mudflats and saltmarsh. In the spring, nightingales can be heard, which are a BoCC4 ‘Red list’ species and therefore add to the ecological value of this LNR.

63. All statutory designated sites for nature conservation are considered to be of high importance unless otherwise stated, in accordance with the criteria set out in Table 23.8.

64. All non-statutory designated sites are considered to be of medium importance, in accordance with the criteria set out in Table 23.8.

23.5.2.1 Holland Haven Marshes SSSI and LNR

65. Given the location of this site in relation to the onshore project area, detailed baseline surveys of the interest features of the Holland Haven Marshes SSSI and LNR have been undertaken for the site to inform this EcIA. The information presented in this section excludes ornithological interest features of the site, which are considered in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

66. The SSSI is designated for the following (excluding ornithological interest features):

- Its ditch network which, the citation states, represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, and which include a number of nationally and locally scarce species;
- The adjoining grasslands, which are of botanical importance in their own right as well as acting as a buffer zone to the ditch system; and
- Aquatic and terrestrial invertebrates associated with these habitats.

67. The Holland Haven Marshes LNR supports coastal grassland and marshland, associated wildfowl and waders, as well as aquatic insect life, including some rare beetles and damselflies, and the great green bush-cricket *Tettigonia viridissima* (Essex Wildlife Trust, 2021).

68. In order to inform this EcIA, detailed botanical surveys of the ditch network and adjoining grasslands and detailed terrestrial and aquatic invertebrate surveys of the SSSI and its immediate surrounds were undertaken in 2021. The results of these surveys are summarised below, and full details can be found in ES Appendix 23.6 and ES Appendix 23.7 (Document Reference: 3.3.35 and 3.3.36).

23.5.2.1.1 Aquatic invertebrates

69. The ditch habitats within Holland Haven Marshes SSSI were sampled for aquatic invertebrates.

70. Most of the ditches are at a late seral stage, with substantial growth of emergent common reed, while more open conditions (extensive open water) are in the recently cleared ditches or wider ditches.

71. A total of 48 species were collected across 16 ditch stations within the two sampling periods of the terrestrial and aquatic invertebrate survey area. The beetles were the richest group, with 21 species collected.

72. Using metrics provided by Buglife – The Invertebrate Conservation Trust, the majority of species have low salinity tolerance, marsh fidelity and species quality scores, and are therefore considered to be freshwater species without particular habitat association. The surveys concluded that:

- Species that are tolerant of brackish conditions were recorded from two stations (3 and 4) and species dependent on mildly brackish conditions were recorded in one station (11, the main channel of the Holland Brook);
- Species which are widespread or typical of grazing marsh assemblages were found in five stations (five species); and
- Species scoring more than the minimum in terms of quality / status scores were found in 11 stations, with 12 species scoring either 2 or 3 on a scale from '1' to '5'. (Species scoring 2 are equivalent to species considered to be of local occurrence and species scoring 3 were Nationally Scarce at the time the scoring developed).

73. The surveys recorded three species of water beetle which are of conservation concern and are listed as Nationally Scarce within the most recent review (Foster, 2010). All three are believed to be widespread on the Essex coastal marshes. These species are:
    - *Peltodytes caesus*;
    - *Hydaticus seminiger*; and
    - *Hygrotus parallelogrammus*.
74. It should also be noted that the ruddy darter *Sympetrum sanguineum,* listed on the citation of Holland Haven Marshes SSSI and the solider fly *Stratiomys singularioris* listed on the SSSI citation are no longer of conservation concern, due partly to range expansion and greater survey effort revising its known distribution.
75. The overall value of Holland Haven Marshes SSSI is considered to be of less than 'county' (i.e. local) importance for freshwater invertebrates. Notably, no species of grazing marsh fidelity were recorded, highlighting that assemblages of aquatic invertebrates were comprised of more common generalist species.
76. There are historic records of several focus species from the Tendring District Council LoWS Review document (TDC, 2008) within the habitat and species study area. However, these are historic (i.e. prior to 2000) and this information, combined with the county importance of the Holland Haven Marshes SSSI invertebrate assemblage results in the importance of aquatic invertebrates being defined as 'low' (see Table 23.8).
77. Additional details on aquatic invertebrate assemblages are provided in the Terrestrial and Aquatic Invertebrate Survey Report in ES Appendix 23.6.

23.5.2.1.2 Terrestrial invertebrates

78. Holland Haven Marshes SSSI citation includes the following terrestrial invertebrates:
    - Roesel's bush cricket *Metrioptera roeselii.*
    - Bee species *Bombus muscorum*;
    - Brown Argus *Aricia agestis*.
79. Roesel's bush cricket is no longer of conservation concern, having undergone a substantial climate-driven range expansion since the 1990s. *Bombus muscorum* is a UK species of principal importance and although not listed as

being of conservation concern, it is considered likely that it has undergone declines and therefore justifies a Nationally Scarce status (see ES Appendix 23.6 (Document Reference: 3.3.35).

80. In addition to these species, the Fisher's estuarine moth *Gortyna borelii lunata* is a protected species associated with maritime grassland in Essex and north Kent, with legal protection under The Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). A data search revealed a series of records of this species within the SSSI from 2005-2019 Natural England monitoring of the SSSI (see ES Appendix 23.6 (Document Reference: 3.3.35). Specific Fisher's estuarine moth surveys were not carried out in the 2021 surveys for Project, however, the moth's sole foodplant (hog's fennel *Peucedanum officinale*) was recorded within the grassland habitats as part of the NVC survey (see Section 23.5.2.1.3, and ES Appendix 23.7 (Document Reference: 3.3.36)) and so it is therefore assumed the moths are present within Holland Haven Marshes (see ES Appendix 23.7 (Document Reference: 3.3.36) for location). This assumption of moth presence is made due to both the Fisher's estuarine moth and hog's fennel having extremely limited distributions and close association with one another.

81. Field sampling was undertaken at six sampling stations, comprising tall maritime grassland with varying extents of open short and disturbed ground conditions within the terrestrial and aquatic invertebrate survey area. These sampling stations covered the range of terrestrial habitats and included the areas of habitat judged to be of the highest quality and most likely to support significant species and assemblages.

82. Six species that are currently listed as being of conservation concern were recorded (of which one has Red Data Book (RDB) status and two are Nationally Scarce).

83. Three of these are bees / wasps that would be classed as common or 'least concern' based on the current descriptions of their distribution and occurrences in authoritative reviews. These are:

- Silvery leafcutter bee *Megachile leachella*;
- Large-headed resin bee *Heriades truncorum*; and
- European beewolf *Philanthus triangulum*.

84. The remaining three species noted as being of conservation concern were:

- Rove beetle, *Tachyporus formosus*;
- Small heath butterfly, *Coenonympha pamphilus*; and
- Cinnabar moth, *Tyria jacobaeae*.

85. The presence of the Fisher's estuarine moth, as well as other species of conservation concern, defines the importance of the terrestrial invertebrate assemblage as being high (see Table 23.8).

86. Additional details on terrestrial invertebrate assemblages are provided in ES Appendix 23.6 (Document Reference: 3.3.35).

23.5.2.1.3 Ditch network and adjoining grasslands

87. NVC field surveys of the terrestrial and aquatic habitats of the Holland Haven Marshes SSSI and its immediate surroundings were conducted in summer 2021. Botanical communities inside and within 250m of the SSSI boundary and onshore project area were recorded (known as the NVC survey area), as well as the presence and absence of botanical interest features. A total of 130 terrestrial quadrats were sampled, all of which were assigned to a community.

88. In terms of aquatic species, 93 ditch samples were taken within the NVC survey area. All but two of these ditch samples were assigned an emergent vegetation community, while samples 51 of the 93 were assigned an aquatic vegetation community. The unassigned aquatic samples largely indicate an absence of aquatic vegetation.

89. The NVC survey area largely consists of grassland, much of it grazed and managed as traditional grazing marsh by cattle. The Holland Brook drains the marsh and enters the sea at a controlled sluice north of Holland Haven Country Park. The marsh is divided by ditches which are mostly connected to the Brook. The eastern, seaward end demonstrates a clear saline influence. The eastern section of the site is used as a golf course and the terrestrial and emergent vegetation there has been significantly modified. A total of 32 different vegetation communities were identified on the site, these are listed in Table 23.13.

90. Notable floral species in the survey area include (those which are nationally notable are highlighted in **bold**):

- Marram *Ammophila arenaria* (Essex RDB)
- Sea fern grass *Catapodium marinum* (Essex RDB)
- Rock samphire *Crithmum maritimum* (Essex RDB)
- Water horsetail *Equisetum fluviatile* (Essex RDB)
- Downy oat Helictotrichon pubescens (Essex RDB)
- Sea barley *Hordeum marinum* (**SSSI species,** Essex RDB vulnerable);
- Fat duckweed *Lemna gibba* (**SSSI species,** scarce in Essex);
- Dittander *Lepidium latifolium* (Essex RDB)
- Tubular water dropwort *Oenanthe fistulosa* (**SSSI species**, Essex RDB vulnerable);
- Parsley water dropwort *Oenanthe lachenalii* (**SSSI species,** Essex RDB near-threatened);
- Corky-fruited water dropwort *Oenanthe pimpinelloides* (Essex RDB)
- Hog's fennel *Peucedanum officinale* (Essex RDB)
- Small pondweed sp. *Potamogeton berchtoldii/ pusillus* (Essex RDB (both))
- Lesser spearwort *Ranunculus flammula* (**England RDB vulnerable**);
- Yellow rattle *Rhinanthus minor* (Essex RDB)

- Grey bulrush *Scirpus tabernaemontani* (**SSSI species**, scarce in Essex);
- Marsh ragwort *Senecio aquaticus* (Essex RDB)
- Pepper saxifrage *Silaum silaus* (Essex RDB)
- Greater duckweed *Spirodela polyrhiza* (**SSSI species**, Essex RDB)
- Strawberry clover *Trifolium fragiferum* (**UK RDB vulnerable**); and
- Sea clover *Trifolium squamosum* (Essex RDB).

Table 23.13 NVC communities from terrestrial and aquatic surveys

NVC community
Mesotrophic Grasslands
MG1 *Arrhenatherum elatius* grassland, no sub-community (watercourse banks)
MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community (coastal grassland)
MG5a *Cynosurus cristatus - Centaurea nigra* grassland, *Lathyrus pratensis* sub-community
MG7c *Lolium perenne – Alopecurus pratensis – Festuca pratensis* grassland
MG10b *Holcus lanatus – Juncus effusus* rush pasture, *Juncus inflexus* sub-community
MG12a *Festuca arundinacea* grassland, *Lolium perenne – Holcus lanatus* sub-community
MG13 *Agrostis stolonifera – Alopecurus geniculatus* grassland
Swamp communities
S4a *Phragmites australis* reedbed, Phragmites australis sub-community
S6 *Carex riparia* swamp
S7 *Carex acutiformis* swamp
S14c *Sparganium erectum* swamp, *Mentha aquatica* sub-community
S14d *Sparganium erectum* swamp, *Phalaris arundinacea* sub-community
S19a *Eleocharis palustris* swamp, *Eleocharis palustris* sub-community
S19c *Eleocharis palustris* swamp, *Agrostis stolonifera* sub-community
S20 *Scirpus tabernaemontani* swamp
S21a *Scirpus maritimus* swamp, *Scirpus maritimus* dominated sub-community.
S22 *Glyceria fluitans* swamp
S28a *Phalaris arundinacea* swamp, *Phalaris arundinacea* sub-community
Saltmarsh communities
SM12 *Aster tripolium* saltmarsh community
SM16b *Festuca rubra* saltmarsh, sub-community with *Juncus gerardii* dominant
SM23 *Spergularia marina – Puccinellia distans* saltmarsh community
SM24 *Elytrigia atherica* saltmarsh community
Woodland Communities
W21 *Crataegus monogyna – Hedera helix* scrub
W22 *Prunus spinosa – Rubus fruticosus* scrub
W23 *Ulex europaeus – Rubus fruticosus* scrub

NVC community
W24 *Rubus fruticosus – Holcus lanatus* scrub
Open Vegetation Communities
OV25 *Urtica dioica – Cirsium arvense* community
Aquatic Communities
A1 *Lemna gibba* community
A2a *Lemna minor* community, typical sub-community
A3 *Spirodela polyrhiza – Hydrocharis morsus ranae* community
A5b *Ceratophyllum demersum* community, *Lemna minor* sub-community
A12 *Potamogeton pectinatus* community

91. As no sensitive SSSI habitats are located within the ditch network within the onshore project area, the importance of onshore project area is based on the presence of locally scarce species and is therefore considered to be of medium importance.

92. SSSI habitats (mesotrophic grasslands) and SSSI species are present within the adjoining grassland habitats of the onshore project area, therefore this receptor is of high importance.

93. Full details of the NVC report can be found in ES Appendix 23.7 (Document Reference: 3.3.36).

23.5.2.1.4 Summary

94. In summary, Holland Haven Marshes SSSI is considered to be of low importance for its aquatic invertebrate species, high importance for its terrestrial invertebrate species (especially the Fisher's estuarine moth), medium importance for the botanic interest of the ditch network, and high importance for the botanic interest of the adjoining grassland habitats.

23.5.3 Habitats

95. The baseline presented is based on the findings from the Extended Phase 1 Habitat Survey.

96. Full details of the habitats present are provided in ES Appendix 23.1 Extended Phase 1 Habitat Survey Report (Document Reference: 3.3.30).

97. Features of interest within each habitat are denoted using Target Notes (TNs), which are referenced using a numbering system. The locations of the TNs are shown on ES Figure 23.3 (Document Reference: 3.2.19) and further details are provided within ES Appendix 23.1 (Document Reference: 3.3.30). Please note that habitat areas provided here relate to the areas of habitat found within the habitats and species study area (i.e., the onshore project area plus a 50m buffer).

98. In the Extended Phase 1 Habitat Survey and NVC surveys, the following eight UKHPI were identified within the onshore habitat and species study area:

- Coastal saltmarsh;

- Ancient woodland;
- Deciduous woodland;
- Hedgerows;
- Arable field margins;
- Reedbeds;
- Rivers; and
- Ponds.

99. In addition, coastal floodplain grazing marsh and lowland fen UKHPI were identified within the Natural England 'Priority Habitat Inventory' dataset within the habitats and species study area. It should be noted that these habitats overlap the Phase 1 / NVC habitats identified within the Extended Phase 1 Habitats Survey and NVC Surveys, and therefore have not been included within the habitat calculations set out in Section 23.5.3.12. The location of these UKHPI habitats can be seen on ES Figure 23.2 (Document Reference: 3.2.19) with their respective areas shown in Table 23.14.

100. Details of the habitats which underpin coastal floodplain grazing marsh and lowland fen UKHPI are described below and in ES Appendix 23.7 (Document Reference: 3.3.36).

Table 23.14 UKHPI footprints within the habitat and species area and onshore project area (based on Natural England 'Priority Habitat Inventory' dataset)

UKHPI	Area (ha) within the habitat and species study area	Area (ha) within the onshore project area
Coastal and floodplain grazing marsh	15.55	13.69
Deciduous woodland	5.76	1.96
Lowland fens	1.47	1.47
Lowland heathland	0.11	-
Traditional orchard	0.09	-

101. The habitats recorded during the Extended Phase 1 Habitat survey and NVC survey within the habitats and species study area are described below.

23.5.3.1 Coastal saltmarsh

102. Small areas of transitional saltmarsh habitat were recorded within Holland Haven Marshes SSSI during the NVC Survey (see Maps 2k, 2l and 2n, in ES Appendix 23.7 (Document Reference: 3.3.36). This habitat was typically recorded in narrow areas behind the sea defences or found in dried pools in the brackish part of the marsh.

103. Note that as this habitat was only recorded during the detailed habitat surveying undertaken during the NVC survey, unlike the remaining habitats detailed below saltmarsh is not included within the habitat calculations set out in Section 23.5.3.12. Approximately 0.98ha of this habitat are present within the habitat and species study, 0.79ha of which was within the onshore project area.

23.5.3.2 Arable land

104. The largest habitat by area within the habitat and species study area is arable land (JNCC Phase 1 Habitat code J1.1) at 602.61ha. At the time of the Extended Phase 1 Habitat Survey, some of these fields were in crop and some were ploughed. In 2022, some of these were showing young crops.

105. An additional 1.52ha of arable field margins were also recorded in the habitat and species study area. These typically comprised set aside areas, including crop stubble, and grassland buffer strips.

23.5.3.3 Boundary features

106. Field boundaries within the habitat and species study area were comprised predominately of hedgerows, with some field margin drainage ditches (both dry and wet), scattered scrub and trees. The predominant type of hedgerow recorded was species-poor intact (J2.1.2). The total length of hedgerows within the habitat and species study area was 23,034.22m.

107. The hedgerows recorded within the habitat and species study area are detailed in Table 23.15 below.

Table 23.15 Hedgerows recorded within the habitat and species study area

Hedgerow type	Length (m) within the habitat and species study area
Species-poor intact (J2.1.2)	8,285.52
Species-poor defunct (J2.2.2)	3,419.41
Species-poor with trees (J2.3.2)	5,471.14
Native species-rich with trees (J2.3.1)	3,697.86
Native species-rich defunct (J2.2.1)	1,039.33
Native species-rich intact (J2.1.1)	1,120.97

108. Key species recorded in hedgerows throughout the habitat and species study area included hawthorn and blackthorn, with bramble, dog rose *Rosa Canina*, English oak *Quercus robur*, ash *Fraxinus excelsior*, elm *Ulmus* spp. and hazel *Corylus avellana*.

23.5.3.4 Woodland

109. A total of 10.25ha of woodland (A1.1.1, A1.1.2, A1.3.1 and A1.3.2) was recorded throughout the habitat and species study area and included semi-natural and plantation broad-leaved woodland, semi-natural and mixed plantation woodland and a small area of coniferous plantation woodland. These areas ranged from larger areas of woodland to smaller roadside and field margin copses. A high proportion of woodland areas contained game bird pens and feeding apparatus. Notable parcels of woodland within the onshore project area include:

- 1.3ha south of the Network Rail infrastructure at Great Holland (TN410);
- 0.7ha of mixed plantation woodland north of the A120 at Horsleycross Street (TN416);
- 1.8ha of woodland east of Damant's Farm Lane, Thorpe-le-Soken (TN421);

- 1.6ha of mixed semi-natural woodland along the Tendring Brook river corridor, south of Lodge Lane, Tendring (TN525); and
- 0.7ha of mixed plantation woodland north of the A120 at Horsleycross Street (TN474) (the locations of the TNs are shown on ES Figure 23.3 (Document Reference: 3.2.19).

110. Key species recorded included common oak, ash, elm, white poplar *Populus alba*, sweet chestnut *Castanea sativa*, hazel, holly *Ilex aquifolium*, sycamore *Acer pseudoplatanus*, birch *Betula* spp., and pine species.

111. An additional 0.11ha of broadleaved parkland and scattered trees (A3.1) were recorded within the habitat and species study area.

112. Six areas of ancient woodland were found within 500m of the onshore project area, these are:

- Simon's Wood;
- Manning Grove;
- Tendring Grove;
- Hollandhall Wood;
- Gravel Wood; and
- Stonehall Wood.

113. In the Extended Phase 1 Habitat Survey, veteran trees were also recorded in the target notes (ES Appendix 23.1 (Document Reference: 3.3.30). Descriptions of the veteran trees within the onshore project area are detailed in Table 23.16, and their respective locations are detailed in ES Appendix 23.1 (Document Reference: 3.3.30).

Table 23.16 Target noted veteran trees within the habitat and species study area.

Target Note	Description
TN502	Veteran oak tree, isolated in field.
TN505	Veteran oak tree, on roadside.
TN507	Veteran oak tree, in hedgeline.
TN584	Veteran tree

23.5.3.5 Scrub

114. A total of 3.38ha of dense and scattered scrub (A2.1 and A2.2) were recorded within the habitat and species study area and key species comprised hawthorn, hornbeam *Carpinus betulus,* bramble, bracken *Pteridium aquilinum*, nettle *Urtica dioica* and cow parsley *Anthriscus sylvestris*.

115. These areas represented a range of habitat sub-types including transitional habitat associated with boundary features, field margins, woodland successional habitats, and watercourse margins.

23.5.3.6 Improved grassland

116. A total of 32.92ha of improved grassland (B4) was recorded across the habitat and species study area, mainly consisting of grazing pasture for sheep, cattle,

and horses. These grasslands were characterised by short sward perennial rye grass *Lolium perenne* with limited herbs including ragwort *Jacobea vulgaris*, clover *Trifolium* spp., and dandelion *Taraxacum officinale* with areas of scattered/dense shrubs and/or scrub.

23.5.3.7 Semi-improved and poor semi-improved grassland

117. An area of 5.45ha of semi-improved (B2.2) and 7.08ha poor semi-improved (B6) grassland was recorded throughout the habitat and species study area. These areas comprised coarse ruderal grass and herb species such as Yorkshire fog *Holcus lanatus*, brome *Bromus hordeaceus*, common bent *Agrostis capillaris*, perennial rye grass, and cock's foot *Dactylis glomerata*.

23.5.3.8 Amenity grassland

118. An area of 23.49ha of amenity grassland (J1.2) was recorded within the habitat and species study area, generally consisting of short sward perennial rye grass subject to frequent mowing.

23.5.3.9 Other tall herb and fern - ruderal

119. An area of 2.47ha of ruderal herbs (C3.1) was recorded within the habitat and species study area, ranging from unmanaged fields through to field margins and set-aside areas within arable crops.

120. Key species noted included bristly ox-tongue *Helminthotheca echioides*, common and ribwort plantain *Plantago spp*., fleabane *Pulicaria dysenterica*, common hogweed *Heracleum sphondylium*, nettle, ox-eye daisy *Leucanthemum vulgare* and teasel *Dipsacus fullonum*.

23.5.3.10 Standing and running water

121. Watercourses in the habitat and species study area included 2,266.35m / 3.74ha of standing water (G1) (drainage ditches / ponds) and 2,422.96m / 0.73ha of running water (G2) such as rivers.

122. In addition, standing water bodies were recorded within the habitat and species study area plus a 250m buffer, in order to carry out Habitat Suitability Index (HSI) assessments for great crested newts. A total of 89 standing water bodies were recorded.

23.5.3.11 Other habitats

123. The following habitats were also recorded within the habitat and species study area:

- Scattered bracken, 0.19ha (C1.2);
- Boulders/rocks above high tide mark, 0.14ha (H4);
- Ephemeral/short perennial, 0.50ha (J1.3);
- Caravan site, 0.07ha (J3.4);
- Buildings, 1.27ha (J3.6);
- Dry ditch, 4,299.70m (J2.6); and
- Artificial sea wall, 970.97m (J3.5).

23.5.3.12 Summary

124. Table 23.17 shows the key habitats which were recorded within the habitat and species study area and onshore project area during the Extended Phase 1 Habitat Survey (ES Appendix 23.1 (Document Reference: 3.3.30).

Table 23.17 JNCC Phase 1 habitats recorded within the habitats and species study area and onshore project area during the Extended Phase 1 Habitat Survey.

JNCC Phase 1 habitat code	JNCC Phase 1 habitat description	Area (ha) within habitat and species study area	Area (ha) within the onshore project area
A1.1.1	Broadleaved woodland – semi-natural	3.91	1.49
A1.1.2	Broadleaved woodland – plantation	1.95	0.56
A1.3.1	Mixed woodland – semi-natural	0.27	-
A1.3.2	Mixed woodland – plantation	4.12	0.46
A2.1	Scrub – dense/continuous	1.94	0.34
A2.2	Scrub - scattered	1.44	1.40
A3.1	Broadleaved parkland/ scattered trees	0.11	-
A3.3	Mixed parkland/ scattered trees	1.52	-
N/A	Arable field margins	5.45	0.85
B2.2	Neutral grassland – semi-improved	32.92	3.56
B4	Improved grassland	7.08	15.69
B6	Poor semi-improved grassland	0.19	3.76
C1.2	Bracken- scattered	2.47	-
C3.1	Other tall herb and fern – ruderal	0.3	0.66
G1	Standing water	3.74	0.71
G2	Running water	0.73	0.59
H4	Boulders/ rocks above high tide mark	0.14	0.13
J1.1	Cultivated/ disturbed land – arable	566.52	282.54
J1.2	Cultivated/ disturbed land – amenity grassland	23.49	16.34
J1.3	Cultivated/ disturbed land – ephemeral/ short perennial	0.5	-
J3.4	Caravan site	0.07	0.02
J3.6	Buildings	1.27	-

JNCC Phase 1 habitat code	JNCC Phase 1 habitat description	Area (ha) within habitat and species study area	Area (ha) within the onshore project area
J4	Bare ground	1.5	0.06
J5	Other habitat	0.49	-
JNCC Phase 1 habitat code	**JNCC Phase 1 habitat description**	**Length (m) within the habitat and species study area**	**Length (m) within the onshore project area**
G1	Standing water	2,266.35	1,303.22
G2	Running water	2,422.96	1,168.57
J2.1.1	Intact hedge – native species-rich	1,127.36	58.89
J2.1.2	Intact hedge – species-poor	7,676.38	3,108.33
J2.2.1	Defunct hedge – native species-rich	851.58	307.39
J2.2.2	Defunct hedge – species-poor	3,091.68	1,751.79
J2.3.1	Hedge with trees – native species-rich	3,524.73	1,602.54
J2.3.2	Hedge with trees – species-poor	5,102.97	1,554.27
J2.5	Wall	0.4	-
J2.6	Dry ditch	4,299.7	2,102.37
J3.5	Artificial sea wall	970.97	863.13

23.5.3.13 Biodiversity Net Gain

125. For each of the habitats recorded during the Extended Phase 1 Habitat Survey, 'habitat condition' was also recorded for use in BNG calculations. Habitat condition was recorded following the Biodiversity Metric 3.0 Auditing and accounting for biodiversity: User Guide[6] (Panks *et al*., 2021), the current version of BNG condition assessments at the time of field survey. Habitat condition for the habitats within the habitats and species study area is set out in Table 23.18.

126. Habitat condition was recorded to ensure that the Project can calculate the biodiversity units lost during the development of the Project, in order that the Project can identify the degree of BNG required achievable for the Project. An initial BNG calculation in the statutory version of the Defra metric (Defra, 2024) has been carried out as set out in the BNG Strategy (Document Reference: 7.22).

[6] At the time of the Extended Phase 1 Habitat Survey, the Defra Biodiversity Metric versions 3.1, 4.0 and the statutory metric had not yet been released, therefore this stage of the assessment was based on Version 3.0.

127. The Early Design BNG assessment and calculations provided in the BNG Strategy (Document Reference: 7.22) represent the BNG within the onshore project area at the Project's ES stage. Post-consent, the onshore project area will be further refined and will result in changes in the habitat baseline to be included. The final BNG calculations and assessment will be carried out post-consent, to ensure the habitat baseline, compensation and enhancement measures are appropriate and accurate. The relevant planning authorities will be consulted on the findings. Production of the Early Design BNG assessment will be secured through (Document Reference: 7.22).

128. In the Environment Act 2021, a minimum of 10% BNG will be mandatory for NSIPs from November 2025, which is subsequent to the current timeline of North Falls DCO submission. There is currently little existing guidance in regard to potential BNG obligations of DCO applications, thus the Early Design BNG assessment and calculation relied on guidance provided alongside the statutory biodiversity metric at the time of writing (Natural England, 2023).

Table 23.18 Habitat condition within the habitat and species study area assessed during the Extended Phase 1 Habitat Survey using Panks *et al*., 2021.

