

East Anglia TWO Offshore Windfarm

Chapter 22

Onshore Ecology

Preliminary Environmental Information

Volume 1

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Chapter 22 Onshore Ecology appendices are presented in **Volume 3: Appendices** and listed in the table below.

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Appendix 22.1	Extended Phase 1 Habitat Survey Report
Appendix 22.2	eDNA Survey Report
Appendix 22.3	Water vole and otter Survey Report
Appendix 22.4	Bat Survey Report
Appendix 22.5	Cumulative Impact Assessment with the Proposed East Anglia ONE North Project

Glossary of Acronyms

AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
CoCP	Code of Construction Practise
CCS	Construction Consolidation Sites
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute for Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CMS	Construction Method Statement
CRoW	Countryside and Rights of Way Act
CWS	County Wildlife Site
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
ECOW	Environmental Clerk of Works
EclA	Ecological impact Assessment
EEC	European Economic Community
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
ESC	East Suffolk Council
ETG	Expert Topic Group
EU	European Union
ha	Hectares
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
ICZM	Integrated Coastal Zone Management
ILE	Institute of Lighting Engineers
IPC	Infrastructure Planning Commission
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LPA	Local Planning Authority
m	Metres
MAGIC	Multi-Agency Geographic Information for the Countryside
NERC Act	Natural Environment and Rural Communities Act

NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OHL	Overhead Line
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PID	Public Information Day
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
SBIS	Suffolk Biodiversity Information Service
SCC	Suffolk County Council
SCDC	Suffolk Coastal District Council
SoS	Secretary of State
SPA	Special Protection Area
SPR	ScottishPower Renewables
SSSI	Site of Special Scientific Interest
TN	Target Note
UK BAP	UK Biodiversity Action Plan
UKHPI	UK Habitat of Principal Importance
WDC	Waveney District Council

Glossary of Terminology

Applicant	East Anglia TWO Limited. ScottishPower Renewables is the parent company of East Anglia TWO limited
Construction consolidation sites	Compounds which will contain laydown, storage and work areas for onshore construction works. The HDD construction compound will also be referred to as a construction consolidation site.
Development Area	Area containing all onshore and offshore infrastructure, transmission works, construction consolidation sites, and mitigation areas.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one offshore construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and cable connection to the National Grid.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to the EIA and the information required to support HRA.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
Jointing Bay	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing electrical earthing links.
Mitigation areas	Areas captured within the Development Area specifically for mitigating expected or anticipated impacts.
National Grid infrastructure	The proposed East Anglia TWO project will require connection into an additional substation for ultimate connection to national electricity grid. The required National Grid infrastructure comprising a National Grid substation, connection to the existing electricity pylons and associated works will be consented as part of the proposed East Anglia TWO project Development Consent Order but will be National Grid owned assets.
National Grid overhead line works	Works required to upgrade the existing electricity pylons and overhead lines to transport electricity from the National Grid substation to the national electricity grid
National Grid overhead line works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the proposed East Anglia TWO project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation required to connect the proposed East Anglia TWO project to the national electricity grid.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Onshore cable corridor	The corridor within which the onshore cable route will be located.

Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables and two fibre optic cables.
Proposed onshore development Area	Onshore transmission works, mitigation areas and temporary construction facilities such as access roads or construction consolidation sites and National Grid infrastructure.
Onshore infrastructure	The combined name for all infrastructure associated with the proposed East Anglia TWO project from landfall to grid connection.
Onshore substation	The East Anglia TWO substation and all of the electrical equipment, both within and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia TWO project.
Onshore study area	All onshore areas being considered for the placement of onshore infrastructure or temporary construction consolidation sites. This includes areas being considered for National Grid infrastructure, East Anglia TWO onshore substation, onshore cable corridor and landfall.
Onshore transmission works	Landfall, onshore cable route and onshore substation location and National Grid substation location. This does not include temporary construction facilities such as access roads or construction consolidation sites.
Transition Bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

22 Onshore Ecology

22.1 Introduction

1. This chapter of the Preliminary Environmental Report (PEIR) considers the impacts of the proposed East Anglia TWO project on onshore ecological receptors. Potential impacts on birds are considered separately in **Chapter 23 Onshore Ornithology**.
2. This chapter provides an overview of the existing baseline environment in respect to onshore ecology in relation to the proposed East Anglia TWO project. This chapter also provides an Ecological Impact Assessment (EclA) of the potential impacts of construction, operation and decommissioning of the proposed East Anglia TWO project upon this baseline environment. The EclA also considers the cumulative impacts of existing and proposed projects in respect to onshore ecological receptors. The chapter was produced by Royal HaskoningDHV.
3. This chapter refers to the following onshore chapters, where relevant:
 - **Chapter 19 Air Quality;**
 - **Chapter 20 Water Resources and Flood Risk;**
 - **Chapter 23 Onshore Ornithology;**
 - **Chapter 25 Noise and Vibration;** and
 - **Chapter 29 Landscape and Visual Impact Assessment.**

22.2 Consultation

4. Consultation is a key driver of the Environmental Impact Assessment (EIA) process, and continues throughout the lifecycle of a project, from its initial stages through to consent and post-consent.
5. To date, consultation with regards to onshore ecology has been undertaken via Expert Topic Group (ETG), described within **Chapter 5 EIA Methodology**, with meetings held in April 2018 and November 2018, and through the East Anglia TWO Scoping Report (ScottishPower Renewables (SPR) 2017). Feedback received through this process has been considered in preparing the PEIR where appropriate and this chapter will be updated following the next stage of consultation for the final assessment submitted with the Development Consent Order (DCO) application.

6. A summary of the consultation responses that have been received to date, with specific reference to onshore ecology, is provided in **Table 22.1**.

Table 22.1 Consultation Responses

Consultee	Date/ Document	Comment	Response / where addressed in the PEIR
Natural England	08/1/2017 Scoping Response	The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The National Planning Policy Framework (NPPF) requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 109), which should be demonstrated through the ES.	Noted and considered throughout this PEIR chapter. Section 22.5.4 details the anticipated baseline trends.
Natural England	08/12/2017 Scoping Response	Natural England notes that as of 30th November 2017 the Conservation of Habitats and Species Regulations 2010 and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 were both consolidated and should now be referred to as; The Conservation of Habitats and Species Regulations 2017 (or 'the Habitats Regulations 2017') and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (or 'the Offshore Habitats Regulations 2017'). The 2017 Regulations do not introduce any material changes to the regulations or change how they should be interpreted and applied but where reference to specific regulations are made the numbering may have changed.	Comments are noted and references made to The Conservation of Habitats and Species Regulations 2017 (or 'the Habitats Regulations 2017') where appropriate.
Natural England	08/12/2017 Scoping Response	Natural England agrees with the designated sites listed. However, the PEI will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geo-conservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The PEI should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures.	Designated sites and local wildlife sites are discussed in section 22.5.1 and potential impacts on designated sites are discussed in section 22.6.1 . Sites designated for geological features are discussed in Chapter 18 Ground Conditions and Contamination

Consultee	Date/ Document	Comment	Response / where addressed in the PEIR
Natural England	08/12/2017 Scoping Response	The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the PEI.	Details of the ecological surveys, field surveyors, and their findings from the baseline field surveys are discussed in section 22.5.2 .
Natural England	08/12/2017 Scoping Response	Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters.	Potential impacts on the baseline environment area discussed in section 20.6.1 .
Suffolk Wildlife Trust	19/12/2017 Scoping Response	In relation to the proposed surveying periods given in the Scoping Report, we consider that the period proposed for dormouse surveys is too short for a presence/absence survey. The surveys should be undertaken from May to November following the guidance in the Dormouse Conservation Handbook (2nd edn.) Bright, P., Morris, P. and Mitchell-Jones, T. (2006). The Dormouse Conservation Handbook (2nd edn). English Nature.	All ecological field surveys have been undertaken in accordance with industry accepted guidance and within their optimal surveying windows. Where limitations have been encountered, these have been acknowledged and discussed in section 22.5.3 .
Suffolk Wildlife Trust	19/12/2017 Scoping Response	With regard to bats (both activity surveys and emergence/re-entry surveys outlined in the Scoping Report), the survey periods should follow the published best practice guidance. Dependent on habitat type and quality there is likely to be the need to extend the identified survey periods further into late summer (July/August) and into the autumn (September/October). It should be ensured that survey effort follows the published good practice guidance to ensure that adequate data is collected to ensure that a robust assessment can be made. Collins, J. (ed.). (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.	The suite of bat activity and emergence/re-entry surveys have been undertaken in accordance with industry accepted guidance. Details of these surveys are provided in section 22.5.3 . <i>Note: These surveys are ongoing at the time of the preparing this report but the full suite of findings will be reported within the ES chapter.</i>
Environment Agency	08/12/2017 Scoping Response	There should be – from the outset – an aspiration to go beyond “no-net-loss” in terms of terrestrial biodiversity features, and aim for ecological enhancements as part of the broader development. For example, the Thorpeness Hundred River offers numerous opportunities to develop ecological projects	Embedded mitigation measures are presented in section 22.3.3 and further mitigation measures, where required, are presented

Consultee	Date/ Document	Comment	Response / where addressed in the PEIR
		that could enhance local biodiversity and improve river quality.	in section 22.6.1 .
Norfolk County Council	01/11/2017 Scoping Response	The need to consider cumulative impact is a requirement of the EIA process. This is of particular importance when considering ecological impacts. Projects to be incorporated in such an assessment must include those in the past, present and foreseeable future. Projects to be incorporated in such an assessment must include not only other potential wind farms but also other types of project taking place in the marine environment or onshore so that all elements of the infrastructure are assessed.	Section 22.7.1 presents the cumulative impact assessment.
The Planning Inspectorate	20/12/2017 Scoping Response	The Scoping Report applies a variety of distances within which species and designated sites are identified, such as, for example, 3km from the onshore study area for designated sites and 2km for protected species. No explanation is provided of how these distances were selected. The study areas used for the assessment must be clearly explained and justified and sufficiently broad to capture all ecological receptors which could be significantly affected by the Proposed Development.	Table 22.3 presents the impact study areas that have been used for different receptors. These are in accordance with industry accepted guidance and/or professional judgement and were agreed with stakeholders
The Planning Inspectorate	20/12/2017 Scoping Response	Within the Scoping Report, the designated sites are described as listed in Table 3.10 and reflected in Figure 3.6. However, Figure 3.6 does not show three of the sites listed in the table: the Minsmere to Walberswick Ramsar, Special Protection Area (SPA) and Special Area Conservation (SAC); the Minsmere to Walberswick Heath and Marshes Site of Special Scientific Interest (SSSI); or the Gromford Meadow SSSI. Table 3.10 does not include the Alde- Ore & Butley Estuaries SAC (shown on Figure 3.6) and incorrectly identifies the Alde-Ore Estuary SPA and SSSI as a SAC.	Designated sites are discussed in section 22.5.1 and shown on Figure 22.1 and Figure 22.2 .
The Planning Inspectorate	20/12/2017 Scoping Response	The Scoping Report does not set out how sensitive receptors will be identified; this should be made clear in the PEI and agreed with the relevant statutory bodies.	Section 22.5.1 presents the findings from the baseline ecological surveys and desk study review. Methodologies for onshore ecological receptors have been discussed and agreed with stakeholders at the

Consultee	Date/ Document	Comment	Response / where addressed in the PEIR
			Onshore Ecology and Ornithology Expert Topic Group (ETG) meetings held to date. Section 22.4 provides the details of the methodologies used to inform the PEIR. Section 22.6 presents the impacts on sensitive receptors.
The Planning Inspectorate	20/12/2017 Scoping Response	The PEI should ensure that, in addition to protected species and designated habitats, potential effects on non-protected species and non-designated habits which may be affected by the Proposed Development are also assessed.	Section 22.5.1 provides information in relation to all ecological receptors (designated or otherwise) that have been considered within this PEIR.

7. Ongoing public consultation has been conducted through a series of Public Information Days (PIDs) and Public Meetings. PIDs have been held throughout Suffolk in November 2017, March 2018, and June / July 2018 with further events planned in 2019. A series of stakeholder engagement events were also undertaken in October 2018 as part of consultation phase 3.5. These events were held to inform the public of potential changes to the onshore substation location. This consultation aims to ensure that community concerns are well understood and that site specific issues can be taken into account, where practicable. Consultation phases are explained further in **Chapter 5 EIA Methodology**. Full details of the proposed East Anglia TWO project consultation process will be presented in the Consultation Report, which will be submitted as part of the DCO application.
8. **Table 22.2** shows public consultation feedback pertaining to onshore ecology. Consultation phases are explained further in **Chapter 4 Site Selection and Assessment of Alternatives**.

Table 22.2 Public Consultation Responses relevant to Onshore Ecology

Topic	Response / where addressed in the PEI
Phase 1	
<ul style="list-style-type: none"> Impacts on wildlife 	Impacts to protected and notable wildlife species are assessed in section 22.5.3 .
Phase 2	
<ul style="list-style-type: none"> Impacts on wildlife Impact on woodland and ancient woodland How can ecological impacts be mitigated Substations in operation should be maintained in a way to encourage biodiversity 	<p>Impacts to protected and notable wildlife species are assessed in section 22.5.3.</p> <p>Mitigation measures (including ecological enhancement) are given in section 22.3.3</p>
Phase 3	
<ul style="list-style-type: none"> Wildlife impacts (otter, badger, hedgehog, fox, shrew, adder, grass snake, slow worms, bats and bees) Impact through cable routing Impact on great crested newts along the cable route (far more than in the reptile mitigation land at Sizewell) Diverse insect population Impact on woodland and hedgerows (substation and cable corridor) Avoid ancient oak tree in field adjacent to east of River Hundred Horizontal Directional Drilling (HDD) around shrubland Impacts of EMF on bats HDD under ancient woodland near Aldringham Court Avoid Thorpeness Common Suggest replanting along the cable corridor Protect Beta Grove Wood and Laurel Covert Wood 	<p>Impacts to protected and notable wildlife species are assessed in section 22.5.3.</p> <p>Mitigation measures are given in section 22.3.3</p> <p>Impacts to Thorpeness Common are assessed in Chapter 21 Land Use</p> <p>Chapter 4 Site Selection and Assessment of Alternatives details the process of route refinement to avoid sensitive habitats where appropriate.</p>
Phase 3.5	
<ul style="list-style-type: none"> Ecosystem disruption Impact on woodland and ancient woodland Should not disrupt Grove Wood Impact on hedgerows from road widening and cable route Unacceptable movement of vegetation 	<p>Potential impacts on woodland are assessed in section 22.6.1.4. This includes reference to Grove Wood, Aldeburgh Road and Laurel Covert.</p> <p>Impacts on hedgerows are assessed in section 22.6.1.5.</p> <p>Wildlife impacts (and potential impacts to their habitats) have been assessed in respect to protected or notable species through section</p>

Topic	Response / where addressed in the PEI
<ul style="list-style-type: none"> Wildlife impact on badgers, bats, newts, adders, foxes, hares, butterflies, hedgehogs, grass snakes, frogs and toads Impacts on habitats Ancient woodland at Aldeburgh Road Biodiversity should be considered Concern over impact on Laurel Covert Wood Ecological impact of cable route Impact on wildlife crossing roads with increased traffic Scattering of wildlife Impact on heathland Full ecological survey needed for loss of woodland within the AONB and of Grove Wood 	<p>22.6.</p> <p>Ecological surveys have been conducted to inform this chapter. These are detailed further in Appendices 22.1-22.4.</p>

22.3 Scope

22.3.1 Study Area

9. The onshore infrastructure includes the following elements:
 - Landfall;
 - Onshore cable corridor including cable route, trenchless crossing (for example Horizontal Directional Drilling (HDD)) zones, joint bays;
 - Onshore substation; and
 - National Grid Infrastructure.
10. A full description of, and associated information for, the onshore infrastructure is provided in **Chapter 6 Project Description**.
11. The study areas for specific onshore ecological receptors used in this EclA are provided in **Table 22.3**. Different study areas have been used for different receptors depending on their sensitivity and on their habitat preferences. These study areas were selected in accordance with industry accepted guidance and/or professional judgement and subsequently agreed with stakeholders (Natural England, Environment Agency and Suffolk Wildlife Trust) via the Onshore Ecology and Onshore Ornithology Method Statement at the ETG meeting in April 2018.

