East Anglia TWO Offshore Windfarm

Chapter 23

Onshore Ornithology

Preliminary Environmental Information
Volume 1
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Glossary of Acronyms

AONB	Area of Outstanding Natural Beauty
BBPP	Breeding Bird Protection Plan
BBS	Breeding Bird Survey
BoCC	Birds of Conservation Concern
BCT	Bat Conservation Trust
BTO	British Trust for Ornithology
CCS	Construction Consolidation Site
CoCP	Code of Construction Practice
CIEEM	Chartered Institute of Ecology and Environmental Management
CIA	Cumulative Impact Assessment
CIRIA	Construction Industry Research and Information Association
CMS	Construction Method Statement
CRoW	Countryside and Rights of Way Act 2000
CWS	County Wildlife Site
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
EA	Environment Agency
EcoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electro-magnetic fields
ES	Environmental Statement
ETG	Expert Topic Group
ha	hectares
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
ICZM	Integrated Coastal Zone Management
IOFs	Important Ornithological Features
IPC	Infrastructure Planning Commission
JNCC	Joint Nature Conservation Committee
km	Kilometres
LNR	Local Nature Reserve
LSE	Likely Significant Effect
LWS	Local Wildlife Site
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NPS	National Policy Statements
NSIP	Nationally Significant Infrastructure Project
OCoCP	Outline Code of Construction Practice

OHL	Overhead Line
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PIDs	Public Information Days
SAC	Special Area of Conservation
SoS	Secretary of State
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

Glossary of Terminology

Applicant	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	The area comprising the Proposed Onshore Development Area and the Offshore Development Area
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 National Grid infrastructure.
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 (from Mean Low Water Springs) 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	A National Grid substation, connection to the existing electricity pylons and National Grid overhead line realignment works which 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 realignment 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 realignment 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 electricity generated by 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.
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.
Indicative onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Proposed onshore development area	A refined version of the indicative onshore development area.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia TWO project from landfall to the connection to the national electricity grid.
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.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

23 Onshore Ornithology

23.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the potential effects on onshore ornithology associated with the construction, operation and decommissioning of the proposed East Anglia TWO project.

2. The specific objectives of this chapter are to:

- Describe the ornithological baseline;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects of predicted impacts on onshore ornithological receptors;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation, including cumulatively with other projects.

3. The assessment has been carried out by MacArthur Green, following relevant guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2016), Natural England (2010; 2015) and Scottish Natural Heritage (SNH 2016; 2018) relevant to the surveying and assessment of onshore renewable energy projects.

4. This chapter should also be read in conjunction with ***Chapter 22 Onshore Ecology***, which provides further information on other ecological interests, including habitats within the study area that have been referred to here. This chapter should also be read in conjunction with ***Chapter 12 Offshore Ornithology***, which captures the interests of offshore bird species.

23.2 Consultation

5. 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.

6. To date, consultation with regards to onshore ornithology has been undertaken via Expert Topic Group (ETG), described within ***Chapter 5 EIA Methodology***, with meetings held in June 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. ***Table 23.1*** summarises the consultation responses received to date regarding onshore ornithological matters and provides information on where and/or how they have been addressed in this assessment. Responses from stakeholders have been captured in the table below.

Table 23.1 Consultation Responses

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
Natural England	08/12/2017 Scoping Response	As advised during the meeting with SPR on 6th November 2017, the Sandlings Special Protection Area (SPA) is within the onshore study area. Substation site selection is on-going, but any location west of the SPA would require the cable route to cross the Sandlings SPA either via Horizontal Directional Drilling (HDD) or trenching. Therefore: • Any mitigation must be dependent on the sensitivity of the designated habitat and/or species impacted – surveys must be undertaken to better inform mitigation; • Recommend at least 1 year of survey data – must ensure these are programmed in sufficiently (N.B woodlark can nest early); • Timing of construction works could be a likely mitigation option; and • HDD under the narrowest point of the Sandlings SPA would be Natural England's preferred option to avoid direct impacts on habitat. Noting that even with a HDD option, there would be a need to consider seasonal restrictions or mitigation (e.g. screening) as nests within the SPA could still be disturbed by noise, light and vibration during construction.	Baseline surveys were designed specifically to record the abundance and distribution of Sandlings SPA qualifying interests, as well as any other species of high conservation concern (see ***section 23.5***). Methodologies presented in the East Anglia TWO and ONE North Onshore Ecology and Onshore Ornithology Method Statement were agreed with Natural England during consultation. Mitigation associated with minimising the likelihood of a significant effect of construction activities on the Sandlings SPA have been outlined in ***section 23.6***.
RSPB	20/12/2017 Scoping Response	The Scoping Report indicates that the new landfall location in the vicinity of Sizewell is likely to result in a need for the onshore cable route to cross the Sandlings SPA and the Leiston-Aldeburgh Site of Special Scientific Interest (SSSI). The Sandlings SPA comprises forest and heathland habitat and are designated for breeding	Baseline surveys were designed specifically to record the abundance and distribution of Sandlings SPA and Leiston-Aldeburgh SSSI qualifying interests, as well as

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
		woodlark and nightjar. The Leiston-Aldeburgh SSSI is designated for its mix of habitats, including heathland, woodland and scrub and supports a range of breeding bird species. Of these, nightingale and turtle dove in particular are known to be present in the cable route search area, both within and potentially also outside the SSSI. Due to the likely presence of these species within the onshore cable route search area, we are concerned that the onshore breeding bird surveys are only proposed for March-April 2018. We recommend that at least two years of survey data are collected. We are also concerned that the survey period is not suitable for the likely species of interest. Nightjar (a feature of the Sandlings SPA) are typically surveyed from May to mid-July (this species does not arrive in the UK until late April – early May) whilst woodlark, an early breeder and also a feature of the Sandlings SPA, require surveys to start in the second half of February. The proposed survey period of March-April therefore risks missing nightjar entirely and under-recording woodlark. Other species of interest, such as turtle dove and nightingale would typically be surveyed through four-visit territory mapping from March through to June. In order to ensure sufficient coverage of all these species (as well as general breeding bird interest), we therefore recommend that at least six visits should be carried out from mid-February to mid-July and that two years of survey data are collected.	any other species of high conservation concern (see ***section 23.5***). Surveys, as agreed with Natural England, were undertaken each month from February to August 2018, which is considered sufficient for determining current baseline conditions and likely distribution of qualifying interests.
RSPB	20/12/2017 Scoping Response	We request that detailed consideration is given to potential mitigation measures, for example, avoidance of works in sensitive areas during the breeding season. We request a commitment that HDD techniques will also be used (where technically possible) if the cable route is required to cross a nationally or internationally designated wildlife site. It will also be important to understand whether there would be any need for jointing bays or other maintenance-related access within the SPA in order to evaluate all potential impacts.	Mitigation associated with minimising the likelihood of a significant effect of construction activities on the Sandlings SPA have been outlined in ***section 23.6***. Operational impacts are also considered in ***section 23.6.2***.

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
Natural England	15/02/2018 Email response to Technical Note on Bird Survey Methodology	NE are now content with the changes and clarifications made regarding the bird survey methodology.	Noted.
Onshore Ecology & Ornithology ETG	27/04/2018 Onshore Ornithology & Ecology Meeting	ETG noted that some key features of designated sites appear to be missing from PEIR: Onshore Ecology and Onshore Ornithology Method Statement, e.g. bird species are missing from the Deben Estuary and Stour and Orwell Estuaries SPAs (SPAs are designated for bird species so these should be included).	All designated sites with ornithological interests within 10 kilometres (km) have been included in the assessment – see ***section 23.5.2*** for details.
		In line with their scoping response, the RSPB recommended that breeding bird surveys should be conducted over two years, rather than one due to the potential for variability between years. RSPB also noted that wintering bird surveys should cover the entire winter season (at least November to March) as coverage of February to March only is likely to miss some species.	Baseline surveys were designed specifically to record the abundance and distribution of Sandlings SPA and Leiston-Aldeburgh SSSI qualifying interests, as well as any other species of high conservation concern (see ***section 23.5***). Surveys, as agreed with Natural England, were undertaken each month from February to August 2018, which is considered sufficient for determining current baseline conditions and likely distribution of qualifying interests.
		Onshore ornithology study area was agreed by ETG	Noted.
		ETG recommended that that the potential greater impacts of open trenching should be acknowledged in case HDD is unsuccessful.	HDD techniques would be employed in the landfall area. Where the onshore cable corridor overlaps with designated sites HDD or open trench techniques may be employed. This has been considered in the ***section 23.6.3***.

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 23.2*** shows public consultation feedback pertaining to onshore ornithology. Consultation phases are explained further in ***Chapter 4 Site Selection and Assessment of Alternatives.***

Table 23.2 Public Consultation Responses relevant to Onshore Ornithology

Topic	Response / where addressed in the PEI
Phase 1	
• None	-
Phase 2	
• None	-
Phase 3	
• Habitat loss impacting bird species including: barn, tawny, little owls, nightingales, blackcaps, warblers, curlew, lapwings, woodcock and turtle dove • Impacts of electro-magnetic fields (EMF) on birds • Impact on migratory birds • Impacts on sand martins nesting in cliffs	Habitat loss is assessed for protected species and other species of conservation concern in ***section 23.6.3.1.*** Impacts on seabirds are assessed in ***Chapter 12 Offshore Ornithology***
Phase 3.5	
• Impacts on migratory birds • Impacts on songbird, barn owls, tawny owls, buzzards, little owls, lapwings, curlews, skylark, marsh harriers, buzzards, yellowhammers, greenfinch, goldfinch, tits, fieldfare	Impacts on protected species and species of conservation concern are assessed in ***section 23.6.3*** (construction phase impacts) and ***section 23.6.4*** (operational phase impacts).

Topic	Response / where addressed in the PEI
and redwing; cuckoo – some birds on the RSPB 'Red List'	

23.3 Scope

23.3.1 Study Area

9. The onshore infrastructure for the proposed East Anglia TWO project includes the following elements:

- Landfall;
- Onshore cable corridor;
- 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 onshore ornithology study area is based on the indicative onshore development area, which includes the elements listed above. Based on scientific evidence and professional judgement, a 400m buffer has also been included around the indicative onshore development area, which is considered to be the uppermost spatial extent of potential disturbance-displacement impacts associated with any ornithological receptor assessed in this chapter. The actual extent of potential impacts is likely to be species-specific, with some species having smaller extents of potential impact than 400m from source. The onshore ornithology study area is shown in ***Figure 23.1***. The onshore ornithology study area was agreed with stakeholders as part of the ETG meetings and publication of the onshore ornithology Method Statement.

12. It should be noted that at the time of undertaking baseline ornithology surveys, the proposed onshore development area was yet to be finalised, and therefore survey and reporting was completed on the indicative onshore development area (to which the proposed onshore development area is a more refined version of) plus a 400m buffer from the indicative onshore development area boundary, which is considered to be the uppermost spatial extent of potential disturbance-displacement impacts associated with any ornithological receptor likely to be present. The proposed onshore development area is shown on the figures accompanying this chapter for context. The information presented in this chapter is therefore described in terms of the indicative onshore development area boundary. 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.

23.3.2 Worst Case Scenarios

13. This section identifies the realistic worst case scenarios associated with the proposed East Anglia TWO project alone.

14. ***Chapter 6 Project Description*** details the project parameters using the Rochdale Envelope approach for the PEIR.

15. The realistic worst case scenarios that are relevant to potential impacts on onshore ornithology during construction, operation and decommissioning phases of the proposed East Anglia TWO project are presented in ***Table 23.3***. Please refer to ***Chapter 6 Project Description*** for more detail regarding specific actvities, and their durations, which fall within the construction phase.

Table 23.3 Realistic Worst Case Scenarios

Impact	Parameter	Notes
Construction		
Impacts related to the landfall	HDD temporary works area: 7,000m^2 (70m x 100m) Transition bay excavation footprint (for 2 transition bays): 1,554m^2 (37m x 42m) Landfall CCS: 18,400m^2 (160m x 115m) Landfall transition bays approximate quantity of spoil material (for 2 transition bays): 454m^3	Landfall to be achieved via HDD. No beach access required.
Impacts related to the onshore cable corridor	Onshore cable route: 287,360m^2 (8,980m x 32m) Jointing bay construction excavation footprint: 570m^2 (30.6m x 18.6m). Total for 36 jointing bays: 20,520m^2 (570m^2 x 36) HDD (retained as an option to cross SPA / SSSI): • Entrance pit CCS (x1): 7,000m^2 (100m x 70m) • Exit pit CCS (x1): 3,000m^2 (100m x 30m) Onshore cable route CCS: 18,400m^2 (160m x 115m). Total for 5 CCS: 92,000m^2 (18,400m^2 x 5) Temporary roads: • Onshore cable route haul road between landfall and Snape Road (4.5m wide	Onshore cable corridor construction footprint may be located anywhere within the proposed onshore development area. 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. 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.

Impact	Parameter	Notes
	with additional 4m for passing places at approximately 87m intervals): 41,376m^2 • Onshore cable route and substation access haul road (9m width): 18,675m^2 • Temporary access road: 23,495m^2 Onshore cable trench approximate quantity of spoil material: 13,321m^3	
Impacts related to the onshore substation	Onshore substation CCS: 17,100m^2 (190m x 90m) Permanent footprint (used as CCS during construction): 36,100m^2 (190m x 190m) Substation operational access road: 12,800m^2 (1,600m x 8m)	Construction access is included above as the onshore cable route and substation access haul road.
Impacts related to the National Grid Infrastructure	National Grid substation CCS: 78,750m^2 (250m x 315m) Permanent footprint (used as CCS during construction): 45,500m^2 (325m x 140m)	Design for the required overhead line (OHL) realignment work (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***. Construction access is included above as the onshore cable route and substation access haul road. Operational access is included above as the substation operational access road,
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	36 jointing bays will be installed underground, each with an operational volume of 77m^3	Jointing bays will be buried approximately 1.2m underground – there will no above ground infrastructure.

Impact	Parameter	Notes
	72 link boxes will be installed underground (2 per jointing bay), each with an operational volume of $3m^3$	Link boxes will be located underground immediately adjacent to jointing bays – there will be no above ground infrastructure.
Impacts related to the onshore substation	Operational footprint: 36,100m^2 (190m x 190m) Substation operational access road: 12,800m^2 (1,600m x 8m)	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)	The operational footprint does not include the additional landscaping footprint (which will be agreed post-PEIR). Design for the required overhead line (OHL) realignment work (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***.
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 *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.		

23.3.3 Embedded Mitigation

16. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. Where embedded mitigation measures have been developed into the design of the proposed East Anglia TWO project with specific regard to onshore ornithology, these are described in ***Table 23.4***. Any further mitigation measures suggested within this chapter are therefore considered to be additional.