Habitat	UKHab Code	Condition	Area (ha)	JNCC Code
Broadleaved semi-natural woodland	w1f 30	Poor	0.30	A1.1.1
		Moderate	1.32	
		Good	0.13	
Broadleaved woodland - plantation	w1g 29	Poor	0.94	A1.1.2
		Moderate	0.10	
Coniferous woodland - plantation	w2c 29	Poor	0.12	A1.2.2
Mixed semi-natural woodland	w1f 30	Moderate	0.23	A1.3.1
Mixed plantation woodland	w1h 29	Poor	1.44	A1.3.2
		Moderate	1.10	
		Good	1.12	
Dense/ continuous scrub	h3h	Poor	0.10	A2.1
		Moderate	0.74	
		Good	0.00	
Scattered scrub	h3h 10	Poor	0.02	A2.2
		Moderate	0.01	
Broadleaved parkland/scattered trees	w1g 26	Poor	0.09	A3.1
Mixed parkland/scattered trees	w1h 26	Moderate	0.35	A3.3
Arable field margin	c1a	Poor	0.67	N/A
Semi-improved neutral grassland	g3c	Poor	1.60	B2.2
Improved grassland	g4	Poor	8.68	B4
		Moderate	1.61	
Poor semi-improved grassland	g4	Poor	0.20	B6
		Moderate	1.16	

Habitat	UKHab Code	Condition	Area (ha)	JNCC Code
Scattered bracken	g1c 12	Poor	0.19	C1.2
Other tall ruderal	u1f 81	Poor	1.57	C3.1
		Moderate	0.24	
		Good	1.52	
Standing water	r1	Poor	0.30	G1
		Moderate	0.04	
Running water	r2	Poor	0.01	G2
		Moderate	0.09	
Cultivated/disturbed land - arable	c1c	Poor	319.08	J1.1
Cultivated/disturbed land - amenity grassland	g4 26	Poor	3.02	J1.2
		Moderate	0.08	
Cultivated/disturbed land -ephemeral/short perennial	u1f 81	Poor	0.50	J1.3
Caravan site	u1b 840	Poor	0.05	J3.4
Buildings	u1b5	Poor	0.68	J3.6
Bare ground	s 510	Poor	1.26	J4
Habitat	**UKHab**	**Condition**	**Length (m)**	**JNCC Code**
Standing water	r1	Poor	720.91	G1
Running water	r2	Poor	1317.26	G2
		Moderate	328.22	
Intact hedgerows	h2a 516	Poor	2281.21	J2.1.1 and J2.1.2
		Moderate	1477.06	
		Good	1560.63	
Defunct hedgerows	h2a 518	Poor	1275.55	J2.2.1 and J2.2.2
		Moderate	453.53	
		Good	54.99	
Hedgerows with trees	h2a 200	Poor	1976.92	J2.3.1 and J2.3.2
		Moderate	1597.89	
		Good	1416.28	

23.5.4 Protected and notable species

23.5.4.1 Badger

129. Badgers are legally protected under the Protection of Badgers Act 1992. This makes it a criminal offence to:

- Willfully kill, injure, or take a badger (or attempt to do so);
- Cruelly ill-treat a badger;
- Dig for a badger;
- Intentionally or recklessly damage, destroy or obstruct access to a badger sett;
- Cause a dog to enter a badger sett; and
- Disturb a badger when it is occupying a sett.

130. As a nationally protected species, which are common within the region, badgers are considered to be of medium importance (see Table 23.8).

131. Badgers have been recorded at 159 locations by the Essex Field Club within 2km of the onshore project area. There have been 162 different recordings throughout these locations and 57 of these coming within the last 10 years (up to 2021).

132. A search for signs of badgers, within the habitat and species study area was undertaken concurrently with the Extended Phase 1 Habitat Survey (ES Appendix 23.1 (Document Reference: 3.3.30)). Signs such as setts, tracks, hairs, bedding and spoil heaps, snuffle holes and latrines were checked for. This survey area included any badger activity within the habitats and species study area, which in turn included habitats highlighted as likely to have badger presence in Natural England and Defra's guidance *Protected Species and Development: Advice for Local Planning Authorities* (Natural England and Defra, 2014). Badger surveys for field signs can be carried out any time of year, dependent on weather conditions (Natural England and Defra, 2014).

133. Where setts were noted, they were classified using the following categories, which follows the Scottish Badgers *Surveying for Badgers: Good Practice Guidelines* (Scottish Badgers, 2018):

- Main sett– several holes with large spoil heaps and obvious paths leading from and between sett entrances;
- Annex sett– normally less than 150m from a main sett, comprising several holes. These setts may not be in use all the time, even if main setts are very active;
- Subsidiary sett– these are usually at least 50m from a main sett with no obvious paths connecting them to other setts. These may only be used intermittently; and
- Outlier sett– little spoil present outside holes, with no obvious paths connecting to other setts. These are only used sporadically and may also be used by foxes and/or rabbits.

134. A total of four badger setts were recorded during the Extended Phase 1 Habitat Survey of the habitat and species study area, three of which were outlier setts which were assessed as likely disused, and one active main sett.

135. No badger setts were recorded within the onshore project area.

136. The field signs and setts located within the habitat and species study area are shown on Confidential ES Figure 23.4 (Document Reference: 3.2.19). Confidential Annex ('Appendix D') of ES Appendix 23.1 (Document Reference: 3.3.30) provides additional details on sett locations and field signs recorded during surveys.

23.5.4.2 Bats

137. All bat species are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as an EPS. This makes it a criminal offence to:

- deliberately take, injure, or kill a wild bat;
- intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- damage or destroy a place used by bats for breeding or resting (roosts) (even if bats are not occupying the roost at the time);
- possess or advertise/sell/exchange a bat of a species found in the wild in the European Union (EU) (dead or alive) or any part of a bat; and
- intentionally or recklessly obstruct access to a bat roost.

138. Furthermore, all bat species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure, or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb a bat whilst occupying such a structure or place.

139. Six of the UK's 17 resident bat species are listed as UK species of principal importance. These include:

- Barbastelle bat *Barbastella barbastellus*;
- Bechstein's bat *Myotis bechsteinii*;
- Soprano pipistrelle *Pipistrellus pygmaeus*;
- Brown long-eared bat *Plecotus auratus*;
- Greater Horseshoe Bat *Rhinolophus ferrumequinum*;
- Lesser Horseshoe Bat *Rhinolophus hipposideros*.

140. As a result of these protections, all bat species in the UK are of high importance according to the definition set out in the assessment methodology (Table 23.8).

141. A desk study using Essex Field Club biological records found records of 15 bat species within the habitat and species study area as follows:

- Barbastelle bat;
- Serotine bat *Eptesicus serotinus*;
- Natterer's bat *Myotis nattereri*;
- Leisler's bat *Nyctalus leisleri*;
- Nathusius's pipistrelle *Pipistrellus nathusii*;

- Common pipistrelle;
- Soprano pipistrelle; and
- Brown-long eared bat.

142. A search for suitable habitat to support both roosting and commuting / foraging bats within the habitat and species study area was undertaken concurrently with the Extended Phase 1 Habitat Survey. Suitable habitats for bat species include ancient/ veteran trees or those with decay features; buildings or large gardens; grassland including meadows, pasture and parkland; woodland, scrub and hedgerows (Natural England and Defra, 2014).

23.5.4.2.1 Roosting bats

143. All trees, buildings, and structures (e.g., bridges and farm buildings) were assessed from the ground using binoculars for their potential to support roosting bats (Table 23.19). Each feature was assigned a classification of either 'negligible', 'low', 'moderate' or 'high' suitability for supporting roosting bats, in accordance with the guidelines set out in Table 4.1 of the BCT's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016). The results are shown on ES Figure 23.5 (Document Reference: 3.2.19).

144. The total number features and their assessed suitability for supporting roosting bats are summarised below in Table 23.19, including data from all Extended Phase 1 Habitat Surveys 2021 - 2023.

Table 23.19 Features and their suitability to support roosting bats

Feature	Number within the habitat and species study area	Number within the onshore project area
Bat roost trees/ structures with high suitability	3	0
Bat roost trees/ structures with moderate suitability	51	10
Bat roost trees/ structures with low suitability	70	30
Bat roost trees/ structures with negligible suitability	36	14

145. Following the BCT guidelines at the time of survey (Collins, 2016), the 54 trees or structures identified during 2021 – 2022 surveys and assessed as providing moderate or high suitability for supporting roosting bats within the habitat and species study area (plus those structures assessed as providing low suitability) were subject to emergence / re-entry surveyed during Summer 2022.

146. A total of 78 features suitable for roosting bats were identified during the August 2023 Extended Phase 1 Habitat Survey. Seven of these were assessed as providing negligible suitability for roosting bats, 44 were assessed as providing low suitability, 25 as providing moderate suitability, and two as having high suitability for roosting bats. These features are included in Table 23.19 but were subsequently not subject to the emergence/ re-entry surveys carried out in 2022 and therefore are not part of the numbers described below.

147. In accordance with the BCT guidelines (Collins, 2016), trees classified as providing moderate suitability to support roosting bats had two surveys completed, one dusk (emergence) survey and one dawn (re-entry) survey. Trees classified as having high potential had three surveys completed, either two dusk (emergence) surveys and one dawn (re-entry) survey) or one dusk and two dawn. Trees that had confirmed presence an additional fourth survey was completed to aid with roost characterisation and in the event that a Natural England licence is required.

148. Of the 54 50 trees surveyed in the habitat and species study area, seven had confirmed presence of roosting bats. The remaining 43 features surveyed were considered likely to have an absence of bat roosts. Findings regarding the trees with confirmed bat roosts are set out below in Table 23.20.

149. The confirmed presence / absence results of these surveys are summarised in Table 23.21.

Table 23.20 Trees with confirmed bat roosts within the habitat and species study area.

Tree ID	X and Y coordinates	Date of survey	Time	Species	Number	Roost Status	Notes
BR126	619875, 220136	05/05/2022	20:59	Common pipistrelle	3	Day	Emergence from woodpecker hole, 5m up on West aspect
BR136	619992, 221013	03/05/2022	20:58	Common pipistrelle	1	Day	Emerged from south aspect of building
BR255	616888, 223930	11/05/2022	21:22	Soprano pipistrelle	1	Day	Emergence from large hollow, 6m from ground level
BR388	614926, 225174	16/05/2022	21:17	Unknown	1	Day	Emergence from a large Hollow
BR271	617346, 223722	22/09/2022	19:05	Noctule bat *Nyctalus noctula*	2	Day	2 emergences from a woodpecker hole, 4m high on the north east of the trunk
BR520	617414, 223707	28/07/2022	20:53	Unknown	1	Day	Seen crawling on tree, possible perching/ feeding roost
BR521	614238, 226364	10/08/2022	21:06	Common pipistrelle	1	Day	Emerged from a cluster of trees so could not identify roost site.

Table 23.21 Trees and structures with confirmed presence / likely absence for roosting bats.

Feature	Number within the onshore project area	Number within the habitats and species study area (onshore project area plus 50m buffer)
Trees / structures with confirmed presence as day roosts	0	7
Trees / structures with confirmed likely absence	10	47

150. Further details on the bat emergence / re-entry surveys are available in ES Appendix 23.8 (Document Reference: 3.3.37) and ES Figures 23.5 and 23.6 (Document Reference: 3.2.19).

23.5.4.2.2 Commuting and foraging bats

151. All linear features (e.g., tree lines, waterbodies, and hedgerows) were also assessed for their potential to provide commuting and foraging habitat for bats, in accordance with the BCT guidelines (Collins, 2016) (Table 23.22). The locations of such features are shown in ES Figure 23.5 (Document Reference: 3.2.19).

Table 23.22 Features and their suitability to support commuting/ foraging bats.

Feature	Number within the habitat and species study area	Number within the onshore project area
Bat commuting/ foraging features with high suitability	1	1
Bat commuting/ foraging features with moderate suitability	64	44
Bat commuting/ foraging features with low suitability	29	21
Bat commuting/ foraging features with negligible suitability	12	7

152. Based on the Extended Phase 1 Habitat Survey data identifying potential bat commuting/ foraging features, 12 transects within the habitat and species study area were surveyed for bat activity carried out once a month between April-October 2022. Back-to-back dusk and dawn surveys were conducted in July, totalling eight surveys for each transect. Two static detectors were also deployed per transect of moderate suitability to support commuting and foraging bats once a month between April-October (inclusive), 2022.

153. All 12 transects showed bat activity, with the overall most frequently recorded species on both static detectors and transects being common pipistrelle, followed by soprano pipistrelle. Transect 5 had the highest number of bat recordings at 527, followed by Transect 11 with 496. Both Transects 5 and 11 covered habitats considered suitable for foraging / commuting bats, namely woodland along Tendring Brook and two large lakes near Thorpe-le-Soken. In total 10 species were recorded across all transects.

154. Barbastelle bats were recorded on all 12 transects by static detectors and on eight transects during transect surveys. Transect 13 had the highest number of barbastelle recordings for both static and transect survey data. Barbastelle bats are an Annex II species.

155. A summary of the bat activity survey results is set out in Table 23.23. Further details on the bat activity survey results can be found in ES Appendix 23.9 (Document Reference: 3.3.38) and ES Figure 23.7 (Document Reference: 3.2.19).

Table 23.23 Combined total counts for bat species for transect and static detector surveys, 2022.

Bat species	Total recordings from transects (Apr-Oct)	% of total calls recorded from transects (Apr-Oct)	Total recordings from statics (Apr-Oct)	% of total calls recorded from statics (Apr-Oct)
Barbastelle bat	34	0.94	572	0.22
Serotine bat	4	0.11	17	0.01
Leisler's bat	7	0.19	50	0.02
Serotine bat / Leisler's bat	11	0.30	25	0.01
Common noctule *Nyctalus noctula*	109	3.00	2,390	0.91
Nathusius' pipistrelle	2	0.06	909	0.35
Common Pipistrelle	2,663	73.24	186,154	70.96
Soprano pipistrelle	704	19.36	65,105	24.82
Brown long-eared *Plecotus auritus*	13	0.36	537	0.20
Myotis sp.	547	1.29	3,322	1.27
Nyctalus sp.	0	0	189	0.07
Pipistrellus sp.	42	1.16	3,046	1.16
Bat sp.	0	0	28	0.01

23.5.4.2.3 Migratory Nathusius' pipistrelle

156. Nathusius' pipistrelles undertake long distance migration throughout Europe. Notably, evidence indicates that the migratory corridors of the species are closely associated with coastlines and change depending on environmental conditions (Voigt *et al.*, 2023). Nathusius' pipistrelles are known to migrate to Essex from Europe, as evidenced by the BCT's National Nathusius' Pipistrelle Project (NNPP) which recorded an individual in Essex which had been ringed previously in Latvia (BCT, 2023).

157. Broad migratory flyways are known to run from Russia to Spain, following the northern coastline of mainland Europe (Pravettoni and UNEP/GRID-Adrenal, 2015). Narrower migratory flyways are known to branch off the coastal broad flyway into Germany, Switzerland and Czechia. Data on the migratory routes, patterns and behaviour of Nathusius' pipistrelles across the North Sea to/from

the UK is minimal, with no known number of migrating individuals. The potential migration routes highlighted by the nationwide NNPP dataset (BCT, 2023) were based on the long-distance data of only ten individuals, and therefore to date there is evidence of ad hoc migration from Europe to the UK only.

158. Data published by BCT (BCT, 2023) and Essex Bat Group (Essex Bat Group, 2024) has yet to report confirmed Nathusius' pipistrelle maternity roosts within Essex. Furthermore, the individual Nathusius' pipistrelle recorded migrating from Latvia to Essex was an adult male, rather than a breeding female.

159. Data obtained from the Essex county sampling for the NNPP (BCT, pers. comm) included further information on the population demographics of Nathusius' pipistrelles in Essex including age, sex, and reproductive status. Of the 26 female bats recorded in Essex in this dataset, five were reproductively active and had given birth to young, and an additional bat was lactating at the time of survey. A further 12 female bats had not given birth to young, and eight females could not have their reproductive status determined. Of the 94 male bats recorded, 36 were reproductively active, 17 were not reproductively active, and 41 could not have their reproductive status determined. No juvenile Nathusius' pipistrelles were recorded during the Essex NNPP sampling. The closest sampling point to the onshore project area is 14km north east at Landguard Fort, Felixstowe.

160. A summary of Nathusius' pipistrelles recorded during the activity surveys by both transect surveys and static recorders is presented below in Table 23.24. No roosting Nathusius' pipistrelles were recorded during the emergence re-entry surveys of the habitat and species study area.

Table 23.24 Recorded presence of Nathusius pipistrelle during the bat activity surveys from transect survey recordings and static detectors.

Transect number	April	May	June	July	August	September	October	Total
Transect 1	1	21	39	4	2	9	0	76
Transect 2	0	17	6	21	3	11	0	58
Transect 4	4	13	7	6	0	1	1	32
Transect 5	6	7	22	1	1	3	0	40
Transect 6	11	10	18	4	1	4	0	48
Transect 7	N/A	0	5	4	0	6	2	17
Transect 8	8	17	0	9	0	4	1	39
Transect 9	4	15	22	16	1	4	0	62
Transect 10	20	5	9	36	77	3	7	157
Transect 11	24	33	36	8	29	1	2	133
Transect 12	7	129	42	4	0	12	0	194
Transect 13	26	33	13	11	0	0	2	85
Total	111	300	219	124	114	58	15	941

161. Nathusius' pipistrelles were recorded at all 12 transects surveyed within the Habitat and Species Study Area, totalling 941 occurrences over the survey

period. Transect 12, which was adjacent to Great Holland Pits LoWS, recorded the most Nathusius' pipistrelle activity of all the transects with a total of 194 occurrences. May was the month with the highest overall Nathusius' pipistrelle activity, accounting for almost a third of the total Nathusius' pipistrelle recordings.

162. It is unknown whether the Nathusius' pipistrelle recorded in the bat activity surveys are resident or migratory. For the Project's worst case scenario, it will be assumed the Nathusius' pipistrelle present are potentially migratory, due to a lack of data to evidence otherwise and the presence of the potential migratory route of the species to the Essex area.

23.5.4.3 Water vole and otter

163. Otter are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as EPS. This make it a criminal offence to:

- deliberately take, injure, or kill a wild otter;
- intentionally or recklessly disturb an otter in its place of rest;
- damage or destroy a place used by otters for breeding or resting;
- possess or advertise/sell/exchange an otter found in the wild in the EU (dead or alive) or any part of an otter; and
- intentionally or recklessly obstruct access to an otter's resting place.

164. Furthermore, both otters and water vole are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb an otter or water vole whilst occupying such a structure or place.

165. Both water vole and otter are also listed as UK species of principal importance.

166. As a result of these protections, water vole and otter are of high importance according to the definition set out in the assessment methodology (Table 23.8).

167. The Essex Field Club holds 57 records of water vole within 2km of the habitat and species study area, three of which were recorded within the last 10 years. These three records were shown within the Harwich Gateway retail park, Dovercourt Dock River and the River Colne, all of which are outside the onshore project area. Holland Haven Marshes has historically supported water voles and anecdotal feedback from Natural England through the Evidence Plan Process (EPP) confirmed that water voles are still present in the SSSI.

168. The Essex Field Club holds 14 records of otter within 2km of the habitat and species study area, of which five were recorded within the last 10 years. The five most recent recordings were shown within Holland Haven, Ardleigh reservoir, Alresford Creek, and Tenpenny Brook.

169. All standing and running waterbodies within the habitat and species study area were assessed for their suitability to support water voles and otters during the Extended Phase 1 Habitat Survey (Natural England and Defra, 2014). The

assessment of the suitability of a waterbody to support water voles and/or otters was made in line with *The Water Vole Mitigation Handbook* (Dean *et al*., 2016) and Natural England's *Standing advice for local planning authorities who need to assess the impacts of development on water voles* (Natural England, 2015). The findings of this assessment are summarised in Table 23.25. These watercourses are shown on ES Figure 23.8 (Document Reference: 3.2.19).

Table 23.25 Watercourses suitable for supporting water vole and otters.

Species	Suitable watercourses within the habitat and species study area	Suitable watercourses within the onshore project area
Water vole	5	5
Otter	1	1

170. Based on watercourse suitability assessed in the Extended Phase 1 Habitat Survey, further field surveys were conducted on five[7] watercourses for water vole and otter within the habitat and species study area.

171. Two of the five watercourses surveyed were found to have signs of water vole presence including latrines, feeding remains, burrow entrances and prints during the surveys:

- TN017 - Watercourses and drainage ditches within Holland Haven Marshes SSSI; and
- W003 – Tendring Brook, near Tendring.

172. The water vole field signs found in watercourse TN017 were all located outside of the habitat and species study area. Water vole are highly mobile species and therefore it is assumed that water vole are also present within the areas of TN017 within the onshore project area.

173. No evidence of water voles was found on the remaining three watercourses surveyed within the habitat and species study area.

174. The relative population density of the populations recorded on each of these two watercourses, based on the approach detailed in *The Water Vole Mitigation Handbook* (Dean *et al*., 2016), was 'low'.

175. No watercourses had signs of otter within the habitat and species study area.

176. One watercourse (W003) showed presence of invasive non-native American mink *Neovison vison*, with surveyors findings an old mink spraint. Mink pose a direct competition to otters as well as a predator of water voles so can negatively affect populations of both species.

177. The water vole and otter survey findings are summarised in Table 23.26, and are shown on ES Figure 23.8 (Document Reference: 3.2.19).

[7] Note that, for the purposes of the water vole and otter survey, all the watercourses and drainage ditches within Holland Haven Marshes SSSI were surveyed as a single watercourse (TN017).

Table 23.26 Summary of water vole and otter field survey findings within the habitat and species study area.

Waterbody ID	Species	Field signs
TN017	Water vole	Feeding remains, latrines (5)
W003	Water vole	Feeding remains
	American mink	Spraint (old)

178. Further details of the water vole and otter field survey are detailed in ES Appendix 23.3 (Document Reference: 3.3.32) and ES Figure 23.8 (Document Reference: 3.2.19).

23.5.4.4 Great crested newt

179. Great crested newts are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as EPS. This makes it a criminal offence to:

- deliberately take, injure, or kill a wild great crested newt;
- intentionally or recklessly disturb a great crested newt in its place of rest;
- damage or destroy a place used by great crested newts for breeding or resting;
- possess or advertise/sell/exchange a great crested newt found in the wild in the EU (dead or alive) or any part of a great crested newt; and
- intentionally or recklessly obstruct access to a great crested newt's resting place.

180. Furthermore, great crested newts are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb a great crested newt whilst occupying such a structure or place.

181. Great crested newts are listed as UK species of principal importance.

182. As a result of these protections, great crested newts are of high importance (see Table 23.8).

183. The Essex Field Club holds 10 records of great crested newt within 2km of the habitat and species study area, four of which were recorded within the last 10 years. These records were shown within Weeley, Kirby Cross, and Ardleigh.

184. During the Extended Phase 1 Habitat Survey, all standing water bodies within 250m of the 2022 onshore project area were mapped and subjected to a Habitat Suitability Index (HSI) assessment for their suitability to support breeding populations for great crested newts (following Oldham *et al.,* 2000; Natural England and Defra, 2014).

185. Suitable water bodies identified in the HSI assessment within the great crested newt study area are outlined in Table 23.27. The locations of the standing water bodies subject to HSI are shown in ES Figure 23.9 (Document Reference: 3.2.19).

Table 23.27 Ponds and their habitat suitability index for supporting great crested newts within the great crested newt study area.

Feature	Number within the great crested newt study area	Number within onshore project area
Number of ponds	93	28
Number of ponds with excellent HSI	22	16
Number of ponds with good HSI	15	3
Number of ponds with average HSI	21	7
Number of ponds with below average HSI	11	1
Number of ponds with poor HSI	13	0
Number of ponds where no HSI was undertaken	11	1

186. eDNA testing was conducted on 72 water bodies within the great crested newt study area. Of the 72 tested, nine returned a positive result for great crested newt presence, all of which are located outside the onshore project area. A further 25 water bodies were not subject to eDNA testing due to access restrictions, being unsuitable at the time of survey, as well as one additional pond which was identified after the eDNA surveys were completed during the August 2023 Extended Phase 1 Habitat Survey. The additional pond identified after the eDNA surveys is included in Table 23.27 but was subsequently not subject to eDNA survey.

187. The full great crested newt survey report is detailed in ES Appendix 23.2 (Document Reference: 3.3.31), and results are provided in Table 23.28.

Table 23.28 Great crested newt survey results within the great crested newt study area.

Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO01	TM 23238 18578	0.86	Excellent	Negative
PO02	TM 23060 18351	0.82	Excellent	Negative
PO03	TM 23063 18339	0.82	Excellent	Negative
PO04	TM 23029 18319	0.82	Excellent	Negative
PO05	TM 23022 18306	0.86	Excellent	Negative
PO06	TM 23034 18306	0.86	Excellent	Negative
PO07	TM 23027 18300	0.86	Excellent	Negative
PO08	TM 22935 18244	0.86	Excellent	Negative
PO09	TM 22920 18228	0.86	Excellent	Negative
PO10	TM 15652 24379	0.86	Excellent	Negative

Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO11	TM 22872 18209	0.68	Average	Negative
PO12	TM 22873 18193	0.62	Average	Negative
PO13	TM 22869 18185	0.79	Excellent	Negative
PO14	TM 61544 22507	1	Excellent	Negative
PO15	TM 62286 21818	1	Excellent	Negative
PO16	TM 22859 18183	1	Excellent	Negative
PO17	TM 22864 18176	1	Excellent	Negative
PO18	TM 22798 18127	0.76	Good	Negative
PO19	TM 22718 18053	0.79	Excellent	Negative
PO20	TM 22708 18046	0.79	Excellent	Negative
PO21	TM 22622 17966	0.72	Good	Negative
PO22	TM 22589 17929	0.68	Average	Negative
PO23	TM 22575 17920	0.68	Average	Negative
PO24	TM 22557 17918	0.68	Average	Negative
PO25	TM 22558 17910	0.68	Average	Negative
PO26	TM 22334 17693	0.82	Excellent	Negative
PO34	TM 21136 18788	0.58	Below average	Negative
PO35	TM 21174 18656	0.31	Poor	Negative
PO36	TM 20916 18505	0.73	Good	Negative
PO59	TM 20329 19152	0.74	Average	Negative
PO60	TM 20262 19254	0.50	Below Average	Positive
PO64	TM 20225 19307	0.62	Average	Negative
PO65	TM 20193 19342	0.58	Below Average	Positive
PO66	TM 20149 19368	0.86	Excellent	Negative
PO67	TM 20121 19408	0.57	Below Average	Positive
PO68	TM 20182 19480	0.49	Poor	Positive
PO69	TM 20202 19503	0.53	Below Average	Positive
PO76	TM 20614 20151	0.60	Average	Negative
PO78	TM 20198 20524	0.30	Poor	Negative
PO79	TM 20381 21316	0.68	Average	Negative
PO83	TM 19706 22392	0.69	Average	Negative
PO84	TM 19728 22526	0.72	Good	Positive
PO85	TM 19415 22677	0.80	Excellent	Negative
PO86	TM 19273 22709	0.84	Excellent	Negative
PO87	TM 19189 22953	0.68	Average	Negative
PO88	TM 19326 23209	0.67	N/A	Negative

Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO103	TM 16098 23862	0.61	Average	Positive
PO104	TM 16325 23943	0.73	Good	Negative
PO105	TM 16452 24005	0.54	Average	Negative
PO106	TM 16664 24317	0.64	Average	Negative
PO107	TM 15652 24379	0.67	Average	Negative
PO112	TM 15709 25239	0.75	Good	Negative
PO113	TM 15557 25153	0.68	Average	Negative
PO114	TM 15442 25077	0.65	Average	Negative
PO115	TM 15030 24861	0.65	Average	Negative
PO116	TM 14887 24994	0.72	Good	Negative
PO117	TM 15438 25475	0.65	Average	Positive
PO118	TM 14691 25342	0.54	Below Average	Negative
PO120	TM 15022 25938	0.70	Good	Negative
PO124	TM 14102 26511	0.54	Below Average	Negative
PO125	TM 14217 26683	0.64	Average	Negative
PO127	TM 13093 27091	0.71	Good	Negative
PO128	TM 12555 28100	0.56	Below Average	Negative
PO142	TM 11851 27529	0.75	Good	Negative
PO143	TM 11123 27625	0.82	Excellent	Negative
PO147	TM 09673 27216	0.45	Poor	Negative
PO174	TM 22864 18176	0.76	Good	Negative
PO176	TM 17503 23948	0.75	Good	Negative
PO183	TM 11680 27882	0.71	Good	Negative
PO192	TM 15211 26033	0.78	Good	Positive
PO193	TM 15175 26030	0.51	Below average	Negative
PO195	TM 11643 28069	0.72	Good	Negative

23.5.4.5 Reptiles

188. All common UK reptile species (grass snake *Natrix natrix*, adder *Vipera berus*, common lizard *Zootoca vivipara* and slow worm *Anguis fragilis*) are part-protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), making it an offence intentionally kill or injure, or to sell or offer to any of these four species of reptile.

