East Anglia
Offshore Wind

VATTENFALL

SCOTTISHPOWER
RENEWABLES

East Anglia THREE

Chapter 23

Terrestrial Ecology

Environmental Statement
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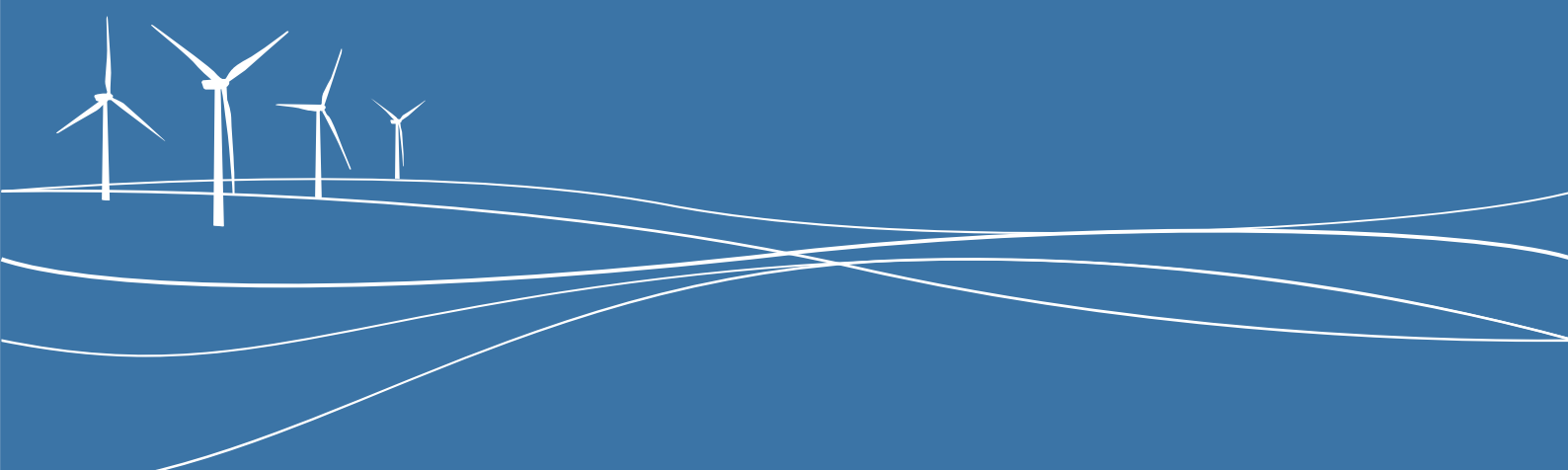

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23.2	East Anglia ONE Background Data Search and Ecological Survey Reports
23.3	East Anglia ONE onshore ecology consultation and Statement of Common Ground (SoCG) and East Anglia THREE Method Statement
23.4	East Anglia ONE Confidential Badger Report
23.5	East Anglia THREE Extended Phase 1 Habitat Survey Report
23.6	East Anglia ONE Great crested newt surveys (2015, pre-construction)
23.7	Assessment of Haul Road Remaining *in-situ* between Projects

23 TERRESTRIAL ECOLOGY

23.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the potential impacts of the proposed East Anglia THREE project on terrestrial ecology. Potential impacts on birds are not considered in this chapter, but are discussed in full in Chapter 24 Onshore Ornithology.

2. This chapter provides an overview of the existing baseline environment in respect to terrestrial ecology within a study area around the onshore electrical transmission works proposed for the project, followed by an Ecological Impact Assessment (EcIA) of the potential impacts of two methods for construction, operation and decommissioning of the onshore cable and associated infrastructure for the proposed East Anglia THREE project. This EcIA also considers cumulative impacts of existing and proposed projects in respect of terrestrial ecology. Given that the onshore electrical transmission works fall within the same area covered for the assessment of East Anglia ONE, the data collected for that project forms the main basis for this EcIA.

3. Figures which should be read in conjunction with this chapter are provided in *Volume 2 Appendix 23*, using data from East Anglia ONE updated with supplementary desk/field survey information as required. The following appendices accompany this chapter:

    - *Appendix 23.1* – Biological records search.
    - *Appendix 23.2* – East Anglia ONE Data Search and Ecological Surveys:
        - Background Data Search (BDS) Report;
        - Phase 1 Habitat Survey Report;
        - Phase 2 Botanical Survey Report;
        - Bat Survey Report;
        - Dormouse Survey Report;
        - Great Crested Newt Survey Report;
        - Water Vole and Otters Survey Report;
        - Reptile Survey Report;

- Terrestrial Invertebrate Surveys Report; and
- Aquatic Invertebrate Surveys Report.

- *Appendix 23.3* – East Anglia ONE onshore ecology consultation and Statement of Common Ground (SoCG) and the proposed East Anglia THREE project Method Statement.
- *Appendix 23.4* – Badger Survey Report (confidential report).
- *Appendix 23.5* – The proposed East Anglia THREE project Extended Phase 1 Habitat Survey Report.
- *Appendix 23.6* – East Anglia ONE Great Crested Newt Survey Report 2015.
- *Appendix 23*.7 – Assessment of Haul Road Remaining *in-situ* between Projects.

4. The chapter has been prepared by Royal HaskoningDHV.

5. It should be noted that the project also has the potential to impact ecological receptors discussed in other chapters within the ES. This chapter refers to other ecology chapters where required. The relevant chapters are:

- Chapter 10 Benthic Ecology (including intertidal at the landfall location);
- Chapter 11 Fish and Shellfish Ecology;
- Chapter 13 Offshore Ornithology;
- Chapter 20 Air Quality;
- Chapter 24 Onshore Ornithology;
- Chapter 26 Noise and Vibration; and
- Chapter 29 Seascape, Landscape and Visual Amenity

23.2 Consultation

6. Consultation undertaken to date is provided in *Table 23.1*. The table includes specific terrestrial ecology consultation comments regarding the proposed East Anglia THREE project from evidence plan meetings (in 2013), the Scoping Report (Royal HaskoningDHV 2012) and responses to the Preliminary Environmental Information Report (PEIR) (Royal HaskoningDHV 2014). Responses from consultees in relation to the East Anglia ONE Offshore Windfarm Scoping Report (RSK 2011), the

East Anglia ONE PEIR (RSK 2012a) and Phase 2 Consultation (RSK 2012b) which are also considered relevant to the proposed East Anglia THREE project are provided in *Appendix 23.3*. These latter consultation responses cover topics such as route selection, ecological survey planning and mitigation.