12. It should be noted that at the time of undertaking the desk based assessment, and following field surveys, the proposed onshore development area was yet to be finalised, and therefore survey and reporting was completed on the indicative onshore development area. The information presented in this chapter is therefore described in terms of the indicative onshore development area boundary. The proposed onshore development area is shown on the figures associated with this chapter for context.

Table 22.3 Study Areas for Different Onshore Ecological Receptors Used for This EclA

Data/Survey	Study Area
Statutory designated sites	Within 2km of the indicative onshore development area
Non-statutory designated sites	Within 2km of the indicative onshore development area
UK Habitats of Principle Importance (UKHPI) and Suffolk Local Biodiversity Action Plan (BAP)	Within and up to 50m of the indicative onshore development area
Protected and notable species (excluding great crested newts and bats)	Within and up to 50m of the indicative onshore development area
Great crested newts	Within and up to 250m of the indicative onshore development area (Note: Although great crested newts can use suitable terrestrial habitat up to 500m from a breeding pond (Great crested newt mitigation guidelines, English Nature, 2001), research suggests that newts are unlikely to travel more than 250m from ponds where suitable habitats for foraging and hibernation exist).
Bats	Within and up to 5km of the indicative onshore development area

22.3.2 Worst Case Scenarios

13. This section identifies the realistic worst case parameters associated with the proposed East Anglia TWO project alone. This includes all onshore infrastructure for the proposed East Anglia TWO project and the National Grid infrastructure required for ultimate connection to national electricity grid.
14. **Chapter 6 Project Description** details the project parameters using the Rochdale Envelope approach for the PEIR.
15. **Table 22.4** identifies those realistic worst case parameters of the onshore infrastructure that are relevant to potential impacts on onshore ecology during construction, operation and decommissioning phases of the proposed East Anglia TWO project. Please refer to **Chapter 6 Project Description** for more detail regarding specific activities, and their durations, which fall within the construction phase.

Table 22.4 Realistic Worst Case Scenarios

Impact	Parameter	Notes
Construction		
Impacts related to the landfall	<p>HDD temporary works area: 7,000m² (70m x 100m)</p> <p>Transition bay excavation footprint (for 2 transition bays): 1,554m² (37m x 42m)</p> <p>Landfall CCS: 18,400m² (160m x 115m)</p> <p>Landfall transition bays approximate quantity of spoil material (for 2 transition bays): 454m³</p>	Landfall to be achieved via HDD. No beach access required.
Impacts related to the onshore cable corridor	<p>Onshore cable route: 287,360m² (8,980m x 32m)</p> <p>Jointing bay construction excavation footprint: 570m² (30.6m x 18.6m). Total for 36 jointing bays: 20,520m² (570m² x 36)</p> <p>HDD (retained as an option to cross SPA / SSSI):</p> <ul style="list-style-type: none"> Entrance pit CCS (x1): 7,000m² (100m x 70m) Exit pit CCS (x1): 3,000m² (100m x 30m) <p>Onshore cable route CCS: 18,400m² (160m x 115m). Total for 5 CCS: 92,000m² (18,400m² x 5)</p> <p>Temporary roads:</p> <ul style="list-style-type: none"> Onshore cable route haul road between landfall and Snape Road (4.5m wide with additional 4m for passing places at approximately 87m intervals): 41,376m² Onshore cable route and substation access haul road (9m width): 18,675m² Temporary access road: 23,495m² <p>Onshore cable trench approximate quantity of spoil material: 13,321m³</p>	<p>Onshore cable corridor construction footprint may be located anywhere within the proposed onshore development area.</p> <p>The location strategy for access routes, CCS and jointing bays will be to site them near to field boundaries or roads as far as practical.</p> <p>Two link boxes sit underground beside each jointing bay at a depth of approximately 1.2m. The construction footprint of these is included in the jointing bay construction excavation footprint.</p>
Impacts related to the onshore substation	<p>Onshore substation CCS: 17,100m² (190m x 90m)</p> <p>Permanent footprint (used as CCS during construction): 36,100m² (190m x 190m)</p> <p>Substation operational access road: 12,800m² (1,600m x 8m)</p>	Construction access is included above as the onshore cable route and substation access haul road.
Impacts related to the National Grid	National Grid substation CCS: 78,750m ² (250m x 315m)	Design for the required overhead line (OHL) realignment work

Impact	Parameter	Notes
Infrastructure	Permanent footprint (used as CCS during construction): 45,500m ² (325m x 140m)	<p>(including cable sealing end CCSs and pylon realignment CCS) is currently on going. As more detail is made available, this will be fully assessed and included in the Environmental Statement (ES) and DCO application. However, indicative locations for cable sealing end CCSs and pylon realignment CCS are shown in Figure 6.6 of Chapter 6 Project Description.</p> <p>Construction access is included above as the onshore cable route and substation access haul road.</p> <p>Operational access is included above as the substation operational access road,</p>
Operation		
Impacts related to the landfall	2 transition bays will be installed underground, each with an operational volume of 227m ³	Transition bays will be buried approximately 1.2m underground – there will no above ground infrastructure.
Impacts related to the onshore cable corridor	<p>36 jointing bays will be installed underground, each with an operational volume of 77m³</p> <p>72 link boxes will be installed underground (2 per jointing bay), each with an operational volume of 3m³</p>	<p>Jointing bays will be buried approximately 1.2m underground – there will no above ground infrastructure.</p> <p>Link boxes will be located underground immediately adjacent to jointing bays – there will be no above ground infrastructure.</p>
Impacts related to the onshore substation	<p>Operational footprint: 36,100m² (190m x 190m)</p> <p>Substation operational access road: 12,800m² (1,600m x 8m)</p>	The operational footprint does not include the additional landscaping footprint (which will be agreed post-PEIR).
Impacts related to the National Grid Infrastructure	National Grid operational substation: 45,500m ² (325m x 140m)	<p>The operational footprint does not include the additional landscaping footprint (which will be agreed post-PEIR).</p> <p>Design for the required OHL realignment work (including cable sealing end CCSs and pylon realignment CCS) is currently on going. As more</p>

Impact	Parameter	Notes
		detail is made available, this will be fully assessed and included in the Environmental Statement (ES) and DCO application. However, indicative locations for cable sealing end CCSs and pylon realignment CCS are shown in Figure 6.6 of Chapter 6 Project Description .
Decommissioning		
<p>No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the onshore substation will likely be removed and be reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left <i>in situ</i>. 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 will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.</p>		

22.3.3 Embedded Mitigation

16. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. The following sections outline the key embedded mitigation relevant for this assessment. Where embedded mitigation measures have been developed into the design of the proposed East Anglia TWO project with specific regard to onshore ecology, these are described in **Table 22.5**. Any further mitigation measures suggested within this chapter are therefore considered to be additional mitigation.

Table 22.5 Embedded Mitigation Measures for Onshore Ecology

Parameter	Mitigation Measures Embedded into the Project Design
General	
Site selection	The project has undergone an extensive site selection process to date which has involved incorporating environmental considerations in collaboration with the engineering design requirements. For further details please refer to Chapter 4 Site Selection and Assessment of Alternatives .
Designated sites	The route of the onshore cable corridor was influenced from the onset of the project design process by the location of designated sites, specifically The Sandlings SPA and component Leiston-Aldeburgh SSSI. The project design minimises the overlap of the onshore cable corridor with these designated sites, choosing a crossing at the narrowest point, within habitat where no records of ornithological target species were found. The Applicant has committed to a reduced working width of 16.1m (reduced from 32m) within Sandlings SPA for a length up to 300m depending on the exact alignment chosen.

Parameter	Mitigation Measures Embedded into the Project Design
General	
	Within areas of overlap with designated sites, HDD and/or open cut crossing techniques may be employed. The HDD entry pits would be located outside of these designated sites to avoid any potential impacts.
HDD at landfall	<p>The landfall location was influenced from the onset of the project design process by the presence of designated sites, specifically Leiston-Aldeburgh SSSI.</p> <p>The project has committed to the use of HDD (refer to Chapter 6 Project Description) at the landfall to minimise potential impacts. Furthermore, the HDD entry pit is located inland from the SSSI boundary and the HDD exit pit will be at sea. There will also be no requirement for access onto the beach at this location. Therefore, there will be no potential for any interaction with this site through the use of the HDD technique.</p>
Construction of onshore cable corridor	<p>The onshore cables will be installed underground to minimise operational impacts to ecological receptors and landscape and visual impacts.</p> <p>Where appropriate, construction work areas would be accessed using existing tracks and road (to be developed as part of the Traffic Management Plan).</p> <p>Reinstatement of all temporary working areas to agreed specifications.</p>
Maintenance and operational measures	<p>Suitable maintenance of any newly planted sections of hedgerow, shelterbelts and woodlands following construction would have an aftercare period of ten years. One for one replacement planting of failed plants would only be required for the first five years.</p> <p>Lighting sensitive to bats would be incorporated according to guidance in Bats and Lighting in the UK (Bat Conservation Trust (BCT) and Institute of Lighting Engineers (ILE) 2009).</p>

22.3.4 Monitoring

- Post-consent, the final detailed design of the proposed East Anglia TWO project and the development of the relevant management plan(s) will refine the worst-case parameters assessed in the EIA. It is recognised that monitoring is an important element in the management and verification of the impacts of the proposed East Anglia TWO project. Outline management plans, across a number of environmental topics, will be submitted with the DCO application. These outline management plans will contain key principles that provide the framework for any monitoring that could be required. The requirement for a final appropriate design and scope of monitoring will be agreed with the relevant stakeholders and included within the relevant management plan(s), submitted for approval, prior to construction works commencing.

22.4 Assessment Methodology

22.4.1 Guidance

22.4.1.1 Legislation and Policy

18. The following sections provide detail on key pieces of International and UK legislation which are relevant to this chapter.
19. Further detail is provided in **Chapter 3 Policy and Legislative Context**.

22.4.1.2 The Conservation of Habitats and Species Regulations 2017 (or ‘the Habitats Regulations 2017’)

20. The Conservation of Habitats and Species Regulations 2017 (the “Habitats Regulations 2017”) revoke and replace the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations 2010”).
21. The Habitats Regulations 2017 are the principal means by which Council Directive 92/43/European Economic Community (EEC) on the conservation of natural habitats of wild fauna and flora (the “Habitats Directive”) is transposed in England and Wales and the adjacent territorial seas. They also transpose elements of the EU Wild Birds Directive (Council Directive 2009/147/EC) in England and Wales.
22. These Regulations provide protection for specific habitats listed in Annex I and species listed in Annex II of the Habitats Directive. The Directive sets out decision making procedures for the protection of Special Areas of Conservation (SAC) and Special Protection Areas (SPA), implemented in the UK through The Conservation of Habitats and Species Regulations 2017.
23. The Regulations make it an offence (subject to exceptions) to deliberately capture, injure, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4.
24. The Regulations require competent authorities to consider or review planning permission, applied for or granted, affecting a European site, and, subject to certain exceptions, restrict or revoke permission where the integrity of the site would be adversely affected.

22.4.1.3 Wildlife and Countryside Act 1981 (as amended)

25. This Act makes it an offence (subject to certain exceptions) to intentionally: kill, injure, or take any wild bird; take, damage or destroy the nest of any wild bird while that nest is in use or being built; and take or destroy an egg of any wild bird.

26. The Act makes it an offence to intentionally kill, injure or take any animal listed in Schedule 5 of the act and protects occupied and unoccupied places used for shelter or protection by such animals.
27. The Act makes it an offence (subject to exceptions) to intentionally pick, uproot or destroy any wild plant listed in Schedule 8 of the Act.
28. The Act makes it an offence to plant or otherwise cause to grow any non-native, invasive species listed under Part 2 of Schedule 9 of the Act.
29. The Act makes provision for the notification and confirmation of Sites of Special Scientific Interest (SSSI).

22.4.1.4 The Protection of Badgers Act 1992

30. The Act makes it an offence to wilfully kill, injure or take, or attempt to kill, injure or take a badger *Meles meles*; and to cruelly ill-treat a badger.
31. The Act makes it an offence to intentionally or recklessly damage, destroy or obstruct a badger sett, or to disturb a badger whilst in a sett.

22.4.1.5 Natural Environment and Rural Communities (NERC) Act 2006

32. Section 41 of the Act requires the Secretary of State (SoS) to compile a list of habitats and species of principal importance for the conservation of biodiversity in England (herein 'S41 species').
33. Decision makers of public bodies, in the execution of their duties, must have regard to the conservation of biodiversity in England, and the list is intended to guide them.

22.4.1.6 The Hedgerows Regulations 1997

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

22.4.1.7 Marine and Coastal Access Act 2009

35. The Act includes provisions for the coastal environment including improving access to the coast and undertaking Integrated Coastal Zone Management (ICZM), which brings policy makers, decision makers and stakeholders together to manage coastal and estuarine areas.

22.4.1.8 The Commons Act 2006

36. The Act aims to protect areas of common land, in a sustainable manner delivering benefits for farming, public access and biodiversity (Department for Environment, Food and Rural Affairs (Defra), 2017).