189. All common UK reptile species are listed as UK species of principal importance.

190. As a result of these protections, all common UK reptile species are considered of high importance (see Table 23.8). The Essex Field Club holds records of 24 adders, 68 common lizards, 33 grass snakes and 49 slow worms within 2km of the habitat and species study area.

191. Habitat capable of supporting large populations of reptiles were recorded during the Extended Phase 1 Habitat Survey within the habitats and species study area. These areas comprised transitions between habitats (ecotones), rank grassland, piles of debris or bare ground which form part of a habitat mosaic providing suitable reptile hibernation, basking and/or foraging habitat suitable for supporting large populations of reptiles (Edgar, Foster, and Baker, 2010; Natural England and Defra, 2014).

192. In addition, a further four suitable habitat mosaics were identified during Summer 2022 Phase 2 ecology surveys. The additional four habitat mosaics identified in the Summer 2022 Extended Phase 1 Habitat Survey were not subject to reptile surveys, as the reptile surveys began prior in May-June 2022.

193. Table 23.29 details the number of areas suitable to support large populations reptile species, identified in the Extended Phase 1 Habitat Survey and subject to further reptile surveys. The locations of these areas are shown on ES Figure 23.10 (Document Reference: 3.2.19).

Table 23.29 Features suitable for supporting reptiles.

Feature	Number within the habitat and species study area	Number within the onshore project area
Mosaics suitable for supporting large populations of reptiles	9	7

194. Reptile presence/ absence surveys were conducted across these habitat mosaics in two survey windows May-June and September-October 2022. Artificial refugia were placed at locations that offer the most suitable habitat for common reptiles, i.e., structurally diverse grassland habitats with areas of bare ground/short vegetation and transitional ecotone habitats. Full details of the reptile surveys are outlined in ES Appendix 23.4 (Document Reference: 3.3.33).

195. Reptile population classes are assessed in accordance with criteria from Froglife *Advice Sheet 10* (Froglife, 1999). This system classifies populations of individual reptile species into three distinct categories, based on the total number of adult animals observed during individual survey occasions. These population categories are set out in Table 23.30.

Table 23.30 Population size class estimates based on the maximum number of adults by one person in one day, taken from Froglife (1999).

Species	Low population	Good population	Exceptional population
Adder	<5	5-10	>10
Grass snake	<5	5-10	>10
Common lizard	<5	5-20	>10
Slow worm	<5	5-20	>10

196. The results of the reptile presence/ absence surveys are set out in Table 23.31. Locations of suitable reptile habitat are illustrated on ES Figure 23.10 (Document Reference: 3.2.19). In summary, reptiles were recorded at six of the nine habitat mosaics surveyed, with ‘good’ populations of common lizard recorded at three of these.

Table 23.31 Reptile species recorded during field survey and population size estimation within the habitat and species study area.

Site ID	Number of refugia	Number of surveys	Species recorded	Peak count (adults)	Population size estimate
TN426	70	7	Common lizard	4	Low
			Grass snake	1	Low
TN525	117	7	Common lizard	9	Good
			Grass snake	1	Low
TN531	30	7	None	N/A	N/A
TN570	40	7	Common lizard	2	Low
TN581	27	4	None	N/A	N/A
TN582	71	7	None	N/A	N/A
TN583	34	7	Common lizard	7	Good
TN584	41	7	Common lizard	5	Good
TN585	67	7	Common lizard	3	Low
			Grass snake	1	Low

197. Further details of the reptile surveys are outlined in ES Appendix 23.4 (Document Reference: 3.3.33) and ES Figure 23.10 (Document Reference: 3.2.19).

23.5.4.6 Hazel dormice

198. Hazel dormice are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as EPS. This makes it a criminal offence to:

- Deliberately take, injure, or kill a wild hazel dormouse;
- Intentionally or recklessly disturb a hazel dormouse in its place of rest;
- Damage or destroy a place used by hazel dormice for breeding or resting;
- Possess or advertise/sell/exchange a hazel dormouse found in the wild in the EU (dead or alive) or any part of a hazel dormouse; and
- Intentionally or recklessly obstruct access to a hazel dormouse's resting place.

199. Furthermore, hazel dormice are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb a hazel dormouse whilst occupying such a structure or place.

200. Hazel dormice are listed as UK species of principal importance.

201. As a result of these protections, hazel dormice are of high importance (see Table 23.8).

202. Essex Field Club holds 29 records of hazel dormouse within 2km of the habitat and species study area.

203. Habitat suitable for hazel dormice was recorded during the Extended Phase 1 Habitat Survey within the habitats and species study area. This included habitats such as woodland parcels, hedgerows and areas of species-rich scrub that are connected to woodland areas, which have a high degree of species diversity within the tree and shrub species (Bright, Morris and Mitchell-Jones, 2006; Natural England and Defra, 2014).

204. Table 23.32 outlines suitable areas for supporting hazel dormice, identified in the Extended Phase 1 Habitat Survey. These areas are shown on ES Figure 23.11 (Document Reference: 3.2.19).

Table 23.32 Features suitable for supporting hazel dormice.

Feature		Number within the habitat and species study area	Number within the onshore project area
Hedgerows	Suitable for supporting dormice	12	9
Woodland areas	Suitable for supporting dormice	3	2

205. Hazel dormice surveys were undertaken on 14 features within the habitat and species study area during 2022. The survey comprised of a nest-tube monitoring survey of suitable hedgerows, and a nest box survey of all suitable woodlands. The survey was undertaken in accordance with good industry practice methods from *The Dormouse Conservation Handbook* (Bright, Morris and Mitchell-Jones, 2006). Full details of the survey design are provided in ES Appendix 23.5 (Document Reference: 3.3.34).

206. From the 14 hedgerows and woodlands surveyed; dormouse presence was recorded within 12 (see ES Figure 23.11 (Document Reference: 3.2.19):

- H075;
- H079;
- H085;
- H087;
- H127;
- H136;
- H149;
- H155;
- H156;
- H221;

- TN410; and
- TN509.

207. Hedge H087 was identified as suitable for hazel dormice during the Extended Phase 1 Habitat Survey but was not subject to further hazel dormouse surveys. However, H087 is connected to TN410 which has confirmed hazel dormouse presence, therefore it is highly likely that H087 also has hazel dormice present.

208. These hedgerows and woodland parcels are all located south of Swan Road, Beaumont, with particular concentrations around Swan Road, Beaumont itself, and Great Holland Pits Nature Reserve, Great Holland.

209. In summary, a total of 12 hedgerows and woodlands have or potentially support dormice, nine of which are within the onshore project area.

210. Further details of the hazel dormouse surveys are outlined in ES Appendix 23.5 (Document Reference: 3.3.34) and ES Figure 23.11 (Document Reference: 3.2.19).

23.5.4.7 Fish

211. The Essex Field Club desk study did not highlight any notable fish species within the habitat and species study area, However, searches of the Environment Agency National Fish Population Database returned records of brown/ sea trout *Salmo trutta* in Holland Brook, which is a UK species of principal importance.

212. As a nationally important species which is uncommon in the region, brown trout presence makes fish an ecological receptor of medium importance.

213. No field survey data has been collected to identify the presence/ likely absence of fish species in watercourses within the onshore project area.

23.5.4.8 Invasive non-native species

214. Where present, the location and extent of invasive non-native species were recorded during the Extended Phase 1 Habitat Survey. These focused on those species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

215. Records of invasive non-native species recorded within 2km of the habitats and species study area held by Essex Field Club included American mink, butterfly bush *Buddleja davidii* and Japanese knotweed *Reynoutria japonica*.

216. Japanese knotweed has been recorded at 21 locations, including Clacton-Holland cliffs, Frating Green, Frinton and Walton Cliffs, Great Clacton, Stour Estuary, and Wivenhoe Marshes.

217. During the field surveys one ditch contained water fern *Azolla filiculoides* over approximately a five-metre length (TN566) within the habitat and species study area. The locations of all target notes from the Extended Phase 1 Habitat Survey are shown on ES Figure 23.3 (Document Reference: 3.2.19). In addition, New Zealand pigmyweed *Crassula helmsii* was recorded in four locations within the habitat and species study area, which were also within the ditches of Holland Haven SSSI, during the NVC survey (see ES Appendix 23.7 (Document Reference: 3.3.36).

218. If invasive non-native species were to be spread during construction, there is potential for harm to be caused to local designated sites and locally important habitats and species. As a result, the importance of this receptor is medium.

23.5.5 Future trends in baseline conditions

219. In the event that the Project is not developed, a description of the anticipated changes in future baseline conditions for onshore ecology has been carried out and is described within this section.

220. With no development, ecological baseline conditions will continue to change following natural trends and increasing influence from climate change. The UK's approach to managing biodiversity loss is set by *Biodiversity 2020: a strategy for England's wildlife and ecosystem services* (Defra, 2011). The policies set out under this strategy seek to reverse these declining trends. Data is still being gathered to determine success of these measures; however, it appears that declining trends in biodiversity for the habitats and species present within the study areas may continue. Therefore, it is assumed that the ecological baseline within the study area will continue to change over time as measures to try and manage the decline in protected species and habitats continue to occur concurrently to natural changes in the environment.

221. The degree of environmental change in the 'no development' scenario therefore depends upon biodiversity management success, climate change trends, and naturally occurring changes outside of anthropogenic influence.

222. Most species of conservation concern subject to targeted ecological surveys in relation to this EcIA 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 range of factors including climate change, alterations to land-use (particularly intensification of farming and increased built development), increased human disturbance and anthropogenic pollution of waters, land, and air.

223. However, measures such as legislation regarding protection of species and habitats, changing farming practices and nature conservation efforts are, in some cases, limiting the magnitude of these negative trends, particularly at specific scales relevant to the onshore project area (e.g. county/district scale). Where an ecological receptor is known to be experiencing baseline natural trends that are relevant to this impact assessment, this is noted in the relevant individual assessment below.

23.6 Assessment of significance

224. The following sections describe the impacts upon those ecological receptors described in Section 23.5 that have the potential to arise because of the construction, operation, and decommissioning phases of the Project. The assessment follows the methodology set out in Section 23.4.3. The assessments are based on the worst case scenarios set out in Section 23.3.2 and include the incorporation of embedded mitigation and project commitments set out in Section 23.3.3.

225. All findings of this section are summarised in Table 23.44.

23.6.1 Likely significant effects during construction

23.6.1.1 Impact 1: Impacts to Holland Haven Marshes SSSI and LNR

226. As the only designated sites for nature conservation located within the onshore project area, consideration of potential effects upon Holland Haven Marshes SSSI and LNR have been assessed separately to other designated sites. Potential effects upon other designated sites are consider under Impact 2 below.

227. Impacts upon Holland Haven Marshes SSSI and LNR have been considered against the interest features of the SSSI identified in Section 23.5.2.1, i.e.

- The ditch network, which, the citation states, represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, and which include a number of nationally and locally scarce species.
- The adjoining grasslands, which are of botanical importance in their own right as well as acting as a buffer zone to the ditch system.
- Aquatic and terrestrial invertebrates associated with these habitats.

228. The potential impacts assessed in relation to Holland Haven Marshes SSSI and LNR are as follows:

- Indirect effects from trenchless crossing breakout; and
- Indirect effects from road traffic emissions.

Ditch network

229. The NVC survey of the flora present at Holland Haven Marshes SSSI found a range of notable aquatic and emergent species associated with the ditch network, including at least once species listed vulnerable in the England RDB (Lesser spearwort) and at least seven aquatic, emergent or marginal species listed on the SSSI citation. It also recorded communities within the onshore project area which fit the SSSI citation including saltmarsh communities SM24, SM16b and SM23. Other SSSI communities were also recorded, but these areas of the SSSI are located outside of the onshore project area. It is notable that no ditches characteristic of the habitats listed on the SSSI citation were recorded within the onshore project area (although these were recorded within the ditches of the upstream sections of the SSSI).

230. As noted in Section 23.3.3, the Project has sought to minimise the potential interaction with Holland Haven Marshes as far as practicable through the use of construction methodologies that are likely to minimise any potential effects upon the habitats present within the SSSI. The commitment to install cable ducts underneath the SSSI using HDD techniques will ensure that there is no pathway for direct impacts upon the interest features of the SSSI or LNR. No works within the SSSI will be required to facilitate this construction, as all works for cable landfall installation will be undertaken from a HDD launch pit, located within the landfall compound located landward of the SSSI.

231. During the drilling process, there is the potential for the release of inert drilling fluids should a 'breakout' occur. In such an instance the materials released will largely comprise bentonite, an inert clay. The release of such material into the ditch system has the potential to give rise to a temporary smothering of sensitive aquatic or emergent plant species within the ditch system before it disperses or is removed.

232. As part of embedded mitigation, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable. Furthermore, a Horizontal Directional Drill Method Statement and Contingency Plan will be prepared in advance of construction which will detail the measures to be taken in the event of a drilling fluid breakout in order to minimise effects upon the features of the SSSI, including procedures to manage the removal of bentonite. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

233. ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) has identified that there is potential for emissions from road traffic movements to cross the threshold of 1% of the site relevant critical load for NO_x and NH_3 for Holland Haven Marshes SSSI, above which effects need to be considered. The North Falls alone road traffic NOx concentration is 1.1% of the relevant critical load and 1.5% for NH_3 of the relevant critical load. This is an extremely minor exceedance of the threshold for short term, temporary effects associated with road traffic emissions, and is highly unlikely to be a driver of the condition of SSSI features (which are primarily land management, agricultural run-off and upstream pollution events). In light of this, indirect effects from air quality emissions are considered to contribute a negligible magnitude of impact upon the SSSI features.

Adjoining grasslands

234. The NVC survey of the flora present at Holland Haven Marshes SSSI found a small number of notable flora species associated with the grasslands within the SSSI and LNR, including at least once species listed vulnerable in the UK RDB scare species (strawberry clover) and at least one marginal grassland species listed on the SSSI citation (sea barley). It also recorded communities within the onshore project area which fit the SSSI citation including mesotrophic grassland MG13. Other SSSI grassland communities were also recorded, but these areas of the SSSI are located outside of the onshore project area. It should be noted that MG13 grasslands were not recorded within the golf course area of the SSSI.

235. As noted above, direct effects upon the SSSI have been avoided through the use of HDD techniques.

236. During the drilling process, there is the potential for the release of inert drilling fluids should a 'breakout' occur. In such an instance the materials released will largely comprise bentonite, an inert clay. The release of such material into the grassland is unlikely to result in significant effects upon the grassland species of the SSSI, as releases would be localised in scale and the bentonite released in such an event will be removed immediately under the Horizontal Directional Drill Method Statement and Contingency Plan. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

237. As noted above, indirect effects from air quality emissions upon all SSSI features are likely to only contribute a negligible magnitude of impact upon the SSSI features.

Aquatic invertebrates

238. The overall value of Holland Haven Marshes SSSI is considered to be of less than 'county' (i.e., local) value for freshwater invertebrates (see ES Appendix 23.6 (Document Reference: 3.3.35)). Notably, no species of grazing marsh fidelity were recorded, highlighting that assemblages of aquatic invertebrates were comprised of more common generalist species. Further information regarding aquatic invertebrates within the onshore project area are detailed in ES Appendix 23.6 (Document Reference: 3.3.35).

239. The commitment to install cable ducts underneath the SSSI using HDD techniques will ensure that there is no pathway to direct impacts upon the interest features of the SSSI or LNR. No works within the SSSI will be required to facilitate this construction, as all works for cable landfall installation will be undertaken from a HDD launch pit, located within the landfall compound located landward of the SSSI.

240. During the drilling process, there is the potential for the release of inert drilling fluids should a 'breakout' occur. In such an instance the materials released will comprise bentonite, an inert clay. The release of such material into the ditch system has the potential to give rise to a temporary smothering of aquatic or emergent plant species which are important to the lifecycle of the nationally scare water beetles recorded within the ditch system, before it disperses or is removed. As noted above, embedded mitigation measures will ensure this level of risk is minimised through the Horizontal Directional Drill Method Statement and Contingency Plan.

241. As noted above, indirect effects from air quality emissions upon all SSSI features are likely to only contribute a negligible magnitude of impact upon the SSSI features.

Terrestrial invertebrates

242. Desk study data highlights the presence of the Habitats Directive Annex II species Fisher's estuarine moth within Holland Haven Marshes SSSI to the west of the onshore project area. Fisher's estuarine moths rely on a sole host plant, hog's fennel, for food and oviposition so destruction of this plant could negatively impact this species.

243. Additionally, six other species of conservation concern were recorded in field survey so could also be active within the onshore project area. Further information regarding terrestrial invertebrates within the onshore project area are detailed in ES Appendix 23.6 (Document Reference: 3.3.35).

244. As noted above, direct effects upon the SSSI have been avoided through the use of HDD techniques.

245. The hog's fennel habitat which supports the Fisher's estuarine moth has not been recorded within the onshore project area during the NVC surveys. In addition, were it to be present hog's fennel is not considered to be at significant risk from bentonite breakout during the use of HDD for the same reasons as set out above. This is because bentonite breakout in these areas, in the unlikely

event it should occur, would be localised in scale, and the bentonite released in such an event can be largely removed from any affected areas immediately through manual removal and washing in the event of a breakout occurring. As such loss of the stands of hog's fennel is considered unlikely.

246. As noted above, indirect effects from air quality emissions upon all SSSI features are likely to only contribute a negligible magnitude of impact upon the SSSI features.

23.6.1.1.1 Magnitude of impact

247. The magnitude of impact of the different interest features of the SSSI / LNR are as follows:

- **Ditch network:** The magnitude of this impact is low, as the embedded mitigation minimises the risk of effects from HDD breakout and a small-scale, temporary increase in NO_x and NH_3 emissions arising from road traffic movements during the Project's construction. Potential impacts would be temporary and reversible.
- **Adjoining grasslands:** The magnitude of this impact is negligible, both from risks arising from bentonite breakout and a small-scale, temporary increase in NO_x and NH_3 emissions arising from road traffic movements during the Project's construction. Potential impacts would be temporary and reversible.
- **Aquatic invertebrates:** The magnitude of this impact is low, as the embedded mitigation minimises the risk of effects from HDD breakout and a small-scale, temporary increase in NO_x and NH_3 emissions arising from road traffic movements during the Project's construction. Potential impacts would be temporary and reversible.
- **Terrestrial invertebrates:** The magnitude of this impact is negligible, negligible, both from risks arising from bentonite breakout arising from a small-scale, temporary increase in NO_x and NH_3 emissions arising from road traffic movements during the Project's construction. Potential impacts would be temporary and reversible.

23.6.1.1.2 Importance of receptor

248. The importance of the different interest features of the SSSI / LNR are as follows:

- **Ditch network:** As the ditches within the onshore project area do not support habitats for which the SSSI is designated, and instead only locally scarce species, the ditches are considered to be of medium importance.
- **Adjoining grasslands:** SSSI habitats (mesotrophic grasslands) and SSSI species are present within the onshore project area, and therefore this receptor is of high importance.
- **Aquatic invertebrates:** Recent invertebrate surveys undertaken of the SSSI indicate that Holland Haven Marshes SSSI is considered to be of less than 'county' (i.e., local) value for freshwater invertebrates. As a result this receptor is of low importance.

- **Terrestrial invertebrates:** The nearby presence of the Annex II Fisher's estuarine moth, as well as other species of conservation concern, defines the importance of the terrestrial invertebrate assemblage as being high.

23.6.1.1.3 Significance of effect

249. Overall, the worst case effect upon Holland Haven Marshes SSSI and LNR is predicted to be minor adverse, which is not significant in EIA terms.

23.6.1.2 Impact 2: Impacts to statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI / LNR)

250. The potential impacts assessed on statutory and on-statutory designated sites (excluding Holland Haven Marshes SSSI / LNR) are as follows:

- Indirect effects from noise and visual disturbance;
- Indirect effects from dust and non-road mobile machinery emissions;
- Indirect effects from road traffic and air quality emissions; and
- Indirect effects arising from sediment / pollutant release into watercourses.

251. In addition to Holland Haven Marshes SSSI and LNR, there are a further eight statutory and 30 non-statutory designated sites of nature conservation located within 5km and 2km of the onshore project area respectively (Table 23.12) (ES Figure 23.1 (Document Reference: 3.2.19)). These sites have all avoided direct effects through the North Falls site selection process as part of the embedded mitigation (see ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6) for further information).

252. The potential for indirect effects upon these sites arising from noise and visual disturbance, dust and air quality and changes to the hydrological conditions have been considered. The screening of sites for further consideration based on potential impact pathways is set out below:

253. A precautionary buffer ZoI of 500m has been set as the maximum distance within which changes in the noise environment due to the Project could potentially occur (see ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) for further details).

254. Temporary indirect effects resulting from non-road mobile machinery and dust emissions have been determined to have a ZOI of 500m when applying the Institute of Air Quality Management (IAQM)'s 2020 *Guide to the assessment of air quality impacts on designated nature conservation sites* (IAQM, 2020).

255. In addition, ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) has undertaken an exercise to identify designated sites for nature conservation which are potentially affected by changes in road traffic emissions, based on the construction road traffic routes assessed in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29).

256. Temporary indirect effects arising from changes to water resources which have functional connectivity to designated sites are assessed based on the relevant catchment areas for surface watercourses.

257. An assessment of the potential impacts upon statutory and non-statutory designated sites is provided in Table 23.33.

Table 23.33 Potential effects upon designated sites for nature conservation

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for:			Receptors	Potential impacts	Magnitude
			Noise and visual disturbance	Air quality	Water resources			
Simon's Wood	0.02	LoWS Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are negligible Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. Potential effects arising from deposition of NOx, NH_3 and nutrient nitrogen arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality, (Document Reference: 3.1.22). Simon's Wood was screened out of further assessment for air quality impacts from road traffic emissions as these were deemed not significant. There is the low potential for noise disturbance to occur upon species associated with Simon's Wood. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Great Holland Pits	0.01	LoWS	✓	✓	X	Woodland, grassland and pond habitats and associated species bird and invertebrate species	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are negligible. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Essex WT Reserve. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Manning Grove	0.48	LoWS Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited	Negligible

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for: Noise and visual disturbance	Air quality	Water resources	Receptors	Potential impacts	Magnitude
							to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are negligible, due to the site being greater than 200m from the nearest dust generating activity. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Manning Grove. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	
Tendring Grove	0.34	LoWS Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are negligible, due to the site being greater than 200m from the nearest dust generating activity. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Manning Grove. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Hollandhall Wood	0.09	LoWS Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are negligible. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Hollandhall Wood. However, the works are temporary in nature (18 – 24 months only)	Negligible

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for:			Receptors	Potential impacts	Magnitude
			Noise and visual disturbance	Air quality	Water resources			
							and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	
Thorpe Green	0.41	LoWS	✓	✓	X	Lowland meadows	Potential effects arising from dust emissions during the Project's construction, which are unlikely to lead to any deleterious effects upon this habitat. In addition, embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. Potential effects arising from deposition of NOx, NH_3 and nutrient nitrogen arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22). For this site, the increase in these emissions are 1.7% and 2.2% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with Thorpe Green. However, the works are temporary in nature (18 – 24 months only) and as such any effects are likely to be negligible.	Negligible
Gravel Wood	0.34	LoWS Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are negligible, due to the site being greater than 200m from the nearest dust generating activity. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Gravel Wood. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Stonehall Wood	0.48	LoWS Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm),	Negligible

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for:			Receptors	Potential impacts	Magnitude
			Noise and visual disturbance	Air quality	Water resources			
							and any nutrient effects from dust on woodland habitats are negligible, due to the site being greater than 200m from the nearest dust generating activity. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Stonehall Wood. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	
Walls Wood	Road network	Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For this site, the increase in these emissions are 2.7%, 1.8%, 2.6% and 1.1% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with Walls Wood. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Unnamed Woodland (Boudge Hill Wood)	Road network	Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH_3, nutrient nitrogen and acid deposition arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For this site, the increase in these emissions are 0.3%, 0.2%, 0.4% and 0.1% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with the unnamed woodland. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
High Barn Wood	Road network	Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from deposition of NOx and NH_3 arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For	Negligible

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for: Noise and visual disturbance	Air quality	Water resources	Receptors	Potential impacts	Magnitude
							this site, the increase in these emissions are 2.7% and 3.5% of the critical load respectively, all of which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with High Barn Wood. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	
Guttridgehall Wood	Road network	Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH_3, nutrient nitrogen and acid deposition arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For this site, the increase in these emissions are 0.3%, 0.2%, 0.3% and 0.1%of the critical load respectively, i.e. all of which are under the critical load, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with Guttridgehall Wood. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Unnamed Woodland (Oakhurst Wood)	Road network	Ancient Woodland	✓	✓	X	Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For this site, the increase in these emissions are 4.7%, 1.2%, 3.1% and 2.4%of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with the unnamed woodland. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be negligible.	Negligible
Hamford Water	0.80	SAC	✓	✓	X	Fisher's estuarine moth *Gortyna borelii lunata* (Annex II species)	Potential effects arising from dust emissions during the Project construction, which have the potential to lead to	Negligible

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for: Noise and visual disturbance	Air quality	Water resources	Receptors	Potential impacts	Magnitude
		NNR	✓	✓	X	Main habitats: salt marsh, intertidal mud flats, coastal, grazing marsh, sands, shingle, small freshwater ponds, and ditches.	temporary localised, short term effects on tidal flora (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next tidal cycle), and any nutrient effects from dust on coastal are negligible, due to the site being greater than 200m from the nearest dust generating activity. Embedded mitigation set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter. There is the low potential for noise disturbance to occur upon species associated with Hamford Water. However, the works are temporary in nature (18 – 24 months only) and as such any effects are likely to be negligible.	Negligible
		SSSI	✓	✓	X	Tidal creeks, intertidal mud and sand flats, saltmarshes, islands, beaches, and marsh grasslands. It supports communities of coastal plants which are rare or extremely local in Britain, including Hog's Fennel *Peucedanum officinale* which is found elsewhere only in Kent.		Negligible
Stour and Orwell Estuaries	3.15	Ramsar	✓	✓	X	Contains nationally scarce plants and British Red Data Book invertebrates.	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For this site, the increase in these emissions are 1.5, 0.3%, 0.9% and 0.1% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with Stour and Orwell Estuaries. However, the works are temporary in nature (18 – 24 months only) and as such any effects are likely to be negligible.	Negligible
Stour Estuary	3.31	SSSI	✓	✓	X	The estuary is of national importance for coastal saltmarsh, sheltered muddy shores, two scarce marine invertebrates and a vascular scarce plant assemblage.		Negligible
Cattawade Marshes	3.15	SSSI	✓	✓	X	Grazing marshes with associated open water and fen habitats	Potential effects arising from deposition of NOx and NH3 deposition arising from road traffic emissions (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22)). For this site, the increase in these emissions are 13.6 and 5.9% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat. There is the low potential for noise disturbance to occur upon species associated with Cattawade Marshes. However, the works are temporary in nature (18 – 24 months only) and as such any effects are likely to be negligible.	Negligible

23.6.1.2.1 Magnitude of impact

258. As described in Table 23.33, the worst case magnitude of impact upon any statutory or non-statutory designated sites is considered to be negligible.