Table 23.4 Embedded Mitigation Measures for Onshore Ornithology

Parameter	Mitigation Measures Embedded into the Project Design
General	
Construction disturbance	A Construction Method Statement (CMS) will be developed for the construction activities and will adhere to construction industry good practice guidance. This will incorporate a Breeding Bird Protection Plan (BBPP) which will ensure that the nests, eggs and young of any bird species are protected.
Landfall	
Designated Sites	The landfall location was influenced from the onset of the project design process by the presence of designated sites, specifically Leiston-Aldeburgh SSSI. The project has committed to the use of HDD (refer to ***Chapter 6 Project Description***) at the landfall to minimise potential impacts.
Onshore Cable Corridor	
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 cable route working width within the Sandlings SPA would be minimised to the minimum required (16.1m), and limited to cable trenches and working area only. To avoid disturbance to sensitive receptors. Within areas of overlap with designated sites, HDD and/or open cut crossing techniques may be employed. The HDD entry pits would (where possible) be located away from these designated sites to avoid any potential impacts.
National Grid Substation and Onshore Substation	
Habitat loss	The potential loss of woodland habitat for birds was identified early in the project design process, and therefore the locations of substations are positioned so as to minimise woodland removal, in an area of lower conservation value arable farmland.

23.3.4 Monitoring

17. 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 and 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.

23.4 Assessment Methodology

23.4.1 Guidance

23.4.1.1 Legislation and Policy

18. There are a number of pieces of legislation applicable to onshore ornithology. A summary of the key pieces of International and UK legislation relevant to this chapter are provided in the following sections.

23.4.1.1.1 Birds Directive - Council Directive 2009/147/EC on the Conservation of Wild Birds

19. This Directive provides a framework for the conservation and management of wild birds in Europe. The most relevant provisions of the Directive are the identification and classification of Special Protection Areas (SPA) for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). It also establishes a general scheme of protection for all wild birds (required by Article 5). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.

23.4.1.1.2 Habitats Directive - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora

20. The Directive provides protection for specific habitats listed in Annex I and species listed in Annex II of the Directive. The Directive sets out decision making procedures for the protection of Special Areas of Conservation (SAC) and SPAs and these are implemented in the UK through The Conservation of Habitats and Species Regulations 2017.

23.4.1.1.3 Wildlife and Countryside Act 1981 (as amended)

21. The Act makes it an offence (with 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.

22. The Act makes provision for the notification and confirmation of Sites of Special Scientific Interest (SSSI).

23.4.1.1.4 The Conservation of Habitats and Species Regulations 2017

23. The Regulations transpose the Council Directive 92 / 43 / EEC the 'Habitats Directive' in to national law (in respect of England and Wales) and requires the state to designate SACs and SPAs.

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.

23.4.1.1.5 Natural Environment and Rural Communities (NERC) Act 2006

25. 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').

26. 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.

23.4.1.1.6 Marine and Coastal Access Act 2009

27. 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.

23.4.1.1.7 Countryside and Rights of Way Act 2000 (CRoW)

28. 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.

23.4.1.1.8 National Policy Statements

29. The assessment of potential impacts upon onshore ornithology 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 proposed East Anglia TWO 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)

30. The specific assessment requirements for onshore ornithology, as detailed in the NPSs, are summarised in ***Table 23.5***, together with an indication of the paragraph numbers of the PEIR chapter where each is addressed.

Table 23.5 NPS Assessment Requirements

NPS requirement	NPS reference	PEIR reference
EN-1 Overarching NPS for Energy		
'Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, 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) consider thoroughly the potential effects of a proposed project.'	Section 5.3.3.	Existing environment is discussed in ***section 23.5.*** Assessment is set out in ***sections 23.6*** and ***23.7.***
'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'	Section 5.3.4.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***
'When considering the application, the IPC will have regard to the Government's biodiversity strategy is 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. *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.* *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.'*	Sections 5.3.5, 5.3.7and 5.3.8.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***

NPS requirement	NPS reference	PEIR reference
'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'.	Section 5.3.9.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to avoid interest features at designated sites.
'Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection.'	Section 5.3.11.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to avoid interest features at designated sites.
'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. *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.'*	Section 5.3.11.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to avoid interest features at designated sites.
'The IPC will have regard to sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites when considering applications since they are recognised to have a fundamental role in meeting overall national biodiversity targets.'	Section 5.3.13.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to avoid interest features at designated sites.
The IPC will aim to maximise opportunities to build in beneficial biodiversity features when considering proposals as part of good design.	Section 5.3.15.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.*** This includes replanting and reinstatement of habitat where considered necessary.
The IPC shall have regard to the protection of legally protected species and habitats and species of principal importance for nature conservation. *'The IPC shall 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*	Sections 5.3.16 – 5.3.17.	Existing environment is discussed in ***section 23.5*** Assessment is set out in ***sections 23.6*** and ***23.7.***

NPS requirement	NPS reference	PEIR reference
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.'		
The applicant should include appropriate mitigation measures as an integral part of the proposed development and demonstrate that: During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; During construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements; Habitats will, where practicable, be restored after construction works have finished; and Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.	Section 5.3.18.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.*** This includes replanting and reinstatement of habitat where considered necessary.
'The IPC will need to take account of what mitigation measures may have been agreed between the applicant and Natural England has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'	Section 5.3.20.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***
EN-3 NPS for Renewable Energy Infrastructure		
'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.'	Section 2.4.2.	Project design has avoided sensitive features where possible. Embedded mitigation measures are presented in ***section 23.3.3***
'Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that, where appropriate, adverse effects can then be mitigated and to enable further useful information to be published relevant to future projects.'	Section 2.6.71.	Monitoring is discussed in ***section 23.3.4***
'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.'	Section 2.7.15.	Decommissioning is discussed in ***section 23.6.5***

23.4.1.2 Local Planning Policy

31. Relevant local planning policy is presented in ***Chapter 3 Policy and Legislative Context*.**

23.4.1.3 Assessment Guidance

32. The onshore ornithology assessment will be carried out in accordance with the principles contained within the following guidance documents:

- British Standard 42020:2013 – Biodiversity. Code of Practice for planning and development;
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Ed.;
- Construction Industry Research and Information Association CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd edition).
- European Commission (2010). Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels;
- Natural England (2015a) Standing advice on wild birds.
- Scottish Natural Heritage (2016). Assessing connectivity with Special Protection Areas (SPAs). Version 3; and
- Scottish Natural Heritage (2018). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2.

23.4.2 Data Sources

33. To facilitate the refinement of the onshore ornithology study area and to inform the scope and approach to ornithological surveys, the following desk-based data have been obtained.

Table 23.6 Desk-Based Data Sources to Inform the Assessment

Data	Data source
Internationally designated nature conservation sites (i.e. Ramsar sites)	Joint Nature Conservation Committee (JNCC). MAGIC website
European designated nature conservation sites (i.e. SPA)	JNCC. MAGIC website.
Nationally designated nature conservation sites (i.e. SSSI, National Nature Reserves (NNR), Local Nature Reserves (LNR)	JNCC. MAGIC website.
Locally designated nature conservation sites (i.e. County Wildlife Sites (CWS), Local Wildlife Sites (LWS)	Suffolk Biodiversity Information Service RSPB
Protected Species records	Suffolk Biodiversity Information Service

Data	Data source
	RSPB Suffolk Community Barn Owl Project

34. Any additional sources of data will be identified as part of Section 42 consultation with key stakeholders following publication of the PEIR, and a follow-up meeting post PEIR comments with the Onshore Ecology and Ornithology ETG.

35. A summary of data sources made available for the onshore ornithology assessment is presented in ***Table 23.7***.

Table 23.7 Data Sources

Data	Year	Coverage	Confidence	Notes
Breeding Barn Owl Data	2018	Onshore ornithology study area	High	Suffolk Community Barn Owl Project
Breeding Nightjar	2009-17	Onshore ornithology study area	High	RSPB reserve data
Breeding Woodlark	2008-17	Onshore ornithology study area	High	RSPB reserve data
Breeding Turtle dove	2012-17	Onshore ornithology study area	High	RSPB reserve data
Breeding nightingale	2009-17	Onshore ornithology study area	High	RSPB reserve data

23.4.2.1 Baseline Surveys

36. ***Table 23.8*** presents the surveys that have been and will be undertaken in order to inform the onshore ornithology assessment. The scope and methodology of these surveys were agreed with the Onshore Ecology and Ornithology ETG during consultation (***Table 23.1***).

37. It should be noted that at the time of undertaking baseline ornithology surveys, the proposed onshore development area was yet to be finalised, and therefore survey and reporting was completed on the indicative onshore development area (to which the proposed onshore development area is a more refined version of) plus a 400m buffer from the indicative onshore development area boundary, which is considered to be the uppermost spatial extent of potential disturbance-

displacement impacts associated with any ornithological receptor likely to be present. The proposed onshore development area is shown on the figures accompanying this chapter for context. The information presented in this chapter is therefore described in terms of the indicative onshore development area boundary. 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.

Table 23.8 Onshore Ornithology Surveys

Survey	Surveying period	Summary of survey
Wintering bird surveys	February – March 2018	Walkover surveys within the onshore ornithology study area, focussing on areas of habitat suitable for wintering wildfowl and waders.
Breeding bird surveys	February – August 2018	Series of surveys within the onshore ornithology study area designed to record the distribution and abundance of breeding target species: • One specific woodlark survey in late February within the Sandlings SPA boundary to record early breeding activity. • One winter walkover survey in March, focussing on suitable habitat for wintering wildfowl and waders within the onshore ornithology study area. • Two general breeding bird surveys (incorporating woodlark) per month between April and July within the Sandlings SPA boundary. • Monthly general breeding bird surveys between April and July in the remainder of the onshore ornithology study area. • Two dusk nightjar surveys in June and July, within the Sandlings SPA boundary. • Two hobby surveys in August focussing on the Sandlings SPA and areas of previous records.
Wintering bird surveys	November 2018 – February 2019	Surveys will cover all habitats identified as suitable for supporting wintering birds. Surveys would include observational and transect recording to understand the area's usage by wintering bird species. Further details will be provided in the Environmental Statement submitted as part of the DCO application.

38. The surveys focussed on the target species identified as being confirmed or potential breeders within the Indicative onshore development area. Target breeding species were defined as:

- Qualifying interests of the adjacent Sandlings SPA;

- Species of higher conservation concern listed in the citation for the adjacent Leiston-Aldeburgh SSSI (i.e. excluding nationally common species such as skylark and bullfinch);
- Schedule 1 breeding species; and
- Birds of Conservation Concern (BoCC) Red-listed species (Eaton *et al.* 2015) that breed in low numbers nationally.

39. Additional winter walkovers were conducted in February and March 2018 to provide information on the non-breeding bird assemblage. Target species were wildfowl and wader species.

40. The breeding bird surveys followed the Breeding Bird Survey (BBS) methodology as described by the British Trust for Ornithology (BTO)[1]. Specific woodlark surveys followed guidance in Gilbert et al. (1998), and nightjar surveys followed guidance for national surveys in Conway et al. (2007). Hobby surveys followed recommended guidance in Hardey et al. (2013).

41. Further details of methods and results are outlined in ***Appendix 23.1***.

23.4.3 Impact Assessment Methodology

42. This section defines the methods used to assess the significance of effects through the process of an evaluation of sensitivity (a combination of Nature Conservation Importance and conservation status) and magnitude of effect on ornithological features for each likely impact.

43. There can often be varying degrees of uncertainty over the sensitivity or magnitude of impacts as a result of limited information. A precautionary approach is therefore adopted where the response of a population to an impact is uncertain.

44. The evaluation for wider-countryside interests (interests unrelated to a SPA, but including a SSSI) involves the following process:

- Identifying the potential impacts of the proposed development;
- Considering the likelihood of occurrence of potential impacts where appropriate;
- Defining the Nature Conservation Importance and conservation status of the bird populations present to establish level of sensitivity;
- Establishing the magnitude of the likely impact (both spatial and temporal);

[1] https://www.bto.org/sites/default/files/bbs_instructions_0.pdf

- Using the above information, to reach an evidence based judgement as to whether or not the resultant effect is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant, suggesting measures to mitigate or compensate the effect where required;
- Considering opportunities for enhancement where appropriate; and
- Confirming residual effects after mitigation, compensation or enhancement are considered.

45. ***Chapter 5 EIA Methodology*** provides a summary of the general impact assessment method, and the following sections describe the methodology used to assess the potential impacts of the proposed East Anglia TWO project on onshore ornithological interests.

23.4.3.1 Sensitivity

46. Determination of the level of sensitivity of a feature is based on a combination of the feature's Nature Conservation Importance and conservation status, described in the sections below. Overall sensitivity level is driven primarily by Nature Conservation Importance, but is influenced by conservation status, e.g. if a Medium sensitivity species' population is in unfavourable condition, this would raise the sensitivity to Medium-High.

47. There are three levels of Nature Conservation Importance as detailed in ***Table 23.9***.

Table 23.9 Determining Factors of a Population's Nature Conservation Importance

Importance	Description
High	Populations receiving protection as a feature of an SPA, proposed SPA, Ramsar Site, SSSI or which would otherwise qualify under selection guidelines. Species present in nationally important numbers (>1% national breeding population).
Medium	The presence of species listed in Annex 1 of the Birds Directive (but population does not meet the designation criteria under selection guidelines). The presence of breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The presence of target species noted on the latest Birds of Conservation Concern (BoCC) Red list due to their inherent rareness in the UK. Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the proposed development.

Importance	Description
	Species present in regionally important numbers (>1% regional breeding population).
Low	All other species' populations not covered by the above categories.

48. Ornithological receptors to be assessed are taken to be those target species of Medium or above Nature Conservation Importance, and are referred to as Important Ornithological Features (IOFs).

49. The concept of conservation status of a species has been defined by SNH (2018) as "*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest (which for the purposes of the Birds Directive is the EU)*".

50. Conservation status is considered 'favourable' under the following circumstances:

- "*Population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;*
- *The natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and*
- *There is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis".*

51. SNH (2018) recommends that *"An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status"*.

52. In the case of breeding species populations not associated with designated sites, the relevant scale for assessment is considered to be the regional (Suffolk) population. For wintering or migratory species, the national UK population is often considered to be the relevant scale for determining effects on the conservation status and this approach is applied here.

23.4.3.2 Magnitude

53. An impact is defined as a change of a particular magnitude to the abundance and/or distribution of a population as a result of the proposed project. Impacts can be adverse, neutral or favourable.

54. In determining the magnitude of impacts, the resilience of a population to recover from temporary adverse conditions is considered in respect of each potentially affected population.

55. The sensitivity of individual species to disturbance during relevant behaviours is considered when determining spatial and temporal magnitude of impact and is assessed using guidance described by Bright et al. (2006), Hill et al. (1997) and Ruddock & Whitfield (2007).