22.4.1.9 Countryside and Rights of Way Act 2000 (CRoW)

37. The Act amends the law relating to public rights of way including making provision for public access on foot to certain types of land. Amendments are made in relation to SSSIs to improve their management and protection, as well as to the Wildlife and Countryside Act 1981, to strengthen the legal protection for threatened species. Provision is also made for Areas of Outstanding Natural Beauty (AONB) to improve their management.

22.4.1.10 National Planning Policy Framework (NPPF)

38. The NPPF, published in 2012 and revised in 2018 replaces the former series of Planning Policy Statements. From its outset, the document makes plain that it is concerned with sustainable development, and paragraph 8 states that there are three dimensions to sustainable development: economic, social and environmental, and that all three are mutually dependent and gains for all should be sought jointly and simultaneously through the planning system. The environmental dimension is defined (as per the framework document) below:

“an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.”

22.4.1.11 Natural Environment White Paper 2011

39. The paper was the first White Paper produced by the government in 20 years. The paper contains plans to reconnect nature, connect people and nature for better quality of life and capture and improve the value of nature.

22.4.1.12 Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services

40. The Strategy sets out how England will implement the 2010 Aichi Biodiversity Targets, European Commission's 2011 EU Biodiversity Strategy and the recommendations of the 2011 Natural Environment White Paper. It contains the following relevant targets:
- Better wildlife habitats with 90% of priority habitats in favourable or recovering condition and at least 50% of SSSIs in favourable condition, while maintaining at least 95% in favourable or recovering condition;
 - More, bigger and less fragmented areas for wildlife, with no net loss of priority habitat and an increase in the overall extent of priority habitats by at least 200,000ha;
 - By 2020, at least 17% of land and inland water in England, especially areas of particular importance for biodiversity and ecosystem services, conserved

through effective, integrated and joined up approaches to safeguard biodiversity and ecosystem services including through management of our existing systems of protected areas and the establishment of nature improvement areas;

- Restoring at least 15% of degraded ecosystems as a contribution to climate change mitigation and adaptation;
- By 2020, we will see an overall improvement in the status of our wildlife and will have prevented further human-induced extinctions of known threatened species; and
- By 2020, significantly more people will be engaged in biodiversity issues, aware of its value and taking positive action.

22.4.1.13 National Policy Statements

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

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

42. The specific assessment requirements for onshore ecology, as detailed in the NPS, are summarised in **Table 22.6** together with an indication of the section of the PEIR chapter where each is addressed.

Table 22.6 NPS Assessment Requirements with Relevance to Onshore Ecology

NPS Requirement	NPS Reference	PEIR Reference
<i>'Where the development is subject to EIA the applicant should ensure that the ES [Environmental Statement] clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Infrastructure Planning Commission (IPC) [now the Planning Inspectorate] consider thoroughly the potential effects of a proposed project.'</i>	Section 5.3.3	Existing environment is presented in section 22.5.1 , the impact assessment is set out in section 22.6.1 .
<i>'The applicant should show how the project has taken</i>	Section 5.3.4	Embedded mitigation

NPS Requirement	NPS Reference	PEIR Reference
<i>advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'</i>		measures are provided in section 22.3.3 and where applicable, further mitigation measures are outlined in section 22.6 and section 22.7 .
<p><i>'When considering the application, the IPC will have regard to the Government's biodiversity strategy as (sic) set out in 'Working with the grain of nature', which aims to halt or reverse declines in priority habitats and species; accept the importance of biodiversity to quality of life. The IPC will consider this in relation to the context of climate change.</i></p> <p><i>As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives (as set out in section 4.4 above); where significant harm cannot be avoided, then appropriate compensation measures should be sought.</i></p> <p><i>In taking decisions, the IPC should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; habitats and other species of principal importance for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment.'</i></p>	Section 5.3.5 – Section 5.3.8	<p>Site selection decisions and embedded mitigation measures have sought to avoid features of biodiversity and geological interest.</p> <p>Embedded mitigation measures are provided in section 22.3.3 and where applicable, further mitigation measures are outlined in section 22.6 and section 22.7.</p>
<i>'For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes pSPAs to be considered in the same way as if they had already been classified. Listed Ramsar sites should, also as a matter of policy, receive the same protection'.</i>	Section 5.3.9	Designated sites are presented in section 22.5.1 . Site selection decisions have been made to avoid interest features at designated sites.
<i>'Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection.'</i>	Section 5.3.10	Designated sites are presented in section 22.5.1 . Site selection decisions have been made to avoid interest features at designated sites.

NPS Requirement	NPS Reference	PEIR Reference
<p><i>'Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted.</i></p> <p><i>Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.'</i></p>	Section 5.3.11	Designated sites are presented in section 22.5.1 . Site selection decisions have been made to avoid interest features at designated sites.
<p><i>"Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a fundamental role to play in meeting overall national biodiversity targets; contributing to the quality of life and the well-being of the community; and in supporting research and education. The IPC should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent."</i></p>	Section 5.3.13	Designated sites are presented in section 22.5.1 . Site selection decisions have been made to avoid interest features at designated sites.
<p><i>'Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated.</i></p> <p><i>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.</i></p> <p><i>Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided.</i></p> <p><i>Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why.'</i></p>	Section 5.3.14	Impacts to woodlands are presented in section 22.5.2 .
<p>The IPC will aim to maximise opportunities to build in beneficial biodiversity features when considering proposals as part of good design.</p>	Section 5.3.15	The Applicant will seek to incorporate ecological enhancement where appropriate and where agreed with stakeholders.
<p>The IPC shall have regard to the protection of legally</p>	Sections	Information on

NPS Requirement	NPS Reference	PEIR Reference
protected species and habitats and species of principal importance for nature conservation. <i>'The IPC should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context, the IPC should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development.'</i>	5.3.16 – 5.3.17	protected species and habitats is provided in section 22.5.3 and the outcome of the assessment process is provided in section 22.6.1 .
The applicant should include appropriate mitigation measures as an integral part of the proposed development and demonstrate that: <ul style="list-style-type: none"> • During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; • During construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements; • Habitats will, where practicable, be restored after construction works have finished; and • Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals. 	Section 5.3.18	Embedded mitigation measures are presented in section 22.3.3 . Mitigation measures associated with potential impacts are presented in section 22.6 .
<i>'The IPC will need to take account of what mitigation measures may have been agreed between the applicant and whether Natural England has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'</i>	Section 5.3.20	Embedded mitigation measures are presented in section 22.3.3 . Mitigation measures associated with potential impacts are presented in section 22.6 .
EN-3 NPS for Renewable Energy Infrastructure		
<i>'Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.'</i>	Section 2.4.2	Project design has been an iterative process that has sought to avoid sensitive features wherever possible. Embedded mitigation measures are presented in section 22.3.3 .
<i>'Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that, where appropriate, adverse effects can then</i>	Section 2.6.71	Monitoring is discussed, where relevant, in section 22.6.1 and

NPS Requirement	NPS Reference	PEIR Reference
<i>be mitigated and to enable further useful information to be published relevant to future projects.'</i>		section 22.6.1.2.
<i>'There may be some instances where it would be more harmful to the ecology of the site to remove elements of the development, such as the access tracks or underground cabling, than to retain them.'</i>	Section 2.7.15	Decommissioning is provided in section 22.6.3.

22.4.1.14 Local Planning Policy

43. EN-1 states that the Planning Inspectorate will also consider Development Plan Documents or other documents in the Local Development Framework to be relevant to its decision making.
44. The indicative onshore development area falls under the jurisdiction of SCC and under Suffolk Coastal District Council (SCDC) local planning authority (LPA). SCDC are in the process of merging with Waveney District Council (WDC) into an East Suffolk Council (ESC) to take effect from 1st April 2019.
45. SCDC is reviewing their current Local Plan, a First Draft Local Plan has been published for public consultation (period of consultation from 20th July to 14th September 2018) (SCDC 2018). This plan sets out strategic planning policies within East Suffolk and how the local planning authorities address the NPPF on a local basis. **Table 22.7** details Objectives, Strategic Policies and Development Management Policies that are relevant to onshore ecology. A number of policies which primarily relate to the management of water resources and flood risk, and which are inter-linked with onshore ecology are discussed in **Chapter 20 Water Resources and Flood Risk** and have not been repeated here.

Table 22.7 Relevant Local Planning Policies

Document	Policy	Policy/Guidance Purpose
Suffolk County Council		
There is no county level planning policy that requires consideration for the development. Planning policy is provided at the local district and borough levels.		
SCDC		
SCDC Local Plan - Core Strategy and Development Management Policies	SP1	Central to the Core Strategy for the future of the Suffolk Coastal district is the achievement of sustainable development. The Strategy in this respect will be to...conserve and enhance the areas natural historic and built environment.
	SP14	Biodiversity and geodiversity will be protected and enhanced using a framework based on a network of: <ul style="list-style-type: none"> Designated sites;

Document	Policy	Policy/Guidance Purpose
		<ul style="list-style-type: none"> Wildlife corridors and links; The rivers, estuaries and coast; Identified habitats and geodiversity features Landscape character areas; and Protected species. <p>Sites of European importance, which include Special Areas of Conservation and Special Protection Areas are statutorily protected under the Conservation of Habitats and Species Regulations 2017 (based on European Union (EU) directives), and wetlands of global importance (Ramsar sites) are protected by Government policy to apply the same level of protection as to European sites. More generally, the policy approach to development on sites designated for their biodiversity or geodiversity interest is set out in Policy DM27. The Suffolk BAP and Suffolk Local Geodiversity Action Plan will be implemented. The Strategy will also be to contribute to county targets through the restoration, creation and on-going management of new priority habitats as identified in those documents.</p>
	DM27	<p><i>'All development proposals should:</i></p> <p><i>(a) Protect the biodiversity and geodiversity value of land and buildings and minimise fragmentation of habitats;</i></p> <p><i>(b) Maximise opportunities for restoration, enhancement and connection of natural habitats; and</i></p> <p><i>(c) incorporate beneficial biodiversity conservation features where appropriate.</i></p> <p><i>Development proposals that would cause a direct or indirect adverse effect (alone or combined with other plans or projects) to the integrity of internationally and nationally designated environmental sites or other designated areas, priority habitats or protected / priority species will not be permitted unless:</i></p> <p><i>(i) Prevention, mitigation and, where appropriate, compensation measures are provided such that net impacts are reduced to a level below which the impacts no longer outweigh the benefits of the development or</i></p> <p><i>(ii) With regard to internationally designated sites that the exceptional requirements of reg. 62 of the Conservation of Habitats and Species regulations 2010 (as amended) relating to the absence of alternative solutions and Imperative reasons of overriding Public Interest have been met.</i></p> <p><i>Improved site management and increased public access to sites will be encouraged where appropriate.'</i></p>

22.4.1.15 Assessment Guidance

46. This EclA has been undertaken in accordance with the following guidance and standards:

- Chartered Institute of Ecology and Environmental Management (CIEEM) (2016a) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition;
 - British Standard 42020:2013 – Biodiversity. Code of Practice for planning and development;
 - Construction Industry Research and Information Association (CIRIA) C648 (2006) Control of water pollution from linear construction projects; and
 - CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd Edition).
47. The following species-specific guidance and standards have been used during the assessment process:
- Natural England (2015) Standing advice on protected species (bats (all species), great crested newt *Triturus cristatus*, badger, water vole *Arvicola amphibius*, otter *Lutra lutra*, reptiles, protected plants, invertebrates, white-clawed crayfish *Austropotamobius pallipes*, ancient woodlands and veteran trees);
 - British Standard 5837: 2012 – Trees in relation to design, demolition and construction;
 - Bat Conservation Trust and Institute of Lighting Engineers (2009) Bats and Lighting in the UK;
 - Dean et al. (2016) The Water Vole Mitigation Handbook (The Mammal Society Guidance Series);
 - Edgar et al. (2010). Reptile Habitat Management Handbook;
 - English Nature (2001) Great Crested Newt Mitigation Guidelines;
 - Joint Nature Conservation Committee (JNCC) (2003) Herpetofauna Worker's Manual;
 - Natural England (2014) Otters: surveys and mitigation for development projects. Natural England Standing Advice;
 - Natural England (2015) Badgers: surveys and mitigation for development projects. Natural England Standing Advice;
 - Natural England (2015) Bats: surveys and mitigation for development projects. Natural England Standing Advice;
 - Natural England (2015) Great crested newts: surveys and mitigation for development projects. Natural England Standing Advice;
 - Natural England (2015) Invertebrates: surveys and mitigation for development projects. Natural England Standing Advice;

- Natural England (2015) Reptiles: surveys and mitigation for development projects. Natural England Standing Advice;
- Natural England (2015) Water voles: surveys and mitigation for development projects. Natural England Standing Advice;
- Strachan and Moorhouse (2011) Water Vole Conservation Handbook, 3rd Edition; and
- GB Non-native Species Secretariat (2015) Species Information.

22.4.2 Data Sources

48. This EclA has been informed by the findings from a desk-based exercise and field survey data which has been obtained in 2017 and 2018. These data sets have been collected for different study areas depending on the receptor concerned and upon the project information available at the time of collection.
49. The field survey programme commenced in April 2018 and some surveys (e.g. monthly bat activity surveys) were ongoing at the time of writing this PEIR chapter. However, at the time of the finalisation and submission of the ES, these surveys and their findings will have been completed and therefore inform the EclA. For the purposes of this PEIR, this EclA contains the findings of all completed field surveys undertaken as of August 2018. Where appropriate, it also contains interim findings of those surveys which have commenced but are yet to be completed. The full survey findings will be presented within the ES at DCO submission.
50. The field survey methodology and programme is outlined in the Onshore Ecology and Onshore Ornithology Method Statement (which has informed the methodology outlined in **section 22.4**) (SPR 2018) and was agreed with stakeholders (Natural England, Environment Agency and Suffolk Wildlife Trust) at the ETG meeting held in April 2018.
51. The desk-based data sources used to inform the EclA are summarised in **Table 22.8** and have been obtained to cover the study areas referred to in **Table 22.3**.

Table 22.8 Desk-Based Data Sources to Inform the EclA

Data	Data source
Internationally designated nature conservation sites (i.e. Ramsar sites)	Joint Nature Conservation Committee (JNCC). Multi-Agency Geographic Information for the Countryside (MAGIC) website
European designated nature conservation sites (i.e. Special Protection Area (SPA), Special Area of Conservation (SAC)).	JNCC. MAGIC website.