23.6.1.2.2 Importance of receptor

259. Statutory designated sites are of high importance and non-statutory designated sites are of medium importance.

23.6.1.2.3 Significance of effect

260. For statutory designated sites, the significance of effect is considered to be minor adverse, which is not significant in EIA terms; similarly for non-statutory designated sites, the significance of effect is minor adverse, which is not significant in EIA terms.

23.6.1.3 Impact 3: Permanent and temporary loss of saltmarsh

261. The potential impacts assessed on saltmarsh are:

- Indirect effects from trenchless crossing breakout; and
- Indirect effects from dust emissions.

262. Saltmarsh comprises approximately 0.79ha of the onshore project area, located entirely within Holland Haven Marshes SSSI, as shown in ES Appendix 23.7 (Document Reference: 3.3.36). Saltmarsh is a UKHPI.

263. Saltmarsh is defined as "*Angiosperm-dominated stands of vegetation, occurring on the extreme upper shore of sheltered coasts and periodically covered by spring high tides*" (JNCC, 2022).

264. All saltmarsh within the onshore project area is proposed to be crossed by HDD as part of the Project's embedded mitigation, removing the potential for direct effects upon this habitat.

265. During the HDD process, there is the potential for the release of inert drilling fluids which may temporarily smother small areas of the saltmarsh within Holland Haven Marshes. As part of the Project's embedded mitigation, the HDD will be designed to minimise the risk of a breakout. Furthermore, a Horizontal Directional Drill Method Statement and Contingency Plan will be prepared in advance of construction which will detail the measures to be taken in the event of a drilling fluid breakout, to minimise any short-term potential effects upon saltmarsh. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

266. Potential indirect effects upon saltmarsh habitats arising from dust emissions generated during construction works will be short term (i.e., until the tide removes dust from the area) and localised and managed through the use of good industry practice dust management measures set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22).

23.6.1.3.1 Magnitude of impact

267. The assessment has concluded a negligible magnitude of impact on saltmarsh due to the low risk of impacts occurring and embedded mitigation measures.

23.6.1.3.2 Importance of receptor

268. As saltmarsh is a UKHPI, it is classified as having a high importance.

23.6.1.3.3 Significance of effect

269. The overall significance of effect is minor adverse, which is not significant in EIA terms.

23.6.1.4 Impact 4: Permanent and temporary loss of coastal and floodplain grazing marshes

270. The potential impacts assessed on coastal and floodplain grazing marshes are as follows:

- Indirect effects from trenchless crossing breakout; and
- Indirect effects from dust emissions.

271. Coastal and floodplain grazing marshes are a UKHPI and comprise 13.69ha of the onshore project area. ES Figure 23.2 (Document Reference: 3.2.19) shows the location of this habitat within the onshore project area.

272. Grazing marshes are defined as “periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water” by JNCC (2008a). These ditches are usually rich in plant and invertebrate species.

273. This habitat can also be valuable for breeding waders. Further details on bird assemblages within the onshore project area are detailed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

274. Majority of the coastal and floodplain and grazing marsh within the onshore project area is located within Holland Haven Marshes SSSI. Therefore, the Project’s commitment to use HDD under the Holland Haven Marshes SSSI will avoid direct impacts on this habitat during construction. An additional parcel of coastal floodplain grazing marsh is located within the onshore project area, approximately 160m east of Simon’s Wood. This area will also be crossed using trenchless techniques, due to the presence of important ornithological features. Further details on coastal floodplain grazing marshes and their associated important ornithological features can be found in Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

275. During the HDD process, there is a low risk of the release of inert drilling fluids, which may temporarily smother small areas of the coastal floodplain and grazing marshes. The preparation of a Horizontal Directional Drill Method Statement and Contingency Plan as part of the Project's embedded mitigation will minimise the potential effects upon this habitat in the unlikely event of a breakout. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

276. Potential indirect effects upon coastal floodplain and grazing marsh habitats arising from dust emissions generated during construction works will be short term and localised and managed through the use of good industry practice dust management measures set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22).

277. There is potential for birds that use this habitat to be affected by light and/ or noise during the construction phase. These potential impacts are addressed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

23.6.1.4.1 Magnitude of impact

278. A temporary, negligible magnitude impact on coastal grazing and floodplain marsh is concluded because of the low risk of a potential breakout associated with the HDD and embedded mitigation measures for bentonite breakout and construction dust emissions.

23.6.1.4.2 Importance of receptor

279. As coastal floodplain grazing marshes are a UKHPI, they are classified as being of high importance.

23.6.1.4.3 Significance of effect

280. The overall significance of effect is minor adverse. This is considered to be not significant in EIA terms.

23.6.1.5 Impact 5: Permanent and temporary loss of woodland habitat including veteran trees

281. The potential impacts of permanent loss and indirect effects from dust emissions on woodland habitat and veteran trees are assessed in this section.

282. Lowland mixed deciduous woodlands contribute to 1.96ha of the onshore project area, comprised of small parcels scattered throughout the onshore cable route. Lowland mixed deciduous woodlands are a UKHPI and are of heightened conservation and ecological value. All UKHPI within the onshore project area are shown in ES Figure 23.2 (Document Reference: 3.2.19). This includes six woodlands designated as ancient woodland located within 500m of the onshore project area. Potential effects upon these ancient woodlands have been considered in Section 23.6.1.2 above.

283. Lowland mixed deciduous woodlands are comprised of mixed broad-leaved tree species. Ground flora and canopy composition of this habitat type are rich and often highly vary between sites and can host a wide variety of species (JNCC 2008g).

284. Four veteran trees were identified in the Extended Phase 1 Habitat Survey carried out within the habitat and species study area. Of these four veteran trees, one was located within the onshore project area (TN507). The single veteran tree identified within the onshore project area (TN507) will not be directly impacted as it will be subject to trenchless crossing (e.g. using HDD).

285. As part of the Project's embedded mitigation, site selection has sought to avoid locating infrastructure within woodland as far as practicable. Where this has not been practicable, direct effects upon all remaining woodland parcels will be avoided through the use of trenchless techniques (e.g. HDD) to install cable ducts beneath woodlands. Where this takes place, cable ducts will be installed at least 2m below ground level to ensure the majority of the root zone is avoided. As noted in Section 23.6.1.2 above, no ancient woodland will be directly affected by the Project's onshore works, including Simon's Wood ancient woodland, where no works will take place within 15m of the habitat (Natural England and Forestry Commission, 2022).

286. A pre-construction walkover survey will be undertaken by an appropriately qualified arboriculturist. This survey will define specific mitigation measures that will be implemented to protect any trees that are located adjacent to the construction working areas. This will include the identification of root protection areas to avoid damage to the trees. The arboricultural report will be submitted to and agreed with the local authority prior to the commencement of any construction works.

287. Potential indirect effects upon woodland habitats arising from dust emissions generated during construction works will be short term (i.e., until rain washes the dust from foliage) and localised and managed through the use of good industry practice dust management measures set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22).

23.6.1.5.1 Magnitude of impact

288. The magnitude of impact is considered to be negligible, as woodlands are avoided altogether or by the use of HDD during construction and indirect effects from dust emissions will be minimal and managed through good industry practice mitigation.

23.6.1.5.2 Importance of receptor

289. The importance of UKHPI deciduous woodlands and veteran trees is considered to be high.

23.6.1.5.3 Significance of effect

290. The significance of effect for woodlands is minor adverse, which is not significant in EIA terms.

23.6.1.6 Impact 6: Permanent and temporary loss of hedgerows

291. The potential impacts assessed on hedgerows are:

- Direct effects from permanent and temporary habitat loss; and
- Indirect effects from dust emissions.

292. There are 8,383.21m of hedgerows recorded within the onshore project area. Hedgerows are shown on ES Figure 23.3 (Document Reference: 3.2.19). Hedgerows are listed as a UKHPI.

293. Hedgerows are of high ecological value as they provide foraging and nesting resources, commuting corridors and habitat connectivity in the wider landscape, as well as being a refuge for biodiversity within intensively managed agricultural environments.

294. At this stage in the Project's design trenchless techniques cannot be committed to at all hedgerows, where the engineering feasibility of using such techniques needs further assessment before it can be confirmed. The list of techniques being considered at each crossing is described in ES Chapter 5 Project Description (Document Reference: 3.1.7), ES Appendix 5.1 Crossing Schedule (Document Reference: 3.3.2). North Falls has sought to use trenchless techniques (e.g., HDD) to minimise impact on sensitive features where feasible. Where this is not practical, the working width at hedgerows has been narrowed to 30m to minimise the length of hedgerow which needs to be removed. Details

of this are provided in the OCoCP (Document Reference: 7.13), secured through DCO requirement.

295. In the worst case scenario (as detailed in ES Appendix 5.1 (Document Reference: 3.1.2)) 12 of the total 72 hedgerows within the onshore project area may be crossed using open cut trenching. Trenching could result in up to 30m being temporarily lost per hedgerow. A 6m temporary loss per hedgerow would be required at 57 hedgerows to facilitate construction of a haul road only. An additional total length of up to 309.75m across a further 13 hedgerows may potentially be temporarily lost to facilitate construction of construction accesses to the onshore project area. This gives a total of up to a maximum 1,011.75m temporary loss of hedgerow habitat within the onshore project area. The remaining hedgerows will be retained in full and crossed using trenchless technologies.

296. Construction of the onshore substation may require the permanent removal of up to 30m of hedgerow.

297. To be considered a priority habitat, hedgerows need to consist at least 80% native woody species (JNCC, 2008b). Within the onshore project area the most ecologically valuable hedgerows recorded were 58.89m of native species-rich intact hedgerows and 1,598.55m of native species-rich intact hedgerows with trees. However, it should be noted that 77% of the hedgerow network surveyed within the onshore project area comprised heavily managed species-poor hedgerows, with minimal buffer strips providing little ecological value. In general, hedgerows were well connected to woodland parcels and river corridors.

298. Embedded mitigation in relation to hedgerows includes:

- Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the onshore cable route working width at hedgerow crossings;
- Haul roads will be microsited to use existing hedgerow gaps where practicable during the Project's detailed design;
- Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using locally important and native species as advised by Essex Wildlife Trust. Further details on replanting are set out in Table 23.5, in the OLEMS; and
- All hedgerow sections permanently removed at the onshore substation would be replaced as part of the Project's landscaping scheme. The details of the outline scheme are set out within the OLEMS.

299. Potential indirect effects upon hedgerow habitats arising from dust emissions generated during constructions works will be short term (i.e., until rain washes the dust from foliage) and localised and managed through the use of good industry practice dust management measures set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22).

23.6.1.6.1 Magnitude of impact

300. With implementation of embedded mitigation, the magnitude of impact in the short term is low and negative during the time it takes for the hedgerows to re-establish (3-7 years) (Royal Horticultural Society, 2022) In the long term, the magnitude is low and positive, as re-planting of removed hedgerows with native species mix post-construction has been committed to and will positively influence the conservation status and integrity of hedgerows in the onshore project area.

23.6.1.6.2 Importance of receptor

301. The importance of hedgerows is high due to their listing as a UKHPI. This covers all hedgerows within the onshore project area, whatever their ecological status.

23.6.1.6.3 Significance of effect

302. The significance of effect in the short term is moderate adverse, and in the long term is moderate beneficial, as the quality and quantity of this UKHPI will be improved through construction embedded mitigation. Both these are effects are significant in EIA terms.

23.6.1.7 Impact 7: Permanent and temporary loss of rivers, ponds, reedbeds and lowland fen

303. The potential impacts assessed on rivers, ponds, reedbeds and lowland fen habitats are as follows:

- Direct effects from temporary habitat loss during open cut trenching;
- Direct effects from permanent watercourse rerouting;
- Indirect effects from trenchless crossing breakout; and
- Indirect effects from dust emissions.

304. Rivers, ponds, reedbeds and lowland fen are all listed as UKHPI. These habitats are shown on ES Figure 23.3 (Document Reference: 3.2.19).

305. The surveys recorded 1,168.57m of linear river habitat within the onshore project area. Marginal vegetation associated with watercourses relies on many factors such as the geology, slope and water quality. Rivers and other watercourses also host protected and notable species such as otters and water vole, increasing their importance as a habitat (JNCC 2008c).

306. Reedbeds, lowland fen and associated marginal vegetation of freshwater bodies provide valuable habitat for a wide range of species. For example, great crested newts lay their eggs and fold them into leaves of marginal vegetation available at their breeding ponds (JNCC 2008e). Additionally, many bird species use reedbeds for nesting (e.g., moorhen *Gallinula chloropus* and reed warbler *Acrocephalus scripaceus*). Further details into bird assemblages within the onshore project area are detailed in ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26).

307. Ponds form a significant component of the 0.71ha of standing water identified within the onshore project area. Ponds are strongly associated with their aquatic invertebrate assemblages as well as being a vital breeding resource for amphibian species, including the protected great crested newt (JNCC 2008d).

All ponds are avoided either through the design of the scheme or by the use of trenchless techniques (e.g. HDD). The 1,499.30m of linear standing water identified within the onshore project area is comprised mainly of agricultural drainage ditches, which can also provide habitat for water voles and otters in certain instances.

308. A total of 16 watercourses in the onshore project area will be crossed using trenchless techniques, as detailed in Table 23.34, this includes all watercourses recorded during the ecology surveys. Further site selection work is likely to reduce this as part of ongoing detailed onshore cable route design. This will avoid direct temporary construction impacts on these features. Further details of watercourses affected are outlined in the Project's crossing schedule (ES Appendix 5.1 (Document Reference: 3.3.2)) and ES Figure 5.2 (Document Reference: 3.2.3).

Table 23.34 Watercourses and ponds which will be crossed using trenchless techniques.

Section of the cable route	Obstacle ID	Obstacle details
Landfall	WX-02	Environment Agency main river
Section 1	WX-03	Holland Brook
Section 1	WX-08	Watercourse
Section 1	WX-10	Watercourse/ drain
Section 1	WX-11	Watercourse
Section 1	WX-12	Watercourse
Section 3	WX-13	Watercourse/ drain
Section 3	WX-14	Watercourse
Section 3	WX-16	Watercourse
Section 3	WX-21	Watercourse
Section 4A	WX-25	Watercourse
Section 4A/4B	WX-22	Environment Agency main river – Tendring Brook
Section 5	WX-23	Watercourse
Section 5	WX-26	Watercourse
Section 6/7	WX-24	Watercourse
Section 6/7	WX-27	Watercourse

309. A total of 19 watercourses will potentially require crossing for construction of a 6m wide haul road, which could affect the flow and integrity of the watercourse. The total worst case scenario of watercourse length potentially temporarily lost is 114m. The construction techniques at these locations will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable (see Table 23.5 for embedded mitigation measures to be employed during open cut trenching of watercourses). Reinstatement and monitoring of habitat will take place post-construction.

310. Embedded mitigation as previously set out relating to the trenchless crossing design and breakout contingency planning will be implemented to minimise the risk of effects on watercourses and ponds. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

311. Construction of the onshore substation will potentially result in the permanent rerouting of one standing water field drain, depending on the location of the final onshore substation infrastructure. As part of embedded mitigation, all watercourses which are permanently lost during construction will be re-routed and their biodiversity value will be increased as set out in the OLEMS.

312. Potential indirect effects upon water habitats arising from dust emissions generated during constructions works will be minimal and localised, and managed through the use of good industry practice dust management measures set out in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22).

23.6.1.7.1 Magnitude of impact

313. With embedded mitigation the magnitude of impact upon watercourses is negligible. There will be small-scale temporary and reversible effects on the river habitats during construction. Although there will be potential permanent change at the onshore substation, there will be no net loss of habitat overall.

23.6.1.7.2 Importance of receptor

314. These habitats are all of high importance as examples of UKHPIs in good condition, as well as providing habitat for several protected and notable species.

23.6.1.7.3 Significance of effect

315. The overall significance of effect is minor adverse with embedded mitigation measures in the construction design, which is not significant in EIA terms.

23.6.1.8 Impact 8: Permanent and temporary loss of arable field margins

316. Direct effects from temporary and permanent habitat loss are assessed in this section.

317. Arable field margins are listed as a UKHPI where they are specifically being managed for wildlife. A total of 0.85ha of the onshore project area was comprised of arable field margins. The location of these field margins is shown in ES Figure 23.3 (Document Reference: 3.2.19).

318. Temporary disturbance of arable field margins may occur during open cut trenching for installation of cable ducts. As part of embedded mitigation, all habitats will be reinstated within the first season following the completion of construction. A method statement for reinstatement of the arable field margin habitats will be included in the EMP as described in Table 23.5. See OLEMS for further details (Document Reference: 7.14).

23.6.1.8.1 Magnitude of impact

319. The changes to arable field margin habitats are temporary, however, they are negligible in scale with minimal impact in the viability of this habitat within the region. As such the magnitude of impact would be negligible.

23.6.1.8.2 Importance of receptor

320. The UKHPI status of the arable field margins makes the importance of this receptor high.

23.6.1.8.3 Significance of effect

321. The significance of effect is therefore anticipated to be minor adverse. This effect is not significant in EIA terms. However, beneficial effects are also anticipated in the long term (although not quantified here), as arable field margin losses are reinstated and even increased with habitat creation and management as embedded mitigation post-construction.

23.6.1.9 Impact 9: Permanent and temporary impacts on badgers

322. The potential impacts assessed for badgers are as follows:

- Direct disturbance of setts or mortality of badgers from construction activities;
- Indirect effects from noise;
- Indirect effects from light spill; and
- Indirect effects from dust emissions.

323. The Extended Phase 1 Habitat Survey recorded a total of one main and three outlier badger setts within the habitat and species study area, of which none were within the onshore project area (ES Appendix 23.1 (Document Reference: 3.3.30)). No further setts were within 30m of the onshore project area, and therefore no other setts will need to be considered in the impact assessment, following guidance from English Nature (2002). Locations of setts in relation to the onshore project area are shown on Confidential ES Figure 23.4 (Document Reference: 3.2.19).

324. Badgers are not listed as UK species of principal importance (nationally or locally). However, they are still legally protected under the Protection of Badgers Act 1992. This makes it a criminal offence to intentionally hunt, injure or disturb badgers, as well as protecting their setts from destruction and disturbance.

325. Direct disturbance of setts or mortality of badgers can be caused by construction activities in close proximity to setts. Indirect disturbance could also result from noise, light and air pollution. All of these effects will be temporary, while construction is undertaken in the vicinity of badger habitat.

326. As part of embedded mitigation, during the post-consent detailed design the Project will seek to avoid works taking place within 30m of a sett through micro-siting of the Project infrastructure, where practicable. This will ensure direct and indirect impacts are avoided on badger setts during construction. A pre-construction badger survey will be undertaken across the entire onshore project area to confirm the status of badgers prior to works commencing. Should the pre-construction badger survey confirm that construction works will directly affect an active sett, a licence will be required from Natural England before works can commence. The process for obtaining a licence from Natural England and delivering the mitigation required is set out in the OLEMS. The OLEMS also sets out good industry practice for minimising noise, dust and light disturbance during construction.

23.6.1.9.1 Magnitude of impact

327. The magnitude of impact on badgers is defined as negligible at the population level due to implementation of embedded mitigation (pre-construction badger survey, micro-siting and obtaining the appropriate Natural England licences if any licensable works are deemed necessary within 30m of a newly established badger sett).

23.6.1.9.2 Importance of receptor

328. Badgers are defined as having medium importance as they are legally protected by the Protection of Badgers Act 1992.

23.6.1.9.3 Significance of effect

The overall significance of effect on badgers is considered to be minor adverse, as encounters on site are unlikely due to the setts within 30m of the onshore project area being outlier setts. This is not significant in EIA terms.

23.6.1.10 Impact 10: Permanent and temporary impacts on bats

329. The potential impacts assessed on bats are as follows:

- Direct mortality or injury of roosting bats during tree removal;
- Direct habitat loss due to hedgerow removal; and
- Indirect effects from light spill.

330. All bat species in the UK are EPS under The Conservation of Habitats and Species Regulations 2017 (as amended) and are also protected under the Wildlife and Countryside Act 1981 (as amended). In addition, barbastelle, Bechstein's, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat are all UK species of principal importance.

Roosting bats

331. There are 10 features (i.e., tree and structures) within the onshore project area identified to be of moderate suitability for roosting bats, and no features of high suitability for roosting bats (ES Figure 23.5 (Document Reference: 3.2.19)). None of the potential roosting features within the onshore project area were recorded as supporting as active bat roosts during the Bat Emergence / Re-entry Surveys (ES Appendix 23.8 (Document Reference: 3.3.37)). A further seven confirmed roosts have been recorded within 50m of the onshore project and therefore within the possible range of indirect effects (ES Figure 23.6 (Document Reference: 3.2.19)).

332. A total of 30 features were classified as having low suitability for roosting bats within the onshore project area. These features may also contribute to bat activity on site (ES Figure 23.5 (Document Reference: 3.2.19)).

333. Without mitigation, a risk of killing or injuring roosting bats during tree removal to facilitate construction exists for the seven active roosts.

Commuting and foraging bats

334. Sixty-one commuting and foraging features within the habitat and species study area were considered to provide moderate to high suitability for commuting and foraging bats (ES Figure 23.5 (Document Reference: 3.2.19)). Commuting and foraging can take place for extensive distances from key roost sites (up to 10km)

therefore, bats roosting outside the habitat and species study area are potentially commuting and foraging along linear features affected by the Project.

335. Twenty features were classified as having low suitability to support bat foraging or commuting. These features may also contribute to bat activity within the onshore project area and have therefore been assumed to be of value for local bat species of high importance (ES Figure 23.5 (Document Reference: 3.2.19)).

336. All 12 bat activity transects surveyed in 2022 showed bat activity (ES Figure 23.7), with the overall most frequently recorded species on both static detectors and transects being common pipistrelle, followed by soprano pipistrelle. Transect 5 had the highest number of bat recordings at 527, followed by Transect 11 with 496. Both Transects 5 and 11 covered habitats considered suitable for foraging / commuting bats, namely woodland along Tendring Brook and two large lakes near Thorpe-le-Soken.

337. Barbastelle bats were recorded on all 12 transects by static detectors and on eight transects during transect surveys. Transect 13 had the highest number of barbastelle recordings for both static and transect survey data. Barbastelle bats are an Annex II species and are therefore of high importance.

338. As part of the Project's embedded mitigation, wherever practicable sensitive hedgerows will be crossed using HDD techniques to avoid the need for hedgerow removal. In the worst case scenario (as detailed in ES Appendix 5.1 (Document Reference: 3.3.2)) a 6m temporary loss per hedgerow would be required at 57 hedgerows to facilitate construction of a haul road only. However, this gap is not large enough to inhibit commuting bat use of the remaining hedgerow (JNCC, 2001). For the 12 hedgerows subject to open cut trenching and the additional hedge lengths removed to facilitate haul road and onshore cable route access, the maximum length removed is over 10m at each hedge and therefore will likely create habitat fragmentation prior to reinstatement (JNCC, 2001). In the realistic worst case scenario set out in Table 23.4, 1,011.75m of hedgerows may need to be removed during cable duct installation and haul road construction.

339. In the worst case scenario, hedgerow removal may occur within bat activity transects 1, 4, 5, 6, 7, 8, 9, 10, 11 and 12. Therefore, hedgerow removal could potentially impact the following bat species recorded in those areas during the bat activity surveys:

- Barbastelle bat;
- Serotine bat;
- Leisler’s bat;
- Noctule bat;
- Nathusius’ pipistrelle;
- Common pipistrelle;
- Soprano pipistrelle;
- Brown long-eared bat;
- *Myotis* sp.; and

- Other unidentified bat sp.

340. Nathusius' pipistrelle generally forage in wetland habitats, such as rivers and lakes, and do not necessarily follow strict flight-lines along linear features in the landscape (JNCC, 2001). Similarly noctule bats forage over open habitat areas, such as wetlands and open pasture, and are also not heavily reliant on linear features as flight lines during commuting and foraging (JNCC, 2001).

341. Several of the bat species identified in the bat activity surveys rely on hedgerows, so may be impacted by the potential hedgerow loss in the worst case scenario. Barbastelle bats utilise hedgerows as both commuting corridors and foraging grounds between their woodland roost sites. Brown long-eared bats forage in woodland habitats and rely on hedgerows as flightlines between their foraging habitats (JNCC, 2001). Serotine, Leisler's, common pipistrelle and soprano pipistrelle bats all also regularly use hedgerows as commuting and foraging habitat, however, these species can also utilise open habitats (JNCC, 2001).

342. Construction of the onshore substation may require the permanent removal of up to 30m of hedgerow identified as providing moderate suitability for supporting commuting / foraging bats.

343. As noted under Impact 7, embedded mitigation in relation to hedgerows includes:

- Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the cable route working width at hedgerow crossings;
- Haul roads will be microsited to use existing hedgerow gaps where practicable during the Project's detailed design;
- Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using locally important and native species as advised by Essex Wildlife Trust. Further details on replanting are set out in Table 23.5, and will be set out in the OLEMS.

344. In addition, construction of the onshore cable route and onshore substation works have the potential to give rise to indirect effects upon commuting, foraging, and roosting bats as a result of light disturbance during construction. However, standard construction hours (07:00-19:00) means there is a low risk of disturbance to bats during the summer months when they are active between dusk and dawn. All indirect effects associated with onshore cable route and onshore substation construction will be temporary and only occur while works are being undertaken in the vicinity of the features. Embedded mitigation set out in Table 23.5 will ensure that any security lighting used during construction adheres as far as practicable to accepted lighting guidance (BCT and ILP, 2023).

23.6.1.10.1 Magnitude of impact

345. There is a potential for a short-term negligible magnitude of impact upon roosting bats, as a small number of isolated tree roosts are potentially directly

affected during construction. With the implementation of embedded mitigation, removal of these roosts would be undertaken under licence and only once bat boxes had been installed in advance as replacement habitat. There are no confirmed roosts within the onshore substation works area, and as such impacts are restricted to the onshore cable route and landfall only.

346. There is potential for short term medium magnitude of impact on commuting/ foraging barbastelle and brown long-eared bats, and a short-term low magnitude of impact on commuting/foraging serotine, Leisler's, common pipistrelle and soprano pipistrelle bats. This is due to hedgerow removal and the time period required for replanted hedgerows to establish. Such impacts relate specifically to 1.011.75m of hedgerow being temporarily removed across 72 features, which when replanted would require 3-7 years to reach full maturity (Royal Horticultural Society, 2022). However, bats will use the hedgerows as commuting routes before full maturity. Once matured, the reinstated hedgerows should provide improved biodiversity value due to the increased diversity of hedgerow species and this impact will be medium beneficial.