56. Impacts are judged in terms of magnitude in space and time. There are five levels of spatial impacts and temporal impacts as detailed in in ***Table 23.10*** and ***Table 23.11*** respectively.

Table 23.10 Spatial Magnitude

Value	Definition
Very High	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80% of population lost, or increase in additive mortality.
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80% of population lost, or increase in additive mortality.
Medium	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20% of population lost, or increase in additive mortality.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5% of population lost, or increase in additive mortality.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the “no change” situation. Guide: < 1% of population lost, or increase in additive mortality.

Table 23.11 Temporal Magnitude

Value	Definition
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25 years), except where there is likely to be substantial improvement after this period. Where this is the case, Long-Term may be more appropriate.
Long-term	Effects lasting for approximately 15 - 25 years or longer (see above).
Medium-term	Effects lasting for approximately 5 – 15 years.
Short-term	Effects lasting up to approximately 5 years.

Value	Definition
Negligible	Effects lasting <12 months.

23.4.3.3 Impact Significance

57. The potential significance of the effect is determined through a standard method of assessment based on a review of evidence and professional judgement, considering both sensitivity and magnitude of change as detailed in ***Table 23.12*** and ***Table 23.13***. Major and moderate effects are considered significant in the context of the EIA Regulations.

Table 23.12 Significance Criteria

Significance	Definition
Major	Significant effect, as the effect is likely to result in a permanent/ long term and very high/ high extent significant adverse effect on the integrity of the feature.
Moderate	Significant effect, as the effect is likely to result in a medium term and high / medium extent partially significant adverse effect on the feature.
Minor	The effect is likely to adversely affect the feature at an insignificant level by virtue of its limited duration and/or extent, but there would probably be no effect on its integrity. This is not a significant effect.
Negligible	No material effect. This is not a significant effect.

Table 23.13 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*

23.4.4 Cumulative Impact Assessment

58. The proposed East Anglia TWO project Cumulative Impact Assessment (CIA) will initially consider the cumulative impact with only the East Anglia ONE North project against two different construction scenarios (i.e. construction of the two projects concurrently 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.

59. For a general introduction to the methodology used for the CIA please refer to ***Chapter 5 EIA Methodology***. Further detail of the CIA in regard to onshore ornithology is given in ***Appendix 23.2*** and ***section 23.7.1***.

23.4.5 Assessment of Likely Significant Effects on a Natura 2000 Site

60. The method for assessing the significance of a likely effect on a Natura 2000 designated site (an SPA or Ramsar site) is different from that employed in the EIA for wider-countryside ornithological interests. This involves taking cognisance of the Habitats Directive, which is transposed into domestic legislation by the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations').

61. The Habitats Regulations Assessment (HRA) process consists of several phases that are described in Planning Inspectorate Advice Note 10 (Planning Inspectorate 2016). The purpose of the HRA process is to identify where potential Likely Significant Effects (LSEs) may occur and to provide information to the competent authority so that they can determine whether an LSE is expected to occur through an Appropriate Assessment.

62. For those sites where LSE cannot be excluded in Stage 1 (Screening), further information to inform the assessment is reported separately in an HRA report (document reference EA2-DEVWF-ENV-REP-IBR-000738) which will be submitted alongside the Environmental Statement submitted as part of the DCO application. The HRA report will provide information to determine whether a project alone or in-combination could adversely affect the integrity of a Natura 2000 site in view of its conservation objectives.

23.4.6 Transboundary Impact Assessment

63. There are no transboundary impacts with regards to onshore ornithology as the onshore project area is not sited in proximity to any international boundaries. Transboundary impacts are therefore scoped out of this assessment and will not be considered further.

23.5 Existing Environment

23.5.1 Onshore Ornithology Study Area Description

64. The onshore ornithology study area stretches from the coastline between Sizewell and Thorpeness in the east, to Friston inland to the west (***Figure 23.1***). The Sandlings SPA, which comprises much of the eastern half of the onshore ornithology study area, is made up of lowland heathland, acid grassland and forestry plantations on sandy soils.

65. The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation

value. Woodlark and nightjar have adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.

66. Further inland from the Sandlings SPA, the landscape of the study area is dominated by large arable fields and pasture, with small blocks of woodland and hedgerows throughout. The study area is broken up by numerous roads and small villages.

23.5.2 Designated Sites

67. Designated sites that are located within, and up to 10km from, the onshore ornithology study area are listed in ***Table 23.14*** and shown on ***Figure 23.2***.

Table 23.14 Statutory Designated Sites with an Ornithological Interest within 10km of the Onshore Ornithology Study Area

Designated site	Ornithological qualifying interests	Proximity to closest point of onshore ornithology study area
Sandlings SPA	During the breeding season; • Nightjar • Woodlark	Within study area
Leiston-Aldeburgh SSSI	Species present include nightjar, woodlark, skylark, tree pipit, turtle dove, bullfinch and nightingale, water rail, marsh harrier, gadwall and grasshopper warbler, Bewick's swan, bittern, white-fronted goose, gadwall and teal.	Within study area
Sizewell Marshes SSSI	The breeding bird assemblage is of national significance, including shoveler, gadwall, teal, snipe and lapwing.	0.5km
Minsmere to Walberswick Ramsar, SPA	During the breeding season; • Avocet • Bittern • Little Tern • Marsh Harrier • Nightjar • Woodlark Over winter; • Avocet • Bittern	1.8km

Designated site	Ornithological qualifying interests	Proximity to closest point of onshore ornithology study area
	• Hen Harrier	
Minsmere – Walberswick Heath and Marshes SSSI	Reedbed habitat for reed warbler, bearded tit, marsh harrier, bittern, Cetti's warbler, garganey and water rail. Lagoons for avocet, shoveler, gadwall, teal and shelduck. Large blocks of grazing marsh support a high number of species of breeding waterfowl. Heathland habitat for woodlark and nightjar.	1.8km
Snape Warren SSSI	Nightjar	2.3km
Alde-Ore Estuary Ramsar, SPA, SAC, SSSI	During the breeding season; • Avocet • Little Tern • Marsh Harrier • Sandwich Tern • Lesser Black-backed Gull Over winter; • Avocet • Redshank Assemblage qualification: • A seabird assemblage of international importance • A wetland of international importance.	3.5km
Sandlings Forest SSSI	Nightjar and woodlark	4.6km
Blaxhall Heath SSSI	Nightjar and tree pipit	5.2km

23.5.3 Historic Records

68. Biological records within, and up to 2km from, the onshore ornithology study area were obtained from the Suffolk Biodiversity Information Service. These have been reviewed and the following target species records were provided:

- Red kite;
- White-tailed eagle; and
- Goshawk.

69. No evidence of breeding activity was found within these records, which likely relate to non-breeding individuals.

70. Records of target species within the part of the North Warren RSPB reserve that overlaps with the indicative onshore development area were provided by the RSPB in December 2017, and are presented within the text in ***section 23.5.4***. The RSPB reserve covers practically all of the Sandlings SPA and Leiston-Aldeburgh SSSI in the data search area, with the exclusion of Thorpeness Golf Course – for which data for woodlark and nightjar were also provided. Reserve data were provided from 2009 to 2017, prior to which, monitoring and survey methods were different.

23.5.4 Field Surveys

71. The following paragraphs present a summary of abundance and distribution of target species that were recorded during baseline onshore ornithology surveys within the onshore ornithology study area in 2018. Details of survey observations are shown on ***Figures 23.3*** to ***23.9.*** For each species, expert professional judgement has been used to define the number of territories based on the survey observations. The number of territories for each species are then presented in this chapter. This includes species that are listed in Schedule 1 of the Wildlife & Countryside Act 1981 and afforded additional legal protection from disturbance. As such, the details of sensitive locations of any nest sites are not included here but are shown in Confidential ***Figure 23.3, Figure 23.4*** and ***23.9***.

72. A summary of ornithological receptors recorded during baseline surveys, and their breeding status, is presented in ***Table 23.15***.

Table 23.15 Summary of Ornithological Receptors Recorded During 2018 Baseline Surveys

Species	Conservation Status	Breeding Status Within Study Area	Estimated Number of Territories
Barn owl *Tyto alba*	Schedule 1; BoCC Green	Probable (entering nest box)	1
Bittern *Botaurus stellaris*	Annex 1, Schedule 1, BoCC Amber	Probable (booming male)	1
Cetti's warbler *Cettia cetti*	Schedule 1; BoCC Green	Probable (singing males)	5
Crossbill *Loxia curvirostra*	Schedule 1, BoCC Green	Possible (suitable habitat)	1
Dartford warbler *Sylvia undata*	Schedule 1, BoCC Amber	Confirmed (fledged young)	4
Hobby *Falco subbuteo*	Schedule 1, BoCC Green	Confirmed (occupied nest)	2+

Species	Conservation Status	Breeding Status Within Study Area	Estimated Number of Territories
Kingfisher *Alcedo atthis*	Annex 1, Schedule 1, BoCC Amber	Confirmed (occupied nest)	1
Marsh harrier *Circus aeruginosus*	SSSI species; Annex 1, Schedule 1, BoCC Amber	Probable (displaying pairs)	2-3
Marsh warbler *Acrocephalus palustris*	Schedule 1, BoCC Red	Possible (singing male)	1
Nightingale *Luscinia megarhynchos*	SSSI species; BoCC Red	Probable (singing males, adult with juveniles)	6
Nightjar *Caprimulgus europaeus*	SPA species; Annex 1, BoCC Amber	Probable (churring males)	6
Peregrine *Falco peregrinus*	Annex 1, Schedule 1, BoCC Green	Non-breeding	0
Red kite *Milvus milvus*	Annex 1, Schedule 1, BoCC Green	Possible (pair in suitable habitat)	0-1
Short-eared owl *Asio flammeus*	Annex 1, BoCC Amber	Migrant	0
Spotted flycatcher *Muscicapa striata*	BoCC Red	Probable (family)	1
Turtle dove *Streptopelia turtur*	SSSI species; BoCC Red	Probable (pairs and singing males)	10
Woodlark *Lullula arborea*	SPA species; BoCC Green	Confirmed (families)	7
Yellow wagtail *Motacilla flava*	BoCC Red	Confirmed (provisioning)	2-3

23.5.4.1 Woodlark

73. Approximately seven woodlark territories were located within the onshore ornithology study area in 2018, all but one of these were located within suitable heath, scrub and forestry habitats within the Sandlings SPA, with the other near Aldringham (***Figure 23.3***). Of these territories, at least three may overlap in part with the indicative onshore development area. Following refinement of the indicative onshore development area, one additional woodlark territory was found to overlap with what is now known as the proposed onshore development area. Therefore, a total of four woodlark territories fall within the proposed onshore development area. The species was absent from the more intensive farmland to the west of Aldringham.

74. The RSPB provided survey data from 2009 to 2017 for the part of the North Warren Reserve that overlaps with the onshore ornithology study area. Results showed that six woodlark territories were recorded in 2017, in broadly similar areas to those found in 2018. Woodlark numbers appear to be reasonably stable since 2012. Between 2009 and 2011 a maximum of two territories were recorded. A further two territories were usually recorded within Thorpeness Golf Course, adjacent to the indicative onshore development area.

23.5.4.2 Nightjar

75. Nightjars breed on dry lowland heaths in England although can also breed in open woodland with bracken, and clearings in conifer plantation. Suitable habitat within the onshore ornithology study area was limited to the Sandlings SPA, and so coordinated dusk surveys focussed on this area. A total of six territories were recorded in the SPA (outside of the indicative onshore development area), signified by the presence of churring males (***Figure 23.4***).

76. In 2017 the RSPB recorded two churring males within the part of the RSPB's North Warren reserve within the onshore ornithology study area, in a similar location to two churring males in 2018. Numbers from 2009 to 2016 varied between zero and three males. Up to two males may also be present within Thorpeness Golf Course.

23.5.4.3 Turtle dove

77. Up to ten turtle dove territories were occupied within the onshore ornithology study area in 2018, mainly within the northern part of the Sandlings SPA and adjacent farmland (***Figure 23.5***). The species was also present in the Aldringham area, but there were no records west of Knodishall Common.

78. RSPB counted six turtle dove territories within the part of the RSPB's North Warren reserve within the onshore ornithology study area in 2017, which until 2018 was the highest number since annual counts began in 2012. Two territories in 2017 were within the northern part of the SPA which overlaps with the indicative onshore development area.

23.5.4.4 Nightingale

79. Approximately seven territories were located within the onshore ornithology study area in 2018. Five of these were at the edges of the Sandlings SPA, with a further two in scrub habitats within the landfall search area (***Figure 23.6***). The species was absent to the west of Aldringham.

80. RSPB counted 16 territories within the part of the RSPB's North Warren reserve within the onshore ornithology study area in 2017, with a broadly similar distribution around the edges of the SPA, as recorded in 2018. One territory was

found within the northern part of the SPA which overlaps with the indicative onshore development area.

81. Numbers have been relatively stable since 2009 (with a peak of 18 in 2016), although it is not apparent whether lower numbers in 2018 may be attributable to an actual decline, or difference in methodology or survey effort.

23.5.4.5 Marsh harrier

82. No marsh harrier nest sites were confirmed within the onshore ornithology study area. However, it is likely that around 2-3 pairs made use of the area in 2018, with activity largely confined to The Fens area of the Sandlings SPA where suitable reedbed habitat exists (***Figure 23.7***). A pair was also recorded quartering a field within the indicative onshore development area, to the north of the landfall search area. No breeding activity is likely to take place west of Aldringham where the habitat is generally less suitable for the species.

23.5.4.6 Barn owl

83. During 2018 surveys, one barn owl was recorded, entering a nest box in the western end of the onshore ornithology study area. Comprehensive monitoring data of nest boxes within the onshore ornithology study area in 2018 will be made available by the Suffolk Community Barn Owl Project when it has been analysed, and this information will be considered in the final onshore ornithology assessment presented in the Environmental Statement submitted as part of the DCO application.

23.5.4.7 Bittern

84. Bitterns prefer tall vegetation within standing water, adjacent to open water. *Phragmites* reedbeds are particularly favoured in England. One booming male was present within the onshore ornithology study area in 2018, within The Fens reedbed area (outside of the indicative onshore development area).

23.5.4.8 Cetti's warbler

85. Approximately five territories were recorded within the onshore ornithology study area in 2018, four of which were within The Fens, with a further territory within scrubby habitat in the landfall search area.

23.5.4.9 Crossbill

86. One possible crossbill territory was located within the Sandlings SPA in 2018, but there were no other records apart from a flock of 15 individuals that were seen on Aldringham Walks in early April.

23.5.4.10 Dartford warbler

87. Dartford warblers are found in heathland with gorse scrub and scattered trees. These habitats within the onshore ornithology study area are restricted to the Sandlings SPA.

88. Approximately four territories were recorded in 2018, three within the SPA, although a recently fledged family group was recorded to the north of the SPA within the indicative onshore development area.