Table 23.1 Consultation Responses

Consultee	Date / Document	Comment	Response / where addressed in the ES
Suffolk County Council (SCC)	December 2013 / Expert Topic Group (ETG) minutes	Data collected to characterise the onshore ecology should be supplemented by any pre-construction surveys being undertaken by East Anglia ONE	Pre-construction surveys are discussed in embedded mitigation, *Table 23.4*
SCC	December 2013 / ETG minutes	As per East Anglia ONE, the Development Consent Order(DCO) will need to secure further pre-construction surveys	Pre-construction surveys are discussed in embedded mitigation, *Table 23.4*
SCC	December 2013 / ETG minutes	Agreement on proposed methodology and terminology for assessment. Agreement on and list of potential impacts to be considered in the Environmental Impact Assessment (EIA)	Assessment is undertaken in sections 23.6 and 23.7
SCC	December 2013 / ETG minutes	The impact assessment should refer to East Anglia ONE mitigation as informed by the East Anglia ONE pre-construction surveys	East Anglia One mitigation is included in embedded mitigation, *Table 23.4* and discussed in sections 23.6 and 23.7
SCC	December 2013 / ETG minutes	Suggest that ETG background paper section 4.5 should separate out Habitats Regulations Assessment (HRA) issues from European Protected Species (EPS) issues as they are not directly related. Agree that there are not likely to be any non-ornithological onshore Likely Significant Effect (LSE) in the HRA context Agree that there is not likely to be any adverse effects on EPS, provided that pre-construction surveys are secured and are able to inform appropriate mitigation (as secured through the Landscape & Ecological Management Plan for East Anglia ONE)	ETG background paper is provided in *Appendix 23.3*
Natural England	December 2013 / ETG minutes	We agree that data collected for EA1 are suitable for 3&4 and confirm that surveys from 2012 are valid as a baseline for 2015 submission, however, we also refer you to our standing advice on protected species	Existing environment is characterised in section 23.5

Consultee	Date / Document	Comment	Response / where addressed in the ES
		http://www.naturalenglang.org.uk/ourwork /planningdevelopment/spatialplanning/ Standingadvice/default.aspx 'How up to date does a survey have to be': This varies depending upon the species being investigated. Surveys should not be more than two to three years old for medium or high impact schemes or for multi-plot or phased developments. However surveys should be as up to date as possible, ideally from the most recent survey season. Where a EPS licence is to be applied for once planning permission has been granted, Natural England expects applicants to carry out a walk-over of the development site within three months of an application being submitted to check that the habitats have not changed significantly since the survey was carried out. We also refer you to our note on Nationally Significant Infrastructure Projects (NSIPs) and Protected Species.	
Natural England	December 2013 / ETG minutes	We understand the operational and other issues you have described and we agree that the onshore and offshore documents could be married with sign posting and cross referencing. However, we feel there is a lack of clarity at the moment, especially in the following: We find it confusing to separate 'habitat' and species features when talking about Special Protected Areas (SPAs), as the 'habitat' features are only important in so far as they support the birds.	SPA habitat would be crossed by Horizontal Directional Drilling (HDD) and therefore no impact is anticipated (section 23.6). Impacts to birds are discussed fully in Chapter 13 Offshore Ornithology and Chapter 24 Onshore Ornithology.
Little Bealings Parish Council	Scoping Opinion / November 2012	The EIA should include a comprehensive assessment of tree and hedge loss in the parish and whether temporary or permanent.	Impacts are assessed in sections 23.6 and 23.7
SCC	Scoping Opinion / November 2012	Ancient and species rich hedgerows are also a priority. Biodiversity Action Plan (BAP) habitat and potentially host to protected species. HDD under such hedgerows should also be considered (paragraph 673). The developer should have regard to the Suffolk Hedgerow Survey, published by Suffolk Coastal District Council's (SCDC) Greenprint Forum3.	Impacts are assessed in sections 23.6 and 23.7

Consultee	Date / Document	Comment	Response / where addressed in the ES
SCC	Scoping Opinion / November 2012 SoCG / July 2013	Paragraph 669 states that no statutory sites would be impacted by the landfall, though the location of the landfall point in Figure 3.1 (page 265) identifies that the landfall point is within the Bawdsey Cliffs Site of Special Scientific Interest (SSSI). It is recognised that this is a SSSI of predominantly geological, as opposed to biological, interest.	Impacts are assessed in sections 23.6 and 23.7 Impacts upon the geology of Bawdsey Cliffs SSSI are covered in Chapter 19 Geology and Ground conditions
SCC	Scoping Opinion / November 2012	As a general point, with reference to potential impacts on habitats and species, the EIA needs to clarify the mitigation hierarchy including compensation and offsetting of any permanent losses, for example habitats within the cable corridor and the converter station site (paragraphs 327 & 354).	Chapter 6 Environmental Impact Assessment Methodology discusses methodology in general terms. Embedded mitigation is covered in section 23.3.3. Where further mitigation is recommended this is covered in detail in the impact assessments in section 23.6
SCC	Scoping Opinion / November 2012	There are a number of minor errors in the documentation • Mill Stream Local Nature Reserve (LNR) is also a County Wildlife Site (CWS) • Martlesham Creek and Sluice Wood CWS is missing • Newbourne Springs SSSI – spelling error • Bramford Meadows CWS & LNR is not just designated for ditch vegetation but is also of considerable importance for its invertebrate populations. • Fore and Bushey Groves CWS is also Ancient and Semi-Natural Woodland (ASNW)	The errors have been corrected. Where designated site classifications were missed these have been corrected are covered in sections 23.5.1 and 23.5.2
Planning Inspectorate	Scoping Opinion / December 2012	The Planning Inspectorate recommends that surveys should be thorough, up to date and take account of other development proposed in the vicinity.	Consultation with Natural England has agreed the majority of surveys undertaken for East Anglia ONE are valid for this assessment (section 23.5). Additional Extended Phase 1 Habitat Surveys and badger surveys were undertaken in