347. Both Nathusius' pipistrelle and noctule bats forage in open and wetland habitats. Therefore, the magnitude of impacts on both species are negligible, as they will not be impacted by the potential hedgerow losses in the worst case scenario.

23.6.1.10.2 Importance of receptor

348. Bats are of high importance due to their legal status as EPS.

23.6.1.10.3 Significance of effect

349. The significance of effect is considered to be major adverse in the short term for brown long eared and barbastelle bats; moderate adverse in the short term for serotine, Leisler's, common pipistrelle and soprano pipistrelle bats; and minor adverse for Nathusius' pipistrelle and noctule bats. However, once the hedgerows grow up in approximately 3-7 years (Royal Horticultural Society, 2022), the effect will become moderate beneficial for all bat species with the proposed embedded mitigation measures being put in place. This is significant in EIA terms.

23.6.1.10.4 Additional mitigation

350. Hedgerow removal will be programmed for winter to give bats time to adjust to the change prior to the maternity period. Hedgerows will be removed in the preceding winter as close to the onset of works as practicable and works will not commence after nights of poor weather (in case of bad weather roosts being used).

351. Hedgerow replanting will follow in the first winter after construction, with the exception of the 6m gap required for the haul road, which will be replanted following the completion of onshore construction (i.e., after at most 18 months). Replanting will follow guidance to encourage insect biomass (Collins, 2023). Future hedgerow management will include allowing standard trees (with an exception of a 6m buffer from each cable centre) to develop during the period of aftercare (up to 10 years) to improve quality of the hedgerow as a foraging resource.

352. The Project will seek to retain as many mature trees as practicable given the benefits they provide within linear commuting / foraging features.

353. Pre-construction surveys will be undertaken in advance of works commencing. If any new features identified as supporting bats require removal during these surveys, this will be completed under a Natural England EPS mitigation licence.

354. Confirmed roosting sites that cannot be retained will be removed pre-construction, in line with the EPS mitigation licence method statement and BCT good industry practice guidelines: gently taking down the structure in sections and leaving them on the ground for 24 hours to allow any bats to vacate the feature(s).

355. Where roosts of low conservation significance are lost to the Project, bat boxes will be installed as mitigation (Collins, 2023). The type of bat box needed will depend on the species found in the onshore project area, and these will be determined once pre-construction surveys have been concluded.

356. Details of the process to be followed should active bat roosts need to be removed is detailed in the OLEMS.

23.6.1.10.5 Residual significance of effect

357. With the above additional mitigation measures undertaken, the magnitude of impact is reduced to low in the short term for barbastelle and brown long-eared bats, and therefore the significance of effect is moderate adverse, which is still significant in EIA terms. The magnitude of impacts on serotine, Leisler's, common pipistrelle and soprano pipistrelle bats with additional mitigation will be reduced to negligible in the short term, and therefore the significance of effect is minor adverse, which is not significant in EIA terms. However, in the long term (3-7 years due to hedgerow reinstatement) the effect will become moderate beneficial for barbastelle and brown long-eared bats, and minor beneficial for all other bat species with the proposed embedded mitigation measures being put in place (Royal Horticultural Society, 2022). Moderate beneficial is significant in EIA terms.

23.6.1.11 Impact 11: Permanent and temporary impacts on water voles and otters

358. The potential impacts assessed for water voles and otters are:

- Indirect effects from trenchless crossing breakout;
- Indirect effects from noise; and
- Indirect effects from light spill.

359. Otters are legally protected under The Conservation of Habitats and Species Regulations 2017 (as amended). Water voles are legally protected under the Wildlife and Countryside Act 1981 (as amended). Water voles and otters are also both listed as UK species of principal importance.

360. Five watercourses were found to be suitable to support water voles and one watercourse was found to be suitable to support otters within the onshore project area during the Extended Phase 1 Habitat Survey.

361. The water vole surveys conducted in 2022 (see ES Appendix 23.3 (Document Reference: 3.3.32)) concluded that two watercourses within the onshore project area had signs of water vole presence including latrines, feeding remains, burrow entrances and prints. Both watercourses with confirmed water vole activity – watercourses and drainage ditches within Holland Haven Marshes

SSSI (TN017) and Tendring Brook (W003) - are to be crossed using trenchless techniques (see also ES Figure 23.8 (Document Reference: 3.2.19)) and Table 23.25)).

362. No watercourses supported signs of otter within the onshore project area.

363. During the drilling process there is the potential for the release of inert drilling fluids (bentonite) which has a small risk of affecting water voles within watercourse W003 through localised, short-term smothering of foraging habitat. The embedded mitigation set out previously regarding trenchless crossing design and the implementation of breakout contingency planning in the unlikely event of a release into a watercourse, will minimise any effects upon watercourses that support water voles (and otters). An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

364. Temporary works may be required on watercourse W003 to strengthen the culvert used to route vehicles across the temporary haul road. Temporary damming and diverting will be required, potentially fragmenting water vole habitat. The techniques used to carry out these works are detailed in ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23).

365. Construction of the onshore cable route and landfall works create a small risk of indirect effects upon otters as a result of light and noise disturbance during construction. All indirect effects associated with construction will be temporary and only occur while works are being undertaken in the vicinity of the features. Embedded mitigation measures to manage light spill, dust and noise emissions are set out in Table 23.5.

23.6.1.11.1 Magnitude of impact

366. The magnitude of impact is considered to be negligible, as watercourses associated water voles are avoided using trenchless techniques during the construction phase and the implementation of embedded mitigation manages the small risk of indirect impacts.

367. As no signs of otter were recorded during surveys there is no impact recorded on the otter population. However, the absence of records does not necessarily mean the absence of otters from the onshore project area, as otter home ranges are large and they live solitarily or in small family groups. Notwithstanding this, the embedded mitigation measures for water vole are considered equally applicable to otters, there is therefore confidence in the evaluation of ‘no impact’ on otter populations as a result of the works.

23.6.1.11.2 Importance of receptor

368. Water voles and otters are of high importance due to their legal protection and listing as UK species of principal importance.

23.6.1.11.3 Significance of effect

369. The significance of effect on water voles is minor adverse without mitigation measures, which is not significant in EIA terms. There is no effect on otters, as there is no magnitude of impact on the species.

23.6.1.11.4 Additional mitigation

370. It is considered that the least impactful option for water voles would be to manage the risk of breakout through the Horizontal Directional Drill Method Statement and Contingency Plan, rather than to displace water voles unnecessarily. Therefore, licensing will not be needed for water vole mitigation where trenchless techniques are proposed under watercourses.

371. A pre-construction survey will be undertaken prior to construction to confirm the presence/absence of water voles and otters within the onshore project area. If no field signs of water voles or otters are found within 50m of the construction footprint, no specific water vole or otter mitigation will be required. If the presence of water voles or otter holts is confirmed, then mitigation under the appropriate licence regime will be agreed with Natural England.

372. Post-construction monitoring of locations where water voles have been directly affected by construction would be undertaken during the breeding season one year after completion of construction and in line with any licence conditions, to determine the continued presence of the water vole populations.

373. Wherever practicable, night-time working near watercourses will be avoided or else minimised to reduce indirect impacts of light and noise on otters.

374. Exit ramps from excavations will be provided at night near watercourses with confirmed presence of otters, to provide them with a means of escape.

23.6.1.11.5 Residual significance of effect

375. The residual significance of effect on water voles remains minor adverse, which is not significant in EIA terms.

376. There remains no effect on otters as there is still no magnitude of impact on the species.

23.6.1.12 Impact 12: Permanent and temporary impacts on great crested newts

377. The potential impacts assessed for great crested newts are:

- Direct disturbance or mortality of great crested newts from construction activities and equipment; and
- Direct effects from terrestrial habitat loss.

378. Great crested newts are an EPS under The Conservation of Habitats and Species Regulations 2017 (as amended) and also protected under the Wildlife and Countryside Act 1981 (as amended). They are listed as a UK species of principal importance.

379. During the 2022 eDNA survey (see ES Appendix 23.2 (Document Reference: 3.3.1)), great crested newt presence was confirmed within nine water bodies within the great crested newt study area (ES Figure 23.9 (Document Reference: 3.2.19)). All nine water bodies with confirmed great crested newt presence are located outside of the onshore project area and will not be directly affected by the works. A further 25 water bodies were not subject to eDNA sampling. All of these water bodies are also located outside of the onshore project area. The potential impacts presented below assume as a worst case that great crested newts are present in those water bodies that could not be assessed. Further

information on great crested newt presence and activity in the onshore project area are detailed in ES Appendix 23.2 (Document Reference: 3.3.31).

380. As part of embedded mitigation during ongoing Project design and refinement, the Project has sought to avoid standing water bodies as far as practicable.

381. It is considered that great crested newts associated with the breeding ponds within the great crested newt study area may be using suitable terrestrial habitats within the onshore project area. Therefore, they may be adversely affected by heavy machinery and habitat clearance, as well as general construction activities on site. Refugia, rough grassland, and hedgerows that could be utilised by great crested newts when not breeding in ponds may be removed if located within the construction footprint and therefore would need to be appropriately mitigated. As outlined in Table 23.5, all suitable terrestrial habitats will be reinstated following completion of construction, as part of embedded mitigation for the Project. Habitat reinstatement for great crested newts, where required, would be detailed within the Project's EMP.

23.6.1.12.1 Magnitude of impact

382. The magnitude of impact on great crested newts is low with embedded mitigation, as breeding ponds have been avoided but terrestrial habitat connectivity remains temporarily affected during construction.

23.6.1.12.2 Importance of receptor

383. Great crested newts are of high importance, due to their legal status as an EPS.

23.6.1.12.3 Significance of effect

384. The significance of effect on great crested newts is moderate adverse, which is not significant in EIA terms.

23.6.1.12.4 Additional mitigation

385. North Falls propose to ensure appropriate mitigation for impacts upon great crested newts through Natural England's District Level Licensing (DLL) scheme for Essex. This scheme is designed to allow developers to pay for off-site compensation as an alternative to undertaking detailed on-site surveys and applying for a mitigation licence. This ensures that money which would have been spent on costly mitigation is better spent in targeted improvement to the district great crested newt population. Consultation with Natural England regarding the proposal and the viability of using the scheme for North Falls has taken place to date. NFOW are seeking to enter the scheme in advance of DCO approval, with a formal application for a DLL being made post-consent. An Impact Assessment and Conservation Payment Certificate (IACPC) is being obtained in advance of DCO approval to formally enter North Falls into the DLL scheme. The draft IACPC has been provided with the DCO application (Document Reference: 7.29).

23.6.1.12.5 Residual significance of effect

386. The application of the DLL scheme will reduce the magnitude of effect to negligible, resulting in the residual significance of effect with additional mitigation to be minor adverse. This is not significant in EIA terms.

23.6.1.13 Impact 13: Permanent and temporary impacts on reptiles

387. The potential impacts assessed for reptiles are as follows:

- Direct effects from habitat loss;
- Direct disturbance or mortality of reptiles from construction activities and equipment; and
- Direct effects from potential refugia removal.

388. All common reptile species in the UK are given partial legal protection under the Wildlife and Countryside Act 1981 (as amended). All common reptile species are listed as UK species of principal importance.

389. Within the habitat and species study area, nine habitat mosaics were recorded as being suitable for supporting large populations of reptiles (ES Figure 23.10 (Document Reference: 3.2.19). Seven of these mosaics were within the onshore project area.

390. During the 2022 reptile surveys a total of 30 common lizards, and three grass snakes were observed across nine habitat mosaics within the habitat and species study area. Of these occurrences, 25 of the common lizard records and the three grass snake records were located in the seven reptile survey habitat mosaics within the onshore project area.

391. Three sites (TN525 TN583 and TN584) within or adjacent to the onshore project area had estimated 'good' populations of common lizard according to FrogLife (1999) guidance.

392. Further information on reptile assemblages within the onshore project area are detailed in ES Appendix 23.4 (Document Reference: 3.3.33) and field survey results are summarised in Table 23.31. Locations of suitable reptile habitat are illustrated in ES Figure 23.10 (Document Reference: 3.2.19).

393. Loss of suitable reptile habitat such as rough grassland and vegetation clearance in advance of construction poses a small risk of reptile mortality or disturbance without appropriate mitigation measures.

394. Removal of debris (e.g., concrete, roofing materials, corrugated sheets) could also affect reptiles, as they often use such materials to bask. Post-development habitat enhancement will be provided to replace any features removed during construction.

23.6.1.13.1 Magnitude of impact

395. The magnitude of impact for reptiles is low, as any impacts will be localised but will potentially involve disturbance to series of locally valuable 'good' sized populations for the duration of construction (i.e. one breeding season) in any one area. As detailed in Table 23.5, a Precautionary Method of Works (PMoW) will be put in place for all suitable reptile habitat within the onshore project area and this will be detailed and agreed through the Project's EMP.

23.6.1.13.2 Importance of receptor

396. The reptile species found during surveys are listed as UK species of principal importance and are therefore considered to be of high importance.

23.6.1.13.3 Significance of effect

397. With the implementation of embedded mitigation, the overall significance of effect is moderate adverse, due to short term temporary adverse effects occurring upon a high importance receptor. This is significant in EIA terms.

23.6.1.13.4 Additional mitigation

398. For those habitat mosaics which support 'good' populations of reptiles, which are directly affected during construction, a reptile translocation programme will be undertaken where necessary. This will be included in the EMP and supervised by an Ecological Clerk of Works (ECoW). The translocation programme will follow Natural England's *Reptiles: advice for making planning decisions* (2022) and Herpetofauna Worker's Manual (Gent and Gibson, 2003). It will involve undertaking pre-construction surveys to understand the current population size / distribution, identifying a suitable translocation site which provides the correct habitat features for the population to be translocated and undertaking an appropriate duration of trapping days (to be specified following the pre-construction surveys). Once trapping is complete the site will be cleared using a precautionary method of working to minimise potential impacts upon any remaining individuals.

23.6.1.13.5 Residual significance of effect

399. The residual significance of effect is minor adverse with implementation of additional mitigation measures, this is not significant in EIA terms.

23.6.1.14 Impact 14: Permanent and temporary impacts on hazel dormice

400. The potential impacts assessed for hazel dormice are as follows:

- Direct habitat loss due to hedgerow removal;
- Indirect effects from noise; and
- Indirect effects from light spill.

401. Hazel dormice are EPS under The Conservation of Habitats and Species Regulations 2017 (as amended) and are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) as well as being listed as UK species of principal importance.

402. The Extended Phase 1 Habitat Survey found eight hedgerows and two woodland areas suitable for supporting hazel dormice within the onshore project area (ES Figure 23.11 (Document Reference: 3.2.19)). Of these, the 2022 hazel dormice surveys found likely presence of dormice on all but two of the features surveyed. One further woodland area and three hedgerows assessed as suitable for hazel dormice were located within the habitats and species study area.

403. All woodland areas will be avoided through the use of trenchless crossing techniques during construction. All hedgerows which have confirmed hazel dormouse presence will be crossed using trenchless techniques to avoid direct impacts on these features.

404. For three of the eight hedgerows where dormouse presence was recorded within the onshore project area, the option of creating a 6m wide haul road within the hedgerow has been retained at this stage, should there not be an existing

gap/gateway in the hedgerow that can be used. Approximately 6m of hedgerow would be removed prior to construction at these locations and reinstated following construction. Dormice are likely to avoid crossing hedgerow gaps >3m (Bright, Morris and Mitchell-Jones, 2006; Bright 1998), and as such creation of 6m gaps is likely to give rise to habitat fragmentation prior to reinstatement. A low risk of killing or in injuring individual dormice also exists during hedgerow removal itself. These effects are small-scale and localised; however, they have the potentially to adversely affect the habitat resource for the species' population at a local scale. Following the habitat reinstatement (see below), the local habitat resource is expected to improve in the long term.

405. As noted under Impact 7, embedded mitigation in relation to hedgerows includes:

- Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the onshore cable route working width at hedgerow crossings;
- Haul roads will be microsited to use existing hedgerow gaps where practicable during the Project's detailed design;
- Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using locally important and native species as advised by Essex Wildlife Trust and following. Further details on replanting are set out in Table 23.5, and will be set out in the OLEMS.

406. Indirect impacts from lighting and noise could potentially cause temporary localised disturbance effects on hazel dormice, by increasing their risk of predation and causing increased stress levels, increasing the risk of mortality. Embedded mitigation measures set out in out in Table 23.5 include minimising the use of construction lighting to localised areas, using motion activated lighting where practicable, and only using targeted lighting around sensitive habitats.

23.6.1.14.1 Magnitude of Impact

407. The magnitude of impact on the hazel dormice population is low, as impacts are restricted to small-scale direct impacts on three features and indirect, reversible impacts from construction activities.

23.6.1.14.2 Importance of receptor

408. The importance of hazel dormice as ecological receptors is high, due to their status as EPS, as well as their status as a species of principal importance.

23.6.1.14.3 Significance of effect

409. The significance of effect for hazel dormice is moderate adverse in the short term with embedded mitigation, this is significant in EIA terms. However, in the long term (3-7 years due to hedgerow reinstatement) the effect will become moderate beneficial with the proposed embedded mitigation measures being put in place (Royal Horticultural Society, 2022). This is significant in EIA terms.

23.6.1.14.4 Additional mitigation

410. For the three hedgerows where small-scale hedgerow removal is required, the hedgerow is recommended to be cleared during the hibernation period (November to March inclusive) to avoid the risk of killing or injuring individuals during clearance works.

411. In order to the mitigate the effects of habitat fragmentation, temporary hedgerows would be put in place across the gap during the active season (April to October inclusive. These temporary hedgerows would be taken down during the day to allow vehicles to use the haul road, and put back in place overnight when the dormice are active. They would consist of 'dead hedges', or containerised hedges, with the final proposed method being detailed within the EMP.

412. Where practicable, additional feeding sites and nesting boxes would be installed in hedgerows and woodland edges outside of the onshore project area, to accommodate for any hazel dormice disturbed by noise (Bright, Morris and Mitchell-Jones, 2006).

23.6.1.14.5 Residual significance of effect

413. The residual significance of effect would be reduced to minor adverse in the short term and moderate beneficial in the long term (3-7 years due to hedgerow reinstatement) (Royal Horticultural Society, 2022) This is significant in EIA terms.

23.6.1.15 Impact 15: Permanent and temporary impacts on fish

414. The potential impacts assessed on fish are:

- Direct effects from temporary habitat loss during open cut trenching; and
- Indirect effects on habitat and food sources from bentonite breakout during trenchless crossing operations.

415. A desk study undertaken using the Environment Agency National Fish Population Database returned records of brown/ sea trout in Holland Brook. This is a UK species of principal importance.

416. Holland Brook will be avoided by using HDD techniques at the landfall. The embedded mitigation set out previously regarding HDD design and the implementation of a Horizontal Directional Drill Method Statement and Contingency Plan (in the unlikely event of a release into a watercourse) will minimise any potential effects on watercourses that support fish. All other watercourses recorded in the ecology surveys will also be avoided using trenchless techniques for cable route construction and installation works. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application (Document Reference: 7.15).

417. A total of 19 watercourses will potentially require crossing for construction of a 6m wide haul road, which could affect the flow and integrity of the watercourse and potentially the fish assemblages they support. The total worst case scenario of watercourse length potentially temporarily lost to haul road crossings is 114m. The construction techniques at these locations will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable (see Table 23.5 for embedded mitigation measures to be

employed during open cut trenching of watercourses). Reinstatement and monitoring of habitat will take place post-construction.

418. Further detail of the potential impacts on water resources and flood risk, which are potentially associated with fish species, are detailed in ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23).

23.6.1.15.1 Magnitude of impact

419. The magnitude of impact on fish species is low, as Holland Brook and all other watercourses identified by the ecology surveys will be avoided through the use of trenchless techniques.

23.6.1.15.2 Importance of receptor

420. As a result of the presence of brown/ sea trout in Holland Brook, the importance of the fish specifically in the watercourses of the onshore project area is medium.

23.6.1.15.3 Significance of effect

421. The significance of effect on fish as a receptor is therefore minor adverse, this is not significant in EIA terms.

23.6.1.16 Impact 16: Spread of invasive non-native species

422. Invasive non-native species (INNS) listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) are those that pose a risk to biodiversity and conservation of native species in the UK.

423. INNS were recorded in desk studies and as part of the Extended Phase 1 Habitat Survey.

424. The desk study identified several INNS within 2km on the onshore project area:

- American mink;
- Butterfly bush; and
- Japanese knotweed.

425. The field surveys noted additional invasive non-native species within the onshore project area, namely, water fern, and New Zealand pigmyweed. Evidence of American mink was recorded during the water vole and otter survey.

426. No INNS were found within the onshore substation works area during field surveys.

427. Known locations of INNS should be avoided by construction works in order to limit their spread. Where avoidance is not feasible, they will be removed and disposed of appropriately (e.g., as part of pre-construction vegetation removal works). The implementation of control measures will be detailed in the Code of Construction Practice (CoCP), an outline version of which will be submitted with the DCO application, including species specific removal methodologies.

428. Other ways INNS could be spread during construction are through inadvertent introduction from elsewhere via vehicles, plant or personnel; and via seeds, planting stock or substrate.

429. Control measures will be included in the CoCP to avoid the introduction of INNS and for safe management and disposal, should they be found on site. Control measures could include:

- Spraying with chemicals;
- Pulling or digging out plants;
- Burying plants;
- Burning plants; and
- Disposing of plants off site.

23.6.1.16.1 Magnitude of impact

430. The risk of the spread of INNS during construction is low due to the implementation of mitigation and control measures as outlined in the CoCP.

23.6.1.16.2 Importance of receptor

431. If invasive non-native species were to be spread during construction, there is potential for harm to be caused to native habitats and species by out-competition of habitat (e.g. Himalayan balsam) and predation (e.g. American mink on water vole). As a result, the importance of this receptor is medium.

23.6.1.16.3 Significance of effect

432. With the implementation of the measures within the CoCP, the significance of effect will be minor adverse. This is not significant in EIA terms.

23.6.2 Likely significant effects during operation

433. During operation, it is expected that there will be no further requirement for land to be disturbed or excavated, except in the event that onshore cables require repair or maintenance or the onshore substation access works needing to be reinstated. However, these activities would not extend beyond the construction footprint assessed above, and for the former would be relatively rare and localised in occurrence. For the latter, the haul road required to access the onshore substation, required in the unlikely event of transformer failure, would potentially be in place for up to 7 months, but its location would be over land already disturbed during construction. As such, direct and indirect physical impacts on ecological receptors during operation have been scoped out of further assessment, as impacts would have already occurred during the construction phase.

23.6.2.1 Impact 1: Temporary disturbance to habitats and species during maintenance activities

434. The potential impacts on habitats and species assessed during maintenance activities are:

- Direct effects from localised habitat loss;
- Indirect effects from dust emissions;
- Indirect effects from excess noise;
- Indirect effects from excess light spill.

435. The onshore substation will be unmanned but will require regular visits from staff for routine maintenance. However, these will be within the operational substation area and will have no direct effect on ecological receptors. Any effects on ecological receptors will be limited to temporary indirect disturbance to the adjacent habitats and species.

436. There may be a need to access the buried cables via the link boxes for maintenance or repair purposes. Any reactive repairs will have fewer potential impacts to those of construction (Section 23.6.1), as they would be localised, of small scale and temporary in nature.

437. No habitat loss is anticipated to occur during maintenance activities. However, vehicle tracking and small-scale grassland or arable field margin disturbance to access link boxes and other underground components of the Project may occur. Therefore, there is a small potential for temporary disturbance to localised pockets of habitat as well as potential disturbance of protected and notable species during maintenance activities.

23.6.2.1.1 Magnitude of impact

438. As a result of the disturbance being localised and temporary, the magnitude of the impact is considered to be negligible.

23.6.2.1.2 Importance of receptor

439. The onshore project area includes several areas of deciduous woodland, lowland fen and coastal and floodplain grazing marsh.

23.6.2.1.3 Significance of effect

440. The overall significance of this effect is minor adverse, as the potential disturbance is both temporary and indirect. This is not significant in EIA terms.

23.6.2.2 Impact 2: Disturbance to species from onshore substation operational noise and light

441. During the operation of the onshore substation, there is a low risk that operational noise and lighting may result in disturbance and/or illumination of adjacent habitats and species.

442. Bat activity transect 1 runs along the western and northern perimeters of the proposed onshore substation works area. The transect survey recordings and static detector sound analysis detected the following bat species in close proximity to the onshore substation along transect 1:

- Barbastelle bat;
- Serotine bat;
- Leisler's bat;
- Noctule bat;
- Nathusius' pipistrelle;
- Common pipistrelle;
- Soprano pipistrelle; and
- Brown long eared bat.

443. Such bat species likely use existing hedgerows and linear features, as well as arable land in the onshore substation works area, to commute and forage. Therefore, operational light spill or noise from the onshore substation could disturb commuting/ foraging bats.

444. During the baseline surveying, reptile mats were placed on land adjacent to the north of the onshore substation works area. The reptile surveys found three adult male common lizards, one adult female common lizard, and one juvenile common lizard. Operational light spill or noise from the onshore substation could disturb resident reptile species in the area.

445. The possibility remains that new badger setts could be established within or nearby the onshore substation works area, due to suitable habitat being present. If this occurs, there may be potential disturbance on such badger setts from noise and light disturbance, as well as potential disturbance to foraging badgers.

446. No other records of protected and notable species or their habitats were recorded in the onshore substation works area.

447. An Operational Lighting Plan will be developed in line with advice given by a suitably qualified ecologist, as well as following current guidance including produced by the BCT and ILP (2023) and Exmoor National Park (2011). Operational lighting will be directional and for security purposes only and it is expected that there would be no light significant spill beyond the onshore substation operational boundary. Therefore, operational light spill will be minimised as far as possible and is unlikely to disturb protected and notable species or their habitats, including bats, reptiles and badgers.

448. Industry good practice measures and mitigation measures will be employed to reduce operational noise from the onshore substation as much as possible. The onshore substation operational noise will be present 24 hours a day, 7 days a week so protected and notable species in the area will become accustomed to any operational noise over time. It is therefore considered unlikely that operational noise will significantly affect any ecological features such as bats, reptiles and badgers.

449. Details of operational noise levels are set out in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).

23.6.2.2.1 Magnitude of impact

450. As the noise and light disturbance is localised to the onshore substation, the magnitude of this impact is considered to be low.

23.6.2.2.2 Importance of receptor

451. The onshore substation works area has not been identified as supporting any habitat or species populations of value that can be affected by light and/or noise, therefore the importance of this impact is negligible.

23.6.2.2.3 Significance of effect

452. The significance of the effect for operational light and noise from the onshore substation is considered to be negligible. This is not significant in EIA terms.

23.6.2.3 Impact 3: Habitat improvements arising from biodiversity enhancements

453. Biodiversity enhancements have been included as part of the proposed landscaping within the onshore substation works area. All biodiversity enhancements have been designed strategically to ensure habitat connectivity is created with the surrounding landscape, in line with the *Essex Green Infrastructure Strategy* (Essex County Council, 2020).

454. Habitat-based biodiversity enhancements could contribute to the goal of exploring opportunities to deliver a minimum 10% BNG for the onshore elements of the Project. Biodiversity enhancements implemented as part of the Project's onshore substation landscaping will be subject to a 30-year maintenance plan, to ensure their habitat condition is maintained for that period post-construction. Further details on the Early Design BNG Assessment can be found in the BNG Strategy (Document Reference: 7.22).