89. RSPB counted six territories within the part of the North Warren reserve that overlaps with the onshore ornithology study area in 2017, and a slight increase in numbers seems to have occurred since 2012 when four territories were recorded.

23.5.4.11 Hobby

90. Hobbies breed in lowland areas with mature trees, either in groves, in clumps, in lines, or at woodland edges, where good numbers of large, flying insects are found (Hardey et al. 2013). Their favoured habitats include heaths, open woodland and mixed farmland. Nesting territories are often near wetlands.

91. Baseline surveys recorded foraging hobbies within the Sandlings SPA and at The Fens wetland area, with a single record at Aldringham. Breeding behaviour was recorded late in the season (hobbies become more demonstrative as young grow) at two locations: within the Sandlings SPA where a pair was alarm calling above a nest in a pine tree, and a single bird was alarm calling at The Fens. Numbers of individuals recorded (up to nine simultaneously over the North Warren reedbed) suggest that more pairs may be present in the local area.

23.5.4.12 Kingfisher

92. Kingfishers nest in vertical bankside holes in slow-moving, shallow rivers or streams which are clean enough to support abundant small fish.

93. Breeding activity was recorded at one location in 2018, outside of the indicative onshore development area on a stream near Thorpeness Golf Club.

23.5.4.13 Marsh warbler

94. Marsh warbler is a rare breeder in the UK, with an estimated 2-8 pairs present in any year (*Musgrove et al. 2013*), distributed mainly in southeast England. They are found in areas of dense vegetation with taller bushes nearby.

95. There was one record of a singing male within an area of suitable breeding habitat within the landfall search area, which is considered to represent a possible territory. No further breeding evidence was recorded at this, or any other location.

23.5.4.14 Peregrine

96. One peregrine was recorded in flight to the north of The Sandlings SPA, but no breeding evidence within the onshore ornithology study area was recorded in 2018. The species is unlikely to breed in the local area, with no suitable nesting habitat.

23.5.4.15 Red Kite

97. In June 2018, two birds were recorded soaring above the reedbeds at The Fens alongside buzzards, but no further observations, and no breeding evidence was recorded. The species is unlikely to breed within the vicinity of the onshore ornithology study area.

23.5.4.16 Short-eared owl

98. An individual short-eared owl was flushed during a survey in the Sandlings SPA in April 2018. This is likely to be a migrant, with no other observations made within the onshore ornithology study area during baseline surveys.

23.5.4.17 Spotted flycatcher

99. Spotted flycatcher is Red-listed, with numbers declining rapidly and consistently since the 1960s. A spotted flycatcher family (adult with juveniles) was recorded in farmland in July 2018, within the onshore ornithology study area, around 800m northwest of the indicative onshore development area. No further observations were made during baseline surveys.

23.5.4.18 Yellow wagtail

100. Yellow wagtail is Red-listed, and the species has been in rapid decline since the early 1980s, with notable range contractions in East Anglia. Britain holds almost the entire world population of the *flavissima* race, so population changes in the UK are of global conservation significance. It breeds in a variety of habitats in the UK, including arable farmland, wet pastures and upland hay meadows.

101. A total of 2-3 pairs were likely to have bred within the onshore ornithology study area in 2018, with records on farmland on the northern edge of the Sandlings SPA.

23.5.4.19 Wintering Species

102. Walkover surveys were undertaken in February and March 2018, focussing on waterbodies, wetland and agricultural habitats that may be suitable for wintering birds of conservation concern, in particular wildfowl and waders.

103. The only area of standing freshwater within the onshore ornithology study area that is known to attract wildfowl and waders is the agricultural reservoir to the

north of the Sandlings SPA, in The Walks area. A small number of ponds distributed across the onshore ornithology study area were also checked.

104. The agricultural reservoir was found to be used by tufted duck *Aythya fuligula*, little grebe *Tachybaptus ruficollis*, mallard *Anas platyrhynchos* and a number of common gulls *Larus canus* and black-headed gulls *Chroicocephalus ridibundus*. Lapwings *Vanellus vanellus* were present in the onshore ornithology study area in February and March, with total counts of 26 and 75 individuals, respectively. The only other wader species recorded in these months was a count of two woodcock *Scolopax rusticola* in March. Counts of up to 13 greylag geese *Anser anser* and two Canada geese *Branta Canadensis* were also made in February and March, but no other geese species were present.

23.5.5 Anticipated Trends in Baseline Condition

105. In accordance with the 2017 EIA Regulations, climate impacts require consideration in the assessment, which covers both the impacts of the proposed East Anglia TWO project on climate change and the vulnerability of the proposed East Anglia TWO project to climate change. The potential trends in baseline onshore ornithology conditions are considered here.

106. According to ClimateUK (2012[2]), The Environment Agency suggests that in the east of England, mean monthly river flows between July and November could decrease by 30-80% if temperature rises associated with medium to high climate change scenario assumptions up to 2050 are realised. Bird species associated with coastal zones, semi-natural grasslands, wetlands and freshwater habitats are likely to be particularly vulnerable to changes in water availability. Ecosystems are likely to face increasing pressure due to changes in soils and invasion of non-native species, pests and diseases.

107. Changes in climate (most likely temperature increases and rainfall decreases) may over the long-term (i.e. within the next 25 years, but likely to continue permanently beyond that) affect the bird assemblage within the onshore ornithology study area, by altering habitats and prey availability. Sensitive species such as spotted flycatcher for example, have declined in numbers over the long-term, and climate change has been suggested as a contributing factor.

108. The onshore ornithology study area comprises mainly agricultural habitats, which are by-and-large likely to remain relatively unchanged over the short- to medium-term at least. Warmer temperatures and carbon fertilisation may present opportunities to increase yields in the short-term, but lower water availability in the summer and increased flooding, accompanied by increased incidences of

[2] http://www.greensuffolk.org/assets/Greenest-County/Adaptation/General/Summary-of-climate-change-risks-to-East-of-England.pdf

pests and diseases in the longer term may mean that the type of agriculture in the area may alter, potentially affecting the suitability of habitats for the current bird assemblage.

109. As identified in Natural England's (2014) *Climate Change Adaptation Manual*, fire risk associated with warmer, drier weather may increase in heathland habitats, particularly close to urban areas where there is more recreational pressure, which may adversely affect species within the Sandlings SPA, in particular the populations of nightjar and woodlark.

110. On balance, it is likely that without the proposed East Anglia TWO project, most target species currently found within the indicative onshore development area would decline in numbers over the long-term, should climate changes occur as predicted. This would likely be reflective of national trends, potentially resulting in increased nature conservation value for some species that may become rarer or become more restricted in distribution. It is also possible that some species currently found in hotter, drier climates may colonise the area and begin to breed, as seen with the expansion of Cetti's warbler and Dartford warbler populations in southeast England in recent decades (Hayhow et al. 2017). Habitat is also more likely to remain suitable for turtle dove, according to Hayhow et al. (2017).

111. The proposed East Anglia TWO project would provide a contribution towards reducing the rate of change in the climate over the long-term, by providing lower emissions in producing energy compared to non-renewable sources.

112. Despite possible long-term changes in abundance, distribution and sensitivity of ornithological receptors, the results of the baseline surveys and assessment in this chapter are considered to be sufficiently robust to be able to characterise the situation during the operational period of the proposed East Anglia TWO project.

23.6 Potential Impacts

113. The following sections describe the impacts upon those onshore ornithology receptors described in ***section 23.5*** that have the potential to arise as a result of the construction, operation and decommissioning phases of the proposed East Anglia TWO project. The assessments are based on the worst-case scenarios set out in ***section 23.3.2*** and include the incorporation of embedded mitigation and project commitments set out in ***section 23.3.3***.

23.6.1 Scoped-in Important Ornithological Features

114. The assessment of likely effects will be applied to those 'scoped-in' IOFs of Medium or High Nature Conservation Importance (see ***Table 23.9***) recorded within the onshore ornithology study area that are known to be present within or

adjacent to the indicative onshore development area (as confirmed through survey results and desk studies outlined above). These comprise (***Table 23.16***):

- Barn owl;
- Cetti's warbler;
- Dartford warbler;
- Marsh harrier;
- Marsh warbler;
- Nightjar;
- Nightingale;
- Turtle dove;
- Woodlark; and
- Yellow wagtail.

115. In addition, it is concluded that a Likely Significant Effect cannot be discounted at this stage for the nightjar and woodlark populations of the Sandlings SPA due to the proximity to the indicative onshore development area. The information to inform the assessment of potential effects on the integrity of the Sandlings SPA will be presented in the HRA report (document reference EA2-DEVWF-ENV-REP-IBR-000738) accompanying this PEIR. The Leiston-Aldeburgh SSSI, which is a component of the Sandlings SPA, is however considered in this chapter, within an EIA context.

Table 23.16 Nature Conservation Importance of IOFs

Species	Nature Conservation Importance	Reason
Barn owl	Medium	Schedule 1; BoCC Green
Cetti's warbler	Medium	Schedule 1; BoCC Green
Dartford warbler	Medium	Schedule 1, BoCC Amber
Marsh harrier	High	SSSI species; Annex 1, Schedule 1, BoCC Amber
Marsh warbler	High	>1% of national breeding population, Schedule 1, BoCC Red
Nightjar	High	SPA species; Annex 1, BoCC Amber
Nightingale	High	SSSI species; BoCC Red
Turtle dove	High	SSSI species; BoCC Red
Woodlark	High	SPA species; BoCC Green

Species	Nature Conservation Importance	Reason
Yellow wagtail	Medium	BoCC Red

116. It is also necessary to consider the species' conservation status when assessing the likely effects. Relevant conservation status information for the 'scoped in' IOFs is detailed within ***Table 23.17***.

Table 23.17 Conservation Status of Scoped-in IOFs

Species	Conservation Status Information	Conservation Status
Barn owl	Green list	According to the Suffolk Community Barn Owl project the regional barn owl population has recovered from a low of approximately 45 breeding pairs in the late 1980s, to an average of 450 occupied nest boxes over the last six years, with 469 in 2017[3]. The regional population is therefore considered to be in favourable conservation status.
Cetti's warbler	Green list	Cetti's warblers first bred in Suffolk in the 1970s, and since then the national population has risen to 1,827 pairs (Hayhow et al. 2017). East Anglia is one of the strongholds for the species in the UK and so regional population is considered to be in favourable conservation status.
Dartford warbler	Amber list (HDRec, BL)	The national Dartford warbler population was estimated to be 3,200 pairs in 2006. An expansion in range over the last few decades has led to an increase in numbers by 70%, with this trend projected to continue (Hayhow et al. 2017). The regional population is therefore considered likely to be in favourable conservation status.
Marsh harrier	Amber list (HDRec, BL)	The national marsh harrier population is estimated to be 365 pairs, which represents a long-term increase of 479% over the last 25 years (Hayhow et al. 2017). The regional population is likely to reflect this trend, with East Anglia one of the main areas for breeding. It is therefore considered to be in favourable conservation status.
Marsh warbler	Red list (BDp1, BDp2, BR)	Marsh warbler is a scarce UK breeder with an estimated population average of eight pairs (Hayhow et al. 2017), mainly in southeast England. It was identified as a species with a high likelihood of extinction in the UK in Hayhow et al. (2017), and so the regional population is likely to be very small, and in unfavourable conservation status.
Nightingale	Red list (BDp1, BDp2, BDr2)	Nightingales exhibited a 48% decline nationally, between 1995 and 2015, and a similar trend was replicated within the Suffolk region. The UK population was estimated to be 5,542 territorial males in 2012-134. According to the Suffolk Bird Report 2014

[3] http://www.eadt.co.uk/news/suffolk-barn-owl-scheme-s-success-leads-to-new-approach-1-5474965
[4] https://www.bto.org/volunteer-surveys/nightingale-survey/results

Species	Conservation Status Information	Conservation Status
		(Mason 2015), numbers have declined regionally. The regional population is likely to be in unfavourable conservation status.
Nightjar	Amber list (BDMr2)	The British population was estimated to be 4,600 males in 2004, representing a 36% increase in 12 years. The 2004 survey did however reveal a decline in the Suffolk population (284 males) by around 11% albeit with lower confidence in results[5]. According to Natural England's (2015b) Site Improvement Plan for the Sandlings, the nightjar population on the Suffolk coast has declined by 66% since Sandlings SPA notification in 2001. Numbers recorded locally by RSPB seem to have remained steady since 2012, suggesting that the SPA population is likely to be stable.
Turtle dove	Red list (BDp1, BDp2, BDMr1, BDr2, ERLOB)	Turtle doves have undergone a massive long-term decline, with numbers down nationally by 98% between 1970 and 2015. The population was last estimated to be 14,000 territories in 2009 (Musgrove et al. 2013). It has been identified by Hayhow *et al*. (2017) as a species at high risk of extinction in the UK, even though it is predicted that the climate will remain suitable for the species. Estimates from Balmer et al. (2013) indicate that Suffolk supports almost 17% of the UK population. From public sighting records 2012-2013, turtle doves were reported from 89% of the 10km grid squares. Breeding numbers are however likely to be historically low in the region, with the population in unfavourable conservation status.
Woodlark	Green list	The national woodlark population was last estimated at 3,100 pairs in 2006 (Musgrove *et al.* 2013), with 370 pairs in Suffolk. The Sandlings area held around 16% of the regional total, according to the Suffolk Local Biodiversity Action Plan woodlark species account[6]. Recent trends are unclear but there was a large increase in numbers nationally from 1986 to 2006 (up 1,086%) as the species greatly expanded its range. Conversely, according to Natural England's (2015b) Site Improvement Plan for the Sandlings, the woodlark population on the Suffolk coast has declined by 65% since Sandlings SPA notification in 2001.
Yellow wagtail	Red list (BDp1, BDp2, BDMr1, BDMr2)	The UK yellow wagtail population has shown a large long-term decline of 67%. The population was estimated to be 15,000 territories in 2009. Range contraction has been identified in many areas, including parts of East Anglia (Balmer *et al*. 2013) and so the regional population is considered to be in unfavourable conservation status.

5 https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspecieshabitats/actionplans/nightjar.pdf

6 https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspecieshabitats/actionplans/woodlark.pdf

Species	Conservation Status Information	Conservation Status
BoCC criteria (Eaton et al. 2015): **HDRec:** Historical decline in breeding population but showing recovery. **BL:** breeding localisation. Species were considered localised if more than 50% of the UK population was found at ten or fewer sites. **BDp:** Breeding population decline. Severe decline in the UK breeding population size (>50%) over 25 years (BDp[1]) or the longerterm (BDp[2]), defined as the entire period used for assessments since the first BoCC review, starting in 1969. **BDr:** Breeding range decline. Severe decline in UK range (>50%) between the breeding bird atlases in 1988–91 and 2007–11 (BDr[1]) or 1968–71 and 2007–11 (BDr[2]), as measured by the calculated change in the number of occupied 10-km squares. **BDMr:** Breeding range decline. As for Red list criterion BDr, but with moderate decline (>25% but <50%) between 1988–91 and 2007–11 (BDMr[1]) or 1968–71 and 2007–11 (BDMr[2]). **ERLOB:** European Red List status.		