Consultee	Date / Document	Comment	Response / where addressed in the ES
			2014 to update data gaps.
Planning Inspectorate	Scoping Opinion / December 2012	The Planning Inspectorate recommends that the proposals should address fully the needs of protecting and enhancing biodiversity. The assessment should cover habitats, species and processes with the sites and surroundings. The Planning Inspectorate recommends that the impacts on protected fish species is fully assessed and appropriate mitigation provided	Assessments are fully detailed in sections 23.6 and 23.7. All major watercourses would be crossed via pre-installed ducts (installed by East Anglia ONE) to avoid impacts. Mitigation measures for pollution prevention to watercourses are included in *Table 23.4*. Impacts on fish in the marine environment are discussed in Chapter 11 Fish and Shellfish Ecology.
Planning Inspectorate	Scoping Opinion / December 2012	Paragraph 649 of the Scoping Report states that potential impacts have been identified 'assuming that construction will entail HDD and ducting or open trenching for the whole of the 37km cable route'. This statement is unclear, and the ES should clearly set out the design parameters against which the assessment is undertaken.	Scenario 2 (open trenching) is no longer considered for the proposed East Anglia THREE project. Cables would instead be installed in ducts laid during East Anglia ONE construction (see section 23.3.2 or Chapter 5 Description of the Development).
Planning Inspectorate	Scoping Opinion / December 2012	The assessment should take account of the impacts arising from noise and vibration generated by the proposed development and the potential impact on air quality (including dust). Appropriate cross reference should be made to these specialist reports in the ES.	Reference is made to Chapter 20 Air Quality and Chapter 26 Noise and Vibration where appropriate. Impacts associated with noise and dust are discussed in sections 23.6 and 23.7.
Planning Inspectorate	Scoping Opinion / December 2012	The ES should set out in full the potential risk to EPS and confirm if any EPS licences will be required. The applicant should take into consideration recent changes in legislation with regard to EPS licence procedures. Further information	Risks to EPS are discussed in sections 23.6 and 23.7.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		in relation to EPS matters can be found within section 4 of this report.	
Natural England	Consultation Response Email May 2015	Please accept this email as confirmation that Natural England is satisfied that overall the surveys carried out in 2012 and listed in your email below, are valid as a baseline for 2015 submission of the DCO application for East Anglia THREE. We welcome the additional data to be provided from the East Anglia ONE surveys planned for 2015 and appreciate that whilst this will not be available prior to submission of the DCO application for East Anglia THREE, it will be available to support the Examination process if required. However, Natural England does highlight that three years is a significant time between **bat** surveys and usage of sites by bats can change considerably in that time. Therefore we advise the following, as per our standard advice for all terrestrial developments that have the potential to disturb bats: - • If impacts were recorded as high or populations of any species listed were high, we would recommend an updated survey is undertaken now to support your application. • Where impacts or population size is considered low, ecological justification should be provided in your application for why no further surveys are required.	The data sources used as part of the assessment are outlined in section 23.4.2. The assessment for bats is presented in section 23.5.4.4.
Natural England	Comments on Draft ES Chapter August 2015	Natural England is satisfied that the habitats of the Deben Estuary SPA, SSSI, Ramsar site and Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) will not be significantly affected due to the small amount of permanent habitat loss and the fact that the majority of habitats on site are likely to regenerate naturally following works. The majority of county wildlife sites and areas of priority or supporting habitat have been avoided and where they can't be avoided for example where the cable	No response required.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		crosses Millers Wood, an ancient woodland, sensible proposals are provided. The mitigation proposed for protected species follows good practice guidelines and all the required licences are noted. The cable route is 970m from Little Blakenham Pit SSSI, designated for bats a good lighting strategy is proposed and pre-construction surveys will be undertaken and Natural England is satisfied with this approach. There are evidently several Red data book/ rare invertebrate species on site and we are satisfied sensitive invertebrate sites will be surveyed again prior to works commencing.	
SCC	Draft ES Consultation Meeting September 2015	Ensure that the baseline survey information is valid for the impact assessment. Confirm that baseline surveys covered all Local BAP (LBAP) priority species and Natural Environment and Rural Communities Act 2006 Section 41 species of principal importance for the purpose of conserving biodiversity (herein 'S41 species') Ensure that the risk of the impact of ash dieback upon the mitigation planting regime has been considered.	Survey information validity has been discussed in consultation with Natural England: they have confirmed that they are happy with the validity of the survey data. LBAP priority species and S41 species were included within the baseline surveys. This can be seen with section 23.5. Chapter 29 Seascape, Landscape and Visual Amenity and the OLEMS contain information on how best to deal with the issue of ash dieback.

23.2.1 Statement of Common Ground (East Anglia ONE)

7. The proposed East Anglia THREE project utilises the same onshore cable route and substation location as East Anglia ONE. A SoCG specific to the proposed East Anglia THREE project is to be developed in advance of the DCO Examination. Until this point in time, the East Anglia ONE SoCG will be used as a basis for the East Anglia THREE SoCG, and is used as a reference point for the assessment.

8. The SoCG was produced for East Anglia ONE in July 2013 for Ecology and Ornithology. Consultees included SCC, Mid Suffolk District Council (MSDC), SCDC, Natural England, East Suffolk Internal Drainage Board (ESDB), and Suffolk Wildlife Trust (SWT). The sections below outline the matters which have been agreed and are documented in the SoCG. There are no disagreed matters which relate to this chapter, as all non-agreed points were in reference to onshore ornithology and are considered in Chapter 24 Onshore Ornithology. Further details for the SoCG are provided in *Appendix 23.3*. Details regarding the Deben Estuary SPA and impacts to birds are discussed in Chapter 24 Onshore Ornithology.

9. The terrestrial ecology matters which have been agreed and which are documented in the SoCG are summarised below, and are relevant to the proposed East Anglia THREE project as the projects follow the same onshore cable route. These matters have been considered during the assessment process within this chapter:

- The ES adequately characterises the baseline relevant to terrestrial ecology;
- The impact methodology as set out in each assessment chapter provides an appropriate approach to assessing potential impacts of the proposed East Anglia ONE project on terrestrial ecology;
- Assuming agreed mitigation is implemented, the proposed development is not considered likely to damage the terrestrial ecological and geological features of interest of relevant SSSIs or other protected sites, e.g. CWSs. The parties are agreed that adequate mitigation can be secured for bats at the substation(s) through the implementation of the proposals agreed through the Landscape and Ecological Management Strategy;
- Assuming agreed mitigation is implemented, the proposed development is not considered to have a detrimental effect on onshore EPSs. The parties are agreed that adequate mitigation can be secured for bats at the substation(s) through the implementation of the proposals agreed through the Outline Landscape and Environmental Management Strategy (OLEMS); and
- Where mitigation requires the granting of a Natural England licence, the measures proposed are considered to be in line with Natural England guidance.