455. Habitat-based biodiversity enhancements include the following measures:

- Native hedgerow planting (UKHab codes: h2a 11 and h2a5 11);
- Native woodland (w1g) planting,
- Lowland meadow (g3a) UKHPI creation;
- Other neutral grassland (g3c) planting;
- Ditch reinstatement (r1g 50);
- Sustainable Drainage System (SuDS) ponds (r1g 42 848) creation; and
- Marginal vegetation (f2d) planting surrounding the SuDS ponds.

456. Woodland plantation as part of proposed landscaping would follow the Essex County Council and Places Services guidance *Essex Tree Palette: A guide to choosing the most appropriate tree species for Essex sites according to landscape character and soil type* (2018). Where practicable the Project has retained existing trees and hedgerows, in line with the *Essex Green Infrastructure Strategy* (Essex County Council, 2020).

457. Other biodiversity enhancements, outside of those included in the Early Design BNG assessment, are being proposed at the onshore substation in order to target locally important ecological receptors:

- Reptile and amphibian hibernacula, placed to create transitional areas between areas of woodland and grassland;
- Scrape creation within open grassland for butterfly and moth species dependent on colonizing plant species. Such areas also provide basking habitat for reptiles;
- Ensuring woodland plantation as part of landscaping follows the Essex County Council guidance Essex Tree Palette: A guide to choosing the most appropriate tree species for Essex sites according to landscape character and soil type (2018); and
- Sustainable Drainage System (SuDS) pond design will be tailored to ensure suitability for supporting breeding amphibians, in line with criteria set out in Oldham et al. (2000) and the great crested newt conservation handbook (Langton, Beckett and Foster, 2001).

458. Further information on habitat enhancement proposals is provided within the OLEMS (Document Reference: 7.14). Final details of the Project's habitat creation, and BNG, will be agreed post-consent, and is secured through DCO Requirement.

23.6.2.3.1 Magnitude of impact

459. The magnitude of impact is considered to be medium, as habitat and biodiversity improvement has the potential to improve the conservation status at a local scale.

23.6.2.3.2 Importance of receptor

460. Reinstatement and creation of habitats will likely be beneficial to a range of species in the local area, including potentially those with legal protection. Therefore, the importance of creating, conserving, and improving habitats is high.

23.6.2.3.3 Significance of effect

461. The significance of effect is anticipated to be moderate beneficial, based on the assumption that habitat creation is carried out and maintained during site operation. This is significant in EIA terms.

23.6.2.4 Impact 4: Impacts on migratory Nathusius' pipistrelle

462. Nathusius' pipistrelles were recorded at all 12 transects surveyed within the onshore project area, totalling 941 occurrences over the survey period. Transect 12, which was adjacent to Great Holland Pits LoWS, recorded the most Nathusius' pipistrelle activity of all the transects with a total of 194 occurrences. May was the month with the highest overall Nathusius' pipistrelle activity, accounting for almost a third of the total Nathusius' pipistrelle recordings.

463. All of the data obtained from the BCT's Essex county sampling for the NNPP was outside the 3km core sustenance zone for Nathusius' pipistrelle, and therefore it is highly unlikely that the bats captured in this data are the same individuals as those encountered in the bat activity surveys. The largest proportion of Nathusius' pipistrelles recorded, 40% across both sexes, could not have their reproductive status determined. A further 35% were found to be reproductively active, and a further 24% were not their reproductively active. Of those Nathusius' pipistrelles found to be reproductively active, vast majority were males. Additionally, the Essex BCT NNPP data did not record any juvenile bats. Therefore, it is unlikely that Essex is valuable for breeding Nathusius' pipistrelles.

464. It is unknown whether the Nathusius' pipistrelle recorded in the bat activity surveys are resident or migratory. For the Project's worst case scenario, it will be assumed the Nathusius' pipistrelle present are migratory, due to a lack of data to evidence otherwise. These were likely not breeding adults as there are currently no recorded maternity roosts in Essex and as a result of the population data provided by the BCT NNPP.

465. The potential operational impacts on migratory Nathusius' pipistrelle to be assessed are as follow:

- Direct impacts and potential mortality from collision with offshore turbines;
- Indirect impacts and potential mortality from air pressure changes caused by offshore turbines; and

- Indirect impacts from the creation of offshore structures.

466. Whilst a risk of collision is present between Nathusius' pipistrelles and offshore turbines, majority of bat species recorded offshore have been observed flying at altitudes lower than the rotor swept zone (Ahlén *et al*., 2007; Brabant *et al*., 2018; and Troxell *et al*., 2019). Migratory Nathusius pipistrelles' fly at 1-3 m over the sea to ensure they are oriented correctly (Ahlén *et al*., 2007). Exceptions to this low altitude have been observed when hunting, where altitude depends on invertebrate availability (Ahlén *et al*., 2007). Embedded mitigation of a WTG minimum air gap of 27m above MHWS would reduce collision risk of migratory bats, as Nathusius' pipistrelles already tend to fly lower than turbine rotor swept zone. Bats are known to better avoid moving objects than stationary ones using echolocation, further reducing the risk of collision with offshore wind turbines (Jen and McCarty, 1978).

467. Emerging evidence suggests majority of bat mortalities at offshore wind farms occur from barotrauma, rather than direct collisions with turbines. Wind turbines create areas of low air pressure, which can result in tissue damage to air-containing structures (for example the lungs) in bats from rapid or excessive pressure change (Baerwald *et al*., 2008). Baerwald *et al*., (2008)'s study on bat mortality at a wind energy facility in Alberta, Canada found that 90% of bat fatalities involved internal haemorrhaging consistent with barotrauma.

468. Monitoring of migratory bats at offshore wind farms in the North Sea has observed bats congregating around offshore turbines, to feed on accumulations of flying insects or to seek refuge (Ahlén *et al*., 2007; Ahlén *et al*., 2009; Hüppop and Hill, 2016). Some observations have been made of roosting Nathusius' pipistrelles in the nacelles of offshore turbines in the North Sea (Laegerveld *et al*., 2014; Ahlén *et al*., 2009). North Falls Offshore Wind Farm could therefore provide potential offshore roosting and foraging habitat for migratory Nathusius' pipistrelles, aiding their long-distance migration.

469. The extent of the impacts described above are uncertain given the current data deficiencies in Nathusius' pipistrelles migration over the North Sea and their subsequent interactions with offshore wind farms. Only ten individual migratory bats have been recorded in the NNPP dataset undertaking long-distance migration over the North Sea (BCT, 2023), suggesting the migration of Nathusius' pipistrelle to/from the UK may not be in large numbers and also therefore not a key component of the resident population.

23.6.2.4.1 Magnitude of impact

470. The number of migratory Nathusius' pipistrelles recorded in the area are currently very low, so it can be assumed such impacts (both adverse and beneficial) will not have wider impacts on the overall Nathusius' pipistrelle population. The magnitude of impact on migratory Nathusius' pipistrelles is therefore considered to be negligible.

23.6.2.4.2 Importance of receptor

471. Nathusius' pipistrelle bats are of high importance due to their legal status as EPS.

23.6.2.4.3 Significance of effect

472. The significance of effect is anticipated to be minor adverse due to the low number of migratory Nathusius' pipistrelles likely to experience any impacts.

23.6.3 Likely significant effects during decommissioning

473. No decision has been made regarding the final decommissioning policy for the substation, as it is recognised that good industry practice, rules and legislation change over time. However, the onshore substation equipment will likely be removed and reused or recycled.

474. It is expected the onshore cables will be removed from ducts and recycled, with the transition pits and ducts left in situ.

475. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan would be provided.

476. It is anticipated that the decommissioning impacts will be similar in nature to those identified during construction (Section 23.6.1). Namely this includes:

- Impacts on Holland Haven Marshes SSSI and LNR;
- Impacts on statutory and non-statutory designated sites;
- Permanent and temporary loss of saltmarsh;
- Permanent and temporary loss of coastal and floodplain marshes;
- Permanent and temporary loss of woodland habitats and veteran trees;
- Permanent and temporary loss of hedgerows;
- Permanent and temporary loss of rivers, ponds, reedbeds and lowland fen;
- Loss or damage to arable field margins;
- Permanent and temporary impacts on badgers;
- Permanent and temporary impacts on bats;
- Permanent and temporary impacts on water voles and otters;
- Permanent and temporary impacts on great crested newts;
- Permanent and temporary impacts on reptiles;
- Permanent and temporary impacts on hazel dormice;
- Permanent and temporary impacts on fish; and
- Spread of invasive non-native species.

23.7 Potential monitoring requirements

477. Monitoring of populations of protected and notable species may be required to ensure there is no significant effects on local populations or conservation status. Such species may include, but not be limited to, water vole, badger, hazel dormice and great crested newts.

478. Monitoring of habitat creation and enhancement proposals, particularly around the onshore substation, is set out in the OLEMS.

23.8 Cumulative effects

23.8.1 Identification of potential cumulative effects

479. The first step in the CEA process is the identification of which effects assessed for North Falls on their own have the potential for cumulative effects with other plans, projects, and activities. This information is set out in Table 23.35. Only potential effects assessed in Section 23.6 as negligible or above are included in the CEA (i.e., those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact).

Table 23.35 Potential cumulative effects

Impact	Potential for cumulative effect	Rationale
Construction		
Impacts on Holland Haven Marshes SSSI and LNR	Yes	Cumulative direct impacts arising from two or more projects are possible on statutory and non-statutory designated sites. Such impacts have the potential to affect the qualifying features (habitats/species) associated with these sites.
Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI and LNR)	Yes	Cumulative direct impacts arising from two or more projects are possible on statutory and non-statutory designated sites. Such impacts have the potential to affect the qualifying features (habitats/species) associated with these sites.
Permanent and temporary loss of saltmarsh	Yes	Impacts to this habitat from activities such as HDD could act cumulatively with other plans or projects in the nearby area particularly if there is a temporal overlap in construction.
Permanent and temporary loss of coastal and floodplain marshes	Yes	Impacts to this habitat from activities such as HDD could act cumulatively with other plans or projects in the nearby area particularly if there is a temporal overlap in construction.
Permanent and temporary loss of woodland habitats and veteran trees	Yes	Impacts to this habitat from activities such as open cut trenching could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.
Permanent and temporary loss of hedgerows	Yes	Impacts to this habitat from activities such as open cut trenching could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.
Permanent and temporary loss of rivers, ponds and reedbed	Yes	Impacts to this habitat from activities such as open cut trenching could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.

Impact	Potential for cumulative effect	Rationale
Permanent and temporary loss of arable field margins	Yes	Impacts to this habitat from activities such as open cut trenching could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on badgers	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact badgers, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on bats	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact bats, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on water voles and otters	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact water voles and otters, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on great crested newts	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact great crested newts, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on hazel dormice	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also affect hazel dormice, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on reptiles	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact reptiles, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on fish	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact fish species, particularly if there is a temporal overlap in construction.
Spread of invasive non-native species	No	Standardised procedure and protocol will be followed during construction to minimise the risk of spreading invasive non-native species. Therefore, with the EMP in place, cumulative effects will not occur.
Operation		
Maintenance activities post project completion	Yes	Potential for cumulative effects to occur with other projects where they are located immediately adjacent to the onshore substation or adjacent cable repair activities.
Onshore substation operational noise and light	Yes	Potential for cumulative effects to occur with other projects where they are located immediately adjacent to the onshore substation.
Habitat improvements arising from biodiversity enhancements	Yes	Potential for cumulative effects to occur with other projects where they are located immediately adjacent to the onshore substation or the onshore cable route.

Impact	Potential for cumulative effect	Rationale
Impacts on migratory Nathusius' pipistrelle	Yes	Potential for cumulative effects to occur with other projects where offshore infrastructure is located directly adjacent to the offshore infrastructure of North Falls.
Decommissioning		
Decommissioning strategies have not yet been finalised; however, the cumulative impacts are expected to be the same as those of the initial construction phase.		

23.8.2 Other plans, projects, and activities

480. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative effects for inclusion in the CEA (described as 'project screening'). This information is set out in Table 23.36 below, together with a consideration of the relevant details of each, including current status (e.g., under construction), planned construction period, closest distance to the onshore project area, status of available data and rationale for including or excluding from the assessment.

481. The Project screening has been informed by the development of a CEA project list which forms an exhaustive list of plans, projects, and activities within the study area (Section 23.3.1) relevant to North Falls. 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.

Table 23.36 Summary of projects considered for the CEA in relation to onshore ecology (project screening)

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
National Infrastructure Planning						
Five Estuaries EN010115	Pre-application	2028 - 2030	Five Estuaries onshore project area directly overlaps with North Falls onshore project area.	High	Yes	The onshore project area for Five Estuaries covers largely the same area as North Falls. There is also a possibility that both projects could be constructed at around the same time, therefore, cumulative effects may occur.
Norwich to Tilbury EN020027	Pre-application	2027 - 2031	EACN component of Norwich to Tilbury directly overlaps with North Falls onshore project area.	Low	Yes	The proposed substation area for Norwich to Tilbury overlaps with the North Falls onshore project area, to the west on the onshore substation works area and the proposed new substation operational access road overlaps and Bentley Road improvement works. Therefore, cumulative impacts could occur.
East Anglia TWO Offshore Windfarm EN010078	Approved (DCO Issued 2022)	Mid 2020s	47	High	No	The onshore infrastructure for this project is not in close proximity to the onshore project area so will not likely have a cumulative effect on onshore ecology.
Bradwell B new nuclear power station EN010111	Pre-application	Predicted 9 – 12 years	21	High	No	The project is not in close proximity to the onshore project area so will not likely have a cumulative effect on onshore ecology.

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Ipswich Rail Chord TR040002	Approved (DCO issued 2012)	Built	17	High	No	Ipswich Rail Chord has already concluded construction and will therefore not contribute to cumulative effects during North Falls construction or decommissioning periods. Cumulative impacts are not expected during operation as Ipswich Rail Chord does not have operational effects that could contribute to effects from North Falls.
Sizewell C Project EN010012	Approved (DCO issued 2022)	2022 – 2034	49	High	No	Sizewell C Project is located over 40km from the onshore project area and so will not likely have a cumulative effect on onshore ecology.
Nautilus Interconnector EN020023	Pre-application	Information unavailable	44	Medium	No	The location of onshore infrastructure associated with this project is not known, however, it is highly unlikely to be within close proximity to the onshore project area, as currently areas in Kent and East Sussex are being considered, so will not likely have a cumulative effect on onshore ecology.

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Lake Lothing Third Crossing TR010023	Approved (DCO issued 2020)	Over 2 years	76	High	No	The project is over 75km away from the onshore project area so will not likely have a cumulative effect on onshore ecology.
Richborough Connection Project EN020017	Approved (DCO issued 2017)	Built	55	High	No	This project has already been built and is therefore now part of the existing baseline. The project is over 55km away from the onshore project area so will not likely have a cumulative effect on onshore ecology in terms of operational impacts.
Manston Airport TR02002	Information unavailable	Information unavailable	53	N/A	No	The airport is also over 50km from the onshore project area so will not likely have a cumulative effect on onshore ecology. Operation of Manston Airport over time will cause species impacted by noise and light disturbance to become accustomed to general operation, therefore not providing potential for cumulative effects.
Kentish Flats Extension EN010036	Approved (DCO issued 2013)	Built	46	High	No	This project has already been built and is therefore now part of the existing baseline. The project is over 46km away from the onshore project area so will not likely have a cumulative effect on onshore

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						ecology in terms of operational impacts.
Sea Link EN020026	Pre-application	Information unavailable	20	N/A	No	The location of any onshore infrastructure associated with this project is not known, however, it is highly unlikely to be within close proximity to the onshore project area so will not likely have a cumulative effect on onshore ecology.
Galloper Offshore Windfarm EN010003	Approved	Built	15	High	No	This project has already been built and any onshore infrastructure is now part of the baseline.
A12 Chelmsford to A120 widening scheme TR010060	Pre-examination	Information unavailable	27	Medium	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Rivenhall IWMF and Energy Centre EN010138	Pre-application	Information unavailable	27	Medium	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Essex County Council						
Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
ESS/24/15/TEN						cumulative effect on onshore ecology.
St. George's Infant School and Nursery, Barrington Road, Colchester, Essex, CO2 7RW CC/COL/71/22	Approved	Information unavailable	9	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Wilson Marriage Centre, Barrack Street, Colchester, Essex, CO1 2LR CC/COL/85/22	Approved	Information unavailable	9	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Wivenhoe Quarry Alresford Road, Wivenhoe, Essex, CO7 9JU ESS/80/20/TEN/42/2	Report being prepared	Information unavailable	7	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex, CO7 7AT ESS/24/15/TEN/55/1/NMA	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex, CO7 7AT https://planning.essex.gov.uk/Planning/Display/ESS/24/15/TEN	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
ESS/24/15/TEN/2/1/NMA						cumulative effect on onshore ecology.
Old Heath County Primary School, Old Heath Road, Colchester, Essex, CO2 8DD CC/COL/50/22	Approved	Information unavailable.	8	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology, especially when considering the works' localised nature.
Crown Quarry (Wick Farm), Old Ipswich Road, Ardleigh, CO7 7QR ESS/57/04/TENLA4	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Wivenhoe Quarry, Alresford Road Wivenhoe, Essex CO7 9JU ESS/80/20/TEN/42/2	Approved	Information unavailable.	7	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Martell's Quarry, Slough Lane, Ardleigh, Essex, CO7 7RU ESS/42/22/TEN	Out for consultation	Information unavailable	3	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Land at: Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
ESS/105/21/TEN						cumulative effect on onshore ecology.
Land at Martells Quarry, Slough Lane, Ardleigh, Essex, CO7 7RU ESS/39/22/TEN	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Land to the south of Colchester Main Road, Alresford, Colchester, CO7 8DB ESS/17/18/TEN/NMA2	Report being prepared	Information unavailable	6	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Land at: Martells Quarry, Slough Lane, Ardleigh, Essex, CO7 7RU ESS/39/22/TEN/NMA/1	Approved	Information unavailable	3	N/A	No	The project is outside of the onshore project area for North Falls so will not likely have a direct or indirect cumulative effect on onshore ecology.
Tendring Education Centre, Jaywick Lane, Clacton on Sea, Essex, CO16 8BE CC/TEN/40/21/3/1	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect cumulative effect on onshore ecology.
Tendring Education Centre, Jaywick Lane, Clacton on Sea, Essex, CO16 8BE CC/TEN/40/21/4/1	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						cumulative effect on onshore ecology.
Land At Martells's Quarry, Slough Lane, Ardleigh, Essex CO7 7RU ESS/39/22/TEN	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect cumulative effect on onshore ecology.
Land At Martells's Quarry, Slough Lane, Ardleigh, Essex CO7 7RU ESS/39/22/TEN/NMA/1	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect cumulative effect on onshore ecology.
Crown Quarry (Ardleigh Reservoir Extension), Wick Farm, Old Ipswich Road, Tendring, Colchester, CO7 7QR ESS/57/04/TENLA4	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex ESS/24/15/TEN	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect cumulative effect on onshore ecology.
Ardleigh Waste Transfer Station, A120, Ardleigh, Colchester, CO7 7SL ESS/04/17/TEN	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a direct or indirect

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						cumulative effect on onshore ecology.
35 Roach Vale, Colchester, CO4 3YN CC/COL/07/22	Approved	Information unavailable.	4	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Boxted Bridge, Boxted, Essex, CO4 5TB CC/COL/106/21	Report being prepared	Information unavailable	9	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex ESS/24/15/TEN	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Lufkins Farm, Great Bentley Road, Frating CO7 7HN ESS/99/21/TEN/SO	EIA not required	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Lufkins Farm, Great Bentley Road, Frating CO7 7HN ESS/99/21/TEN	Resolution made/ awaiting legal agreement	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester ESS/24/15/TEN	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, CO7 7EX ESS/24/15/TEN	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Tendring District Council						
Land Between the A120 and A133, To The East of Colchester and of Elmstead Market 21/01502/CMTR	Awaiting decision	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.
Hamilton Lodge Parsons Hill Great Bromley Colchester Essex CO7 7JB 20/00547/OUT	Approval-outline	Information unavailable.	2	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology.

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Land adjacent to Lawford Grid Substation Ardleigh Road Little Bromley Essex CO11 2QB 21/02070/FUL	Approved	Information unavailable.	0.3	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a direct or indirect cumulative effect on onshore ecology; in addition, it will have been constructed and operational by the time of the Project's construction.

23.8.3 Assessment of cumulative effects

482. The Five Estuaries is also in its application phase, having submitted a DCO to the Planning Inspectorate for the Project, which was accepted on 22nd April 2024. Although subject to a separate DCO, the Five Estuaries shares the same landfall location and onshore cable route (including Bentley Road improvement works) as North Falls, with the two projects also having co-located onshore substations within the same onshore substation works area. The two projects also have the same national grid connection point.

483. Five Estuaries Offshore Wind Farm Limited (VEOWL) and NFOW have sought to collaborate and coordinate where practicable, which has led to collaborative design of the Projects' onshore infrastructure, and also to sharing of detailed project design information onshore. As a result, a detailed CEA for effects arising from the development of the Five Estuaries can be undertaken. The CEA section of this chapter is therefore split into two sections:

- the first describing a detailed CEA covering effects predicted to arise from development of Five Estuaries and North Falls;
- the second, detailing effects predicted to arise from the development of Five Estuaries, North Falls and other projects.

484. The latter section will be based on the project information available for each scheme in the public domain, and by definition is therefore less detailed than the Five Estuaries and North Falls CEA section.

485. Full details on the approach to CEA used within this chapter are set out in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

23.8.3.1 Five Estuaries

23.8.3.1.1 Realistic worst case scenario

486. Using the design information provided by VEOWL, and checked/updated against the submission of the Five Estuaries ES, a realistic worst case cumulative scenario has been developed for the purposes of this chapter.

487. This realistic worst case cumulative scenario considers three potential cumulative scenarios, as outlined in ES Chapter 5 Project Description (Document Reference: 3.1.7):

- **Scenario 1:** North Falls 'Option 2' build out is progressed, and VEOWL undertakes landfall, onshore substation construction and cable pull which overlaps with North Falls equivalent works. In this scenario, onshore cable route associated works, including TCCs, accesses and haul road, all remain in place and are used by the second project during its construction.
- **Scenario 2:** North Falls 'Option 1 build out is progressed, and VEOWL undertakes landfall, onshore substation and onshore cable route construction and cable pull, all of which does not overlap with North Falls' equivalent works. There would be a gap of between 1 and 3 years between each Projects' construction. In this scenario, onshore cable route associated works, including TCCs, accesses and haul road, all remain in place and are used by the second project during its construction.

- **Scenario 3:** North Falls ‘Option 1’ build out is progressed, and VEOWL undertakes a separate landfall, onshore substation and onshore cable route construction and cable pull with a multi-year (i.e. >3 year) gap between the two construction activities. In this scenario, there is no reuse in onshore temporary works between the two projects, and all onshore cable route associated works are rebuilt and reinstated in full by the second project.

488. Full details on the build out scenarios considered within this assessment are detailed in ES Chapter 5 Project Description (Document Reference: 3.1.7) ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

489. The realistic worst case scenario for likely cumulative effects scoped into the EIA for the onshore ecology assessment are summarised in Table 23.37. These are based on project parameters for Five Estuaries described in ES Chapter 5 Project Description (Document Reference: 3.1.7), which provides further details regarding specific activities and their durations.

Table 23.37 Realistic worst case scenario of cumulative effects arising from development of North Falls and Five Estuaries – Scenario 3 (independent build).

Potential impact	Parameter	Notes
Construction		
Impacts relating to the landfall	Landfall HDD (temporary works) physical parameters: • Maximum No. of Transition Joint Bays (TJB) = 4 • Individual TJB dimensions / permanent landtake = 4 x 15m • Maximum number of HDD = 6 • Maximum indicative HDD spacing onshore = 40m • Maximum HDD depth = 20m • Maximum indicative length of HDD = 1.1 km • HDD temporary works area = 150 x 300m • Drill exit location = subtidal exit below MHWS (up to 8m depth)	Duration includes compound establishment, HDD, transition bays, and reinstatement.
	Duration: • 13 months (of which HDD = 6 months) + 13 months (of which HDD = 6 months) • HDD to include 24 hour / 7 days working where required	
Impacts relating to the onshore cable route	Cable route construction physical parameters: • Route length = up to 24km • Jointing bays = Up to 192 (approximately every 500m) buried below ground • Joint bay dimensions = 4 x 15m • Maximum cable trench depth = 2m • Minimum cable burial depth (to top of protection tile) = 0.9m • Indicative cable route width = 72m (open cut trenching), 90m (trenchless crossings), 130m (complex trenchless crossings)	Overall duration includes establishing / reinstating TCCs and haul roads, cable installation (trench excavation, duct installation, cable jointing), HDD (includes compound establishment, HDD, and reinstatement).

Potential impact	Parameter	Notes
	• Cable construction compound dimensions = 150 x 150m (main) to 100 x 100m (satellite) • No. of trenches = 4 • Cable trench dimensions = 3.5 – 1.2 x 2m (tapered top to bottom) • Haul road width = 6m wide road, 10m wide total including verges, drainage and passing places. • Haul road spacing at passing places = 500m • Hedge replanting restrictions = shrubs max 5m high within 6m of each cable centre.	
	Trenchless crossings physical parameters: • Maximum width of buried cable = 130m • Maximum trenchless crossing depth = 20m • HDD compound dimensions = 75 x 150m	
	Durations: • Bentley road improvement works = 6 - 9 months • Cable route works = 18 – 27 months per project, with a 57 month gap in between i.e. 111 months start to finish • Cable installation = 12 months (per project) • Major HDD (each location) = 8 months (of which HDD = 4 months) (per project) • Minor HDD crossings = 2 months (per project) • Major HDD crossings to include 24 hour / 7 days working where required.	

Potential impact	Parameter	Notes
Impacts relating to the onshore substation and unlicensed works	Onshore substation (temporary works) physical parameters: • Indicative area of the substations = 280 x 210m (project 1) + 280 x 210m (project 2) • Construction compound footprint = 250 x 150m (project 1) + 250 x 150m (project 2) National grid connection works physical parameters (for two projects): • All enabling worth / platform constructed by national grid. • Cable installation works as described above • Equipment may include: ○ cable sealing ends, surge arrestors, earth switch, disconnectors, circuit breakers, current transformers, voltage transformers, busbars	
	Durations: • Substation construction duration = 21 - 27 months per project, with a 57 month gap in between i.e. 111 months start to finish	
Operation		
Impacts relating to the onshore cable route	Cable route operational physical parameters: • No. of link boxes = up to 196 • Link box footprint (per box) = 0.6 x 1 x 1.5m • Cross-sectional area of buried cement-bound sand = 0.6m^2	

Potential impact	Parameter	Notes
Impacts relating to the onshore substation	Onshore substation physical parameters: • Indicative area of the substations = 280 x 210m (project 1) + 280 x 210m (project 2)	Normal operating conditions would not require lighting at the onshore substation, although low level movement detecting security lighting may be utilised for health and safety purposes. Temporary lighting during working hours would be provided during maintenance activities only. Low level continuous noise emissions would also be generated by the onshore substation during operation.
Decommissioning		
No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable route, 400kV cable route and onshore substation. It is also recognised that legislation and good industry practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused, or recycled where practicable and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the purposes of a worst case scenario, the impacts will be no greater than those identified for the construction phase.		