23.6.2 Scoped-out Ornithological Receptors

117. Based on listed qualifying interest species, distance from the site and foraging ranges during the breeding season (e.g. Pendlebury et al. 2011; SNH 2016), all designated sites other than the Sandlings SPA and Leiston-Aldeburgh SSSI have been scoped out of the assessment due to a lack of likely connectivity for qualifying interests.

118. The following target species recorded during baseline surveys have been scoped out, with rationale provided in ***Table 23.18***.

Table 23.18 Scoped out Ornithological Receptors

Species	Closest breeding record to Indicative onshore development area	Preferred habitat	Rationale for scoping out
Bittern	800m	Tall vegetation within standing water, adjacent to open water. *Phragmites* reedbeds.	No suitable habitat within Indicative onshore development area, so no habitat loss. Closest construction activity would be visually and audibly screened, at a distance likely beyond any disturbance impacts.
Crossbill	300m	Conifer woodland including plantation.	No suitable habitat within Indicative onshore development area, so no habitat loss. Closest construction activity would be visually and audibly screened, at a distance likely beyond any disturbance impacts (up to 150m, FCS 2006[7]).

[7] https://scotland.forestry.gov.uk/images/corporate/pdf/Guidancenote32Birddisturbance.pdf

Species	Closest breeding record to Indicative onshore development area	Preferred habitat	Rationale for scoping out
Hobby	420m	Mature trees, either in groves, in clumps, in lines, or at woodland edges. Favoured habitats include heaths, open woodland and mixed farmland, often near wetlands.	No observed activity within Indicative onshore development area, and agricultural habitats are likely to be of lower suitability for foraging. Ruddock & Whitfield (2007) did not include hobby in their expert literature review of disturbance reactions, presumably due to a lack of breeding pairs in Scotland (the report was commissioned by Scottish Natural Heritage). For the most similar species reviewed, merlin (which can be tree-nesting), a disturbance range of up to 300-500m was suggested. However, the authors advised that like most other raptors, if previously exposed to relatively innocuous disturbance merlins are capable of developing a tolerance to relatively high levels of at least some forms of human disturbance when free from direct interference. The location of the closest hobby nest is likely to be screened from any activities.
Kingfisher	250m	Slow-moving, shallow rivers or streams	No suitable habitat within Indicative onshore development area. It is relatively common for kingfishers to nest in areas of human activity, and so birds are unlikely to be disturbed at this distance from any activity.
Peregrine	N/A	Open upland and coastal areas with cliffs and secure nest sites.	No breeding or foraging activity recorded – one bird flying over unlikely to breed nearby.
Red kite	N/A	Open stands of coniferous and broadleaved woodland. Marginal agricultural land and mixed farming.	No breeding or foraging activity recorded – two birds flying over reedbeds unlikely to breed nearby.
Short-eared owl	N/A	Heather moorland, rough grazing, bogs and young conifer plantation	Individual recorded likely to be a migrant – no breeding activity.
Spotted flycatcher	900m	Mature deciduous or mixed woodland with open clearings, farmland with scattered trees.	Closest record likely to be beyond potential disturbance distance associated with construction.
Wintering species (wildfowl	N/A	Usually associated with waterbodies and	No wintering species recorded within the onshore ornithology study area were found in numbers that were potentially significant within

Species	Closest breeding record to Indicative onshore development area	Preferred habitat	Rationale for scoping out
and waders)		particular types of agricultural land.	a national / migratory population context, or within the context of any designated site where potential connectivity may exist.

23.6.3 Potential Impacts during Construction

119. The key aspects of construction with respect to the IOFs are the construction of the onshore substation, National Grid infrastructure, the excavation works (and supporting activities) associated with the onshore cable corridor and landfall during construction. There is the potential for direct impacts where IOFs and the footprint of the proposed works overlap leading to loss or fragmentation of habitat (Impact 1), which would be both short-term (e.g. temporary compounds, excavation works) and long-term (e.g. substation). This could impact on breeding or foraging individuals. Displacement and disruption of breeding and foraging birds as a result of noise and general disturbance (Impact 2) may occur over a short-term period (either the duration of a particular construction activity within working hours, or the duration of the whole construction period).

120. Impacts on breeding birds would be confined to areas in the locality of infrastructure. Few attempts have been made to quantify the effects of disturbance of birds, due to activities of this type, and much of the available information is inconsistent. However, as a broad generalisation, larger bird species such as raptors, or those that feed in flocks in the open tend to be more susceptible to disturbance than small birds living in structurally complex habitats (such as woodland, scrub and hedgerow) (Hill *et al*. 1997).

23.6.3.1 Impact 1: Habitat Loss

23.6.3.1.1 Nightjar

121. As a qualifying interest of the Sandlings SPA, and a Schedule 1 species, nightjar is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be stable, albeit with limited recent data. Overall the species' sensitivity is therefore considered to be High.

122. Potential impacts on nightjar require consideration here in an EIA context, and separately within the context of the Sandlings SPA in the HRA report.

23.6.3.1.1.1 Impact Associated with the Landfall

123. Nightjars in Suffolk have been observed to prefer to nest on heathlands and young coniferous plantation up to five years old (Ravenscroft 1989). Birds may

forage short distances from the nest, particularly when they have eggs or young (Schlegel 1967, Cross et al. 2005), although distances have been recorded up to 3.1km (Alexander & Cresswell 1990). A study of radio-tracked nightjars in southeast England by Sharps et al. (2015) showed that nightjars travelled a mean maximum distance of 747m from their territory centre each night. When leaving their smaller song territories, individuals preferred pre-closure canopy forest and newly planted forest as well as open grazed grass heath.

124. Baseline surveys in 2018 recorded nightjar territories that were regularly distributed within The Sandlings SPA in dry heath habitats (***Figure 23.4***). The closest territory centre was located approximately 500m from the landfall area, which mainly comprises arable land and improved grassland, unsuitable for foraging. No habitat loss for nightjar is therefore likely to result from works associated with the landfall (negligible spatial, and short-term temporal magnitude).

23.6.3.1.1.2 Impact Associated with the Onshore Cable Corridor

125. Three territory centres within the SPA were within 200m of the indicative onshore development area (see ***Figure 23.4***). One further territory was within 500m, and two further territories were within 750m, suggesting that there may be some potential for individuals to forage within the indicative onshore development area. The results of the Phase 1 Habitat survey in ***Figure 22.1.3*** however show that there is no suitable habitat (taken to be heath, coniferous woodland or scattered trees) within the indicative onshore development area and so it is unlikely that any habitat for nesting or foraging would be lost due to the construction of infrastructure associated with the proposed East Anglia TWO project (negligible spatial, and short-term temporal magnitude).

23.6.3.1.1.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

126. The onshore substation and National Grid infrastructure, located at the westernmost part of the indicative onshore development area, would not be within an area of suitable habitat for nightjar, and over 4km from the nearest recorded territory. No impacts on nightjar would result from the construction of the substations (Negligible spatial, and Short-term temporal magnitude).

23.6.3.1.1.4 Significance of Effect

127. As discussed above, the species sensitivity is high and the magnitude of effect is negligible. Therefore, the unmitigated effect on the regional and Leiston-Aldeburgh SSSI nightjar populations from habitat loss is considered to be **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.1.5 Mitigation

128. None required.

23.6.3.1.1.6 Residual Effect

129. The residual effects on the regional and SSSI populations of Nightjar are unchanged (**minor adverse** and not significant).

23.6.3.1.2Woodlark

130. As a qualifying interest of the Sandlings SPA, and a Schedule 1 species, woodlark is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

131. Potential impacts on woodlark require consideration here in an EIA context, and separately within the context of the Sandlings SPA in the HRA report.

23.6.3.1.2.1 Impact Associated with the Landfall

132. Woodlarks may breed on heaths, scrubland, neglected farmland and golf courses, avoiding areas of intensive agriculture. In England, the largest population is in the Breckland region of Suffolk and Norfolk, where most pairs breed in areas of pine forest that has been felled and replanted (Forrester et al. 2007).

133. The distribution of woodlark territories recorded during baseline surveys in 2018 reflects these habitat preferences, with all observations occurring within heath or scrub habitats, mainly within the SPA.

134. The closest woodlark territory in 2017 and 2018 was over 300m from the landfall area, and with the landfall area largely comprising intensively farmed land surrounding the SPA, it is unlikely there would be any habitat loss due to construction works (negligible spatial and short-term temporal magnitude).

23.6.3.1.2.2 Impact Associated with the Onshore Cable Corridor

135. The large majority of the indicative onshore development area comprises intensive agricultural habitats, with only small areas of scrub and semi-improved grassland where it overlaps with the northernmost part of the SPA, and to a lesser extent in patches around Aldringham. It is possible that some of the suitable habitat within the SPA may be lost during the construction phase – however from 2018 baseline survey data, and 2017 RSPB data, woodlarks were not recorded in this area of the SPA, showing that it is not likely to be part of any territories. The indicative onshore development area at Aldringham which is in proximity to a possible woodlark territory comprises an access route to the main onshore development area corridor and so little, if any, suitable habitat would be lost. The

overall magnitude of habitat loss within a regional population context is therefore considered to be negligible spatial and short-term temporal.

23.6.3.1.2.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

136. The onshore substation and National Grid infrastructure located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for woodlark, and over 3km from the nearest recorded territory. No impacts on woodlark would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.1.2.4 Significance of Effect

137. As discussed above, the species sensitivity is high and the magnitude of effect is negligible. Therefore, the unmitigated effect on the regional woodlark population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations. Within the context of the Leiston-Aldeburgh SSSI population (taken to be approximately seven territories, as per 2018 Sandlings SPA counts), this would also be a **minor adverse** and not significant unmitigated effect.

23.6.3.1.2.5 Mitigation

138. None required.

23.6.3.1.2.6 Residual Effect

139. The residual effects on the regional and SSSI populations are unchanged (**minor adverse** and not significant).

23.6.3.1.3Turtle dove

140. As a named component of the Leiston-Aldeburgh SSSI, turtle dove is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.3.1 Impact Associated with the Landfall

141. Turtle doves nest in mature hedgerows, tall scrub and woodland edges, often close to freshwater, feeding in weedy arable fields. The closest record of a territory to the landfall area in 2017 or 2018 was around 300m to the north. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. With intensive agricultural habitats generally of lower suitability for the species, and the positioning of construction footprint to avoid Leiston-Aldeburgh SSSI, no habitat loss is therefore predicted relating to construction works

associated with the landfall (negligible spatial and short-term temporal magnitude).

23.6.3.1.3.2 Impact Associated with the Onshore Cable Corridor

142. Most turtle dove records in 2018 were within, or in proximity to the Sandlings SPA, particularly the area around the agricultural reservoir and arable fields where the most suitable habitat exists (***Figure 23.5***). A temporary loss of some feeding habitat within the Indicative onshore development area may therefore affect up to nine territories within the onshore ornithology study area for the duration of the construction period. This would potentially affect 0.4% of the regional turtle dove population (approximately 2,380 territories), which is considered to be an impact of negligible spatial and short-term temporal magnitude.

143. When taken within the context of the Leiston-Aldeburgh SSSI population (taken to be approximately eight territories, as per 2018 surveys) some territories may be affected by habitat loss. Although the majority of each territory is likely to be within the SSSI, it is possible that a small loss of habitat could lead to a reduction in productivity for these territories during the construction period. This is considered to be an impact of medium spatial and short-term temporal magnitude.

23.6.3.1.3.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

144. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for turtle dove, and around 2km from the nearest recorded territory. No impacts on turtle dove would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.1.3.4 Significance of Effect

145. As discussed above, the species sensitivity is high and the magnitude of effect for the regional population is negligible Therefore, the unmitigated effect on the regional turtle dove population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

146. Within the context of the Leiston-Aldeburgh SSSI population, a reduction in productivity due to habitat loss would represent a **major adverse** and potentially significant unmitigated effect as the magnitude of the effect is increased from negligible spatial at a regional level to medium spatial in the context of the Leiston-Aldeburgh SSSI population.

23.6.3.1.3.5 Mitigation

147. If undertaking works within 200m of the Sandlings SPA during the turtle dove breeding season (mid-April to July), an unaffected location within the onshore ornithology study area would be identified for sowing turtle dove seed mix. Based on advice provided by Operation Turtle Dove initiative[8], where possible, the supplementary feeding area would be located within 300m of previously recorded turtle dove territories recorded in The Sandlings SPA. It could comprise a strip of land measuring a minimum 50m long by 5m wide, or similar, and be located in an open location, either in-field or adjacent to field boundaries. Suitable areas for seed deployment may include stubbles, other fallow or recently established or cultivated areas (including fallow or seed plots), bare or sparsely vegetated tracks or very short grass.

148. During the construction period, supplementary feeding would be carried out from mid-April until late June, or until turtle dove breeding activity is known to have ceased in July. The feeding area would be prepared to comprise a bare surface free of vegetation, or have vegetation that is short (<15cm) and patchy, including at least 30% (preferably 50-60%) bare areas in April. The feeding area would be subject to cutting or use of a rotovator if the vegetation subsequently covered all the ground and became taller than 25cm before the end of the feeding period in late June. A mix of suitable seed types as advised by Operation Turtle Dove would be sown weekly.

149. In addition, where possible all habitats of conservation value which would be subject to temporary loss are reinstated post-construction in agreement with Natural England.

23.6.3.1.3.6 Residual Effect

150. When considering the mitigation measure outlined above, and the positioning of the construction footprint to avoid Leiston-Aldeburgh SSSI (at the landfall), the level of significance of habitat loss on turtle dove, will remain as **minor adverse** and not significant within the context of the EIA Regulations.

151. When considering the mitigation measures outlined above, the level of significance of construction effects on turtle dove, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.1.4Nightingale

152. As a named component of the Leiston-Aldeburgh SSSI, nightingale is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional

[8] https://www.operationturtledove.org

population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.4.1 Impact Associated with the Landfall

153. Nightingales occupy a range of habitats, but prefer scrub and woodland thickets, often in the vicinity of water. Scrubby field margins coupled with an adjacent belt of rank grass and ruderal vegetation provide thick cover that nightingales require for foraging. The UK population was estimated to be approximately 5,500 males in 2012 (Massimino et al. 2017). Although the regional (Suffolk) population is unknown, Balmer et al. (2013) shows that southeast England is the stronghold for the species.

154. Two territories were recorded in scrub habitat within the Leiston-Aldeburgh SSSI and landfall area in 2018 (***Figure 23.6***). It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. HDD works are included as embedded mitigation for the landfall area (***Table 23.4***), no habitat loss is predicted for these territories. An impact of negligible spatial and short-term temporal magnitude is therefore predicted.