Data	Data source
Nationally designated nature conservation sites (i.e. SSSI, National Nature Reserves (NNR), Local Nature Reserves (LNR)).	JNCC. MAGIC website.
UKHPI	JNCC
Locally designated nature conservation sites (i.e. County Wildlife Sites (CWS), Local Wildlife Sites (LWS))	Suffolk Biodiversity Information Service (SBIS)
Protected Species records	SBIS

22.4.2.1 Assumptions and Limitations

52. Biological records data provided by SBIS includes records collected by members of the public and volunteers, and therefore these are not necessarily subject to quality control or necessarily contain full details of, or spatially accurate information for, the species recorded. The absence of records does not imply any species or habitat is absent from the search area. Nor does recorded presence imply current, continuing or breeding presence. Despite these caveats, biological records provide very useful supporting data to provide context when field survey data is not available.
53. Field surveys have been undertaken during their optimum surveying windows, where access has been possible. Approximately 30% of the onshore study area was inaccessible during the 2018 survey effort. In these instances, an assessment of the habitat/likelihood of species being present has been made using the findings from the Extended Phase 1 Habitat Survey. The data gaps encountered due to the lack of full landowner access will be subject to full surveys post-consent when landowner access is available.
54. Some habitats could not be fully accessed during the field surveys due to physical barriers preventing entry, for example complex field drain networks or dense scrub. However, these areas were encountered infrequently and, where they were, they were recorded and it was noted that the presence of field signs within these areas could not be ruled out.
55. The Extended Phase 1 Habitat Survey was undertaken in April 2018, which is within the optimal survey period for identifying ground flora species and habitat communities.
56. Despite the survey limitations described above, the data collected is considered to be sufficient to identify the nature and scale of impacts likely to arise as a

result of the indicative onshore development area in order to conduct a robust EclA.

57. It should be noted that at the time of undertaking the 2018 Extended Phase 1 Habitat Survey, the proposed onshore development area was yet to be finalised, and therefore survey and reporting was completed on the indicative onshore development area. The information presented in this chapter is therefore described in terms of the indicative onshore development area boundary. The proposed onshore development area is shown on **Figure 22.4** for context. In any instances where the proposed onshore development area does not overlap exactly with the indicative development area, an assessment of the habitat/likelihood of species being present has been made using the findings from the Extended Phase 1 Habitat Survey and desk based assessment. For the ES submitted with the DCO application this chapter and its appendices will be revised to ensure relevance to the proposed onshore development area.

22.4.3 Impact Assessment Methodology

22.4.3.1 EclA Overview

58. The EclA methodology proposed in relation to onshore ecology is based on the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2nd Ed.) (CIEEM 2016a). This approach was agreed with stakeholders at the ETG meeting held in April 2018. These 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.
59. The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where possible, quantifying the sensitivity and value of all ecological receptors and magnitude of effects which have been scoped into this assessment. Using this information, the significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.
60. The EclA has used professional judgement to ensure the assessed significance level is appropriate for each individual receptor, taking account of local values for biodiversity to avoid a subjective assessment wherever possible as per the CIEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix detailed below.

22.4.3.2 Importance

61. The first stage of an EclA is determining the ‘importance’ of ecological features or ‘receptors’. CIEEM identifies the important ecological features as those key

sites, habitats and species which have been identified by European, national and local governments and specialist organisations as a key focus for biodiversity conservation in the UK. These include:

- Statutory and non-statutory designated sites for nature conservation;
- Species occurring on national biodiversity lists;
- UK Habitats of Principal Importance; and
- Red listed, rare or legally protected species.

62. 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.

63. For this EcIA, the guidelines outlined in **Table 22.9** will be followed to provide the relative importance of different ecological features.

Table 22.9 Definitions of Importance Levels for Onshore Ecology

Importance	Definition
High	<p>An internationally designated site or candidate site or an area which the statutory nature conservation organisation has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified;</p> <p>A nationally designated site or a discrete area, including ancient woodlands, which the statutory nature conservation organisation has determined meets the published selection criteria for national designation (e.g. Site of Special Scientific Interest (SSSI) selection guidelines) irrespective of whether or not it has yet been notified;</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole;</p> <p>A viable area of a UK Habitat of Principal Importance or smaller areas of such habitat which are essential to maintain the viability of a larger whole (such as some hedgerows);</p> <p>A European protected species (EPS) listed in The Conservation of Habitats and Species Regulations 2017; or</p> <p>A regularly occurring, nationally significant population / number of any internationally important species.</p>
Medium	<p>County Council / Unitary Authority designated sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on defined ecological criteria and Wildlife Trust sites;</p> <p>Viable areas of habitat identified in a Local Biodiversity Action Plan (LBAP);</p> <p>Semi-natural woodland greater than 0.5 hectares (ha) which is considered to be in 'good condition'.</p>

Importance	Definition
	Any regularly occurring population of a nationally important species which is threatened or rare in the region; or A regularly occurring, locally significant number of a species identified as important on a regional basis.
Low	Semi-natural woodland greater than 0.25ha which is considered to be in 'good condition' or greater than 0.5ha in unfavourable condition; Network of inter-connected hedgerows including some species-rich hedgerows; Individual Important hedgerows or other ancient-countryside linear features; Viable areas of habitat identified in a sub-county (District / Borough) BAP; Any regularly occurring population of a nationally important species which is not threatened or rare in the region or county; Sites / features that are scarce within the District / Borough or which appreciably enrich the District / Borough habitat resource; or Other features identified as wildlife corridors or migration routes.
Negligible	Features of value to the immediate area only e.g. within the site.

64. In addition to the features listed in **Table 22.9**, 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.
65. CIEEM places the emphasis on using professional judgement when considering importance of ecological receptors, based on available guidance, information and expert advice (CIEEM 2016). Various aspects of ecological importance should be taken into account, including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features.

22.4.3.3 Magnitude

66. The magnitude of the impact is assessed according to:
- The extent of the area subject to a predicted impact;
 - The duration the impact is expected to last prior to recovery or replacement of the resource or feature;
 - Whether the impact is reversible, with recovery through natural or spontaneous regeneration, or through the implementation of mitigation measures or irreversible, when no recovery is possible within a reasonable timescale or there is no intention to reverse the impact; and

- The timing and frequency of the impact, i.e. conflicting with critical seasons or increasing impact through repetition.

67. **Table 22.10** summarises the definitions of magnitude that have been used for the onshore ecological receptors.

Table 22.10 Definitions of Magnitude Levels for Onshore Ecology

Magnitude	Definition
High	Major impacts on the feature / population, which would have a sufficient effect to alter the nature of the feature in the short to long term and affect its long-term viability. For example, more than 20% habitat loss or damage.
Medium	Impacts that are detectable in short and long-term, but which should not alter the long-term viability of the feature / population. For example, between 10 - 20% habitat loss or damage.
Low	Minor impacts, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature / population. For example, less than 10% habitat loss or damage.
Negligible / No impact	A potential impact that is not expected to affect the feature / population in any way, therefore no effects are predicted.

22.4.3.4 Duration

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

- Short term – effects which at most occur over a part of – or over a part of a key period of – a species' active season or a habitat's growing season, i.e. typically effects 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 effects 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 effects which occur over more than one year.

69. Where deviations from these definitions are used, this is explained within the text.

22.4.3.5 Impact Significance

70. Following the identification of receptor importance and magnitude of the effect, it is possible to determine the significance of the impact.

71. Ecologically significant impacts are defined as:

‘...impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)’ (CIEEM 2016a).

72. 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.

73. CIEEM recommend that the following factors are taken into account 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).

74. Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in **Table 22.11** below and knowledge of the ecological features affected.

75. 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 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 22.11 Impact Significance Matrix

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

76. The impact significance categories are defined as shown in **Table 22.12**.
77. Following initial assessment, if the impact does not require additional mitigation (or none is possible) the residual impact will remain the same. If, however, additional mitigation is proposed there will be an assessment of the post-mitigation residual impact.

Table 22.12 Impact Significance Definitions

Impact 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.

78. 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.
79. Embedded mitigation has been referred to and included in the initial assessment of impacts. If the impact does not require mitigation (or none is

possible) the residual impact remains the same. If, however, mitigation is required an assessment of the post-mitigation residual impact is provided.

22.4.4 Cumulative Impact Assessment

80. The proposed East Anglia TWO project Cumulative Impact Assessment (CIA) will initially consider the cumulative impact with only the proposed East Anglia ONE North project against two different construction scenarios (i.e. construction of the two projects simultaneously and sequentially). The worst case scenario of each impact is then carried through to the traditional CIA which considers other developments which are in close proximity to the proposed East Anglia TWO project. For a general introduction to the methodology used for the CIA please refer to **Chapter 5 EIA Methodology**.
81. In terms of onshore ecology, the key consideration used in relation to linear development is whether there is spatial or temporal overlap of effects from projects on the same receptors. Therefore, for habitats and non-mobile species there is no pathway for cumulative impact between spatially separated projects. There is however the potential for a cumulative impact upon the overall habitat resource at a regional or national level. Where potential regional or national level impacts are identified and considered to be relevant they are included in the CIA.
82. For mobile species, there is only a pathway for cumulative impact if there is spatial overlap of potential receptor ranges in addition to temporal overlap with the activity or its resultant impact i.e. where developments follow on from one another before the species has recovered from displacement or other impacts. In addition, whilst it is assumed that any consented development would be subject to mitigation and management measures which would reduce impacts to non-significant unless there were exceptional circumstances, it is accepted that such projects may contribute to a wider cumulative impact.
83. Finally, in cases where this project has negligible or no impact on a receptor (through, for example, avoidance of impact through routing or construction methodology) it is considered that there is no pathway for a cumulative impact.
84. Further details of the methods used for the CIA for onshore ecology are provided in **section 22.7**.

22.4.5 Transboundary Impact Assessment

85. There are no transboundary impacts with regards to onshore ecology as the onshore infrastructure is not sited in proximity to any international boundaries.

22.5 Existing Environment

22.5.1 Designated Sites

86. Designated sites that are located within, and up to 2km from, the indicative onshore development area are listed in **Table 22.13** and shown on **Figure 22.1** and **Figure 22.2**. **Table 22.13** also provides a summary of the qualifying features/reasons for notification of these designated sites. The legislation underpinning designated sites is provided in **Chapter 3 Policy and Legislative Context**.

Table 22.13 Designated Sites within 2km of the Indicative Onshore Development Area

Designated site	Key features	Proximity to indicative onshore development area
Statutory Designated Sites		
Sandlings SPA	Breeding populations of nightjar and woodlark. Acid grassland, heath, scrub, woodland (including commercial forest), fen, open water and vegetated shingle.	Within indicative onshore development area
Minsmere to Walberswick Ramsar, SPA and SAC	Nationally important numbers of breeding and wintering birds. Annual vegetation of drift lines (vegetated shingle). European dry heath.	1.8km
Alde-Ore Estuary Ramsar, SPA, SSSI and Alde-Ore & Butley Estuaries SAC	Nationally important numbers of breeding and wintering birds. Estuaries. Atlantic salt meadows. Mudflats.	2km
Leiston to Aldeburgh SSSI	Acid grassland, heath, scrub, woodland, fen, open water and vegetated shingle.	Within indicative onshore development area
Sizewell Marshes SSSI	Lowland unimproved wet meadow	400m
Minsmere to Walberswick Heath and Marshes SSSI	Mudflats, shingle beach, reed beds, heathland and grazing marsh.	1.8km
Non-statutory Designated Sites – County Wildlife Sites (CWS)		
Grove Wood	Ancient woodland	Within indicative onshore development area
Suffolk Shingle Beaches	Vegetated shingle	Within indicative onshore development area (at the landfall)
Aldringham to Aldeburgh	Species rich grassland	On the boundary of the indicative onshore

Designated site	Key features	Proximity to indicative onshore development area
Disused Railway Line		development area
Knodishall Common	Acid grassland	On the boundary of the indicative onshore development area
Dower House	Acid grassland	Within indicative onshore development area
Great Wood	Ancient woodland	480m
Knodishall Whin	Habitat mosaic	600m
Reckham Pits Wood	Habitat mosaic	680m
Leiston Common	Habitat mosaic	680m
Buckle's Wood	Ancient woodland	800m
Sizewell Levels and Associated Areas	Habitat mosaic	1.1km
Benhall Green Meadows	Wet species rich grassland	1.6km
Church Common	Heathland mosaic	1.8km
Kelsale Morio Meadow	Species rich grassland	2km
Southern Minsmere Levels	Grazing marsh	2km

87. All statutory designated sites for nature conservation are considered to be of high importance, in accordance with the criteria set out in **Table 22.9**.
88. All non-statutory designated sites are considered to be of medium importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2 Terrestrial Habitats

89. The information presented here is based on field survey data collected during the 2018 Extended Phase 1 Habitat Survey. Full details of the habitats present are provided in **Appendix 22.1**. Features of interest are described using Target Notes (TN), which are referenced using a numbering system. The locations of the TNs are shown on **Figure 22.4**, and further details are provided within the 2018 Extended Phase 1 Habitat Survey Report (**Appendix 22.1**).

22.5.2.1 Arable Land

90. The largest habitat by area (417ha) within the indicative onshore development area is arable land (JNCC Phase 1 Habitat code J1.1). At the time of the survey these ranged from fields that were either in crop (including beetroot,

potato and oilseed rape) or had been ploughed. The 417ha of arable land equates to approximately 78.2% of this type of habitat within the indicative onshore development area.

91. All areas of arable land are considered to be of low importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.2 Boundary Features

92. Field boundaries consisted primarily of hedgerows (93 of 99 boundary features recorded), of which the majority (33) are species-poor hedgerows with trees (J2.3.2). However, species-poor intact hedgerows (31) (J2.1.2), species-poor defunct hedgerows (23) (J2.2.2), species-rich hedgerows with trees (5) (J2.3.1) and species-rich defunct hedgerows (1) (J2.2.1) were also recorded. Occasionally fields were bordered by fences (J2.4) or dry ditches (J2.6).
93. Species rich hedgerows (J2.1.1, J2.2.1 and J2.3.1) typically consisted of shrub and tree species including hawthorn *Crataegus monogyna*, oak *Quercus robur*, ash *Fraxinus excelsior*, hornbeam *Carpinus betulus*, willow *Salix spp.*, ivy *Hedera helix*, dog rose *Rosa canina*, holly *Ilex aquifolium*, with ground flora typically consisting of common nettle *Urtica dioica*, bramble *Rubus fruticosus*, cow parsley *Anthriscus sylvestris*, red-dead nettle *Lamium purpureum*, cleavers *Galium aparine*, common hogweed *Heracleum sphondylium*, lords & ladies *Arum maculatum*, broad leaf dock *Rumex obtusifolius*, wild clary *Salvia verbenaca*, hedgerow crane's-bill *Geranium pyrenaicum* and herb robert *Geranium robertianum*. Species poor hedgerows (J2.1.2, J2.2.2 and J2.3.2) were characterised by fewer than five species within a 30m stretch and were typically dominated by hawthorn.
94. As a UKHPI and Suffolk BAP hedgerow habitat, the local hedgerow resource is of high importance based on the criteria defined in **Table 22.9**. None of the hedgerows identified were assessed as important hedgerows in terms of ecological criteria (species rich and intact hedge). Further detail is given in **section 22.6.1.5**

22.5.2.3 Semi-natural Woodland

95. Areas of semi-natural woodland (A1.1.1, A1.2.1 and A1.3.1) were recorded in 38 locations within the indicative onshore development area, these ranged from large areas of woodland through to small isolated pockets at field margins and within disused pits. These areas of woodland represent a coverage of approximately 22ha, which in turn represents approximately 4.1% of this type of habitat within the indicative onshore development area.