23.8.3.1.2 During construction

Impact 1: Impacts on Holland Haven Marshes SSSI and LNR

490. North Falls has sought to minimise the potential interaction with Holland Haven Marshes as far as practicable through the use of HDD that are likely to minimise any potential effects upon the habitats present within the SSSI and LNR. The commitment to install cable ducts underneath the SSSI using HDD will ensure that there is no pathway for direct impacts upon the interest features of the SSSI or LNR. No works within the SSSI will be required to facilitate this construction, as all works for cable landfall installation will be undertaken from a HDD launch pit, located within the landfall compound located landward of the SSSI. The overall residual impacts for Holland Haven Marshes SSSI and LNR from North Falls are assessed as minor adverse. Residual impacts relate to the potential release of inert drilling fluids should a 'breakout' occur.

491. As part of embedded mitigation for North Falls, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable. Furthermore, North Falls will produce a Horizontal Directional Drill Method Statement and Contingency Plan in advance of construction which will detail the measures to be taken in the event of a drilling fluid breakout in order to minimise effects upon the features of the SSSI, including procedures to manage the removal of bentonite. Such measures have reduced the magnitude of effect

492. Holland Haven Marshes SSSI and LNR is also within the onshore project area of Five Estuaries, thus Five Estuaries has similarly committed to the use of HDD at landfall to avoid direct impacts on the SSSI and LNR.

493. Only minor cumulative effects could occur on Holland Haven Marshes SSSI and LNR, due to the use of HDD by both projects and the mitigation implemented by North Falls has minimised any potential effects to minor adverse. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application for North Falls (Document Reference: 7.15). No significant cumulative effects are therefore likely to occur.

Impact 2: Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI and LNR)

494. In addition to Holland Haven Marshes SSSI and LNR, there are a further eight statutory and 30 non-statutory designated sites of nature conservation located within 5km and 2km of the onshore project area respectively (Table 23.12) (ES Figure 23.1 (Document Reference: 3.2.19)). These sites have all avoided direct effects through the North Falls site selection process as part of the embedded mitigation (see ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6) for further information). The overall residual impacts on designated sites were assessed to be minor adverse. Residual indirect impacts would relate to noise and light on those designated sites named in Table 23.33.

495. The indirect cumulative impacts on designated sites from noise and light would be temporary and localised, therefore only potentially impacting designated site features of interest during the construction phase of the Projects. All designated sites are outside of the 500m ZOI for noise impacts and a sensitive lighting scheme using good industry practice is being used by both North Falls and Five

Estuaries. Therefore, no significant cumulative effects are likely to arise on designated sites.

Impact 3: Permanent and temporary loss of saltmarsh

496. All 0.79ha of saltmarsh within the onshore project area is located within Holland Haven Marshes SSSI. Therefore, the Project's commitment to use HDD under the Holland Haven Marshes SSSI will avoid direct impacts on this habitat during construction. The overall residual impacts were assessed as minor adverse on saltmarsh habitats. Residual impacts relate to the potential release of bentonite should a breakout occur, as well as potential impacts from dust emissions.

497. As part of embedded mitigation for North Falls, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable. Furthermore, a Horizontal Directional Drill Method Statement and Contingency Plan will be prepared in advance of North Falls' construction, which will detail the measures to be taken in the event of a drilling fluid breakout in order to minimise effects upon the features of the SSSI (including saltmarsh habitats), comprising procedures to manage the removal of bentonite.

498. The same areas of saltmarsh are also within the onshore project area for Five Estuaries. Five Estuaries has similarly committed to the use of HDD at landfall to avoid direct impacts on Holland Haven Marshes, which in turn includes saltmarsh.

499. No significant cumulative effects are likely to arise on saltmarsh habitats from bentonite breakout as a result of North Falls mitigation minimising this small risk. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application for North Falls (Document Reference: 7.15).

500. Potential indirect effects upon saltmarsh habitats arising from dust emissions generated during the construction works of both projects will be short term and localised and managed through the use of good industry practice dust management measures. Therefore, no significant cumulative effects are likely to arise on saltmarshes from dust emissions.

Impact 4: Permanent and temporary loss of coastal and floodplain marshes

501. Majority of the 13.69ha of coastal floodplain and grazing marsh within the onshore project area is located within Holland Haven Marshes SSSI. Therefore, the Project's commitment to use HDD under the Holland Haven Marshes SSSI will avoid direct impacts on this habitat during construction. Trenchless techniques have also been committed to for crossing the additional parcel of coastal floodplain grazing marsh outside of Holland Haven Marshes near Simon's Wood, due to ornithological interest. The overall residual impacts were assessed as minor adverse on coastal and floodplain marsh habitats. Residual impacts relate to the potential release of bentonite should a breakout occur, as well as potential impacts from dust emissions.

502. As part of embedded mitigation for both projects, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable. As part of embedded mitigation for North Falls, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable. Furthermore, a Horizontal Directional Drill Method

Statement and Contingency Plan will be prepared in advance of North Falls' construction, which will detail the measures to be taken in the event of a drilling fluid breakout in order to minimise effects upon the features of the SSSI (including coastal and floodplain grazing marsh habitats), comprising procedures to manage the removal of bentonite.

503. The same areas of coastal and floodplain grazing marshes are also within the onshore project area for Five Estuaries. Five Estuaries has similarly committed to the use of HDD at landfall to avoid direct impacts on Holland Haven Marshes, which in turn includes coastal and floodplain marsh.

504. No significant cumulative effects are likely to arise on coastal floodplain and grazing marsh habitats from bentonite breakout as a result of North Falls mitigation minimising this small risk. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application for North Falls (Document Reference: 7.15).

505. Potential indirect effects upon coastal floodplain and grazing marsh habitats arising from dust emissions generated during the construction works of both projects will be short term and localised and managed through the use of good industry practice dust management measures. Therefore, no significant cumulative effects are likely to arise on coastal and floodplain grazing marshes from dust emissions.

Impact 5: Permanent and temporary loss of woodland habitats and veteran trees

506. Lowland mixed deciduous woodlands contribute to 1.96ha of the onshore project area. Additionally, one veteran tree was located within the onshore project area (TN507). All woodland and veteran trees will be avoided through the use of HDD to install cable ducts beneath woodlands. Where this takes place, cable ducts will be installed at least 2m below ground level to ensure the majority of the root zone is avoided. As noted in Section 23.6.1.2 above, no ancient woodland will be directly affected by the Project's onshore works, where no works will take place within 15m of the habitat. A pre-construction walkover survey will be undertaken by an appropriately qualified arboriculturist which will define specific mitigation measures to protect any trees located adjacent to the construction working areas. The arboricultural report will be submitted to and agreed with the local authority prior to the commencement of any construction works. The overall residual impacts were assessed as minor adverse on woodland habitats and veteran trees. Residual indirect impacts would relate to dust emissions from construction works.

507. Five Estuaries have also committed to avoiding direct impacts on woodlands and veteran trees through the use of HDD. Potential indirect effects upon woodlands and veteran trees arising from dust emissions generated during the construction works of both projects will be short term and localised and managed through the use of good industry practice dust management measures. Therefore, no significant cumulative effects are likely to arise on woodland and veteran trees from dust emissions.

508. There are potential beneficial cumulative effects as part of biodiversity enhancements proposed to be implemented by both projects as part of their individual BNG strategies and landscaping plans. Such enhancements would aim to improve the quality, connectivity and quantity of habitats, including

woodland planting. Biodiversity enhancements implemented as part of the Projects' BNG strategies will be subject to a 30-year maintenance plan, to ensure their habitat condition is maintained for that period post-construction. As a result, there will likely be a long term moderate beneficial cumulative effect on woodland habitats.

Impact 6: Permanent and temporary loss of hedgerows

509. In the worst case scenario (as detailed in ES Appendix 5.1 (Document Reference: 3.3.2)) 12 of the total 72 hedgerows within the onshore project area may be crossed using open cut trenching. Trenching could result in up to 30m being temporarily lost per hedgerow. A 6m temporary loss per hedgerow would be required at 57 hedgerows to facilitate construction of a haul road only. An additional total length of up to 309.75m across a further 13 hedgerows may potentially be temporarily lost to facilitate construction of construction accesses to the onshore project area. This gives a total of up to a maximum 1,011.75m temporary loss of hedgerow habitat within the onshore project area. The remaining hedgerows will be retained in full and crossed using trenchless technologies. The remaining hedgerows will be retained in full and crossed using trenchless technologies. Construction of the onshore substation may require the permanent removal of up to 30m of hedgerow. All hedges lost to construction works will be reinstated and enhanced. The residual effects were assessed as moderate adverse in the short term, and moderate beneficial in the long term. Residual impacts would relate to hedgerow habitat losses and post-construction hedgerow reinstatement.

510. Due to the multi-year gap between North Falls and Five Estuaries construction under the worst case scenario, the moderate adverse impacts of hedgerow habitat loss will likely create cumulative effects. This is due to the extended period of time hedgerow habitat fragmentation will occur in between the construction periods of both projects (i.e. up to 111 months). In the long term, there would be moderate beneficial cumulative effects due to the hedgerow reinstatement and enhancement from both schemes, however this will not occur until 3-7 years post-construction of the second project (Royal Horticultural Society, 2022).

511. Potential indirect cumulative effects upon hedgerow habitats arising from dust emissions generated during constructions works will be short term (i.e., until rain washes the dust from foliage) and localised and managed through the use of good industry practice dust management measures employed by both projects. No significant cumulative effects will be produced as a result of dust emissions.

512. Following habitat reinstatement, the local hedgerow habitat resource is expected to improve in the long term as it will also incorporate biodiversity enhancements. The overall residual effects were assessed as moderate adverse in the short term and moderate beneficial in the long term following hedgerow reinstatement (3-7 years) (Royal Horticultural Society, 2022).

Impact 7: Permanent and temporary loss of rivers, ponds and reedbeds

513. Within the onshore project area there was 0.71ha of standing water (mainly ponds), 1,303.22m of linear standing water and 1,168.57m of linear watercourses. Direct impacts on all ponds and watercourses (recorded within the ecology surveys) within the onshore project area will be avoided through the

use of trenchless techniques. A total of 19 watercourses will potentially require crossing for construction of a 6m wide haul road. The total worst case scenario of watercourse length potentially lost is 114m. The construction techniques at these locations will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable Reinstatement and monitoring of watercourse habitats will take place post-construction. Construction of the onshore substation will potentially result in the permanent rerouting of one standing water field drain. The overall residual effects on ponds, rivers and reedbeds were assessed as minor adverse. Residual impacts relate to temporary habitat losses for haul road construction and indirect effects from dust emissions.

514. Five Estuaries has committed to avoiding all ponds and watercourses identified in their ecology surveys using trenchless techniques and therefore won't be subject to any direct cumulative effects. Potential temporary losses of watercourses subject to haul road crossing within the onshore project area may create cumulative effects, as under Scenario 3 there is no re-use of onshore temporary works. However these haul road impacts on watercourses are temporary and localised, with habitat reinstatement and monitoring ensuring such impacts do not have a long-term effect. The standing water field drain due to be re-routed as part of the onshore substation footprint would not experience any cumulative effects, as both projects have committed to reinstating all watercourses which are permanently lost during construction and increase their biodiversity value.

515. Residual indirect impacts on all watercourses and ponds within the onshore project area will relate to potential dust emissions from construction activities. Potential indirect effects upon freshwater habitats arising from dust emissions generated during constructions works will be minimal and localised, and managed by both projects through the use of good industry practice dust management measures.

516. There will be no significant cumulative effects on rivers, ponds and reedbeds.

Impact 8: Permanent and temporary loss of arable field margins

517. Temporary disturbance of the 0.85ha of arable field margins within the onshore project area may occur during open cut trenching for installation of cable ducts. As part of embedded mitigation, all habitats will be reinstated within the first season following the completion of construction. The overall residual effects on arable field margins were assessed as minor adverse.

518. Five Estuaries has also committed to reinstating all habitats temporarily lost to construction activities, including arable field margins. Therefore, there are no significant cumulative effects on arable field margins.

Impact 9: Permanent and temporary impacts on badgers

519. No badger setts were found within the onshore project area or 30m buffer of the onshore project area where setts could be vulnerable to construction impacts (English Nature, 2002). Badgers consistently open new setts and can do so over a short period of time, therefore new badger setts may be established within the onshore project area by the time of the Project's construction. A pre-construction badger survey will be undertaken across the entire onshore project area to

confirm the status of badgers prior to works commencing. The overall residual effects on badgers was assessed as minor adverse.

520. If new badger setts are established within the 30m of the onshore project area of the Projects, cumulative effects may occur on badgers due to their proximity to construction works. Both projects have committed to pre-construction surveys for badgers so any new setts will be reported and a 30m buffer put in place, this buffer will ensure indirect cumulative effects do not occur. If a badger sett requires removal, appropriate Natural England licensing will be sought, and artificial setts will be created in the local area. With the employment of both projects' mitigation measures, the impacts on local badger populations will be negligible and therefore there will be no significant cumulative effects on badgers.

Impact 10: Permanent and temporary impacts on bats

Roosting bats

521. No active bat roosts were identified within the onshore project area, however 12 features of high or moderate roosting suitability and 31 features with low roosting suitability were present within the onshore project area which may contribute to the local bat assemblage. The overall residual effects on roosting bats were assessed as minor adverse.

522. Both Five Estuaries and North Falls' onshore design does not require the removal of any confirmed bat roosts as part of the onshore works. Additionally, indirect impacts on bat roost features will be avoided through use of a sensitive lighting scheme in construction compounds. If new bat roosts are discovered pre-construction within the construction footprint, both projects will acquire appropriate Natural England licensing for any potential disturbance or roost feature removal required. There will likely not be any significant cumulative effects on roosting bats.

Commuting/ foraging bats

523. Nine bat species had confirmed activity along the 1,011.75m of hedgerow to be removed under the Projects' worst case scenario. Of these species, brown long eared and barbastelle bats are most likely to be affected in the short term by temporary hedgerow losses, due to their reliance on linear features for flight lines. In the short term, residual effects on brown long eared and barbastelle bats were assessed as moderate adverse. However, following hedgerow reinstatement and enhancement post-construction, the long-term residual effect on barbastelle and brown long eared bats was assessed as moderate beneficial.

524. Due to the multi-year gap between North Falls and Five Estuaries construction under the worst case scenario, the moderate adverse impacts of hedgerow habitat loss on barbastelle and brown long eared bats will likely create cumulative effects. This is due to the extended period of time both species will experience loss of flight lines in between the construction periods of both projects. In the long term, there would be moderate beneficial cumulative effects on barbastelle and brown long eared bats due to the hedgerow reinstatement and enhancement from both schemes.

525. All other commuting bat species found in the onshore project area will likely not experience any significant cumulative effects, as they are not reliant on hedgerow habitats for commuting and foraging.

Impact 11: Permanent and temporary impacts on water voles and otters

526. No watercourses with signs of otters are located within the onshore project area. It was assessed there was no overall residual effect on otters.

527. Two watercourses (W003 and TN017) within the onshore project area had signs of water vole activity, however both will be crossed using HDD so direct impacts will be avoided. The overall residual effects on water voles were assessed to be minor adverse.

528. Five Estuaries have committed to the use of HDD under all watercourses identified on their ecology surveys, which in turn includes all of those with identified water vole presence. Therefore, potential residual cumulative effects on water voles would be indirect from construction dust and noise pollution, as well as from potential bentonite breakout during HDD.

529. Bentonite breakout has a small risk of affecting water voles within watercourses through localised, short-term smothering of foraging habitat. The implementation of breakout contingency planning in the unlikely event of a release into a watercourse, will minimise any effects upon watercourses that support water voles (and otters) by both projects. An Outline Horizontal Directional Drill Method Statement and Contingency Plan has been provided with the DCO application for North Falls (Document Reference: 7.15).

530. Construction of the onshore cable route and landfall works of create a small risk of indirect effects upon otters and water vole as a result of light and noise disturbance during construction. All indirect effects associated with construction will be temporary and only occur while works are being undertaken in the vicinity of the features. Similarly any dust emissions during construction will be temporary and localised to construction zones and managed appropriately using good industry practice measures.

531. There will be no significant cumulative effects on otters and water voles.

Impact 12: Permanent and temporary impacts on great crested newts

532. All ponds with great crested newt presence within the onshore project area are avoided through the use of HDD. Nine ponds with confirmed great crested newt presence were located within the great crested newt study area. It is considered that great crested newts associated with any of these ponds may be using suitable terrestrial habitats within the onshore project area and they may be adversely affected by heavy machinery and habitat clearance, as well as general construction activities on site. Refugia, rough grassland, and hedgerows that could be utilised by great crested newts when not breeding in ponds may be removed if located within the construction footprint and therefore would need to be appropriately mitigated. All suitable terrestrial habitats will be reinstated following completion of construction, as part of embedded mitigation for the Project. Habitat reinstatement for great crested newts, where required, is detailed within the Project's OLEMS. The overall residual effects on great crested newts were assessed as minor adverse.

533. Due to the multi-year gap between North Falls and Five Estuaries construction under the worst case scenario, minor adverse cumulative effects may occur due to the time period great crested newts may experience terrestrial habitat losses being lengthened. Both projects ensure appropriate mitigation for impacts upon great crested newts through Natural England's DLL scheme for Essex. Use of DLL ensure mitigation is targeted to improve the district great crested newt population. As both schemes have committed to entering DLL, cumulative effects on great crested newts will be suitably mitigated and will likely not occur.

534. In the long term, no significant cumulative effects will occur following habitat reinstatement post-construction.

Impact 13: Permanent and temporary impacts on hazel dormice

535. All hedgerows which have confirmed hazel dormouse presence will be subject to HDD to avoid direct impacts on these features. For three of the eight hedgerows where dormouse presence was recorded, the option of creating a 6m wide haul road within the hedgerow has been retained at this stage, should there not be an existing gap/gateway in the hedgerow that can be used. Dormice are likely to avoid crossing hedgerow gaps >3m (Bright, Morris and Mitchell-Jones, 2006; Bright 1998), and as such creation of 6m gaps is likely to give rise to habitat fragmentation prior to reinstatement. A low risk of killing or in injuring individual dormice also exists during hedgerow removal itself. These effects are small-scale and localised; however, they have the potentially to adversely affect the habitat resource for the species' population at a local scale. Additional mitigation has been proposed for North Falls to reduce the risk of killing or injuring and of habitat fragmentation. Following the habitat reinstatement, the local habitat resource is expected to improve in the long term. The overall residual effects were assessed as minor adverse in the short term and moderate beneficial in the long term following hedgerow reinstatement (3-7 years) (Royal Horticultural Society, 2022).

536. Due to the multi-year gap between North Falls and Five Estuaries construction under the worst case scenario, the minor adverse impacts of hedgerow habitat loss on hazel dormice will likely create cumulative effects. This is due to the extended period of time hazel dormice will experience habitat fragmentation in between the construction periods of both projects. In the long term, there would be moderate beneficial cumulative effects on hazel dormice due to the hedgerow reinstatement and enhancement from both schemes, however this wouldn't be seen until 3-7 years post-construction of the second project (Royal Horticultural Society, 2022).

537. Indirect impacts from lighting and noise could potentially cause temporary localised cumulative effects on hazel dormice, by increasing their risk of predation and causing increased stress levels, increasing the risk of mortality. Embedded mitigation measures employed by both projects include minimising the use of construction lighting and only using targeted lighting around sensitive habitats, thus eliminating the risk of indirect significant cumulative effects.

Impact 14: Permanent and temporary impacts on reptiles

538. During the 2022 reptile surveys a total of 25 common lizards and three grass snakes were observed within the onshore project area. Seven habitat mosaics within the onshore project area were identified as suitable for supporting large

populations of reptiles. Three sites (TN525, TN583 and TN584) within the onshore project area had estimated 'good' populations of common lizard according to FrogLife (1999) guidance. Loss of suitable reptile habitat such as rough grassland and vegetation clearance in advance of construction poses a small risk of reptile mortality or disturbance without appropriate mitigation measures. Removal of potential hibernacula could also affect reptiles, as they may lose habitats to use for basking. Suitable replacement materials will be provided as mitigation where required. The overall residual impacts were assessed as minor adverse.

539. Five Estuaries have committed to the use of HDD in all of the areas with confirmed populations of reptiles within the onshore project area. However, direct cumulative effects remain possible where haul roads are required to cross trenchless crossings and within the onshore substation works area. All habitats lost within the onshore cable route for haul roads will be reinstated following construction, and therefore won't result in any cumulative effects. Permanent habitat losses at the onshore substation will likely not have significant cumulative effects on local reptile populations, due to the relatively poor quality and small extent of the suitable habitat affected and the low population anticipated to be present.

540. There are potential beneficial cumulative effects as part of biodiversity enhancements proposed to be implemented by both projects as part of their individual BNG strategies and landscaping plans. Such enhancements would aim to improve the quality, connectivity and quantity of habitats, including grasslands and habitat mosaics suitable for reptiles. Biodiversity enhancements implemented as part of the Projects' BNG strategies will be subject to a 30-year maintenance plan, to ensure their habitat condition is maintained for that period post-construction. As a result, there will likely be a long term minor beneficial cumulative effect on reptiles.

Impact 15: Permanent and temporary impacts on fish

541. All watercourses recorded during the ecology surveys will be crossed using HDD. A total of 19 watercourses will potentially require crossing for construction of a 6m wide haul road, which could affect the flow and integrity of the watercourse and potentially the fish assemblages they support. The total worst case scenario of watercourse length potentially temporarily lost to facilitate haul road crossing is 114m. The construction techniques at these locations will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable. The overall residual effects on fish were assessed to be minor adverse.

542. Five Estuaries has committed to avoiding all watercourses identified in their ecology surveys using trenchless techniques and therefore will not be subject to any direct cumulative effects. Potential temporary losses of watercourses subject to haul road crossing within the onshore project area may create cumulative effects, as under Scenario 3 there is no re-use of onshore temporary works. However these haul road impacts on watercourses are temporary and localised, with habitat reinstatement and monitoring ensuring such impacts do not have a long-term significant cumulative effect.

23.8.3.1.3 During operation

Impact 1: Temporary impacts to habitats and species during maintenance activities post project completion

543. There may be a need to access the buried cables via the link boxes for maintenance or repair purposes. Any reactive repairs will have fewer potential impacts to those of construction (Section 23.6.1), as they would be localised, of small scale and temporary in nature. There is small potential for temporary disturbance to localised pockets of habitat as well as potential disturbance of protected and notable species. The overall residual effects were assessed as minor adverse.

544. Five Estuaries may also require access to buried cables via link boxes for maintenance or repair purposes. However, due to the temporary and localised nature of these works, it is unlikely that there will be any significant cumulative effects.

Impact 2: Impacts to species from onshore substation operational noise and light

545. During the operation of the onshore substation, there is a low risk that operational noise and lighting may result in disturbance and/or illumination of adjacent habitats and species. An Operational Lighting Plan will be developed in line with current guidance including produced by the BCT and ILP (2023) and Exmoor National Park (2011). Operational lighting will be directional and for security purposes only and it is expected that there would be no light spill beyond the substation operational boundary. No important populations of protected or notable species have been identified in or near the onshore substation works area. The overall residual effects from onshore substation operational light and noise were assessed as negligible.

546. Five Estuaries' onshore substation will be situated adjacent to that of North Falls, and therefore operational light and noise for both projects will remain localised to the same area. Five Estuaries have committed to employing similar strategies of embedded mitigation as North Falls, including operational lighting being directional in order to minimise unnecessary light spill. Consequently, there will likely be no significant cumulative effects.

Impact 3: Habitat improvements arising from biodiversity enhancements

547. Biodiversity enhancements such as planting additional hedgerows and woodland, grassland creation, scrape creation for pollinators, reptile and amphibian hibernacula and creation of new waterbodies in the form of SuDS are included as part of landscaping proposal at the onshore substation should result in a beneficial impact. Habitat-based enhancements could contribute to the goal of delivering a minimum 10% BNG for the onshore elements of the Project. The overall residual effects were assessed as moderate beneficial.

548. Final details of both Projects' habitat creation, and BNG, will be agreed post-consent. Due to the shared onshore infrastructure design between both projects, biodiversity enhancements from both projects will likely result in moderate beneficial cumulative effects as both projects will be exploring opportunities to achieve 10% BNG through habitat enhancements and creation.

Impact 4: Impacts on migratory Nathusius' pipistrelle

549. During the operation of North Falls, there is a low risk that migratory Nathusius' pipistrelles may be subject to direct impacts and potential mortality from collision with offshore turbines, indirect impacts and potential mortality from air pressure changes caused by offshore turbines; and indirect impacts from the creation of offshore structures. The overall residual effects from these potential impacts have been assessed as minor adverse.

550. The offshore infrastructure of Five Estuaries and North Falls are directly adjacent to each other, meaning turbine operation may have an additive effect to residual impacts on migratory Nathusius' pipistrelles.

551. Whilst the theoretical risk of collision between Nathusius' pipistrelles and turbines would be increased by the cumulatively higher number of offshore turbines present for both projects, this risk remains at a negligible magnitude of impact. This is due to Nathusius' pipistrelles being found to generally fly at altitudes lower than the rotor swept height for both projects, and their ability to utilise their echolocation to avoid collision with moving objects.

552. More air pressure changes would occur when accounting for the cumulative impacts of both project's offshore turbines, increasing the risk of barotrauma injuries and fatalities. However, as few bats have been recorded migrating to Essex, such injuries and fatalities will likely be limited to few individuals and would not have a significant effect on the wider migrating population of Nathusius' pipistrelles (BCT, 2023).

553. Migratory bats at offshore wind farms in the North Sea have been observed congregating around offshore turbines, to feed on accumulations of flying insects, seeking refuge and some records of roosting Nathusius' pipistrelles North Falls and Five Estuaries could therefore provide potential offshore roosting and foraging habitat for migratory Nathusius' pipistrelles, aiding their long-distance migration.

554. Only ten migratory individual bats have been recorded in the national NNPP dataset undertaking long-distance migration over the North Sea (BCT, 2023), suggesting the migration of Nathusius' pipistrelle to/from the UK may not be in large numbers and also therefore not a key component of the resident population. Additionally, the value of Essex for breeding Nathusius' pipistrelles is limited. No significant cumulative effects are predicted on migratory Nathusius' pipistrelles or viability of the wider UK Nathusius' pipistrelle population.

23.8.3.1.4 During decommissioning

555. Decommissioning strategies have not yet been finalised for North Falls or Five Estuaries. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan would be provided.

556. No decision has been made regarding the final decommissioning policy for the substation, as it is recognised that industry good industry practice, rules and legislation change over time. However, the substation station equipment will likely be removed and reused or recycled.

557. It is expected the onshore cables will be removed from ducts and recycled, with the transition pits and ducts left in situ.

558. The potential decommissioning cumulative impacts are not anticipated to exceed those identified during construction (Section 23.8.3.2.3). Namely this includes:

- Impacts on Holland Haven Marshes SSSI and LNR;
- Impacts on statutory and non-statutory designated sites;
- Permanent and temporary loss of saltmarsh;
- Permanent and temporary loss of coastal and floodplain marshes;
- Permanent and temporary loss of woodland habitats and veteran trees;
- Permanent and temporary loss of hedgerows;
- Permanent and temporary loss of rivers, ponds, reedbeds and lowland fen;
- Loss or damage to arable field margins;
- Permanent and temporary impacts on badgers;
- Permanent and temporary impacts on bats;
- Permanent and temporary impacts on water voles and otters;
- Permanent and temporary impacts on great crested newts;
- Permanent and temporary impacts on reptiles;
- Permanent and temporary impacts on hazel dormice; and
- Permanent and temporary impacts on fish.