23.6.3.1.4.2 Impact Associated with the Onshore Cable Corridor

155. Four further nightingale territories were recorded within the Leiston-Aldeburgh SSSI, and within 100m of the indicative onshore development area in 2018. It is possible that some suitable nesting or foraging habitat may be lost along the margins of the indicative onshore development area, which may affect these territories.

156. The unmitigated impact on four territories is likely to affect less than 1% of the population, and so the impact is likely to be of Negligible spatial and Short-term temporal magnitude. Within the context of the Leiston-Aldeburgh SSSI, the unmitigated loss of four territories would represent a worst-case impact of medium spatial and short-term temporal magnitude.

23.6.3.1.4.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

157. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for nightingale, and around 4km from the nearest recorded territory. No impacts on nightingale would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.1.4.4 Significance of Effect

158. As discussed above, the species sensitivity is high and the magnitude of effect on the regional population is negligible Therefore, the unmitigated effect on the regional nightingale population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

159. Within the context of the Leiston-Aldeburgh SSSI population (taken to be approximately 15 territories), the temporary loss of up to four six territories would represent a **major adverse** and potentially significant unmitigated effect as the magnitude of the effect is increased from negligible spatial at a regional level to medium spatial in the context of the Leiston-Aldeburgh SSSI population.

23.6.3.1.4.5 Mitigation

160. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for nightingale. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction. It would be ensured that any habitats of conservation value which would be subject to temporary loss are reinstated post-construction in agreement with Natural England.

23.6.3.1.4.6 Residual Effect

161. When considering the mitigation measure outlined above, and the positioning of construction footprint to avoid Leiston-Aldeburgh SSSI (at the landfall), the level of significance of habitat loss on nightingale will remain as **minor adverse** and not significant within the context of the EIA Regulations.

162. When considering the mitigation measure outlined above, and the commitment that work undertaken within the landfall area will involve HDD rather than surface trenching, the level of significance of habitat loss on nightingale, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.1.5Marsh harrier

163. As a named component of the Leiston-Aldeburgh SSSI, marsh harrier is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be medium-high.

23.6.3.1.5.1 Impact Associated with the Landfall

164. No marsh harriers were recorded within the landfall area, although in June 2018 a pair was recorded quartering in a field directly to the north. Marsh harriers generally occur near freshwater or brackish marshes and swamps, with extensive areas of dense reeds and rushes. In more recent times the species has shown an adaptation to nest and forage on arable farmland. The majority of fields within

the landfall area however are unlikely to be suitable habitat for the species. As such no habitat loss or disturbance impacts are predicted (negligible spatial and short-term temporal magnitude).

23.6.3.1.5.2 Impact Associated with the Onshore Cable Corridor

165. There were two marsh harrier observations within the indicative onshore development area in 2018, one of a pair in flight as described above, and one of a single bird in flight above an arable field. Although no breeding evidence was recorded, it is possible that some foraging habitat may be lost due to construction works in this area. The intensively managed arable fields within the indicative onshore development area are however likely to be suboptimal foraging and nesting habitat compared to other nearby habitats such as reedbed areas in The Fens where numerous records were made in 2018. Within the context of the regional population and the Leiston-Aldeburgh SSSI population, the magnitude of loss of a small amount of foraging habitat is considered to be negligible spatial and short-term temporal.

23.6.3.1.5.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

166. The onshore substation and National Grid infrastructure, located at the westernmost part of the indicative onshore development area, would not be within an area of suitable habitat for marsh harrier, and around 2.5km from the nearest observation in 2018. No impacts on marsh harrier would result from the construction of the substations (negligible spatial and short-term temporal).

23.6.3.1.5.4 Significance of Effect

167. As discussed above, the species sensitivity is medium-high and the magnitude of effect is negligible Therefore, the unmitigated effect on marsh harriers from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations, including within the context of the Leiston-Aldeburgh SSSI population.

23.6.3.1.5.5 Mitigation

168. None required.

23.6.3.1.5.6 Residual Effect

169. The residual effects on the regional and SSSI populations are unchanged (**minor adverse** and not significant).

23.6.3.1.6Barn owl

170. As a Schedule 1 breeding species, barn owl is classified as being of Medium Nature Conservation Importance (***Table 23.9***). The regional population is

considered to be in favourable conservation status. Overall sensitivity is therefore considered to be low-medium.

23.6.3.1.6.1 Impact Associated with the Landfall

171. No barn owls were recorded within the vicinity of the landfall area, and no historic breeding records, or known nest boxes are within this area. It therefore follows that there would be no impacts of construction works within the landfall area on barn owl (negligible spatial and short-term temporal).

23.6.3.1.6.2 Impact Associated with the Onshore Cable Corridor

172. No barn owls were recorded within the Indicative onshore development area in 2018, although it is acknowledged that the range of surveys undertaken were not designed for recording this species. Data from the 2018 breeding season will be made available by the Suffolk Community Barn Owl Project and will be assessed and presented within the Environmental Statement submitted as part of the DCO submission (negligible spatial and short-term temporal).

23.6.3.1.6.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

173. One occupied barn owl nest box was recorded within the onshore substation and National Grid infrastructure areas in 2018. The substations would be located in an area of agricultural land that is potentially suitable for barn owl foraging, and so habitat loss may affect a breeding pair that may use the nest box. The possible loss of one barn owl pair would represent less than 1% of the regional breeding population (around 450 pairs) and so impacts at this scale would be of negligible spatial and short-term temporal magnitude.

23.6.3.1.6.4 Significance of Effect

174. As discussed above, the species sensitivity is low-medium and the magnitude of effect is negligible Therefore, the unmitigated effect on the regional barn owl population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.6.5 Mitigation

175. Any potential losses of territories will aim to be compensated for by the erection of new nest boxes in suitable locations within the local area, in consultation with the Suffolk Community Barn Owl Project.

23.6.3.1.6.6 Residual Effect

176. When considering the mitigation measure outlined above, the level of significance of construction effects on barn owl can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.1.7 Cetti's Warbler

177. As a Schedule 1 breeding species, Cetti's warbler is classified as being of Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be low-medium.

23.6.3.1.7.1 Impact Associated with the Landfall

178. Cetti's warblers breed in thick vegetation including reedbed margins, willow carr, willowherb and nettles, usually in proximity to water or marshy land. The distribution of the species within the onshore ornithology study area reflected these preferences, with four of five territories located within The Fens, with a single territory within scrubby habitat at the edge of the Leiston-Aldeburgh SSSI, within the landfall area (***Figure 23.9***).

179. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. The predicted magnitude of impact is negligible spatial and short-term temporal.

23.6.3.1.7.2 Impact Associated with the Onshore Cable Corridor

180. No Cetti's warbler territories were recorded within the onshore cable corridor section of the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal).

23.6.3.1.7.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

181. No Cetti's warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal).

23.6.3.1.7.4 Significance of Effect

182. As discussed above, the species sensitivity is low-medium and the magnitude of effect is negligible. Therefore, the unmitigated effect on the regional Cetti's warbler population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.7.5 Mitigation

183. None required. It would be ensured that any habitats of conservation value which would be subject to temporary loss are reinstated post-construction in agreement with Natural England.

23.6.3.1.7.6 Residual Effect

184. The residual effects on the regional population are unchanged (**minor adverse** and not significant in the context of the EIA Regulations).

23.6.3.1.8Dartford Warbler

185. As a Schedule 1 breeding species, Dartford warbler is classified as being of Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be low-medium.

23.6.3.1.8.1 Impact Associated with the Landfall

186. Dartford warblers are found in heathland with gorse scrub and scattered trees. These habitats within the onshore ornithology study area are generally restricted to the Sandlings SPA. The closest territory to the landfall area in 2018 was over 600m away, and so no habitat loss impacts are predicted to occur (negligible spatial and short-term temporal).

23.6.3.1.8.2 Impact Associated with the Onshore Cable Corridor

187. Approximately four Dartford warbler territories were recorded in 2018, three within the SPA, although a recently fledged family group was recorded to the north of the SPA within the Indicative onshore development area, suggesting that some suitable habitat may be lost during the construction period. This is unlikely to significantly affect any breeding pairs which are likely to be confined to the SPA for nesting. As such the magnitude of impact, within the context of the regional population, is considered to be negligible spatial and short-term temporal.

23.6.3.1.8.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

188. No Dartford warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal).

23.6.3.1.8.4 Significance of Effect

189. As discussed above, the species sensitivity is low-medium and the magnitude of effect is negligible. Therefore, the unmitigated effect on the regional Dartford warbler population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.8.5 Mitigation

190. None required.

23.6.3.1.8.6 Residual Effect

191. The residual effects on the regional population are unchanged (**minor adverse** and not significant).

23.6.3.1.9Marsh Warbler

192. As a Schedule 1 breeding species found in very low numbers in the UK, marsh warbler is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be very small each year, and therefore in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.9.1 Impact Associated with the Landfall

193. Marsh warbler is a rare breeder in the UK, with an estimated 2-8 pairs present in any year (Musgrove *et al*. 2013), distributed mainly in southeast England. Marsh warblers are found in areas of dense vegetation with taller bushes nearby. During baseline surveys, there was one record of a singing male within an area of suitable scrubby breeding habitat at the edge of the Leiston-Aldeburgh SSSI and within the landfall area, which is considered to represent a possible territory. No further breeding evidence was recorded at this location.

194. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. The predicted magnitude of impact is negligible spatial and short-term temporal.

23.6.3.1.9.2 Impact Associated with the Onshore Cable Corridor

195. No marsh warbler territories were recorded within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.1.9.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

196. No marsh warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.1.9.4 Significance of Effect

197. As the construction footprint will not result in any habitat loss to the Leiston-Aldeburgh SSSI, the unmitigated effect on the national marsh warbler population from construction is classified as **minor adverse** and therefore not significant in the context of the EIA Regulations.

23.6.3.1.9.5 Mitigation

198. None required.

23.6.3.1.9.6 Residual Effect

199. The level of significance of habitat loss on marsh warbler is unchanged (**minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.1.10 Yellow Wagtail

200. As a scarce Red-listed breeding species, yellow wagtail is classified as being of Low-Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be medium.

23.6.3.1.10.1 *Impact Associated with the Landfall*

201. No yellow wagtail observations were made in 2018 within 1km of the landfall area. The species breeds in arable farmland, wet pastures and upland hay meadows, and so no suitable habitat exists in the area. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.1.10.2 *Impact Associated with the Onshore Cable Corridor*

202. A total of 2-3 pairs were likely to have bred within or adjacent to the Indicative onshore development area in 2018, with records on farmland on the northern edge of the Sandlings SPA.

203. Some suitable breeding or foraging habitat may therefore be lost due to construction disturbance. As a worst-case the loss of up to three territories during the construction period would be unlikely to reach significance at a regional level (the breeding population of which is unknown, but likely to be more than 200 pairs). As such the magnitude of impact is considered to be low spatial, and short-term temporal.

23.6.3.1.10.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

204. No yellow wagtail territories were recorded within the onshore substation and National Grid infrastructure areas within the Indicative onshore development area, although habitat may be suitable for the species. No impacts are however predicted (negligible spatial and short-term temporal magnitude).

23.6.3.1.10.4 Significance of Effect

205. As discussed above, the species sensitivity is medium and the magnitude of effect is low. Therefore, the unmitigated effect on the regional yellow wagtail population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.10.5 Mitigation

206. None required.

23.6.3.1.10.6 Residual Effect

207. The residual effects on the regional population are unchanged (**minor adverse** and not significant).

23.6.3.2 Impact 2: Construction Disturbance

23.6.3.2.1 Nightjar

23.6.3.2.1.1 Impact Associated with the Landfall

208. In their review of expert literature, Ruddock & Whitfield (2007) indicated an active disturbance upper limit of <10m during incubation and 50–100m during chick rearing. Murison (2002) however found a significant negative effect on nightjar density within 500m of a path, suggesting that failures could be linked to predation by corvids and dogs operating in conjunction with human disturbance. Furthermore, FCS (2006) advocated a safe working distance of forestry operations from nightjar nest sites of 50-200m, based on Currie & Elliott (1997) who advocated set-back working distances of 200m at egg stage and 50-100m at chick stage.

209. Recently, Shewring & Carrington (2017) reported on nightjar monitoring during the construction period of the Pen y Cymoedd Wind Farm in Wales over a three year period. They found no significant difference detected between chick numbers or nest success at nests within and outside 200m disturbance buffers, and suggested that the current standard 200m disturbance buffer is likely to be excessive.

210. During the construction period, any disturbance impacts on nightjar within the onshore ornithology study area at a greater distance than the previously prescribed 200m buffer would likely to be those related to increased access for predators, dogs or humans, rather than noise or visual disturbance associated with any construction activities within the landfall area. The level of access within and surrounding the Sandlings SPA is not anticipated to change as a result of construction of the proposed East Anglia TWO project, suggesting no additional adverse disturbance impacts would occur beyond 200m from a disturbance source. With the closest nightjar territory around 500m from the landfall area, unmitigated construction activity within the landfall area is unlikely to disturb any territorial birds. Additionally, no foraging would take place in the landfall area due to a lack of suitable habitat (negligible spatial and short-term temporal magnitude).

23.6.3.2.1.2 Impact Associated with the Onshore Cable Corridor

211. When considering the 200m potential disturbance buffer, as a worst-case, three territory centres recorded in the SPA in 2018 were within 200m of the indicative onshore development area which may potentially be affected by unmitigated construction activities during the construction period. From RSPB data in 2017, one territory within the SPA was recorded within 200m. With a regional (Suffolk) population of 284 males in 2004, three to four territories would represent 1.0-1.4% of the regional population. The overall magnitude of disturbance impacts within a regional population context is therefore considered to be low spatial and short-term temporal. Within the context of the Leiston-Aldeburgh SSSI population (taken to be a minimum of six territories, as per 2018 Sandlings SPA counts), the possible loss of at least half of the territories would be of high spatial and short-term temporal magnitude.

212. The potential temporary loss of 3-4 nightjar territories would represent 2.7-3.7% of the cited Sandlings SPA population (109 pairs, count as at 1992).

23.6.3.2.1.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

213. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for nightjar, and over 4km from the nearest recorded territory. No impacts on nightjar would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.2.1.4 Significance of Effect

214. The unmitigated effect on the regional nightjar (high sensitivity) population from construction (short-term loss of up to 3-4 territories due to disturbance associated with work along the Indicative onshore development area) is classified as **moderate adverse**. Within the context of the Leiston-Aldeburgh SSSI population, this is considered to be **major adverse** and therefore significant.

23.6.3.2.1.5 Mitigation

215. A detailed Method Statement would be developed for working within and / or in proximity to the Sandlings SPA. As part of this, a Breeding Bird Protection Plan (BBPP) would be produced to ensure compliance with the Wildlife & Countryside Act 1981, by ensuring no disturbance to breeding birds.