23.3 Scope

23.3.1 Study Area

10. Detailed engineering design, route refinement, and additional information was sought for the landfall, onshore cable route, Construction Consolidation Sites (CCS) and associated temporary works (area / access roads) during the EIA undertaken for East Anglia ONE. This EcIA draws primarily on the information provided within the ES for East Anglia ONE as the landfall and onshore cable route are shared (see Chapter 5 Description of the Development). The ES for East Anglia ONE also identified the converter stations/substation(s) locations for the proposed East Anglia THREE project and a future East Anglia Offshore Wind (EAOW) project.

11. The development footprint is referred to hereafter as the onshore electrical transmission works (which includes access requirements). This is outlined in Chapter 5 Description of the Development.

12. The study areas for specific terrestrial ecological receptors used in this EcIA are provided in *Table 23.2*. These study areas were selected according to standard guidance and professional judgement.

13. For the purposes of this EcIA, the majority of receptors use area of the 'preferred onshore cable route corridor' – a 160m-wide corridor – as their study area, plus a 'substation refined area of search' which considered the footprints for the converter stations/substation(s) for East Anglia ONE and the proposed East Anglia THREE and future EAOW project. This corridor was used as the study area for the field surveys undertaken for East Anglia ONE between 2010 and 2012.

14. This corridor was later refined to obtain the final onshore cable route for East Anglia ONE and the proposed East Anglia THREE project and a future EAOW project, with the final onshore cable route being 75m-wide, except in selected locations. The 160m corridor has been used as the study area for the majority of ecological receptors as this is the area for which the majority of the raw data used in this EcIA has been collected.

15. The figures referenced in *Table 23.2* below show the terrestrial ecology receptors in relation to the onshore electrical transmission works and a 50m buffer. For the full extent of the data gathered within the study area, please refer to figures included within *Appendix 23.2*.

16. Where the study areas for individual ecological receptors vary from the study area described above, this is described in full in *Table 23.2*.

Table 23.2 Study areas for different terrestrial ecology receptors used for this EcIA.

Data / survey	Study area
Statutory designated sites	Within 2km of the preferred onshore cable route corridor and substation refined area of search (*Figure 23.1*).
Non-statutory designated sites	Within 2km of the preferred onshore cable route corridor and substation refined area of search (*Figure 23.2).*
Background Data Search (BDS)	Statutory designated sites, non-statutory designated sites and notable species: Within 2km of the preferred onshore cable route corridor and substation refined area of search Bats: within 5km of the preferred onshore cable route corridor and substation refined area of search (*see Appendix 23.2*)
Phase 1 habitat survey	Preferred onshore cable route corridor and substation refined area of search (*Figures 23.3a – 23.3l*).
Phase 2 botanical survey	Information from the Phase 1 Habitat Survey was appraised, and areas potentially requiring further survey were identified. These are indicated by polygons outlined in red in *Figures 23.3a – 23.3l.*
Hedgerow survey	Onshore cable route corridor and substation area of search (*Figure 23.4a – 23.4g*).
Bat survey	Onshore cable route corridor and substation refined area of search (*Figure 23.7a – 23.7g*).
Dormouse survey	Preferred onshore cable route corridor and substation refined area of search. A wider corridor was surveyed in a few places where a final cable route had not been decided (*Figure 23.16*).
Great crested newt	Buffer of 250m around preferred cable route corridor and substation refined area of search (*Figure 23.8a - 23.8g*).
Water vole and otter	Onshore cable route corridor and substation refined area of search (*Figures 23.9a – 23.9g and Figures 23.10a – 23.10g*).
Reptiles	Survey corridor of 75m comprising the onshore cable route corridor and substation refined area of search, as well as a wider corridor surveyed in a few places where a final route had not been decided (*Figures 23.11a – 23.11g*).
Terrestrial invertebrates	Preferred onshore cable route corridor 160m (*Figures 23.12a – 23.12c*).
Aquatic invertebrates	Selected ditches and watercourses crossed by the preferred onshore cable route corridor (*Figures 23.13a – 23.13g*).
Badgers	Preferred onshore cable route corridor and substation refined area of search (the preferred onshore cable route) (*confidential Figures 23.14a – 23.14g*).
Extended Phase 1 Habitat Survey (2014)	Final onshore cable route corridor, landfall, CCS sites, associated temporary works (area / access roads) and substation site boundary plus a 50m buffer around these areas (*Figures 23.3a – 23.3l*).
Updated badger survey (2014)	Final onshore cable route corridor, landfall, CCS sites, associated temporary works (area / access roads) and substation site boundary plus a 50m buffer around these areas (*Figures 23.14a – 23.14g*).

23.3.2 Worst Case

17. There are two approaches for the construction of the proposed East Anglia THREE project:

- Single Phase - a single phase (up to 1200MW installed in a single construction period); or
- Two Phased - two phases of up to 600MW each, with the start date of each phase of works separated by no more than 18 months).

18. Ducts (including all HDD operations) for the onshore cables for the proposed East Anglia THREE project will be installed during the construction of East Anglia ONE.

19. Therefore, under the Single Phase approach, for construction of the proposed East Anglia THREE project the following works would be required:

- If the short duct method if used at the landfall, a ramp would be required to access the beach;
- Creation of one transition bay compound near to the landfall location;
- Installation of one transition bay compound to connect the offshore shore export cables and the onshore export cables;
- Installation of up to two jointing bays (assuming up to two cables are jointed in each bay) at up to 62 locations along the cable route;
- Creation of one jointing bay construction compound at up to 62 locations along the onshore cable route, each with a hardstanding area of 775m^2 within a compound of 3,740m^2.
- CCS – seven sites covering an aggregated area of up to 1.32ha;
- Access via existing roads and tracks and therefore haul road is required only where joints are placed in remote areas. A maximum of 18.05km of 5.5m width haul road is required. Temporary track matting may be required if ground conditions are very poor;
- Transport to site, cable pulling and jointing at up to 124 (each with 2 cables so 248 joints) jointing bays;
- Installation of up to 248 kiosks for cable maintenance; and

- Up to 300m of open trenching for cables from the end of pre-installed ducts to the substation(s);
- One substation within a 3.04ha compound;
- Up to 235m of open trenching for cables from the substation(s) to ducts pre-installed by National Grid; and
- Reinstatement of land.