96. Broadleaved woodland typically consisted of a mix of ash, sycamore *Acer pseudoplatanus*, oak and silver birch *Betula pendula* with typical understorey and ground flora species including hawthorn, bramble, common nettle, lords & ladies, primrose *Primula vulgaris*, golden saxifrage *Chrysosplenium oppositifolium*, creeping willow *Salix repens* and ground ivy *Glechoma hederacea*. Coniferous woodland species typically included Scots pine *Pinus sylvestris* and juniper *Juniperus communis*.
97. Areas of semi-natural woodland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.4 Plantation Woodland

98. Plantation woodland (A1.1.2, A1.2.2 and A1.3.2) was recorded in 19 locations within the indicative onshore development area and typically included oak, silver birch, beech *Fagus sylvatica*, sweet chestnut *Castanea sativa* and Scots pine. Pheasant feeders and enclosures were observed within several areas of plantation woodland, with limited understorey and ground flora species consisting mainly of bramble, common nettle and lords & ladies. These areas of woodland represent a coverage of approximately 0.1ha, which in turn represents approximately 0.01% of this type of habitat within the indicative onshore development area.
99. Areas of plantation woodland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.5 Scrub

100. A total of 22 areas of scrub were recorded within the indicative onshore development area and in total covers an area of 9ha (representing approximately 1.7% of this type of habitat within the indicative onshore development area). These areas represented a range of habitat sub-types including transitional habitat between woodland and grassland, boundary features, waste ground, field margins and watercourse margins. Species present included bramble, gorse *Ulex spp.*, bracken *Pteridium spp.*, common nettle, common hogweed, cow parsley and cleavers.
101. Areas of scrub are considered to be of medium importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.6 Scattered Trees

102. Scattered trees are present throughout the indicative onshore development area. Species recorded included Scots pine, sweet chestnut, bird cherry *Prunus padus*, beech and silver birch.

103. All scattered trees are considered to be of high importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.7 Improved Grassland

104. Improved grassland (JNCC habitat code B4) was recorded in 33 locations within the indicative onshore development area and in total covers an area of 22ha (representing approximately 4% of this habitat type within the indicative onshore development area). This habitat typically represents an area being used for either grazing or paddocks and is formed of short sward grasses with areas of scrub vegetation.
105. Areas of improved grassland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.8 Poor Semi-Improved Grassland

106. Poor semi-improved grassland (habitat code B6) was recorded in 24 locations within the indicative onshore development area, which in total covers an area of 23ha (representing approximately 4.3% of this habitat type across the indicative onshore development area). These areas were comprised of coarse ruderal grass and herb species such as cock's foot *Dactylis glomerata*, common couch *Elymus repens*, rough meadowgrass *Poa trivialis*, broad leaf dock, red dead nettle and white clover *Trifolium repens*.
107. Areas of poor semi-improved grassland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.9 Standing Water

108. A total of 40 standing water bodies (ponds) are within the indicative onshore development area. The locations of which are shown on **Figure 22.5**.
109. Areas of standing water are considered to be of high importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.10 Coastal Grassland

110. Coastal grassland (H8.4) was recorded along the coastline at the eastern edge of the indicative onshore development area and comprised gorse, bracken, and marram grass *Ammophila arenaria*. Areas of coastal grassland are considered to be of high importance, in accordance with the criteria set out in **Table 22.9**.

22.5.2.11 Coastal Vegetated Shingle

111. Coastal vegetated shingle is considered rare globally and is listed on Annex I of the EU Habitats Directive ('perennial vegetation of stony banks'). It supports a unique range of flora and fauna that are adapted to the harsh conditions that

are present at such locations. This is a feature of the Leiston - Aldeburgh SSSI at the landfall. Landfall will be made using a long HDD and therefore, there will be no direct or indirect impacts on the intertidal zone and so impacts on coastal vegetated shingle are not considered further.

22.5.2.12 Summary

112. **Table 22.14** shows the key habitats which were recorded within the indicative onshore development area during the 2018 Extended Phase 1 Habitat Survey.

Table 22.14 JNCC Phase 1 Habitat Areas and Boundaries Recorded During the Field Survey

JNCC Phase 1 Habitat Survey Code	JNCC Phase 1 Habitat Survey Description	Area (ha)	Percentage of habitat type within indicative onshore development area
A1.1.1	Broadleaved woodland – semi-natural	20.9	3.9%
A1.1.2	Broadleaved woodland – plantation	0.1	0.01%
A1.3.1	Mixed woodland – semi-natural	1.2	0.2%
A2.1	Scrub – dense/continuous	9.2	1.7%
B4	Improved grassland	22.3	4.2%
B6	Poor semi-improved grassland	22.9	4.3%
J1.1	Cultivated/disturbed land – arable	416.5	78.2%
JNCC Phase 1 Habitat Survey Code	JNCC Phase 1 Habitat Survey Description	Length (m)	
J2.1.2	Intact hedge – species poor	7,198	
J2.2.1	Defunct hedge – species rich	176	
J2.2.2	Defunct hedge – species poor	5,995	
J2.3.1	Hedge with trees – species rich	1,357	
J2.3.2	Hedge with trees – species poor	6,994	

22.5.3 Protected, Notable and Invasive Species

113. This section provides a summary of the key species recorded within the indicative onshore development area, drawing on the information obtained from both the desk study and the 2018 ecological field surveys. Results from the desk based study are shown in **Figure 22.3**.

22.5.3.1 Birds

114. All baseline information, and impact assessment, with regard to onshore ornithology is covered in **Chapter 23 Onshore Ornithology** of this PEIR.

22.5.3.2 Badger

115. Badgers have been recorded within the indicative onshore development area and up to 2km from its boundaries (**Figure 22.10**).

116. Eight active badger setts were recorded during the 2018 Extended Phase 1 Habitat Survey within the indicative onshore development area (and 50m buffer), with a further four disused badger setts also being recorded.

117. Badgers are protected under the Protection of Badgers Act 1992.

118. As a regularly occurring population of a nationally important species which is not threatened or rare in the country, badgers are considered to be of low importance.

22.5.3.3 Bats

119. All features (i.e. trees, buildings, structures) noted during the Extended Phase 1 Habitat Survey identified to be within the indicative onshore development area were assessed from the ground using binoculars (in accordance with the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition, 2016) for their suitability to support roosting bats. A total of 15 features were assessed as having moderate or high suitability. **Table 22.15** below provides details of each feature assessed. **Figure 22.4** shows the locations of these features.

Table 22.15 Bat Roosting Habitat Features Recorded During the 2018 Field Survey (should be read in conjunction with **Figure 22.4)**

Target Note number	Feature and description	Bat Potential
TN3b	Scattered scots pine with peeling bark/split limbs	Moderate
TN4b	Dead tree trunk with large holes	Moderate
TN204a	Mature ivy clad oak tree	Moderate
TN213a	Five mature oaks within house gardens with visible cracks/holes	High

Target Note number	Feature and description	Bat Potential
TN218a	Mature ivy clad oak within hedge (TN219a)	Moderate
TN233a	Three mature ivy clad oak around perimeter of pit	Moderate
TN236a	Trees within hedge	Moderate
TN254a	Trees within woodland	High
TN258a	Trees within woodland	High
TN261a	Mature ivy clad oak within hedge (TN260a)	Moderate
TN266a	Mature ivy clad oak in hedge (TN265a)	Moderate
TN306	Trees within woodland	Moderate
TN311	Mature ivy clad oak in hedge (TN309)	Moderate

120. All of those features assessed as having either moderate or high potential to support roosting bats have been subject to bat emergence/re-entry surveys during 2018 to confirm the presence/absence of roosting bats. In accordance with the BCT guidance, no further surveys for those features assessed as having low potential to support roosting bats have been undertaken. The emergence/re-entry surveys for the features having moderate or high potential were undertaken between June and October 2018. Results from the bat activity surveys can be found in **Appendix 22.4** and on **Figure 22.8**.
121. In addition to trees and structures, all linear features (e.g. watercourses, hedgerows) were categorised in terms of their suitability to support commuting or foraging bats, in accordance with the BCT guidance. This categorisation was based on the habitat type, qualified by how well connected to surrounding habitat the habitat feature was. The categorisation used was as follows:
- Defunct hedgerows and field drains typically provided low suitability for commuting and foraging bats;
 - Intact species-rich hedgerows, areas of scrub and small watercourses typically provided moderate suitability for commuting and foraging bats; and
 - Species-rich hedgerows with trees and large watercourses well connected to the wider landscape typically provided high suitability for commuting and foraging bats.
122. In total, 58 features were assessed for their suitability to support commuting or foraging bats and assessed as providing low to high suitability. The locations of the commuting/foraging features are shown on **Figure 22.7**.

123. Bat activity surveys of those features assessed as providing suitability for foraging/commuting bats were undertaken between June and October 2018. Results from the bat activity surveys can be found in **Appendix 22.4** and on **Figure 22.8**.
124. All bats are EPS and a Suffolk priority species. Therefore, all bat species are of high importance.

22.5.3.4 Water Vole and Otter

125. A total of 40 water bodies (ditches and a river) were assessed for their suitability to support water voles. Of these, 27 were dry and assessed as being sub-optimal for water vole. Of the remaining 13 water bodies six were assessed as being sub optimal and two are located outside of the indicative onshore development area. Therefore, leaving a total of five water bodies (ditches) that were assessed as providing optimal habitat for water voles within the indicative onshore development area. **Figure 22.9** shows the locations of these water bodies.
126. Those ditches assessed as sub-optimal were primarily due to the watercourse having very little bank for burrowing, very poor water quality observed, very shallow banks, low flows, evidence of regular channel maintenance or isolation from any connecting habitat.
127. A single water body (Hundred River – TN63) was assessed as being suitable to support otter. The remaining 39 water bodies were assessed as sub-optimal habitat for otters, primarily due insufficient size and depth to support otters as well as not being functionally connected to the wider river network (these were typically agricultural field drains).
128. Two water vole and otter surveys have been completed. The findings of which are provided in **Appendix 22.3**. No evidence of water vole or otter has been recorded during the surveys completed to date or provided by SBIS during the desk study, therefore they are assumed to be absent (as two surveys have been undertaken to confirm no evidence) and are not considered further in this assessment. It should be noted that given the mobility of both water voles and otters, in combination with the presence of optimal habitat for these species being present, prior to works commencing, a pre-construction survey (within the optimal survey window) for both species may be undertaken to confirm that both species remain absent, i.e. no changes to the findings of the 2018 survey. This should be undertaken by a suitably qualified ecologist.
129. Water voles and otters are EPS and Suffolk priority species, therefore both species are of high importance.

22.5.3.5 Great Crested Newt

130. A total of 38 water bodies (ponds) have been identified within the great crested newt study area as being of optimal habitat to support great crested newts. All of these water bodies were assessed for their potential to support great crested newts using the Habitat Suitability Index (HSI) assessment. Full details of these water body assessments are provided in **Appendix 22.2** (eDNA Survey Report, SPR 2018) and the locations of these water bodies are shown on **Figure 22.5**.
131. Suitable terrestrial habitat for supporting foraging and hibernating great crested newts was observed throughout the indicative onshore development area. Part of the HSI assessment includes an assessment of the habitat surrounding a potential breeding pond for its suitability to support foraging and hibernating newts.
132. Of the 38 water bodies subject to the HSI assessment, 10 were noted to be dry and therefore scoped out from any further survey and/or consideration. In addition, access was only granted to 23 of the remaining 28 water bodies and therefore these 23 water bodies were subject to an eDNA test which was undertaken in accordance with approved field and laboratory protocols (Briggs *et al.* 2014), in May and June 2018. This is an approved valid method for great crested newt presence/absence survey and this approach was agreed with stakeholders at the ETG meeting in April 2018. Of the 23 water bodies surveyed, three ponds returned a positive result and the remaining 20 water bodies returned a negative result. Results of eDNA surveys can be found on **Figure 22.6**. Population size assessment surveys will be undertaken for these three waterbodies prior to the commencement of construction works. The findings of which will be used to inform and develop any appropriate mitigation measures where required.
133. Great crested newts are an EPS and a Suffolk LBAP priority species. As an EPS, great crested newts are considered to be of high importance.

22.5.3.6 Reptiles

134. During the field survey, a total of 14 areas of suitable reptile habitat were recorded. These areas comprise habitat mosaics and potential refugia locations for which could potentially support common reptile species. **Table 22.16** contains the details of these areas.

Table 22.16 Areas of Suitable Reptile Habitat or Potential Refugia as Recorded During the 2018 Field Survey (to be read in conjunction with *Figure 22.4*)

Target Note Number	Description
TN9b	Large vegetated mound – optimal feeding/basking area for reptiles
TN22b	Habitat mosaic within scrub vegetation
TN40b	Habitat mosaic within scrub vegetation
TN62a	Habitat mosaic within improved grassland
TN88a	Potential refugia (log piles) and habitat mosaic within woodland area
TN101a	Habitat mosaic within scrub vegetation
TN152a	Habitat mosaic within scrub vegetation
TN162a	Habitat mosaic within woodland area
TN185a	Habitat mosaic within hedgerow and field margin
TN190a	Habitat mosaic within woodland edges
TN198a	Habitat mosaic within grassland area
TN238a	Habitat mosaic within boundary feature
TN283	Habitat mosaic within scrub vegetation
TN310	Habitat mosaic within grassland area

135. The locations of these habitat mosaics and potential refugia are shown on **Figure 22.4**. These mosaics contain a range of habitats including scrub, woodland edges, heath and grassland.
136. An adult female adder was observed during the field survey within the field margins north of Gower House (TN13a). No further reptile surveys will be undertaken (as agreed with stakeholders during the April 2018 ETG meeting), however appropriate mitigation measures (i.e. habitat manipulation works) to ensure compliance with the legislation afforded to reptiles will be developed and adhered to during construction related activities where required.
137. All reptile species are protected under the Wildlife and Countryside Act 1981 (as amended). As a nationally important species which is rare in the region, reptiles are considered to be of medium importance.