216. When undertaking construction works (excluding personnel and vehicle use of haul roads) within 200m of the SPA Boundary during the breeding bird season (generally mid-February to August) the following examples of mitigation measures may be employed:

- Pre-construction bird surveys will be undertaken to establish the presence of breeding birds;
- A BBPP 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;
- 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; and
- Where breeding bird activity within the SPA is recorded within 200m of construction works, such construction works would be halted immediately until a disturbance risk assessment is undertaken by a suitably qualified ecologist. The risk assessment would consider the nature of construction activity, likelihood of disturbance, and possible implications of the construction activities on the breeding attempt and set out measures to ensure that no disturbance occurs. Where it is determined that breeding birds are not likely to be affected, construction works will continue. Where it is determined that breeding birds may be affected, additional mitigation works will be implemented to prevent disturbance. Where, in the opinion of the suitably qualified ecologist, disturbance cannot be avoided by mitigation, construction works within the area of disturbance will be suspended until chicks have fledged.

23.6.3.2.1.6 Residual Effect

217. When considering the Schedule of Mitigation outlined above, the level of significance of construction effects on nightjar, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and is not significant within the context of the EIA Regulations.

23.6.3.2.2Woodlark

23.6.3.2.2.1 Impact Associated with the Landfall

218. The closest woodlark territory in 2017 or 2018 was over 300m from the landfall area, and at this distance, construction disturbance is considered unlikely, with visual and noise screening likely to occur naturally due to intermediate habitats. The overall magnitude of landfall construction impacts on woodlark is therefore considered to be negligible spatial and short-term temporal.

23.6.3.2.2.2 Impact Associated with the Onshore Cable Corridor

219. Approximately seven woodlark territories were located within the onshore ornithology study area in 2018, all but one of these were located within suitable heath, scrub and forestry habitats within the SPA/SSSI, with the other near Aldringham. Of these territories, at least three that may overlap in part with the indicative onshore development area (and up to four when considering the proposed onshore development area – see ***Figure 23.3***). RSPB data show that 2-3 territories within the SPA/SSSI in 2017 were within approximately 200m of the indicative onshore development area, in similar areas to 2018. It is therefore possible that unmitigated, construction activities could disturb breeding or foraging birds. Mallord et al. (2006) found that the distribution of woodlarks on Dorset heaths was significantly affected by the presence of people and dogs. Heavily disturbed areas were still used for foraging, although the habitat was suitable for both foraging and nesting. However, there was no effect of disturbance on nest survival or productivity. Dolman (2015) conducted a study of 147 woodlark nests in Breckland Forest, which showed strong evidence that neither woodlark nests success, nor the productivity of successful nests, were affected by the levels of recreational activity observed. Analysis of broods from 54 successful nests gave no evidence that recreational activity affected post-fledging survival.

220. Activities associated with construction within the indicative onshore development area are likely to be more predictable and less intrusive than those associated with recreational access described in the above studies. As such, although there may be some disturbance to foraging birds away from nest sites, caused by construction activities, this is unlikely to affect the species at a regional population level (370 pairs) with breeding likely continuing at similar numbers. However, in a worst-case scenario, the loss of at least three territories would result in a low spatial and short-term temporal magnitude for disturbance impacts within a regional population context.

221. The potential temporary loss of three territories within the Leiston-Aldeburgh SSSI, would, within the context of the SSSI population (taken to be a minimum of seven territories, as per 2018 SPA surveys) represent an impact of High spatial and Short-term temporal magnitude. The loss would also represent 1.9% of the cited Sandlings SPA population (154 pairs, count as at 1997).

23.6.3.2.2.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

222. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for woodlark, and over 3km from the nearest

recorded territory. No impacts on woodlark would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.2.2.4 Significance of Effect

223. The unmitigated effect on the regional woodlark population (high sensitivity) from construction disturbance is classified as **moderate adverse** and significant in the context of the EIA Regulations. Within the context of the Leiston-Aldeburgh SSSI population (taken to be a minimum of seven territories, as per 2018 Sandlings SPA counts), this would be a **major adverse** and significant effect.

23.6.3.2.2.5 Mitigation

224. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for woodlark. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction.

23.6.3.2.2.6 Residual Effect

225. When considering the mitigation measures outlined above, the level of significance of construction effects on the regional woodlark can be reduced to **minor adverse** and not significant within the context of the EIA Regulations. The effects on the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant.

23.6.3.2.3Turtle dove

23.6.3.2.3.1 Impact Associated with the Landfall

226. The closest record of a territory to the landfall area in 2017 or 2018 was around 300m to the north. With intensive agricultural habitats within the landfall area generally of lower suitability for the species, disturbance impacts are considered unlikely (negligible spatial and short-term temporal magnitude).

23.6.3.2.3.2 Impact Associated with the Onshore Cable Corridor

227. Being a species adapted to taking advantage of agricultural practices, it is likely that turtle doves are tolerant of some level of human disturbance, with a number of records in proximity to public rights of way and buildings. A lack of seed food has probably been the major factor limiting the breeding success of turtle doves in recent decades, coupled with land changes and hunting pressures outside of the UK, rather than any pressures from human disturbance. Nevertheless, an increase in human activity in foraging areas has the possibility of suppressing breeding success or productivity of up to nine pairs present within the onshore ornithology study area for the duration of the construction period. This would potentially affect 0.4% of the regional turtle dove population (approximately 2,380 territories), which is considered to be an impact of negligible spatial and short-term temporal magnitude. When taken within the context of the Leiston-

Aldeburgh SSSI population however (presuming some territories may be affected, particularly those found within the northern part of the SPA/SSSI that overlaps with the indicative onshore development area), the loss of some foraging habitat and possible reduction in productivity is considered to result in an impact of medium spatial and short-term temporal magnitude.

23.6.3.2.3.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

228. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for turtle dove, and around 2km from the nearest recorded territory. No impacts on turtle dove would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.2.3.4 Significance of Effect

229. The unmitigated effect on the regional turtle dove population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations. Within the context of the Leiston-Aldeburgh SSSI population, this would represent a **major adverse** and significant effect.

23.6.3.2.3.5 Mitigation

230. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for turtle dove. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction.

23.6.3.2.3.6 Residual Effect

231. When considering the mitigation measures outlined above, the level of significance of construction effects on turtle dove, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.2.4Nightingale

23.6.3.2.4.1 Impact Associated with the Landfall

232. Two territories were recorded in scrub habitat within the landfall area (***Figure 23.6***). Disturbance is likely to be limited to within around 100m of nest sites, subject to the nature of the disturbance source. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. However, some construction activity associated with the transition bays and landfall HDD may cause disturbance depending on the distance they are sited from the SSSI. It is therefore possible that two territories may be affected. The impact is likely to be

of negligible spatial and short-term temporal magnitude within the context of the regional and Leiston-Aldeburgh SSSI populations.

23.6.3.2.4.2 Impact Associated with the Onshore Cable Corridor

233. Four further nightingale territories were recorded within the Leiston-Aldeburgh SSSI, and within 100m of the indicative onshore development area in 2018, with four also recorded in similar areas in 2017. It is possible that these territories may be subject to disturbance during the construction period. At a regional scale, the loss of four territories would not reach significance (negligible spatial and short-term temporal magnitude), but within the context of the SSSI population this would represent a worst-case impact of medium spatial and short-term temporal magnitude.

23.6.3.2.4.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

234. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for nightingale, and around 4km from the nearest recorded territory. No impacts on nightingale would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.2.4.4 Significance of Effect

235. The unmitigated effect on the regional nightingale population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

236. Within the context of the Leiston-Aldeburgh SSSI population, the temporary loss of up to four territories would represent a **major adverse** and potentially significant unmitigated effect.

23.6.3.2.4.5 Mitigation

237. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for nightingale. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction.

23.6.3.2.4.6 Residual Effect

238. When considering the mitigation measures outlined above, and the commitment that work undertaken within the landfall area will involve HDD rather than surface trenching, the level of significance of construction effects on nightingale will remain unchanged as **minor adverse** and not significant within the context of the EIA Regulations.

239. When considering the mitigation measures outlined above, and the commitment that work undertaken within the landfall area will involve HDD rather than surface trenching, the level of significance of construction effects on nightingale, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.2.5 Marsh harrier

23.6.3.2.5.1 Impact Associated with the Landfall

240. No marsh harriers were recorded using the landfall area. The majority of fields within the landfall area are unlikely to be suitable habitat for the species. As such no disturbance impacts are predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.5.2 Impact Associated with the Onshore Cable Corridor

241. There were two marsh harrier observations within the Indicative onshore development area in 2018, of birds in flight above arable fields. It is possible that some foraging habitat may be lost due to disturbance associated with construction works in this area. The intensively managed arable fields within the Indicative onshore development area are however likely to be suboptimal foraging habitat and so within the context of the regional population and Leiston-Aldeburgh SSSI population, the magnitude of loss of a small amount of foraging habitat is considered to be negligible spatial and short-term temporal.

23.6.3.2.5.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

242. The onshore substation and National Grid infrastructure, located at the westernmost part of the Indicative onshore development area, would not be within an area of suitable habitat for marsh harrier, and around 2.5km from the nearest observation in 2018. No impacts on marsh harrier would result from the construction of the substations (negligible spatial and short-term temporal magnitude).

23.6.3.2.5.4 Significance of Effect

243. As discussed above, the species sensitivity is medium-high and the magnitude of effect is negligible Therefore, the unmitigated effect on marsh harriers from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations, including within the context of the Leiston-Aldeburgh SSSI population.

23.6.3.2.5.5 Mitigation

244. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding marsh harrier territories within

400m of the indicative onshore development area, and seek to ensure that no breeding activity is disturbed by construction works that would occur from late March to August inclusive, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.5.6 Residual Effect

245. When considering the mitigation measures outlined above, the level of significance of construction effects on marsh harrier, including the Leiston-Aldeburgh SSSI population can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.6Barn owl

23.6.3.2.6.1 Impact Associated with the Landfall

246. No barn owls were recorded within the vicinity of the landfall area, and no historic breeding records, or known nest boxes are within this area. It therefore follows that there would be no impacts of construction works within the landfall area on barn owl (negligible spatial and short-term temporal magnitude).

23.6.3.2.6.2 Impact Associated with the Onshore Cable Corridor

247. No barn owls were recorded within the Indicative onshore development area in 2018, although it is acknowledged that the range of surveys undertaken were not designed for recording this species. Data from the 2018 breeding season will be made available by the Suffolk Community Barn Owl Project and will be used in the final assessment (negligible spatial and short-term temporal magnitude).

23.6.3.2.6.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

248. One occupied barn owl nest box was recorded within the onshore substation and National Grid infrastructure areas in 2018, located around the upper end of the range of a recommended protection zone from construction disturbance (175m, advocated by Shawyer 2011). The nest box is within a working farmyard, so direct disturbance to nesting birds is considered unlikely. Nevertheless, the possible loss of one barn owl pair would represent less than 1% of the regional breeding population (around 450 pairs) and so impacts at this scale would be of negligible spatial and short-term temporal magnitude.

23.6.3.2.6.4 Significance of Effect

249. As discussed above, the species sensitivity is low-medium and the magnitude of effect is negligible Therefore, the unmitigated effect on the regional barn owl population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.6.5 Mitigation

250. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding barn owl nest sites within 200m of the indicative onshore development area, and seek to ensure that no breeding activity is disturbed by construction works, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.6.6 Residual Effect

251. When considering the mitigation measure outlined above, the level of significance of construction effects on barn owl can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.7Cetti's Warbler

23.6.3.2.7.1 Impact Associated with the Landfall

252. A single territory was located within scrubby habitat in the landfall search area.

253. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI, therefore, the risk of disturbance would be reduced. However, some construction activity associated with the transition bays and landfall HDD may cause disturbance depending on the distance they are sited from the SSSI. It is therefore possible that one territory may be affected. Although the regional Cetti's warbler population is unknown, Suffolk is recognised as a stronghold for the national population (1,827 pairs), and so the predicted magnitude of impact is negligible spatial and short-term temporal.

23.6.3.2.7.2 Impact Associated with the Onshore Cable Corridor

254. No Cetti's warbler territories were recorded within the onshore cable corridor section of the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.7.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

255. No Cetti's warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.7.4 Significance of Effect

256. As discussed above, the species sensitivity is low-medium and the magnitude of effect (temporary loss of up to one territory) is negligible. Therefore, the

unmitigated effect on the regional Cetti's warbler population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.7.5 Mitigation

257. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding Cetti's warbler territories within 100m of the indicative onshore development area, and seek to ensure that no breeding activity is disturbed by construction works, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5.***

23.6.3.2.7.6 Residual Effect

258. When considering the mitigation measures outlined above, the level of significance of construction effects on Cetti's warbler can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.8 Dartford Warbler

23.6.3.2.8.1 Impact Associated with the Landfall

259. The closest territory to the landfall area in 2018 was over 600m away, and so no disturbance impacts are predicted to occur (negligible spatial and short-term temporal magnitude).

23.6.3.2.8.2 Impact Associated with the Onshore Cable Corridor

260. Approximately four Dartford warbler territories were recorded in 2018, three within the SPA, although a recently fledged family group was recorded to the north of the SPA within the Indicative onshore development area, suggesting that some disturbance to post-breeding birds may occur during the construction period. This is unlikely to significantly affect any breeding pairs which are likely to be confined to the SPA for nesting. As such the magnitude of impact, within the context of the regional population, is considered to be negligible spatial and short-term temporal.

23.6.3.2.8.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

261. No Dartford warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.8.4 Significance of Effect

262. As discussed above, the species sensitivity is low-medium and the magnitude of effect is negligible Therefore, the unmitigated effect on the regional Dartford

warbler population from construction disturbance is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.8.5 Mitigation

263. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for Dartford warbler. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction.

23.6.3.2.8.6 Residual Effect

264. When considering the mitigation measures outlined above, the level of significance of construction effects on Dartford warbler can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.9Marsh Warbler

23.6.3.2.9.1 Impact Associated with the Landfall

265. There was one record of a singing male within an area of suitable scrubby breeding habitat within the landfall search area, which is considered to represent a possible territory. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. However, some construction activity associated with the transition bays and landfall HDD may cause disturbance depending on the distance they are sited from the SSSI. It is therefore possible that one territory may be affected. This results in a negligible spatial and short-term temporal impact magnitude at a national level.

23.6.3.2.9.2 Impact Associated with the Onshore Cable Corridor

266. No marsh warbler territories were recorded within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.9.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

267. No marsh warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the Indicative onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.9.4 Significance of Effect

268. With a commitment to HDD techniques in the landfall area, the unmitigated effect on the national marsh warbler population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.9.5 Mitigation

269. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding marsh warbler territories within 100m of the indicative onshore development area, and seek to ensure that no breeding activity is disturbed by construction works that would occur, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.9.6 Residual Effect

270. When considering the mitigation measures outlined above, the level of significance of construction effects on marsh warbler remains unchanged (**minor adverse)** and not significant within the context of the EIA Regulations.