20. Under a Two Phased approach the following works would be required:

- If the short duct method if used at the landfall, a ramp would be required to access the beach;
- Creation of two transition bay compounds (one during each Phase) near to the landfall location;
- Installation up to two transition bay compounds (one during each Phase) each to house up to two joints between the offshore export cables and the onshore export cables;
- Creation of two jointing bay construction compounds (one during each Phase) at up to 62 locations along the onshore cable route;
- Installation of up to two jointing bays (assuming two cables are jointed in each bay in each in Phase 1 and two jointed in each bay in Phase 2) at up to 62 locations along the cable route, each with a hardstanding area of 775m^2 within a compound of 3400m^2;
- CCS – seven sites covering an aggregated area of up to 1.32ha;
- Access via existing roads and tracks and therefore haul road is required only where joints are placed in remote areas. A maximum of 18.05km (of 5.5m width) haul road is required. Temporary track matting may be required if ground conditions are very poor. As a worst case scenario, it is assumed that all haul road will be removed and the ground reinstated on completion of Phase 1 and will be replaced and then removed again during Phase 2;
- Transport to site, cable pulling and jointing at up to 124 (62 during Phase 1 and 62 during Phase 2) (each with 2 cables so 248 joints) jointing bays;
- Installation of up to 248 kiosks for cable maintenance; and

- Up to 300m of open trenching for cables from the end of pre-installed ducts to the substation(s);
- Up to two substation(s) within a 3.04ha compound;
- Up to 235m of open trenching for cables from the substation(s) to ducts pre-installed by National Grid; and
- Reinstatement of land.

21. Full details of the Single Phase and Two Phased approaches are provided within Chapter 5 Description of the Development.

22. For each impact, the EcIA utilises a worst case approach for both the Single Phase and Two Phased approach to construction, as described above. The design parameters that constitute worst case vary depending on the potential impact under consideration. *Table 23.3* below details the assumptions which have been used.

23. The final routeing of cables connecting into the substation is not known at the current time. Therefore the pre-installed ducts will end just beyond the western boundary of the screening trees and bunding installed by East Anglia ONE to the east of the East Anglia THREE substation. Therefore the final stretch of cables will be open trenched from the end of the ducts to the substation. This will be a maximum distance of 300m. Likewise, National Grid will install ducts to connect into the existing Bramford substation but these will end at the boundary of the National Grid land, therefore EATL will need to open trench up to the end of these ducts, a distance of up to 235m. In both cases the cables would be laid directly into trenches.

24. As discussed in Chapter 5 Description of the Development (section 5.6.6.2.2) East Anglia THREE Limited (EATL) will investigate opportunities to leave haul road in place between projects and/or phases to further minimise impacts, this would be dependent upon the agreement of individual landowners and the approval of the Local Planning Authorities. EATL have presented an assessment, for all terrestrial ecological receptors within this chapter, to install and remove haul road twice under the Two Phased approach due to the increased vehicle movements necessary, disturbance to the ground and associated noise, dust and visual effects. However, although locations where haul road would be left in place is dependent upon individual landowner decisions and Local Authority approval, this potential case is assessed independently for all terrestrial ecological receptors within *Appendix 23.7,* as it is considered the impacts of leaving the haul road in situ between phases may result in different levels of impacts and mitigation necessary to those assessed under the two construction approaches presented.

25. Only those design parameters with the potential to influence the level of impact are identified here. Therefore, if the design parameter is not described in the table below, it is not considered to have a material bearing on the outcome of the assessment.

26. The worst case scenarios identified here are also applied to the cumulative impact assessment (CIA). When the worst case scenarios for the project in isolation do not result in the worst case for cumulative impacts, this is addressed within the cumulative section of this chapter (see section 23.7).

27. Indicative locations for jointing bays within the onshore cable route are provided in Chapter 5 Description of Development. The final locations of these jointing bays will be determined post-consent by engineering design and installation contractors. Therefore, for the purposes of this assessment, the worst case scenario has been assumed, i.e. it has been assumed that the jointing bays could be situated in any location within the onshore cable route corridor.

Table 23.3 Worst Case Assumptions

Impact	Key design parameters forming worst case scenario	Rationale
Construction		
All impacts	*Single Phase* • Footprint = area of haul road (laid and removed once), maximum 62 x jointing bay compounds (each containing 775m^2 of hardstanding), 1 x transition bay compound, substation compound and 7 CCS = 37.85ha; • Total footprint of jointing bay compound (each) – 3,740m^2; • Onshore cable route - duration of works = 29 weeks (with approximately 10 weeks work required in any one section (see Figure 5.14); and • Substation - duration of works 55 weeks. *Two Phased* • Footprint = area of haul road (laid and removed twice), maximum 124 x jointing bay compounds (each containing 775m^2 of hardstanding), 2 x transition bay compounds, substation compound and 7 CCS = 67.05ha; • Total footprint of jointing bay compound (each) – 3,400m^2 • Permanent habitat loss at substation compound = 3.04ha;	Values provided in the project details within Chapter 5 Description of Development.

Impact	Key design parameters forming worst case scenario	Rationale
	• Onshore cable route - duration of works = 29 weeks (with approximately 10 weeks work required in any one section of the onshore cable route), a gap of up to 49 weeks then further 29 weeks; and • Substation - duration of works 55 weeks, a gap of 20 weeks then further 55 weeks.	
Impacts on protected species (in addition to above)	*Single Phase* • Noise (shall not exceed the maximum required local level which is to be provided by the local authorities) and lighting at substation compound, 7 CCS and potentially 62 jointing bay compounds. 24 hour working may be required at CCS. *Two Phased* • Noise (shall not exceed the maximum required local level which is to be provided by the local authorities) and lighting at substation compound, 7 CCS and potentially 124 jointing bay compounds. 24 hour working may be required.	Values provided in the project details within Chapter 5 Description of Development.
Operation		
Disturbance of habitats and species from maintenance activities	*Both approaches* • Disturbance through routine operations at substation compound and occasional maintenance along the onshore cable route; • One visit per jointing bay per year plus non-scheduled maintenance if required, could be required in between jointing bays or kiosk locations. • Permanent habitat loss at substation compound = 3.04ha; and • Kiosks along cable route – Total (0.75m2 x 248) 186m2	Values provided in the project details within Chapter 5 Description of Development.
Impacts to fauna from operational lighting and noise	*Both approaches* • Noise emissions attributable to the substation shall not result in noise emissions attributable to the substation shall not result in a noise level which exceeds 5dB above the background noise level ($_{LA90}$,1hr) during the day and 35dB$_{LAeq}$ 15min during the night at	

Impact	Key design parameters forming worst case scenario	Rationale
	Bullenhall Farm, Hill Farm and Woodlands Farm; and • 24 hour lighting at substation compound.	
Decommissioning		
All impacts	*Both approaches* • Buried cable system: Cables de-energised and left in situ; • Jointing bays left in situ; • Substation removed and land returned to initial state; • Landscaping and reinstatement of the site; and • Presence of plant and vehicles (see Chapter 27 Traffic and Transport).	Values provided in the project details within Chapter 5 Description of Development.