22.5.3.7 Dormice

138. Although Dormice have been recorded within the wider area of Suffolk, no records were returned during the desk study to be within the indicative onshore development area. Furthermore, no suitable habitat was recorded within the

indicative onshore development area during the 2018 Extended Phase 1 Habitat Survey. Consequently, this species is considered to be absent and has not been considered further in this report.

22.5.3.8 Invertebrates

139. No evidence of suitable habitat to support significant populations of invertebrates was noted during the 2018 Extended Phase 1 Habitat Survey within the indicative onshore development boundary. Furthermore, through the implementation of the embedded mitigation measures regarding species, such areas where invertebrates have been recorded (predominately around the habitats along the coastline) will be avoided wherever possible. Consequently, these species have not been considered further in this report.

22.5.3.9 Invasive Non-Native Species

140. During the 2018 Extended Phase 1 Habitat Survey, Himalayan balsam was noted along the Hundred River. This is an invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). No other invasive non-native species were noted during the survey.
141. As the risk posed by this species is of national importance, the risk posed by this species is considered to be of medium importance.

22.5.4 Anticipated Trends in Baseline Condition

142. The ecological baseline described in the preceding sections provides a summary of the habitats and species present within the indicative onshore development area. In broad terms, the indicative onshore development area includes typical lowland UK habitat types comprising largely arable farmland with hedgerows, pockets of woodland, standing and flowing water. The key areas for notable species and habitats are typically designated sites and parcels of woodland and wetland, with species in other areas relying strongly on ecological corridors such as watercourses and hedgerows for connectivity across arable farmland.
143. The overall trend in the UK is for a decline in priority species since the 1970s, although the gradient of this decline has lessened since 2000 (Defra 2017). This overall trend is driven by certain species groups, with moths in particular declining by approximately 80% over this period (Defra, 2017). Habitat connectivity has remained static since 1990, and indicators of ecosystems services provision (pollinators) have also remained static over the short term. Perhaps most relevant to the study area, species associated with farmland have declined over the short and long term, with farmland birds and butterflies both declining, whilst mammal (bats) numbers increased from 1999-2015, but the increase has levelled out from the period 2010-2015 (Defra 2017).

144. Attempts to manage trends in biodiversity are delivered through EU, UK and local legislation and policies. The UK has transposed protection for European protected species and habitats into UK law, and also provides domestic legislation for species and sites not covered by European protection. These species will continue to be protected under the forthcoming EU Withdrawal Bill. 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 are still being gathered to determine success of these measures, however for the time being it appears that declining trends in biodiversity for the habitats and species present within the study area may continue. As a consequence, 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.

22.6 Potential Impacts

145. The following sections describe the impacts upon those ecological receptors described in **section 22.5** that have the potential to arise as a result of the construction, operation and decommissioning phases of the proposed East Anglia TWO project. The assessment follows the methodology set out in **section 22.3.3**. The assessments are based on the worst-case scenarios set out in **section 22.3.2** and include the incorporation of embedded mitigation and project commitments set out in **section 22.3.3**.
146. Given that the exact locations of infrastructure (i.e. haul road, jointing bays and CCS) cannot be determined at this time, a precautionary approach to the assessment has been taken in the sections below, i.e. assuming that the total area of each habitat type within the indicative onshore development area may be affected by the proposed works, or defining a realistic worst case. The location of the onshore infrastructure will be finalised post-PEIR and the assessment updated accordingly and reported within the ES that will form part of the final DCO application.

22.6.1 Potential Impacts during Construction

22.6.1.1 Impact 1: Impacts to Designated Sites

22.6.1.1.1 Impacts Associated with the Landfall

147. There is one statutory designated site overlapping with the part of the coastline where landfall works are expected, namely Leiston-Aldeburgh SSSI. In addition, there are two designated sites within 2km of the landfall works: Sandlings SPA (adjacent to the west); and Sizewell Marshes SSSI (approximately 1.8km north). There are no non-statutory designated sites within the landfall area.

148. The landfall works comprise HDD drilling activities that will launch from an onshore compound out to an exit point out at sea (refer to **Chapter 6 Project Description**). The proposed East Anglia TWO project has committed to a long HDD at the landfall, which avoids any interaction with Leiston-Aldeburgh SSSI, i.e. no requirement for beach access. As such, the intertidal features of the Leiston-Aldeburgh SSSI would not be affected directly or indirectly by landfall construction. As such, no change to Leiston-Aldeburgh SSSI is predicted during the landfall construction works.
149. Sizewell Marshes SSSI comprises water dependent habitats and associated bird assemblages, located 1.8km north of the landfall area. There is no direct overlap with the indicative onshore development area and given the distance of separation there is no mechanism for indirect impacts to this site. As such, no changes to Sizewell Marshes SSSI are predicted during the landfall construction works.
150. Sandlings SPA does not overlap with the landfall area but is located immediately to the west. There is the potential for indirect (disturbance) impacts to bird species (e.g. nightjar and woodlark) associated with this site during landfall construction works. No significant impacts were identified to bird species due to construction at the landfall. Further information on these species and the detailed impact assessment is provided in **Chapter 23 Onshore Ornithology**.

22.6.1.1.2 Impacts Associated with the Onshore Cable Corridor

151. There is one statutory designated site with the potential for direct interaction with the onshore cable corridor, namely Sandlings SPA. In addition, there are two designated sites within 2km of the indicative onshore development area identified for qualifying bird species (i.e. with the potential for indirect disturbance impacts): Minsmere to Walberswick Ramsar and SPA (1.8km north); and Alde-Ore Estuary Ramsar and SPA (approximately 2km south). There are a number of other designated sites within 2km (refer to **Table 22.13**), however, these are all designated for habitats alone and there is no mechanism for indirect disturbance impacts associated with the installation of the onshore cables.
152. Non-statutory designated sites which fall within the indicative onshore development area are listed in **Table 22.13**.
153. The cable route will cross Sandlings SPA within the northernmost (narrowest) section. The worst-case scenario allows for crossing the Sandlings SPA using open cut trenching. The Applicant has committed to a reduced working width of 16.1m (reduced from 32m) within Sandlings SPA for a length up to 300m

depending on the exact alignment chosen. The implications of this embedded mitigation mean that the area potentially affected within Sandlings SPA would be reduced from 0.957ha to 0.483ha, which represents a reduction from 0.028% to 0.014% of the SPA (total area of Sandlings SPA is 3,405.72ha).

154. Based on the criteria defined in **Table 22.9** this is assessed as an effect of medium magnitude (less than 10% of the site affected, but impacts are detectable in the long-term, i.e. 17 months) on a high value receptor, and without mitigation represents a temporary impact of **major adverse significance**.
155. There is the potential for indirect (disturbance) impacts to bird species associated with Minsmere to Walberswick Ramsar and SPA, and Alde-Ore Estuary Ramsar and SPA during cable route construction works. However, cable installation construction noise and human presence at these distances (1.8km and 2km respectively) are not considered to represent any disturbance risk to qualifying species using those sites. Overall no changes are predicted at these two sites.

22.6.1.1.3 Impacts Associated with the Onshore and National Grid Substations

156. There are no statutory designated sites within 2km of the onshore substation and National Grid infrastructure.
157. There is one non-statutory designated site adjacent to the onshore substation site, namely Grove Wood, which is designated as ancient woodland. This woodland will be retained and therefore, there will be no change to this non-statutory designated site.

22.6.1.1.4 Mitigation

158. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:
- Pre-construction bird surveys will be undertaken to establish the presence of breeding birds;
 - A BBPP Plan will be produced for works within or within 200m of the SPA and SSSI boundary which will identify the risks to breeding birds and ensure the protection of their nests;
 - Measures will be adopted to minimise noise, light and disturbance on identified breeding birds, such as visual screening (e.g. opaque fencing) where necessary; and

- Construction activities would be monitored by an Environmental Clerk of Works (ECoW) or suitably qualified ornithologist, who would seek to ensure compliance with the Wildlife & Countryside Act 1981 by avoiding destruction of nests, eggs or young, and affording increased protection from disturbance to Schedule 1 species breeding birds.

22.6.1.1.5 Impacts following Mitigation

159. Following the implementation of the mitigation measures considered necessary (examples outline above), there will be a reduction in the magnitude of effect from medium to negligible on a high value receptor, representing a temporary residual impact of **minor adverse** significance.

22.6.1.2 Impact 2: Impacts to Arable Habitats

160. The largest habitat by area within the indicative onshore development area is arable land. Arable land is typically of low ecological value due to the homogeneity of the habitat as well as farming practises and the presence of insecticides and herbicides within the crops. Arable field margins are a UK BAP and Suffolk LBAP Priority Habitat but the examples here do not qualify, as they are species-poor and heavily affected by agricultural inputs. As such arable habitat is of negligible ecological importance.
161. Given that the exact locations of infrastructure (i.e. haul road, jointing bays and CCS) cannot be determined at this time and given that the majority of the indicative onshore development area is arable land, as a precautionary approach to the assessment the total footprint of construction works (approximately 87ha, see **Table 22.4**) has been assumed to affect arable land (see **Table 22.17**. This represents a temporary loss of 77ha of arable land and permanent loss of 10ha of arable land (due to the operational onshore substation, National Grid infrastructure and permanent access). Impacts would be temporary and reversible (due to reinstatement upon completion of construction) and, given the extent of arable land in the surrounding area, it is considered that the magnitude of effect will be negligible. Operational impacts associated with the loss of arable habitat will not be assessed with regard to those ecologically sensitive receptors considered within this chapter because receptors are not reliant on this area as habitat.

Table 22.17 Potential area of Arable land affected by Construction

Habitat type	Area within indicative onshore development area (ha)	Total area of arable potentially affected
Arable	417	87

162. Given the low ecological value of the habitat and negligible magnitude of effect the impact will be **negligible**. Given the significance of the impact no mitigation is proposed.

22.6.1.3 Impact 3: Impacts to Grassland Habitats

163. **Table 22.18** summarises the potential area of each type of grassland that could be affected by construction. As a precautionary approach to the assessment the total area of each habitat type within the indicative onshore development area is assumed to be affected. The actual areas affected would be smaller than this. Only two grassland types are present in the indicative onshore development area – improved grassland and semi-improved grassland. Both habitat types are classed as receptors of low ecological value.

Table 22.18 Potential area of Grassland affected by Construction

Grassland type	Area within indicative onshore development area (ha)	Total area of grassland potentially affected
Improved grassland	22.3	22.3
Poor semi-improved grassland	22.9	22.9

164. Construction works will lead to a temporary loss of these grassland habitats for the duration of the construction phase. Given the extent of these grassland types within the surrounding area, the magnitude of effect is negligible.
165. Without mitigation, the greatest magnitude arising is negligible magnitude on a low value receptor, results in an impact of **negligible** significance.
166. No additional mitigation is proposed.

22.6.1.4 Impact 4: Impacts to Woodland and Trees

167. **Table 22.19** summarises the area of each type of woodland present within the indicative onshore development area and the realistic worst case tree removal anticipated. All the woodland types identified below are considered to be of medium ecological importance based on the criteria defined in **Table 22.9**.

168. As part of embedded mitigation, the onshore infrastructure will avoid areas of woodland where practicable. As such, the assessment presented here is based on an understanding of the areas where tree loss will be unavoidable, rather than assume that all woodland present within the indicative onshore development area will be lost. There are two locations where woodland losses will be unavoidable:

- Cable corridor crossing Aldeburgh Road (approximately 0.9ha¹); and
- Onshore substation option in proximity to Laurel Covert (approximately 0.1ha²).

Table 22.19 Potential area of Woodland affected by Construction

Woodland type	Approximate Area of woodland within indicative onshore development area (ha)	Approximate Total area potentially affected (ha)
Broadleaved woodland – semi-natural	20.9	1ha ³
Broadleaved woodland – plantation	0.2	0ha
Mixed woodland – semi-natural	1.2	0ha

169. There is the potential to lose up to 1ha of semi-natural broad-leaved woodland during the construction phase. However, the magnitude of effect is considered to be low given the extent of similar habitats within the surrounding area that will be retained.

22.6.1.4.1 Impact without Mitigation

170. Without mitigation, the greatest effect arising is low magnitude on a medium importance receptor, resulting in an impact of at worst **minor adverse** significance.

22.6.1.4.2 Mitigation

171. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

¹ This is based on a precautionary calculation of an onshore cable route length of 550m and a working width of 16.1m (and rounded to the nearest decimal).

² Based on onshore substation location as shown on figures associated with this chapter. Substation siting will be refined following detailed design where appropriate.

³ Conservative assessment based on removal calculations at Aldeburgh Road and Laurel Covert.

- Pre-construction assessment of all trees to be removed by a suitably qualified arboriculturalist;
- Ensuring that at least an equivalent area of lost woodland is replanted following completion of the works (trees cannot be replanted directly above the buried cables);
- Root protection areas to be fenced off during construction for trees in proximity to the works that area to be retained; and
- Introduce biosecurity measures, including cleaning of vehicles, equipment and personnel upon leaving infected areas, during construction to minimise the spread of ash dieback.

22.6.1.4.3 Impact following Mitigation

172. Following the implementation of the agreed mitigation measures considered necessary there should be no net loss of trees; however, there remains a temporary loss of trees and the magnitude of the effect remains low, on a medium importance receptor. Representing a temporary residual impact of **minor adverse** significance.

22.6.1.5 Impact 5: Hedgerows

173. Ninety-three hedgerows were identified within the indicative onshore development area. **Table 22.20** summarises the length of each hedgerow type present. As a UKHPI and Suffolk BAP hedgerow habitat, the local hedgerow resource is of high importance based on the criteria defined in **Table 22.9**. None of the hedgerows identified were assessed as important hedgerows in terms of ecological criteria (species rich and intact hedge).

Table 22.20 Hedgerows Identified within the Indicative onshore development Area

Hedgerow type	Length within indicative onshore development area (m)
Intact hedge – species poor	7,198
Defunct hedge – species rich	176
Defunct hedge – species poor	5,995
Hedge with trees – species rich	1,357
Hedge with trees – species poor	6,994

174. As part of embedded mitigation, hedgerow losses will be minimised where practicable. Where the onshore cable corridor crosses an important hedgerow, the onshore cable corridor will be reduced to the minimal working width (16.1m where possible) thus minimising the total length of hedgerow removed.

Important hedgerows will be defined in the DCO application. As a worst case scenario, it is assumed that the construction phase could result in the majority of the hedgerow identified above being temporarily lost. The scale of that loss would represent an effect of medium magnitude.

175. Without mitigation, this would represent an effect of medium magnitude on a high importance receptor, resulting in an impact of at worst **major adverse** significance.