23.6.3.2.10 Yellow Wagtail

23.6.3.2.10.1 *Impact Associated with the Landfall*

271. No yellow wagtail observations were made in 2018 within 1km of the landfall area. The species breeds in arable farmland, wet pastures and upland hay meadows, and so no suitable habitat exists in the area. No impacts are therefore predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.10.2 *Impact Associated with the Onshore Cable Corridor*

272. A total of 2-3 pairs were likely to have bred within or adjacent to the indicative onshore development area in 2018, with records on farmland on the northern edge of the Sandlings SPA.

273. Some suitable breeding or foraging habitat may therefore be lost due to construction disturbance effects. As a worst-case the loss of up to three territories during the construction period would be unlikely to reach significance at a regional level. As such the magnitude of impact is considered to be low spatial, and short-term temporal.

23.6.3.2.10.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

274. No yellow wagtail territories were recorded within the onshore substation and National Grid infrastructure areas within the indicative onshore development area, although habitat may be suitable for the species. No impacts are however predicted (negligible spatial and short-term temporal magnitude).

23.6.3.2.10.4 Significance of Effect

275. As discussed above, the species sensitivity is medium and the magnitude of effect is low. Therefore, the unmitigated effect on the regional yellow wagtail population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.10.5 Mitigation

276. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding yellow wagtail territories within 100m of the indicative onshore development area, and seek to ensure that no breeding activity is disturbed by construction works, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.10.6 Residual Effect

277. The residual effects on the regional population are unchanged (**minor adverse** and not significant).

23.6.4 Potential Impacts during Operation

278. The predicted worst-case operational scenario is outlined in ***Table 23.3***, which describes a situation with a larger, above ground infrastructure footprint, and associated activities, centred on the substation locations. The possible associated operational impacts are described and assessed below.

23.6.4.1 Impact 1: Disturbance from Maintenance Activities

279. Routine maintenance would require up to one visit per week which is understood to involve a single vehicle and staff visiting the sites during daylight hours. Emergency repairs are expected to be infrequent and short-term in duration. This would only briefly affect IOFs within the immediate vicinity of the area(s) being visited during the breeding season. As a consequence, disturbance from noise and human presence is predicted to be **minor adverse** and therefore not significant.

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

280. Operational lighting will be required for operations and maintenance activities at the onshore and National Grid substations only, and under normal conditions the substations would not be permanently lit. Baseline onshore ornithology survey results as well as Phase 1 habitat survey results (see ***Chapter 22 Onshore Ecology***) suggest that the onshore and National Grid substation area is within an area of low ornithological conservation value, where, with the possible exception of barn owl, IOFs are likely to be absent. A lighting scheme will be designed for the final design for the permanent infrastructure, which will include measures to minimise light spill following the recommendations regarding birds set out in the Bat Conservation Trust's (BCT) Artificial Lighting and Wildlife guidance (2014). As a consequence, disturbance from lighting (above general operational movements on and off site) is predicted to be **minor adverse** and therefore not significant, and only have the potential to affect IOFs in the immediate vicinity of the onshore and National Grid substation areas.

23.6.4.3 Mitigation

281. No additional mitigation measures are required, for Impact 1 or Impact 2.

23.6.4.4 Residual Effect

282. Residual effects remain **minor adverse** and therefore not significant for all IOFs, due to operational impacts.

23.6.5 Potential Impacts during Decommissioning

283. 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.

23.7 Cumulative Impacts

23.7.1 Cumulative Impact with proposed East Anglia ONE North Project

284. 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.

285. The proposed East Anglia TWO project CIA will therefore initially consider the cumulative impact with only the East Anglia ONE North project.

286. 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 sequentially.

287. 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 23.7.2***). 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***.

288. Full assessment of scenario 1 and scenario 2 can be found in ***Appendix 23.2***. This assessment found that scenario 2 represented the worst case impacts for onshore ornithology. A summary of those impacts can be found in ***Table 23.19***.

Table 23.19 Summary of Potential Cumulative Impacts Identified for Onshore Ornithology under Construction Scenario 2

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
Construction						
Impact 1: Habitat loss	All IOFs	Medium-High	Unchanged As per proposed East Anglia TWO project alone	Unchanged As per proposed East Anglia TWO project alone	No additional mitigation required.	**Minor adverse** **Not Significant**
Impact 2: Disturbance	All IOFs	Medium-High	Unchanged As per proposed East Anglia TWO project alone	Unchanged As per proposed East Anglia TWO project alone	No additional mitigation required.	**Minor adverse** **Not Significant**

23.7.2 Cumulative Impact Assessment with Other Developments

289. The assessment of cumulative impacts has been undertaken here as a two stage process. Firstly, all impacts considered in ***section 23.6*** have been assessed for the potential to act cumulatively with other projects. Potential cumulative impacts are set out in ***Table 23.20***.

Table 23.20 Potential Cumulative Impacts

Impact	Potential for Cumulative Impact	Rationale
Construction		
Habitat loss	Yes	Cumulative direct habitat loss impacts arising from two or more projects are possible. Impacts may occur where project boundaries overlap on habitats used by a particular IOF. Such impacts have the potential to affect breeding and/or foraging activities.
Construction disturbance	Yes	Cumulative disturbance may arise when the construction periods of two or more projects overlap temporally, within suitable habitats used by a particular IOF. This may impact on breeding and/or foraging activities.
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 IOF.
Disturbance from operational lighting and noise	No	Impacts are likely to be restricted to around the onshore substation and National Grid substation. No IOFs are likely to be affected due to lack of suitable habitat in the vicinity.
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 *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.		

290. 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 23.6.*** Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.

291. 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. ***Table 23.21*** provides detail regarding this project.

292. 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 23.21 Summary of Projects considered for the CIA in Relation to Onshore Ornithology

Project	Status	Development period	[9]Distance from East Anglia TWO site (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 (2014)[10] and Stage 2 Pre-application Consultation Report (2016)[11] available	Tier 5[12]	Yes	Closeby, and potentially overlapping development boundaries, may result in impacts during the construction phase

[9] Shortest distance between the considered project and East Anglia TWO– unless specified otherwise
[10] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-000103-Sizewell%20C%20EIA%20Scoping%20Report_Main%20text.pdf
[11] http://sizewell.edfenergyconsultation.info/wp-content/uploads/2016/11/EDF_SZC_Stage2_ConsultationDoc_sfw.pdf
[12] Based on criteria set out in ***section 5.7.2*** of ***Chapter 5 EIA Methodology***

23.7.2.1 Cumulative Impacts during Construction

23.7.2.1.1 Impact 1: Habitat Loss

293. The development site for Sizewell C New Nuclear Power Station is located directly to the northeast of the indicative onshore development area, and 0.7km north of the Sandlings SPA. The site is mainly to the north of the existing Sizewell B power station, and comprises the nuclear power station, access road and temporary development required for construction. An area of land to the west/south-west of Sizewell B and east of Leiston will also be required during the construction phase. In addition, land may be required permanently or temporarily for associated development, such as a Visitor Centre, accommodation campus, and park and ride facilities. The Sizewell C New Nuclear Power Station pre-application Consultation Report (2016) identified that two options available for the creation of an accommodation campus would be located close to the Sandlings SPA.

294. The Sizewell C New Nuclear Power Station proposed Nuclear Development Scoping Report (2014) noted that studies conducted over two breeding seasons have recorded Cetti's warbler within wet woodland in Sizewell Marshes, hobby using mature trees for nesting, and barn owl foraging widely. Sizewell Marshes supports small numbers of breeding wildfowl and Cetti's warbler. Marsh harriers nesting at Minsmere are known to forage occasionally over the Minsmere SSSI. There was no evidence to suggest that either nightjar or woodlark are currently breeding within the study area. Further breeding bird surveys are due to be undertaken within the Sizewell C Sizewell C New Nuclear Power Station study area, which would help determine the magnitude of any cumulative effect on IOFs, should the information be available by the time of the final EIA report.

295. Based on the Sizewell C New Nuclear Power Station project information provided to date, there is the potential for a cumulative habitat loss for the following IOFs: marsh harrier and Cetti's warbler.

296. The evidence provided above in ***section 23.6.3.1*** shows that the indicative onshore development area does not appear to be a suitable habitat for marsh harrier, and for Cetti's warbler, works associated with the landfall are planned to use HDD crossing techniques, and therefore no habitat loss is considered likely. No additional cumulative effects on the regional populations are therefore predicted because of the lack of habitat loss (temporary and permanent) predicted for the East Anglia TWO project alone, for these two IOFs.

23.7.2.1.2 Impact 2: Construction Disturbance

297. The Sizewell C New Nuclear Power Station pre-application Consultation Report (2016) identified that the creation of an accommodation campus close to the Sandlings SPA could give rise to potential direct and indirect disturbance to

woodlark and nightjar. Unmitigated, significant cumulative disturbance effects may therefore exist on the Sandlings SPA / Leiston-Aldeburgh SSSI populations of woodlark and nightjar. A number of mitigation measures are being explored for Sizewell C New Nuclear Power Station, including the maintenance of habitat corridors, the management of public access to sensitive sites (including other SPAs beyond the boundaries of the site), and the inclusion of environmental buffers and acoustic fencing to help protect neighbouring habitats and species from light, noise and visual disturbance. There was also an identified need to create alternative foraging habitat for marsh harriers should they be displaced from Sizewell Marshes SSSI as a result of construction noise and visual disturbance.

Mitigation measures outlined for Sizewell C New Nuclear Power Station, as well as those for the proposed East Anglia TWO project would minimise the risk of a significant disturbance effect on the IOFs identified by the Sizewell C New Nuclear Power Station project (woodlark, nightjar, marsh harrier and Cetti's warbler). For the proposed East Anglia TWO project, these mitigation measures would be required during the construction period only, after which the contribution of the proposed East Anglia TWO project to cumulative effects during the operational periods would be negligible.

298. No significant cumulative disturbance effects are therefore predicted for any IOFs when considering mitigation measures for both sites.

23.7.2.2 Cumulative Impacts during Operation

299. As outlined in ***Table 23.20***, no cumulative operational impacts are predicted due to the lack of impacts during the operational phase on all IOFs, associated with the proposed East Anglia TWO project alone.

23.8 Inter-relationships

300. A summary of the likely inter-related effects arising from the proposed East Anglia TWO development on onshore ornithology are presented in ***Table 23.22***.

Table 23.22 Onshore Ornithology Inter-Relationships

Inter-relationship all phases and linked chapter	Section where addressed	Rationale
Chapter 22 Onshore Ecology	Habitats described within the Indicative onshore development area have been fully considered in this chapter in respect to potential habitat loss and its effect on IOFs.	Habitats which support IOFs
Chapter 25 Noise and Vibration	***Section 23.6.3***	Noise disturbance on IOFs

Inter-relationship all phases and linked chapter	Section where addressed	Rationale
Chapter 29 Landscape and Visual Impact	***Section 23.6.4.2.***	Lighting impacts to IOFs

23.9 Interactions

301. The impacts identified and assessed in this chapter may have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The two main potential impacts during the construction period are direct habitat loss, and indirect habitat loss due to disturbance. Although these can happen simultaneously, the spatial extent of the impact is effectively the same as that for disturbance only.

302. No significant impacts were predicted for the operational period, although any habitat loss that began during the construction period may continue over a longer term where permanent infrastructure is located above ground (e.g. substations). Lighting impacts associated with the substations may increase the extent of effective habitat loss.

23.10 Summary

303. A summary of the findings of the PEIR for onshore ornithology is presented in ***Table 23.23***. This table demonstrates that, post mitigation, there are no impacts with a maximum residual impact greater than minor adverse. There will therefore be no impacts on onshore ornithological interests resulting from the proposed East Anglia TWO development that are considered to be significant in EIA terms (i.e. moderate or major adverse). There are also no adverse effects on the integrity of the Sandlings SPA predicted as part of the HRA process.

Table 23.23 Potential Impacts Identified for Onshore Ornithology

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
Construction						
Impact 1: Habitat loss	Nightjar	High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Woodlark	High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Turtle dove	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	No habitat loss within Leiston-Aldeburgh SSSI Supplementary feeding area Post-construction habitat restoration	**Minor adverse** **Not Significant**
	Nightingale	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	No habitat loss within Leiston-Aldeburgh SSSI Post-construction habitat restoration	**Minor adverse** **Not Significant**
	Marsh harrier	Medium-High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Barn owl	Low-Medium	Negligible	Minor adverse Not Significant	New nest boxes to replace any losses	**Minor adverse** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
	Cetti's warbler	Low-Medium	Negligible	Minor adverse Not Significant	Post-construction habitat restoration	**Minor adverse** **Not Significant**
	Dartford warbler	Low-Medium	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Marsh warbler	High	High (national)	Major adverse Significant (national)	None required	**Minor adverse** **Not Significant (national)**
	Yellow wagtail	Medium	Low	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
Impact 2: Disturbance	Nightjar	High	Low High (SSSI)	Moderate adverse Not Significant Major adverse Significant (SSSI)	BBPP Pre-construction surveys	**Minor adverse** **Not Significant**
	Woodlark	High	Low High (SSSI)	Moderate adverse Not Significant Major adverse Significant (SSSI)	BBPP Pre-construction surveys	**Minor adverse** **Not Significant**
	Turtle dove	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse	BBPP	**Minor adverse** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
				Significant (SSSI)	Pre-construction surveys	
	Nightingale	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	BBPP Pre-construction surveys	**Minor adverse** **Not Significant**
	Marsh harrier	Medium-High	Negligible	Minor adverse Not Significant	BBPP Pre-construction surveys	**Negligible** **Not Significant**
	Barn owl	Low-Medium	Negligible	Minor adverse Not Significant	BBPP Pre-construction surveys	**Negligible** **Not Significant**
	Cetti's warbler	Low-Medium	Negligible	Minor adverse Not Significant	BBPP Pre-construction surveys	**Negligible** **Not Significant**
	Dartford warbler	Low-Medium	Negligible	Minor adverse Not Significant	BBPP Pre-construction surveys	**Negligible** **Not Significant**
	Marsh warbler	High	Negligible	Minor adverse Not Significant	BBPP Pre-construction surveys	**Minor adverse** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
	Yellow wagtail	Medium	Low	Minor adverse Not Significant	BBPP Pre-construction surveys	**Minor adverse** **Not Significant**
Operation						
Impact 1: Disturbance	All IOFs	Medium-High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
Impact 2: Lighting	All IOFs	Medium-High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
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 *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.						
Cumulative – with other developments						
As per construction impacts for all IOFs						

23.11References

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