23.3.3 Embedded Mitigation

28. Mitigation measures which are relevant to terrestrial ecology and which have been embedded into the project design are listed in *Table 23.4*. Some of these measures are those which have been already committed to by East Anglia ONE. These measures are highlighted in the table. General mitigation measures are provided first, and apply to all parts of the onshore electrical transmission works. Specific mitigation measures, which apply to the landfall, onshore cable route and the substation, are described separately thereafter.

Table 23.4 Embedded mitigation measures in relation to Terrestrial Ecology

Parameter	Mitigation measures embedded into the project design
General	
Landscape and Ecological Management Strategy (LEMS)	The OLEMS is included with this application which has an overview of ecological mitigation and enhancement measures. The final versions of this document will be agreed with local authorities prior to the commencement of construction works. The final versions would include species protection plan(s) (where appropriate) and provisions for an Ecological Clerk of Works (ECoW).
Code of Construction Practice (CoCP)	The Outline Code of Construction Practice (OCoCP) is included with this application which has an overview of ecological mitigation and enhancement measures. The final versions of this document will be agreed with local authorities prior to the commencement of construction works.

Parameter	Mitigation measures embedded into the project design
Project design – site selection and routeing	Initial routeing and site selection to avoid key sensitive land uses e.g. statutory and non-statutory designated nature conservation sites. Including sensitive features of Suffolk Coast and Heaths AONB where possible, proposed HDD under Millers Wood Ancient Woodland and CWS. (This has been considered as part of East Anglia ONE).
	Routeing of the cable to avoid areas of woodland and key features highlighted within the Suffolk landscape including trees, mature hedge trees and orchards. Careful routeing of the onshore cable route to avoid key areas of sensitivity e.g. near Howes Farm, meadows near Martlesham Hall, Fynn Valley. (This has been considered as part of East Anglia ONE).
	East Anglia ONE will install ducts for East Anglia THREE cables, therefore construction works for the onshore cable route would comprise pulling cables through pre-installed ducts and enabling works (provision of access). Therefore impacts are minimised and localised.
	Jointing bays would be located close to field boundaries and, where possible, microsited to avoid sensitive features including hedgerows, woodland and trees, watercourses and grassland areas which contain notable plant species. Impacts would be localised around jointing bay compounds and haul road. If kiosks are used, these would, where possible, be sited close to field boundaries and hedgerows for visual screening, whilst avoiding the rootzone.
	CCS locations would include a 5m buffer around the site to minimise the impact upon sensitive hedgerows and trees, and a 10m buffer to minimise the impact upon watercourses.
Pre-construction	Pre-construction surveys in relation to legally protected species would be undertaken for the proposed East Anglia THREE project by suitably qualified ecologists to ensure mitigation is based upon up-to-date survey data. Pre-construction surveys undertaken for East Anglia ONE would also be used to augment the baseline characterisation. A detailed method statement / protocol for dealing with invasive species would be prepared, focusing on preventing their spread. This would be agreed with the Environment Agency and Natural England and include a plan showing the location of identified invasive plant species. This protocol would be used if further stands were found during construction activities. General and site-specific mitigation measures, commitments and planning conditions and obligations (including any requirement for EPS licenses), as well as working practices would be translated into a CoCP.
Operation	Suitable maintenance of any newly planted sections of hedgerow, shelterbelts and woodlands following construction would have an aftercare period of ten years. One for one replacement planting of failed plants would only be required for the first five years. Lighting sensitive to bats would be incorporated according to guidance in *Bats and Lighting in the UK* (Bat Conservation Trust (BCT) and Institute of Lighting Engineers (ILE) 2009).

Parameter	Mitigation measures embedded into the project design
Decommissioning	The onshore cables would be decommissioned (de-energised) and the cable jointing bays and transition bays left in situ, and kiosks removed. The exact nature of decommissioning procedures would be determined towards to end of the project's lifetime in accordance with up to date best practice, guidance and legislation.
Landfall	
Construction	Areas of vegetated shingle would be avoided at landfall by design.
	Temporary works would be within a single field with existing road access.
	The excavated material from the jointing / transition bays (earth / sand / shingle) would be stockpiled on the fields or beach for short periods but re-laid to match existing profiles.
Cable installation	
Construction	The onshore cables would be installed underground to minimise impacts to ecological receptors and landscape and visual impacts. (This follows a commitment made by East Anglia ONE).
	No 24 hour lighting except at CCS where working is required.
	Early installation of protective fencing would be utilised in order to minimise impacts to trees and their roots.
	Where possible, construction work areas would be accessed using existing tracks and road (to be developed as part of the Traffic Management Plan).
	An ECoW would undertake compliance monitoring on site during construction.
	Micro-siting of onshore cable route, including: • Use gaps or weak points to go through hedges; • Avoiding mature trees by using existing gaps; and • Re-direct individual cables around trees. (These measures follow a commitment made by East Anglia ONE).
	Habitat removal would, where practicable, be restricted to the minimum working width of 5.5m at watercourse crossings and hedgerows.
	Micro-siting of jointing bays and haul road, including:
	Reinstatement following cable installation to include: • Reinstatement of bank profiles; • Retain and relay vegetation to ditch sides; • Bank and bed materials removed for construction would be stored separately and replaced in the reverse order in which they were removed, to promote the re-establishment of appropriate habitat; and • Reinstatement of affected field boundaries and hedges in the same style or with the same species mix of the original and / or to match adjacent boundaries for up to five years.