22.6.1.5.1 Mitigation

176. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

- Temporarily lost hedgerows will be reinstated post-construction;
- Pre-construction assessment of all trees (in hedges) to be removed by a suitably qualified arboriculturalist; and
- Hedgerow root protection areas to be fenced off during construction, where relevant.

22.6.1.5.2 Impact following Mitigation

177. Following the implementation of the agreed mitigation measures considered necessary there should be significant reduction in the potential impact on hedgerows. Where hedgerows are temporarily removed these will be replaced following the completion of works. As such, the magnitude of effect is expected to reduce from medium to negligible on a high value receptor, representing a temporary residual impact of **minor adverse** significance.

22.6.1.6 Impact 6: Coastal Habitats

178. The project has committed to HDD at the landfall, which avoids any interaction with coastal habitats, i.e. no requirement for beach access. As such, coastal habitats would not be affected directly or indirectly by construction. As such **no change** upon coastal habitats is anticipated as a result of the proposed works.

22.6.1.7 Impact 7: Watercourses and Ponds

179. A total of 40 water bodies, comprising ditches, ponds and rivers, including The Hundred River, Leiston Beck and the Friston Watercourse (all Main Rivers), are located within the indicative onshore development area.
180. Ponds and rivers are UKHPI and a Suffolk LBAP habitats, and as such are of high importance. The potential for these habitats to support protected or notable species is considered in **section 22.5**. Also refer to **Chapter 20 Water**

Resources and Flood Risk for further details on impacts to hydrology, geomorphology and physical habitat.

181. The three rivers are extensively modified (typically related to land drainage) and relatively narrow (up to approximately 5m wide). The onshore cable corridor will need to cross these water bodies and given their narrow width the preferred crossing technique would be open cut trenching. This would result in temporary impacts to the bed and bank habitats which would represent an effect of low magnitude on a high value receptor, representing an impact of **moderate adverse** significance.
182. No ponds are expected to be directly impacted as a result of the proposed works.

22.6.1.7.1 Mitigation

183. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:
- In order to ensure that there are no adverse impacts resulting from the installation of temporary dams, the amount of time that temporary dams are in place would be restricted to a reduced programme where possible, and flumes or pumps would be adequately sized to maintain flows downstream of the obstruction whilst minimising upstream impoundment. Furthermore, a fish rescue would be undertaken in the area between the temporary dams prior to dewatering;
 - The temporary bridge or culvert for the haul road would be adequately sized to avoid impounding flows. If a culvert is used, the invert level of the structure will be installed below the natural bed of the channel so that sediment transport and the movement of fish and aquatic invertebrates can be maintained; and
 - Bed and bank habitats will be reinstated following the completion of the works.

22.6.1.7.2 Impact following Mitigation

184. Following the implementation of the agreed mitigation measures considered necessary, the magnitude of effect is expected to reduce from low to negligible on a high value receptor representing a temporary residual impact of **minor adverse** significance.

22.6.1.8 Impact 8: Badgers

22.6.1.8.1 Impact Associated with the Landfall

185. No badger setts or field signs are located within the indicative onshore development area in proximity to the landfall. One active badger sett and associated field signs of badgers were recorded within a 50m buffer of the indicative onshore development area at the landfall. Where possible known setts will be avoided as the landfall working area is defined; however, as a worst-case scenario it is assumed that these setts would need to be destroyed. Furthermore, construction at the landfall would represent the temporary loss of arable and hedgerow foraging habitat. This is sub-optimal foraging habitat, but in the context of the available foraging resource surrounding the indicative onshore development area, this is relatively small in scale. Overall the magnitude of effect is medium.

22.6.1.8.2 Impact Associated with the Onshore Cable Corridor, Onshore Substation and National Grid Substation

186. A total of seven active setts and four disused setts as well as other field signs such as snuffle holes, tracks, latrines and pathways have been recorded within the indicative onshore development area (including a 50m buffer). Where possible known setts will be avoided as the cable route is defined; however, as a worst-case scenario it is assumed that these setts would need to be destroyed. Furthermore, the installation of onshore cables would represent the temporary loss of a substantial area of arable and hedgerow foraging habitat. This is sub-optimal foraging habitat, but in the context of the available foraging resource surrounding the cable route this is relatively small in scale. Overall the magnitude of effect is high.

22.6.1.8.3 Impact without Mitigation

187. Without mitigation, the greatest magnitude arising is high magnitude on a low importance receptor, which represents an impact of at worst **moderate adverse** significance.

22.6.1.8.4 Mitigation

188. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

- Pre-construction survey for badgers;
- Sett closure (under licence) for setts identified within onshore construction footprint, and creation of artificial setts;
- Protection buffer zone of 30m around all setts outside of the onshore infrastructure; and

- Pre-cautionary methods to minimise harm to badgers during construction, including trenches deeper than 1m must be covered at the end of each working day.

22.6.1.8.5 Impact following Mitigation

189. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from high to low on a low value receptor, representing a temporary residual impact of **minor adverse** significance.

22.6.1.9 Impact 9: Bats

190. As outlined in **section 22.5.3.3**, a bat roost survey was undertaken and nine roosting sites were identified (**Figure 22.7**). Furthermore, the findings from the suite of 2018 activity transect surveys have identified that the areas of woodland, hedgerows and areas of scrub (as well as other habitats) throughout the indicative onshore development area also provide and support a diverse population of foraging/commuting bats within Suffolk. The 2018 activity transects show that there is a higher density of bats using the transect areas within the western area of the indicative onshore development area. However, foraging/commuting bats were observed albeit in lower densities within the transect areas near to the coastline. Given the sensitivity of this receptor there is the potential for significant impacts during construction without mitigation.
191. There are potential impacts to commuting/foraging bats as a result of vegetation clearance and construction along the indicative onshore development area. Consequently, the reduction in available foraging habitat, would in turn reduce the insect biomass of the area and therefore reduce the foraging habitat available to bats within the working width. Hedgerows which have been recorded as having a high level of bat activity (usage) are considered to be 'important' for bats. In addition, due to the rarity of the bat species, any hedgerow with at least one barbastelle pass should also be considered as an 'important' hedgerow. The 2018 surveys indicate that transect area 3 and 4 recorded at least one barbastelle pass.
192. Bats are known to use hedgerows to commute along in order to navigate around the landscape and some species are potentially sensitive to gaps in hedgerows such as species in the genera *Myotis* and *Plecotus* due to the nature of their flight pattern. Species from the genera *Nyctalus* and *Eptesicus*, and *Nathusius*' pipistrelle bats are known to fly high and in open habitats and therefore are unlikely to be impacted by hedgerow severance. Common pipistrelle and soprano pipistrelle bats are generalist species and would tolerate gaps in hedgerows. There is very limited research regarding whether gaps

actually negatively affect *Myotis* / *Plecotus* species. The gaps in hedgerows also have the potential to increase the risk of predation of bats. Bats would be more visible to potential predators while they fly across the gaps as they would have no cover.

193. The construction works have the potential to give rise to the following effects:

- Risk of killing or injuring roosting bats within potential roosting sites;
- Permanent habitat loss of suitable commuting / foraging habitat;
- Habitat fragmentation; and
- Temporary disturbance to commuting / foraging bats and bat roosts during the construction phase (for example via increased noise and light).

194. If bats are found to be using roosting, commuting or foraging features identified within the indicative onshore development area, this would represent an effect of high magnitude.

22.6.1.9.1 Impact without Mitigation

195. Without mitigation, the greatest magnitude arising is high magnitude on a high importance receptor, which would represent an impact of at worst **major adverse** significance. Although it should be noted that the indicative onshore development area is subject to refinements and therefore this is based on worst case assumptions.

22.6.1.9.2 Mitigation

196. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

- Route refinement to avoid identified bat roosts, where practicable;
- Pre-construction survey to confirm the presence of bats;
- Replanting of hedgerows (or use of hazel hurdles) temporarily lost during construction works;
- All temporary lighting to be designed in line with the BCT Bats and Lighting in the UK guidance (2009). This to include the use of directional lighting during construction;
- Construction phase lighting will be limited to between 7am-7pm in low light conditions, with lower-level security lighting outside of these times;
- Ensure that dark corridors remain in place during the construction phase; and

- Pre-cautionary methods when removing trees with bat potential but no presence observed (soft-felling).

22.6.1.9.3 Impact following Mitigation

197. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from high to low on a high importance receptor, representing a temporary residual impact of **moderate adverse** significance.

22.6.1.10 Impact 10: Great Crested Newts

198. Presence of great crested newts has been confirmed within three ponds (Pond 117, Pond 135 and Pond 152) within the indicative onshore development area and up to 250m from its boundaries.
199. Access to two ponds was not possible during 2018 surveys. For these two ponds (Pond 133 and Pond 134), it has been assumed great crested newts are present.
200. All ponds will be avoided during the onshore cable works (no ponds are present within the landfall or onshore substation locations), however temporary impacts to the surrounding terrestrial habitat could potentially occur and these could include:
- Risk of killing or injuring foraging newts during the construction phase;
 - Temporary habitat loss (including grassland foraging habitat, woodland edges for hibernation, areas of scrub and other marginal habitats) for the duration of the construction phase; and
 - Temporary habitat fragmentation for the duration of the construction phase.
201. The temporary loss of habitat and habitat fragmentation at locations known to support great crested newts represents an effect of high magnitude in accordance with criteria outlined in **Table 22.10**.

22.6.1.10.1 Impact without Mitigation

202. Without mitigation, the greatest magnitude arising is high magnitude on a high importance receptor, which would represent an impact of at worst **major adverse** significance.

22.6.1.10.2 Mitigation

203. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

- Route refinement to avoid great crested newt terrestrial habitat, where practicable;
- Pre-construction survey to confirm the presence of great crested newts;
- Trapping and translocation of affected newts (under a project mitigation licence); and
- Pre-cautionary methods of working during construction, including tool box talk and supervision.

22.6.1.10.3 Impact following Mitigation

204. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from high to negligible on a high value receptor, representing a temporary residual impact of **minor adverse** significance.

22.6.1.11 Impact 11: Reptiles

205. Suitable habitats for supporting common reptile species have been identified at 14 locations throughout the indicative onshore development area. It has been agreed with stakeholders (during the April 2018 ETG meeting) that no specific reptile survey of these areas will be required. However, without mitigation the following effects may occur during the construction phase:

- Temporary loss of suitable reptile habitat;
- A risk of killing or injuring reptiles which are active within these locations; and
- A risk of habitat degradation due to pollutant release during the construction phase.

206. These risks would be present for the duration of the construction period (up to 17 months), and would be across multiple areas and would be large scale in terms of locally available habitat. As such, the magnitude of effect is anticipated to be high.

22.6.1.11.1 Impact without Mitigation

207. Without mitigation, the greatest magnitude arising is high magnitude on a medium importance receptor, results in an impact of at worst **moderate adverse** significance.

22.6.1.11.2 Mitigation

208. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

- Pre-cautionary methods of working during construction, including tool box talk, habitat manipulation and ecological supervision.

22.6.1.11.3 Impact following Mitigation

209. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from high to low on a medium value receptor, representing a temporary residual impact of **minor adverse** significance.

22.6.1.12 Impact 12: Invasive Non-Native Species

210. Himalayan balsam is present along the Hundred River. There is a risk of the construction phase works in this area leading to the spread of Himalayan balsam to other areas along this and other watercourses. The risk of introducing and/or spreading of non-native species over the long term is anticipated to have an effect of medium magnitude on a medium value receptor. This represents an impact of **moderate adverse** significance.

211. There are no invasive non-native species recorded elsewhere within the indicative onshore development area.

22.6.1.12.1 Mitigation

212. Mitigation measures will be identified once detailed design is completed and the exact nature of impacts is known. Examples of the types of mitigation measures that may be considered include:

- Pre-construction surveys to confirm the extent of invasive species; and
- Good site practice measures for managing the spread of invasive species during works at watercourses.

22.6.1.12.2 Impact following Mitigation

213. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from medium to negligible on a medium value receptor, representing a temporary residual impact of **minor adverse** significance.

22.6.2 Potential Impacts during Operation

22.6.2.1 Impact 1: Disturbance effects associated with Maintenance Activities

214. The onshore substation and National Grid substation will be unmanned but will require regular visits from staff for routine maintenance. This has the potential to disturb protected species in proximity to the operational substations, related to noise and/or physical presence of people. For the purposes of this assessment this is assumed to be up to one visit per week requiring a single vehicle, and staff visiting the sites during daylight hours.
215. Given the low frequency of the visits, disturbance from human presence is predicted to be of negligible magnitude and only affecting receptors within the immediate vicinity of the area(s) being visited.
216. There are no requirements for regular visits (routine maintenance) at other part of the onshore infrastructure.
217. Without mitigation, the greatest effect arising from one element of the indicative onshore development area is negligible magnitude on at worst high importance receptors, resulting in an impact of at worst **minor adverse** significance.
218. No mitigation is proposed given that the magnitude of effect is reduced as low as possible.

22.6.2.2 Impact 2: Disturbance to Fauna from Operational Lighting and Noise

219. The onshore substation will be unmanned and operational lighting will be limited to routine maintenance activities to meet health and safety requirements. Outside of these periods the substation will not require lighting. Operational noise will be restricted to 35dB at the nearest noise sensitive receptors, which in effect seeks to restrict operational noise at the substation so that it is imperceptible to background night time noise levels. Furthermore, the baseline ornithology survey results (refer to **Chapter 23 Onshore Ornithology**) as well as the Phase 1 Extended Habitat survey results suggest that the onshore substation and National Grid substation area is within an area of low ecological value. As a consequence, disturbance from lighting and noise is predicted to be of minor adverse and therefore not significant and only have the potential to affect ecological receptors in the immediate vicinity of the East Anglia TWO and National Grid substation areas.
220. Without mitigation, the greatest effect arising from one element of the indicative onshore development area is negligible magnitude on at worst high importance receptors, resulting in an impact of at worst **minor adverse** significance.

221. An operational lighting scheme could be designed for the final design for the permanent infrastructure, which will include measures to minimise light spill and be designed in line with the 'Bats and Lighting in the UK' guidance (BCT, 2009).
222. Following implementation of the operational lighting scheme, the magnitude of effect will remain negligible. As a consequence, a residual impact of **minor adverse** significance is expected to remain following mitigation.