23.8.3.1.5 Summary

559. Table 23.38 below provides a summary of the potential significant cumulative effects identified during the onshore ecology CEA in relation to Five Estuaries.

Table 23.38 Summary of potential cumulative effects in relation to Five Estuaries

Potential impact	Cumulative effect	Additional mitigation
Construction		
Impacts on Holland Haven Marshes SSSI and LNR	No significant cumulative effects.	-
Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI and LNR)	No significant cumulative effects.	-
Permanent and temporary loss of saltmarsh	No significant cumulative effects.	-
Permanent and temporary loss of coastal floodplain and grazing marshes	No significant cumulative effect.	-
Permanent and temporary loss of woodland habitats including veteran trees	No short-term significant cumulative effects.	-

Potential impact	Cumulative effect	Additional mitigation
	Moderate beneficial long term cumulative effects.	
Permanent and temporary loss of hedgerows	Moderate adverse short term cumulative effects. Moderate beneficial long term cumulative effects.	-
Permanent and temporary losses of rivers, ponds and reedbeds	No significant cumulative effects.	-
Loss or damage to arable field margins	No significant cumulative effects.	-
Permanent or temporary impacts on badgers	No significant cumulative effects.	-
Permanent or temporary impacts on bats	No significant cumulative effects on roosting bats. Moderate adverse short term cumulative effects on commuting/ foraging barbastelle and brown long eared bats. Moderate beneficial long term cumulative effects on commuting/ foraging barbastelle and brown long eared bats. No significant cumulative effects on other commuting/ foraging bat species.	-
Permanent or temporary impacts on water voles and otters	No significant cumulative effects.	-
Permanent or temporary impacts on great crested newts	Minor adverse short term cumulative effects (not significant). No long-term significant cumulative effects.	-
Permanent or temporary impacts on reptiles	No short-term significant cumulative effect. Minor beneficial long term cumulative effects (not significant).	-
Permanent or temporary impacts on hazel dormice	Minor adverse short term cumulative effects (not significant). Moderate beneficial long term cumulative effects.	-
Permanent and temporary impacts on fish	No significant cumulative effects.	-
Operation		
Maintenance activities post project completion	No significant cumulative effects.	-
Onshore substation operational light and noise	No significant cumulative effects.	-

Potential impact	Cumulative effect	Additional mitigation
Biodiversity enhancements	Moderate beneficial cumulative effects.	-

23.8.3.2 Other projects

560. Based on the project screening in Table 23.36, excluding Five Estuaries, one of the other listed projects will be included in the CEA for further assessment: Norwich to Tilbury.

23.8.3.2.1 During construction

561. Cumulative effects from North Falls, Five Estuaries and other projects during construction are shown in Table 23.39.

Table 23.39 Cumulative effects from other projects during construction

Project	Cumulative effect 1: Impacts on designated statutory and non-statutory sites	Cumulative effect 2: Impacts on habitats	Cumulative effect 3: impacts on protected and notable species
Norwich to Tilbury	A new onshore substation is proposed to be built as part of the Norwich to Tilbury proposals by national grid, overlapping with the North Falls and Five Estuaries onshore project areas. No statutory designated sites are in close proximity to the North Falls onshore substation works area. Manning Grove (LoWS and ancient woodland) is the only non-statutory site within 0.5km of the North Falls proposed substation works area. The land proposed for Norwich to Tilbury also does not include any designated sites. Due to the lack of designated sites within close proximity, there is no potential for cumulative effects associated with the direct disturbance of designated sites. Cumulative effects therefore are not anticipated to significant in EIA terms.	The North Falls and Five Estuaries onshore substation works area primarily consists of arable land of limited ecological value. The Norwich to Tilbury substation area also comprises arable land and therefore cumulative effects upon sensitive ecological habitats would be unlikely. Cumulative effects from both projects could occur to arable field margins, which are a UKHPI, however. North Falls has committed to reinstating and improving any habitats lost in construction, including these arable field margins. Any significant cumulative effects therefore would be short-term due to the short period of time require to reinstate arable field margin habitat. Significant cumulative effects therefore are not anticipated to significant in EIA terms.	No watercourses suitable for supporting water vole, otter or fish have been identified in close proximity to the North Falls onshore substation works area, therefore no cumulative effects on otters, water vole or fish will occur. In the worst case scenario, 1,011.75m of hedgerow will be removed during construction of North Falls and Five Estuaries which was considered significant in EIA terms. Hedgerows within the onshore project area have been assessed as valuable for commuting and foraging bats in the local area. If Norwich to Tilbury requires additional hedgerow removal, there may be cumulative effects at the local scale. North Falls and Five Estuaries onshore substation construction has the potential to have indirect effects on bats (roosting and commuting/ foraging) as a result of light disturbance. As part of the embedded mitigation, North Falls will ensure security lighting used during construction adheres to accepted lighting guidance (BCT and ILP, 2023) therefore reducing cumulative impacts to acceptable levels. Cumulative effects therefore are not anticipated to significant in EIA terms.

23.8.3.2.2 During operation

562. Cumulative effects from North Falls, Five Estuaries and other projects during operation are shown in Table 23.40.

Table 23.40 Cumulative effects from other projects during operation.

Project	Cumulative effect 1: Onshore substation operation
Norwich to Tilbury	Due to the potential close proximity of Norwich to Tilbury, Five Estuaries' and North Falls' substations, there is potential for cumulative effects ecological receptors, particularly on notable species and their habitats from operational noise and light impacts. These were assessed to be negligible for North Falls, due to mitigation measures outlined above. Even though little information is available on the operation of Norwich to Tilbury, if similar light and noise emissions are produced (even with mitigation) displacement of species could occur. These cumulative effects are likely to be temporary and localised, as displacement of species to other surrounding habitats will be minimal. Cumulative effects therefore are not anticipated to significant in EIA terms.

23.8.3.2.3 During decommissioning

563. Decommissioning strategies have not yet been finalised for North Falls, Five Estuaries or Norwich to Tilbury; however, the cumulative effects are expected to be the same as those of the initial construction phase.

23.9 Interactions

564. The effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects as a result of that interaction. Most onshore ecological receptors are intrinsically linked to hydrology, soils, and air quality. Noise, lighting and traffic movements can also affect protected and notable species.

Table 23.41 Onshore ecology interactions

Topic and description	Related chapter	Where addressed in this chapter	Rationale
Construction			
Impacts on water-dependent habitats and designated sites	ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23)	Sections 23.6.1.1, 23.6.1.2, 23.6.1.11 and 23.6.1.15.	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. This could in turn affect ecological receptors which rely on these water resources, including habitats and species such as otters and water voles. and
Impacts on habitats through increased acid and nitrogen	ES Chapter 20 Air Quality (Document Reference: 3.1.22)	Section 23.6.1.2	Potential changes to air quality (e.g., from road traffic emissions) have the potential to affect

Topic and description	Related chapter	Where addressed in this chapter	Rationale
deposition from road traffic during the construction phase			habitats, as outlined in Section 23.6.1.2.
Impacts on terrestrial habitats	ES Chapter 24 Onshore Ornithology (Document Reference: 3.1.26)	Sections 23.6.1.3, 23.6.1.4, 23.6.1.5, 23.6.1.6 23.6.1.7, and 23.6.1.8.	Potential changes to terrestrial habitats, including arable land, field margins, hedgerows and grassland during construction and operation could result in changes in distribution and abundance of breeding and non-breeding important ornithological features.
Impacts on protected and/or notable species from increases in noise and traffic movements during construction	ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28)	Section 23.6.1.9, 23.6.1.10, 23.6.1.11 and 23.6.1.14	Noise disturbance from construction activities has the potential to effect nearby wildlife such as badgers, hazel dormice and water voles.
Operation			
None identified.			
Decommissioning			
Impacts associated with the decommissioning phase are currently unknown but would be no greater than those identified for the construction phase.			

23.10 Inter-relationships

565. The effects identified and assessed in this chapter have the potential to interrelate with each other. The areas of potential inter-relationships between effects are presented in Table 23.42. This provides a screening tool for which effects have the potential to interrelate.

566. Table 23.43 provides an assessment for each receptor (or receptor group) as related to these effects.

567. Within Table 23.43 the effects are assessed relative to each development phase (i.e., construction, operation, or decommissioning) to see if (for example) multiple construction effects affecting the same receptor could increase the significance of effect upon that receptor. Following this, a lifetime assessment is undertaken which considers the potential for effects to affect receptors across all development phases.

Table 23.42 Inter-relationships between effects - screening

Potential inter-relationships between impacts							
	Construction Impact 1 - 2: Impacts to statutory and non-statutory designated sites	Construction Impacts 3 – 9: Permanent and temporary loss or damage of valuable habitats	Impacts 10 – 16: Permanent and temporary impacts on protected and notable species	Construction Impact 17: Spread of Invasive non-native species	Operation Impacts 1-2: Operational and maintenance practices	Operation Impact 3: Biodiversity enhancements	Operation Impact 4: Migratory Nathusius' pipistrelle
Construction Impact 1 - 2: Impacts to statutory and non-statutory designated sites		Yes –there are multiple ecological connections between statutory designated sites and nearby important habitats (e.g., hedgerows and coastal floodplain and grazing marsh).	Yes –statutory designated nature conservation sites support a range of protected and notable species, so impacts to the designated site will likely affect protected and notable species present.	Yes –there is potential for the spread of invasive non-native species such as water fern or New Zealand Pigmyweed to statutory designated sites.	Yes- there is potential for maintenance and emergency cable repairs being needed close to Holland Haven Marshes (SSSI) as the onshore cable route directly goes through the site.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby designated sites as a by providing a resource for mobile species.	Yes – several designated sites within the study area have suitable habitat to support roosting Nathusius' pipistrelles. Therefore changes in the number of Nathusius' pipistrelle migrating to Essex may affect the populations associated with designated sites.
Construction Impacts 3 – 9: Permanent and temporary loss or damage of valuable habitats	Yes –there are multiple ecological connections between statutory designated sites and nearby important habitats (e.g., hedgerows and coastal floodplain		Yes –all protected and notable species are reliant on various habitats so impacts on habitats will also affect the species.	Yes –there is potential for the spread of invasive non-native species such as water fern or New Zealand Pigmyweed to valuable habitats.	Yes- there is potential for maintenance and emergency cable repairs being needed within or close to valuable habitats.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby valuable habitats as a result of mobile species.	Yes – Migratory Nathusius' pipistrelle populations in Essex will likely utilise a variety of habitats within the onshore project area for roosting, foraging and commuting. Changes in habitat resource would therefore potentially impact Nathusius' pipistrelle.

Potential inter-relationships between impacts							
	and grazing marsh).						
Construction Impacts 10 – 16: Permanent and temporary impacts on protected and notable species	Yes –many statutory designated nature conservation sites will support a range of protected and notable species, so impacts to the designated site will likely impact protected and notable species present here.	Yes –all protected and notable species are reliant on various habitats so impacts on habitats will also affect the species.		Yes –some native protected and notable species could be negatively impacted by the spread of invasive non-native species.	Yes- there is potential for maintenance and emergency cable repairs being needed which could disturb notable species. Operational light from the onshore substation could also disturb such species.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of protected and notable species as there are more ecological resources available for them to utilise.	Yes – Nathusius' pipistrelle are regarded as an EPS. Impacts on Nathusius' pipistrelle experienced during construction may have an impact the migratory population during operation.
Construction Impact 17: Spread of Invasive non-native species	Yes –there is potential for the spread of invasive non-native species such as water fern or New Zealand Pigmyweed to statutory designated sites.	Yes –there is potential for the spread of invasive non-native species such as water fern or giant hogweed to valuable habitats.	Yes –some native protected and notable species could be negatively impacted by the spread of invasive non-native species.		Yes – there is potential for invasive non-native species to be spread by maintenance activities similar to that of construction.	Yes- there is potential biodiversity enhancements could improve conditions for invasive non-native species not just native species.	No – Nathusius' pipistrelles are not susceptible to impacts from invasive non-native species.
Operation Impacts 1 - 2: Operational and maintenance practices	Yes- there is potential for maintenance and emergency cable repairs being	Yes- there is potential for maintenance and emergency cable repairs being	Yes- there is potential for maintenance and emergency cable repairs being	Yes – there is potential for invasive non-native species to be spread by		Yes- there is potential for maintenance and emergency cable repairs being	Yes – There is potential that maintenance and emergency cable repairs could be required and may

Potential inter-relationships between impacts							
	needed close to Holland Haven Marshes (SSSI) as the onshore cable route directly goes through the site.	needed within or close to valuable habitats.	needed which could disturb notable species. Operational noise and light from the onshore substation could also disturb such species.	maintenance activities similar to that of construction.		needed within or close to areas targeted by biodiversity enhancements.	therefore disturb Nathusius' pipistrelles. Operational noise and light from the onshore substation could also disturb Nathusius' pipistrelles if near their roosting or feeding habitats.
Operation Impact 3: Biodiversity enhancements	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby designated sites by providing a resource for mobile species.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby valuable habitats as a result of mobile species.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of protected and notable species as there are more ecological resources available for them to utilise.	Yes- there is potential biodiversity enhancements could improve conditions for invasive non-native species not just native species.	Yes- there is potential for maintenance and emergency cable repairs being needed within or close to areas targeted by biodiversity enhancements.		Yes – Biodiversity enhancements could potentially enhance the biodiversity of Nathusius' pipistrelles as there are more ecological resources available for them to utilise.
Operation Impact 4: Migratory Nathusius' pipistrelle	Yes – several designated sites within the study area have suitable habitat to support roosting Nathusius' pipistrelles. Therefore changes in the	Yes – Migratory Nathusius' pipistrelle populations in Essex will likely utilise a variety of habitats within the onshore project area for roosting, foraging	Yes – Nathusius' pipistrelle are regarded as an EPS. Impacts on Nathusius' pipistrelle experienced during construction may have an impact	No – Nathusius' pipistrelles are not susceptible to impacts from invasive non-native species.	Yes – There is potential that maintenance and emergency cable repairs could be required and may therefore disturb Nathusius' pipistrelles. Operational noise	Yes – Biodiversity enhancements could potentially enhance the biodiversity of Nathusius' pipistrelles as there are more ecological	

Potential inter-relationships between impacts							
	number of Nathusius' pipistrelle migrating to Essex may affect the populations associated with designated sites.	and commuting. Changes in habitat resource would therefore potentially impact Nathusius' pipistrelle.	the migratory population during operation.		and light from the onshore substation could also disturb Nathusius' pipistrelles if near their roosting or feeding habitats.	resources available for them to utilise.	

Table 23.43 Inter-relationship between impacts – phase and lifetime assessment

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
Statutory and non-statutory designated sites	Minor adverse	No change	TBC	No greater than individually assessed impact. Effect significances judged at no more than moderate adverse during construction only. Given 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. Effects on designated nature conservation sites during operation are expected to be negligible, and during decommissioning effects are expected to be equivalent or less than those predicted/ assessed during construction. It is therefore considered that effects to designated sites would not combine over the lifetime of North Falls to increase the significance level of any effects.

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
Notable habitats	Moderate adverse	No change	TBC	No greater than individually assessed impact. The construction phase is expected to have the most significant effects on notable habitats due to the larger footprint and longer timeframes than other phases. In contrast, operational impacts are expected to have negligible effects on protected and notable habitats, 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 will be adopted during decommissioning, which further reduces the potential for inter-related impacted across multiple phases of North Falls.	No greater than individually assessed impact. Effects on notable 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 notable /sensitive habitats should be avoided during decommissioning, there is no realistic potential for impacts to combine over the lifetime of the Project and lead to levels of significance which would be greater than those assessed at individual (i.e., construction) phases. The most notable 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. Effect significances throughout the lifetime of North Falls are therefore judged to be of no greater significances than are predicted during any one phase.
Protected and notable species	Moderate adverse	No change	TBC	No greater than individually assessed impact. The construction phase is expected to have the most significant effects on protected and	No greater than individually assessed impact. Given the anticipated small footprint and short timeframe of decommissioning works

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
				notable species due to the larger footprint and the length of time works that could cause a disturbance will last. In contrast, operational impacts are expected to have negligible effects on protected or notable 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 will be adopted during decommissioning, which further reduces the potential for inter-related impacted across multiple phases of North Falls.	relative to construction, there is considered to be no realistic potential for effects to protected and notable species to cumulate over the lifetime of North Falls.
Invasive non-native species (INNS)	Minor adverse	No change	TBC	No greater than individually assessed impact. The same preventative measures relating to INNS would be taken at decommissioning stage as will be adopted during construction. Decommissioning works are expected to involve relatively minor works compared with construction, meaning the risk of spreading invasive non-nature species 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. Assuming appropriate mitigation measures are	No greater than individually assessed impact. The same preventative measures relating to INNS would be taken at decommissioning stage as will be adopted during construction. Decommissioning works are expected to involve relatively minor works compared with construction meaning the risk of spreading invasive non-nature species 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. Assuming appropriate mitigation measures are

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
				adopted (in line with measures due to be adopted at the construction phase) there would be no realistic potential for interaction between effects in various stages of North Falls.	adopted (in line with measures due to be adopted at the construction phase) there would be no realistic potential for cumulative effects through the lifetime of North Falls.

23.11 Summary

568. This chapter has provided a characterisation of the existing environment for onshore ecology based on both existing (e.g., Defra, JNCC, Natural England, Forestry Commission and Essex Field Club datasets) and site-specific survey data (e.g., Extended Phase 1 Habitat Survey and species-specific surveys).

569. The EclA has established that onshore ecological receptors could be affected as a result of direct and indirect effects during the construction and decommissioning phases. The residual effects on the majority of receptors during these phases would be negligible or minor adverse. These potential impacts as identified in this ES are summarised below.

570. 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 23.44.

571. A summary of predicted cumulative effects is also provided in Table 23.45.

Table 23.44 Summary of potential likely significant effects on onshore ecology

Potential impact	Receptor	Importance	Magnitude of impact	Significance of effect	Additional mitigation measures proposed	Residual effect
Construction						
Impact 1: Impacts on Holland Haven Marshes SSSI and LNR	Ditch network, adjoining grasslands, aquatic invertebrate assemblage and terrestrial invertebrate assemblage e of Holland Haven marshes SSI and LNR	Low - High [8]	Negligible – Low	Minor adverse	N/A	Minor adverse
Impact 2: Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI and LNR)	Interest features of sites highlighted in Table 23.12	High	Negligible	Minor adverse	N/A	Minor adverse
Impact 3: Permanent and temporary loss of saltmarsh	Saltmarsh habitat	High	Negligible	Minor adverse	N/A	Minor adverse
Impact 4: Permanent and temporary loss of coastal	Coastal floodplain and	High	Negligible	Minor adverse	N/A	Minor adverse

[8] Depending on receptor.

Potential impact	Receptor	Importance	Magnitude of impact	Significance of effect	Additional mitigation measures proposed	Residual effect
floodplain and grazing marshes	grazing marsh habitats					
Impact 5: Permanent and temporary loss of woodland habitats including veteran trees	Broad-leaved deciduous woodland; ancient woodland; and veteran trees	High	Negligible	Minor adverse	N/A	Minor adverse
Impact 6: Permanent and temporary loss of hedgerows	Hedgerows	High	Low adverse (short term) Low beneficial (long term)	Moderate adverse (short term) Moderate beneficial (long term)	N/A	Moderate adverse (short term) Moderate beneficial (long term)
Impact 7: Permanent and temporary losses of rivers, ponds and reedbeds	Rivers, ponds and reedbeds	High	Negligible	Minor adverse	N/A	Minor adverse
Impact 8: Loss or damage to arable field margins	Arable field margins	High	Negligible	Minor adverse	N/A	Minor adverse
Impact 9: Permanent or temporary impacts on badgers	Badgers	Medium	Negligible	Minor adverse	N/A	Minor adverse
Impact 10: Permanent or temporary impacts on bats	Bats	High	Negligible - Medium	Negligible - Major adverse (short term) Negligible - Moderate beneficial (long term)	Pre-construction surveys will be undertaken in advance of works commencing to identify any new features supporting roosting bats. Roosts requiring removal will be removed under EPS licence,	Negligible - Moderate adverse (short term) Negligible - Moderate beneficial (long term)

Potential impact	Receptor	Importance	Magnitude of impact	Significance of effect	Additional mitigation measures proposed	Residual effect
			adverse (short term)[9] Negligible – Medium beneficial (short term)		and where appropriate will be replaced by bat boxes. Hedgerow removal and replanting to take place in winter to allow bats to become accustomed to habitat changes before breeding season. Hedgerow planting will be designed to encourage insect biomass. The Project will avoid veteran trees within hedgerows.	
Impact 11: Permanent or temporary impacts on water voles and otters	Water voles and otters	High	No impact - Negligible	No effect - Minor adverse	A pre-construction survey will be undertaken prior to work to identify the current distribution of water voles and otters within the onshore project area. Wherever practicable, night-time working near watercourses will be avoided or else minimised to reduce indirect impacts of light and noise on water voles and otters. Exit ramps from excavations will be provided at night near watercourses with confirmed presence, to provide otters and	No effect - Minor adverse

[9] Depending on bat species.

Potential impact	Receptor	Importance	Magnitude of impact	Significance of effect	Additional mitigation measures proposed	Residual effect
					water voles with a means of escape. If no field signs of water voles or otters are found within 50m of the Project, no further mitigation is required.	
Impact 12: Permanent or temporary impacts on great crested newts	Great crested newts	High	Low	Moderate adverse	DLL will be sought to ensure that potential indirect effects upon great crested newts are appropriately mitigated.	Minor adverse
Impact 13: Permanent or temporary impacts on reptiles	Reptiles	High	Low	Moderate adverse	A translocation programme will be agreed for areas with 'good' population of reptiles, and will be agreed through the EMP. Above ground vegetation removed during the reptile active period must be done so whilst adhering to a precautionary method of working (PMoW) for reptiles, supervised by a suitably qualified ecologist.	Minor adverse
Impact 14: Permanent or temporary impacts on hazel dormice	Hazel dormice	High	Low	Moderate adverse (short term) Moderate beneficial (long term)	Trenchless techniques will be used to pass under all hedgerows which have confirmed dormice presence and where practicable will also be used under those identified as suitable to support dormice. Two dormice hedgerows will require a 6m swathe to be removed (if an existing	Minor adverse (short term) Moderate beneficial (long term)

Potential impact	Receptor	Importance	Magnitude of impact	Significance of effect	Additional mitigation measures proposed	Residual effect
					gap/gateway in the hedgerow cannot be found) in order to install the haul road. At these hedgerows, clearance will take place during the dormouse hibernation period, with temporary hedgerows used during the night time to mitigate habitat fragmentation. Where practicable, additional feeding sites and nesting boxes should be installed in hedgerows and woodland edges outside of the onshore project area, to accommodate for any hazel dormice disturbed by noise (English Nature, 2006).	
Impact 15: Permanent and temporary impacts on fish	Fish species	Medium	Low	Minor adverse	N/A	Minor adverse
Impact 16: Spread of invasive non-native species	Native floral and faunal species, as well as local habitats	Medium	Low	Minor adverse	N/A	Minor adverse
Operation						
Impact 1: Maintenance activities post project completion	Floral and faunal species, as well as local habitats	High	Negligible	Minor adverse	N/A	Minor adverse

Potential impact	Receptor	Importance	Magnitude of impact	Significance of effect	Additional mitigation measures proposed	Residual effect
Impact 2: Onshore substation operational light and noise	Faunal species	Negligible	Negligible	Negligible	N/A	Negligible
Impact 3: Biodiversity enhancements	Floral and faunal species, as well as local habitats	High	Low	Moderate beneficial	N/A	Moderate beneficial
Impact 4: Migratory Nathusius' pipistrelles	Nathusius' pipistrelle migratory populations	High	Negligible	Minor adverse	N/A	Minor adverse

Table 23.45 Summary of potential cumulative effects on onshore ecology

Potential impact	Cumulative effect	Additional mitigation	Residual Significance of effect
Construction			
Cumulative effect 1: Impacts on designated statutory and non-statutory sites	No cumulative effects are anticipated on designated sites. Direct impacts on Holland Haven Marshes SSSI/LNR are avoided through the use of HDD by both Five Estuaries and North Falls. Any potential indirect cumulative effects on other designated sites outside the onshore project areas are mitigated for via the use of good industry practice measures. These measures ensure noise, light and dust are temporally and spatially restricted. The eventuality of bentonite breakout is reduced by the use of micrositing and management plans by both Five Estuaries and North Falls.	N/A	Minor adverse

Potential impact	Cumulative effect	Additional mitigation	Residual Significance of effect
Cumulative effect 2: Impacts on habitats	Short term moderate adverse cumulative effects are likely on hedgerows due to the period of time between North Falls and Five Estuaries' construction where habitat reinstatement won't be carried out. These will be reinstated post-construction of the second of the projects. No adverse cumulative effects on other habitats are expected as North Falls has committed to habitat reinstatement post-construction. Potential moderate beneficial long term cumulative effects may occur on woodlands, grasslands and hedgerows, as a result of biodiversity enhancements as part of North Falls' landscaping and BNG targets.	N/A	Moderate adverse for hedgerows in the short term. Moderate beneficial for woodlands, hedgerows and grasslands in the long term. Minor adverse for all other habitats.
Cumulative effect 3: impacts on protected and notable species	No cumulative effects are likely to impact badgers, roosting bats, water voles, otters and fish. Commuting/ foraging barbastelle and brown long-eared bats may all experience short term moderate adverse and hazel dormice may experience minor adverse cumulative effects due to hedgerow from losses resulting in habitat fragmentation. In the long term these cumulative effects are moderate beneficial, following hedgerow reinstatement and enhancement which would improve the quality and quantity of hedgerow in the local area. No cumulative effects are likely to impact other commuting/ foraging bat species.	N/A	Moderate adverse in the short term for commuting/ foraging barbastelle and brown-long eared bats. Minor adverse in the short term for hazel dormice. Moderate beneficial in the long term for commuting/ foraging barbastelle and brown-long eared bats, and hazel dormice. Minor adverse in the short term for great crested newts. Minor beneficial in the long term for great crested newts. Minor adverse for badgers, roosting bats, water voles, otters and fish.

Potential impact	Cumulative effect	Additional mitigation	Residual Significance of effect
	Great crested newts may experience short term minor adverse cumulative effects due to loss of terrestrial hedgerow habitats when not occupying their breeding ponds. Following reinstatement and enhancement of hedgerows post-construction, this cumulative effect will be minor beneficial.		
Operation			
Cumulative effect 1: Onshore substation operation	No cumulative effects are anticipated with Five Estuaries in relation to potential maintenance activities and onshore substation operational noise and light. Moderate beneficial cumulative effects are likely as a result of biodiversity enhancements provided by both North Falls and Five Estuaries. Due to the potential close proximity of Norwich to Tilbury and North Falls' substations, there is potential for cumulative effects ecological receptors, particularly on notable species and their habitats from operational noise and light impacts. These were assessed to be negligible for North Falls, due to mitigation measures outlined above. Even though little information is available on the operation of Norwich to Tilbury, if similar light and noise emissions are produced (even with mitigation) displacement of species could occur. These cumulative effects are likely to be temporary and localised, as displacement of species to other surrounding habitats will be minimal.	N/A	Negligible

Potential impact	Cumulative effect	Additional mitigation	Residual Significance of effect
	Cumulative effects therefore are not anticipated to significant in EIA terms.		
Decommissioning			
Decommissioning strategies have not yet been finalised for North Falls, Five Estuaries Farm or Norwich to Tilbury; however, the cumulative effects are expected to be the same as those of the initial construction phase.			

23.12 References

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