Parameter	Mitigation measures embedded into the project design
	Pollution prevention measures would be implemented in accordance to Environment Agency Pollution Prevention Guidance (PPG) series, in particular (but not limited to) • Working at construction and demolition sites: PPG6; and • Works and maintenance near water: PPG5
	Carefully handle topsoil to best practice guidance (Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra 2009)).
Substation(s)	
Construction / Operation	Implementation of Outline Substation Design Principles, to ensure appropriate finishes and materials.
	Limited 24 hour lighting at substation compound during particular construction activities (e.g. concrete pours).
	Lighting would be limited to internal access roads and walkways, security lighting, task related flood lighting. Further detail on these mitigations would be set out in the Outline CoCP / OLEMS.

23.4 Assessment Methodology

23.4.1 Legislation, Policy and Guidance

23.4.1.1 Legislation

29. There are a number of pieces of legislation applicable to terrestrial ecology. The following key pieces of UK legislation are relevant to this chapter:

- Habitats Directive - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
    - 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)s and SPAs and these are implemented in the UK through The Conservation of Habitats and Species Regulations 2010.
- Birds Directive - Council Directive 79/409/EEC on the Conservation of Wild Birds (also see Chapter 24 Onshore Ornithology)
    - 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 SPAs 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.

- Wildlife and Countryside Act 1981 (as amended):
  - The Act makes it an offence (with exception to species listed in Schedule 2 and with additional penalties for species listed in Schedule 1) 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;
  - The Act makes it an offence to intentionally kill, injure or take any animal listed in Schedule 5 of the act and protects occupied and unoccupied places used for shelter or protection;
  - The Act makes it an offence (subject to exceptions) to intentionally pick, uproot or destroy any wild plant listed in Schedule 8 of the Act;
  - The Act makes it a criminal offence to plant or otherwise cause to grow any non-native, invasive species listed under Schedule 9 of the Act; and
  - The Act makes provision for the notification and confirmation of SSSIs.
- The Conservation of Habitats and Species Regulations 2010 (as amended):
- 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;
- The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4; and
- 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.
- The Protection of Badgers Act 1992

- The Act makes it an offence to wilfully kill, injure or take, or attempt to kill, injure or take a badger; and to cruelly ill-treat a badger; and
- The Act makes it an offence to intentionally or recklessly damage, destroy or obstruct a badger sett, or to disturb a badger whilst in a sett.
- Natural Environment and Rural Communities Act 2006 (NERC)
- Section 41 of the Act requires the Secretary of State to compile a list of habitats and species of principal importance for the conservation of biodiversity in England (herein 'S41 species'); and
- 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.
- The Hedgerow Regulations 1997

  The Regulations make it an offence to remove or destroy certain hedgerows without permission from the local planning authority and the local planning authority is the enforcement body for such offences.
- Marine and Coastal Access Act 2009
  - 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.
- The Commons Act 2006
  - The Act aims to protect areas of common land, in a sustainable manner delivering benefits for farming, public access and biodiversity (Defra 2013).
- Countryside and Rights of Way Act 2000 (CRoW):
  - 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 AONBs to improve their management.

23.4.1.2 Guidance

30. The impact assessment has been based upon the following guidance and standards:

- Institute of Ecology and Environmental Management (IEEM) (2006) Guidelines for Ecological Impact Assessment in the United Kingdom;
- British Standard 42020:2013 – Biodiversity. Code of Practice for planning and development;
- CIRIA C648 (2006) Control of water pollution from linear construction projects;
- CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd edition).

31. The following species-specific guidance and standards have been used during the assessment process:

- Natural England (2015) Standing advice on protected species (bats (all species), great crested newts, badgers, water voles, otters, reptiles, protected plants, invertebrates, white-clawed crayfish, ancient woodlands and veteran trees);
- British Standard 5837: 2012 – Trees in relation to design, demolition and construction;
- Bat Conservation Trust & Institute of Lighting Engineers (2009) Bats and Lighting in the UK;
- Strachan and Moorhouse (2011) Water Vole Conservation Handbook, 3rd Edition; and
- GB Non-native Species Secretariat (2015) Species Information.

23.4.1.3 Policy

23.4.1.3.1 National Planning Policy Framework (NPPF)

32. The NPPF, published in 2012 replaces the former series of Planning Policy Statements. From its outset the document makes plain that it is concerned with Sustainable Development, and paragraph 6 states that there are three dimensions to sustainable development: economic, social and environmental, and that all three are mutually dependent and gains for all should be sought jointly and simultaneously through the planning system. The environmental dimension is defined (as per the framework document) below:

"an environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy".

23.4.1.3.2 Natural Environment White Paper 2011

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

23.4.1.3.3 National Policy Statements

34. The assessment of potential impacts upon terrestrial ecology has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision making documents for NSIPs. Those relevant to the proposed East Anglia THREE project are:

- Overarching NPS for Energy (EN-1) (DECC 2011a); and
- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b).

35. The specific assessment requirements for terrestrial ecology, as detailed in the NPSs, are summarised in *Table 23.5*, together with an indication of the paragraph numbers of the ES chapter where each is addressed. Where any part of the NPS has not been followed within the assessment, an explanation as to why the requirement was not deemed relevant, or has been met in another manner, is provided.

Table 23.5 NPS assessment requirements

NPS requirement	NPS reference	ES 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 laid out in section 23.6 and 23.7.

NPS requirement	NPS reference	ES reference
'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	Mitigation measures in T*able 23.4* and laid out in sections 23.6 and 23.7 identify where replanting and reinstatement would take place.
'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 – 5.3.8	Mitigation measures are discussed in *Table 23.4* and in sections 23.6 and 23.7.
'The IPC will have the same regard to potential Special Protection Areas (pSPAs) and Ramsar sites as those sites identified through international conventions and European Directives.'	Section 5.3.9	Designated sites are discussed in section 23.5. Assessment is laid out in sections 23.6 and 23.7. Design measures 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 23.5. Assessment is laid out in sections 23.6 and 23.7. Design measures 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	Section 5.3.11	Designated sites are discussed in sections 23.5. Assessment is laid out in section 23.6 and 23.7.

NPS requirement	NPS reference	ES reference
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.'		Design measures 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 sections 23.5. Assessment is laid out in section 23.6 and 23.7. Design measures have been made to avoid interest features at designated sites.
'Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The IPC should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location outweigh the loss of the woodland habitat. Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why.'	Section 5.3.14	Impacts to woodland and trees are discussed in sections 23.6 and 23.7, including avoidance and mitigation measures.
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	Mitigation is discussed in mitigation laid out in *Table 23.4* and sections 23.6 and 23.7. 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 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.'	Sections 5.3.16 – 5.3.17	The existing environment for protected and important species and habitats are discussed in section 23.5. Assessment is laid out in sections 23.6 and 23.7.