22.6.3 Potential Impacts during Decommissioning

223. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the onshore substation will likely be removed and be reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left *in situ*. 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 will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

22.7 Cumulative Impacts

22.7.1 Cumulative Impacts with the Proposed East Anglia ONE North Project

224. The East Anglia ONE North offshore windfarm project (the proposed East Anglia ONE North project) is also in the pre-application stage. The proposed East Anglia ONE North project will have a separate DCO application but is working to the same programme of submission as the proposed East Anglia TWO project. The two projects will share the same landfall and cable route and the two onshore substations will be co-located and feed into the same National Grid substation.
225. The proposed East Anglia TWO project CIA will therefore initially consider the cumulative impact with only the East Anglia ONE North project.
226. The CIA considers the proposed East Anglia TWO project and the proposed East Anglia ONE North project under two construction scenarios:
 - Scenario 1 - the proposed East Anglia TWO project and proposed East Anglia ONE North project are built simultaneously; and
 - Scenario 2 - the proposed East Anglia TWO project and the proposed East Anglia ONE North project are built with a construction gap.

227. The worst case (based on the assessment of these two construction scenarios) for each impact is then carried through to the wider CIA which considers other developments which are in close proximity to the proposed East Anglia TWO project (**section 22.7.2**). The operational phase impacts will be the same irrespective of the construction scenario. For a more detailed description of the assessment scenarios please refer to **Chapter 5 EIA Methodology**.
228. Full assessment of scenario 1 and scenario 2 can be found in **Appendix 22.5**. This assessment found that scenario 2 represented the worst case impacts for onshore ecology. A summary of those impacts can be found in **Table 22.21**.

Table 22.21 Summary of Potential Cumulative Impacts Identified for Onshore Ecology under Construction Scenario 2

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
Cumulative Construction Impacts with the proposed East Anglia ONE North project						
Impact 1: Impacts to Designated Sites	Sandlings SPA	High	Negligible	Minor adverse	-	Minor adverse
Impact 2: Impacts to Arable Habitat	Arable land	Low	Negligible	Negligible	-	Negligible
Impact 3: Impacts to Grassland Habitat	Improved and Semi-improved grassland	Low	Negligible	Negligible	-	Negligible
Impact 4: Impacts to Woodland and Trees	Woodland and trees	Medium	Low	Minor adverse	-	Minor adverse
Impact 5: Hedgerows	Hedgerows	High	Negligible	Minor adverse	-	Minor adverse
Impact 6: Coastal Habitats	Coastal habitats	High	No impact	-	-	No impact
Impact 7: Watercourses and Ponds	Watercourse and ponds	High	Negligible	Minor adverse	-	Minor adverse
Impact 8: Badgers	Badgers and suitable foraging habitat	Low	Medium	Minor adverse	-	Minor adverse
Impact 9: Bats	Roosting, Commuting	High	Low	Moderate	-	Moderate adverse

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Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
	and foraging bats			adverse		
Impact 10: Great Crested Newts	Aquatic and terrestrial habitats	High	Low	Moderate adverse	Habitat enhancement at the receptor sites Habitat manipulation within the construction footprint between construction phases	Minor adverse
Impact 11: Reptiles	Common reptile species and suitable habitats	Medium	Low	Minor adverse	-	Minor adverse
Impact 12: Invasive Non-Native Species	Invasive non-native species	Medium	Negligible	Minor adverse	-	Minor adverse
Cumulative Operational Impacts with the proposed East Anglia ONE North project						
Impact 1: Disturbance effects associated Maintenance Activities	Disturbance to Habitats and Species from Maintenance Activities	High	Negligible	Minor adverse	-	Minor adverse
Impact 2: Disturbance to Fauna from Operational Lighting and Noise	Disturbance to Fauna from Operational Lighting and Noise	High	Negligible	Minor adverse	-	Minor adverse

22.7.2 Cumulative Impact Assessment with Other Developments

229. The assessment of cumulative impacts has been undertaken here as a two stage process. Firstly, all impacts considered in **section 22.6** have been assessed for the potential to act cumulatively with other projects. Potential cumulative impacts are set out in **Table 22.22**.

Table 22.22 Potential Cumulative Impacts

Impact	Potential for Cumulative Impact	Rationale
Construction		
Designated sites (statutory and non-statutory)	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
Habitat loss and fragmentation	Yes	Cumulative direct habitat loss impacts arising from two or more projects are possible. Impacts may occur where project boundaries or mitigation areas overlap. Such impacts have the potential to result in loss of habitat and/or habitat fragmentation for which legally protected species may use for shelter, breeding and/or foraging/commuting purposes.
Construction disturbance	Yes	Cumulative disturbance may arise when the construction periods of two or more projects overlap temporally, within suitable habitats that may be used by legally protected species and/or habitat features.
Operation		
Disturbance from maintenance activities	No	Maintenance activities likely to be highly localised, short-term and lower intensity than construction activities so unlikely to affect any legally protected species.
Disturbance from operational lighting and noise	No	Impacts are likely to be restricted to around the East Anglia TWO Onshore Substation and National Grid Substations.
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the onshore substation will likely be removed and be reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left <i>in situ</i> . 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 will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

230. The second stage of the CIA is an assessment of whether there is spatial overlap between the extent of potential effects of the onshore infrastructure and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA have been identified and any overlaps between these and the effects identified in **section 22.6**. Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.
231. Following a review of projects which have the potential to overlap temporally or spatially with the proposed East Anglia TWO project, one development has been scoped into the CIA.
232. **Table 22.23** provides detail regarding the project.
233. The full list of projects for consideration will be updated following PEIR and agreed in consultation with local authorities. The remainder of the section details the nature of the cumulative impacts against all those receptors scoped in for cumulative assessment.

Table 22.23 Summary of Projects Considered for the CIA in Relation to Onshore Ecology

Project	Status	Development period	⁴ Distance from East Anglia TWO indicative onshore development area (km)	Project definition	Level of information available	Included in CIA	Rationale
Sizewell C New Nuclear Power Station	Scoping Opinion Adopted by SoS on 02.06.2014	Uncertain	0.49km	Full Scoping Report Available: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010012/EN010012-000103-Sizewell%20C%20EIA%20Scoping%20Report_Main%20text.pdf	Tier 5 ⁵	No	Close by, and potentially overlapping development boundaries (at this stage unknown), may result in impacts during the construction phase. However, at this stage there is not enough information to support this assessment.

⁴ Shortest distance between the considered project and East Anglia ONE North – unless specified otherwise

⁵Based on criteria outlined in **section 5.2.7** in **Chapter 5 EIA Methodology**

22.7.2.1 Cumulative Impacts during Construction

234. At this stage, the construction and operational footprint of the Sizewell C New Nuclear Power Station, and the construction programme, is unknown. Should the construction phases of the Sizewell C New Nuclear Power Station and the proposed East Anglia TWO project overlap, there is potential for construction phase cumulative impacts.
235. However, limited information is available regarding the Sizewell C New Nuclear Power Station project's construction timings and methodologies, and therefore the impact that that project will have on designated sites and protected species. For this reason, the Sizewell C New Nuclear Power Station is not being taken forward into the CIA at the PEI stage for onshore ecology. This will be considered again for the ES should more information regarding the Sizewell C New Nuclear Power Station project become available.

22.7.2.2 Cumulative Impacts during Operation

236. As outlined in **Table 22.22** no cumulative operational impacts are predicted due to the lack of impacts during the operational phase, associated with the proposed East Anglia TWO project alone.

22.7.2.1 Cumulative Impacts during Decommissioning

237. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the onshore substation will likely be removed and be reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left in situ. 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 will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

22.8 Inter-relationships

238. A summary of the likely inter-related effects arising from the proposed East Anglia TWO project on onshore ecology are presented in **Table 22.24**.

Table 22.24 Inter-Relationships for Onshore Ecology

Inter-relationship all Phases and Linked Chapter	Section where Addressed	Rationale
Chapter 23 Onshore Ornithology	Sections 22.6 and 22.7.	Habitats which support onshore ornithology
Chapter 25 Noise and Vibration	Sections 22.6 and 22.7.	Noise disturbance on protected species
Chapter 29 Landscape and Visual Impact	Sections 22.6 and 22.7.	Lighting impacts to protected species

22.9 Interactions

239. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. For clarity, the areas of interaction between impacts are presented in **Table 22.25**, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 22.25 Interactions Between Impacts on Onshore Ecology

Anticipated Interactions between Impacts

Construction Impacts

	Impact 1: Impacts to Designated Sites	Impact 2: Impacts to Arable Habitat	Impact 3: Impacts to Grassland Habitats	Impact 4: Impacts to Woodland and Trees	Impact 5: Hedgerows	Impact 6: Coastal Habitats	Impact 7: Watercourses and Ponds	Impact 8: Badgers	Impact 9: Bats	Impact 10: Great Crested Newts	Impact 11: Reptiles	Impact 12: Invasive Non- Native Species
Impact 1: Impacts to Designated Sites	-	No	No	Yes	No	No	Yes	No	No	No	No	Yes
Impact 2: Impacts to Arable Habitat	No	-	No	No	No	No	No	No	No	No	No	No
Impact 3: Impacts to Grassland Habitats	No	No	-	No	No	No	No	No	No	Yes	Yes	No
Impact 4: Impacts to Woodland and Trees	No	No	No	-	Yes	No	No	No	Yes	No	Yes	Yes
Impact 5: Hedgerows	No	No	No	No	-	No	No	Yes	Yes	No	Yes	No
Impact 6: Coastal Habitats	No	No	No	No	No	-	No	No	No	No	No	No

Anticipated Interactions between Impacts												
Impact 7: Watercourses and Ponds	No	No	No	No	No	No	-	No	Yes	Yes	Yes	Yes
Impact 8: Badgers	No	No	No	No	No	No	No	-	No	No	No	No
Impact 9: Bats	No	No	No	No	No	No	No	No	-	No	No	No
Impact 10: Great Crested Newts	No	No	Yes	Yes	Yes	No	Yes	No	No	-	No	No
Impact 11: Reptiles	No	No	Yes	Yes	Yes	No	Yes	No	No	No	-	No
Impact 12: Invasive Non-Native Species	No	No	No	No	No	No	Yes	No	No	No	No	-
Operation Impacts												
	Impact 1: Habitat and species during maintenance							Impact 2: Fauna during operational lighting and noise				
Impact 1: Disturbance effects associated Maintenance Activities	-							No				
Impact 2: Disturbance to Fauna from Operational Lighting and Noise	No							-				

Anticipated Interactions between Impacts

Decommissioning impacts

No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the **onshore** substation will likely be removed and be reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left in situ. 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 will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

22.10 Summary

240. A summary of the findings of the PEIR for onshore ecology is presented in **Table 22.26**.

Table 22.26 Summary of Potential Impacts Identified for Onshore Ecology

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
Construction						
Impact 1: Impacts to Designated Sites	Sandlings SPA	High	Medium	Major adverse	Minimise programme of works within SPA where appropriate; Re-instatement of habitat where appropriate	Minor adverse
	Other Designated Sites	High	No impact	-	-	No impact
Impact 2: Impacts to Arable Habitat	Arable land	Low	Negligible	Negligible	-	Negligible
Impact 3: Impacts to Grassland Habitat	Improved and Semi-improved grassland	Low	Negligible	Negligible	-	Negligible
Impact 4: Impacts to Woodland and Trees	Woodland and trees	Medium	Low	Minor adverse	Pre-construction assessment of trees to be removed; Replant an equivalent area of lost woodland following completion of works; Utilise root protection areas for tree to be retained; Use of biosecurity measures.	Minor adverse
Impact 5: Hedgerows	Hedgerows	High	Medium	Major adverse	Hedgerows re-instated post construction; Hedgerow root protection areas to be fenced off	Minor adverse

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
					during construction, where relevant.	
Impact 6: Coastal Habitats	Coastal habitats	High	No impact	-	-	No impact
Impact 7: Watercourses and Ponds	Watercourse and ponds	High	Low	Moderate adverse	<p>Temporary dams in place for a minimal a duration, where practicable, and flumes or pumps would be adequately sized to maintain flows downstream of the obstruction whilst minimising upstream impoundment. Fish rescue would be undertaken in the area between the temporary dams prior to dewatering;</p> <p>The temporary bridge or culvert for the haul road would be adequately sized to avoid impounding flows. If a culvert is used, the invert level of the structure will be installed below the natural bed of the channel so that sediment transport and the movement of fish and aquatic invertebrates can be maintained; and</p> <p>Bed and bank habitats will be reinstated following the completion of the works.</p>	Minor adverse
Impact 8: Badgers	Badgers and suitable foraging habitat	Low	High	Moderate adverse	<p>Pre-construction surveys;</p> <p>Protection buffer zone around setts where practicable;</p> <p>Sett closure (under licence) where required.</p>	Minor adverse
Impact 9: Bats	Roosting, Commuting and foraging bats	High	High	Major adverse	<p>Pre-construction survey to confirm the presence of bats;</p> <p>Cable route refinement to avoid identified bat roosts, where appropriate;</p>	Moderate adverse

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
					<p>Replanting of hedgerows temporarily lost during construction works;</p> <p>All temporary lighting to be designed line with the BCT Bats and Lighting in the UK guidance (2009). This to include the use of directional lighting during construction;</p> <p>Construction phase lighting will be limited to between 7am-7pm in low light conditions, with lower-level security lighting outside of these times;</p> <p>Ensure that dark corridors remain in place during the construction phase; and</p> <p>Pre-cautionary methods when removing trees with bat potential but no presence observed (soft-felling).</p>	
Impact 10: Great Crested Newts	Aquatic and terrestrial habitats	High	High	Major adverse	<p>Pre-construction survey to confirm the presence of great crested newts;</p> <p>Trapping and translocation of affected newts (under a project mitigation licence); and</p> <p>Pre-cautionary methods of working during construction, including tool box talk and supervision.</p>	Minor adverse
Impact 11: Reptiles	Common reptile species and suitable habitats	Medium	High	Moderate adverse	<p>Pre-cautionary methods of working during construction, including tool box talk, habitat manipulation and ecological supervision.</p>	Minor adverse
Impact 12: Invasive Non-Native Species	Invasive non-native species	Medium	Medium	Moderate adverse	<p>Pre-construction surveys to confirm the extent of invasive species; and</p> <p>Good site practice measures for managing the</p>	Minor adverse

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
					spread of invasive species during works at watercourses.	
Operation						
Impact 1: Disturbance effects associated Maintenance Activities	Disturbance to Habitats and Species from Maintenance Activities	High	Negligible	Minor adverse	-	Minor adverse
Impact 2: Disturbance to Fauna from Operational Lighting and Noise	Disturbance to Fauna from Operational Lighting and Noise	High	Negligible	Minor adverse	Production and implementation of an Operational Lighting Scheme	Minor adverse
Decommissioning						
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the onshore substation will likely be removed and be reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left <i>in situ</i> . 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 will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.						
Cumulative Impacts with Other Developments						
At this stage, there is insufficient information available to assess for cumulative impacts						

22.11 References

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