NPS requirement	NPS reference	ES reference
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	Mitigation is discussed in mitigation laid out in *Table 23.4* and sections 23.6 and 23.7. 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	Mitigation is discussed in mitigation laid out in *Table 23.4* and sections 23.6 and 23.7.
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. Mitigation is discussed in mitigation laid out in *Table 23.4* and sections 23.6 and 23.7.
'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 2.6.70	Monitoring is discussed in mitigation laid out in *Table 23.4* and sections 23.6 and 23.7.
'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 23.6.3.

23.4.1.3.4 Local Planning Policy

36. EN-1 states, in paragraph 4.1.5 that:

"Other matters that the IPC [now the Planning Inspectorate] may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict

between these or any other documents and an NPS, the NPS prevails for the purposes of IPC decision making given the national significance of the infrastructure."

37. The proposed East Anglia THREE onshore electrical transmission works fall within the following local authority boundaries:

- SCC;
- MSDC; and
- SCDC.

38. *Table 23.6* provides details of the local planning policy documents and the relevant policies in respect of terrestrial ecology. Designated areas which these policies may refer to are shown on *Figure 23.1*. A number of policies which primarily relate to the landscape of the region, and which are inter-linked with terrestrial ecology are discussed in Chapter 29 Seascape, Landscape and Visual Amenity. For MSDC this includes policies CL1 and CL4. Similarly policies which primarily relate to management of water resources, and which are inter-linked with terrestrial ecology are discussed in Chapter 21 Water Resource and Flood Risk.

Table 23.6 Relevant local planning policies

Document	Policy / Guidance	Policy / Guidance purpose
SCC		
There is no county level planning policy that requires consideration for the development. Planning policy is provided at the local district and borough levels.		
MSDC		
Mid Suffolk Adopted Core Strategy (2008)	SB1	'In the interests of safeguarding the character and appearance of the landscape, its rural amenity, wildlife habitats and conserving resources through the economy of services, new development will take place within existing settlements unless provided for by other policies contained in the plan.'
	CL5	'Development which would result in the loss of or damage to woodland, particularly ancient woodland, or disruption to commercial forestry will be refused. The felling of commercial conifer woodland will be supported where it does not adversely affect the character and appearance of the landscape. '
	CL6	'Tree preservation orders (TPO) will be used where the removal of trees and woodlands would be detrimental to the visual amenity of the surrounding area.'
	CL7	'The district planning authority will, through its responsibility for controlling development and use of land, protect green lanes, TPOs will be used in support of this objective.'

Document	Policy / Guidance	Policy / Guidance purpose
	CL8	'The district planning authority will refuse development likely to bring about:- - the loss or significant alteration of important habitats including heathland, woodland, water meadows, other permanent pasture, parkland, marches, streams, ponds, green lanes, alder carr and osier beds; - the threat to rare or vulnerable species, especially those protected by law. Where development is permitted, the retention of important wildlife habitats will be sought through planning conditions or legal agreement. The district planning authority will consider entering into management agreements under the Wildlife And Countryside Act 1981 which would secure a more comprehensive protection for, and management of, wildlife and ecological sites.'
	CL9	'Development proposals which would harm the nature conservation interest of Ramsar sites, sites of special scientific interest and other nationally designated wildlife areas, will not be permitted except where a case of overwhelming national need has been clearly demonstrated, and there is a lack of acceptable alternative sites. Suffolk county wildlife sites and local nature reserves will also be protected from harm to their nature conservation interest arising from development proposals, and the weight attached to such harm will reflect the relative significance of these designations. The presence of a protected species under the Wildlife And Countryside Act 1981 will be a material consideration in determining any planning application.'
	CL10	'Development adjacent to rivers or associated with other natural areas of water, including lakes and ponds, will be expected to conserve and enhance existing wildlife, landscape and archaeological features.'
	CL24	This policy relates to onshore wind farms but relevant aspects of the policy include the following: 'Particular care will need to be given to the design, siting and colour of ancillary facilities, including transformers and transmission apparatus.'
SCDC		
SCDC Local Plan - Core Strategy and Development Management Policies*	SP1	'Central to the Core Strategy for the future of the Suffolk Coastal district is the achievement of sustainable development. The Strategy in this respect will be to...conserve and enhance the areas natural historic and built environment'.

Document	Policy / Guidance	Policy / Guidance purpose
	SP14	'Biodiversity and geodiversity will be protected and enhanced using a framework based on a network of: • Designated sites; • Wildlife corridors and links; • The rivers, estuaries and coast; • Identified habitats and geodiversity features • Landscape character areas; and • Protected species. Sites of European importance, which include Special Areas of Conservation and Special Protection Areas are statutorily protected under the Conservation of Habitats and Species Regulations 2012 (based on European Union (EU) directives), and wetlands of global importance (Ramsar sites) are protected by Government policy to apply the same level of protection as to European sites. More generally, the policy approach to development on sites designated for their biodiversity or geodiversity interest is set out in Policy DM27. The Suffolk BAP and Suffolk Local Geodiversity Action Plan will be implemented. The Strategy will also be to contribute to county targets through the restoration, creation and on-going management of new priority habitats as identified in those documents.'
	DM27	'All development proposals should: (a) Protect the biodiversity and geodiversity value of land and buildings and minimise fragmentation of habitats; (b) Maximise opportunities for restoration, enhancement and connection of natural habitats; and (c) incorporate beneficial biodiversity conservation features where appropriate. Development proposals that would cause a direct or indirect adverse effect (alone or combined with other plans or projects) to the integrity of internationally and nationally designated environmental sites or other designated areas, priority habitats or protected / priority species will not be permitted unless: (i) Prevention, mitigation and, where appropriate, compensation measures are provided such that net impacts are reduced to a level below which the impacts no longer outweigh the benefits of the development*; or (ii) With regard to internationally designated sites that the exceptional requirements of reg. 62 of the Conservation of Habitats and Species regulations 2010 (as amended) relating to the absence of alternative solutions and Imperative reasons of overriding Public Interest have been met. Improved site management and increased public access to sites will be encouraged where appropriate.'

* the Council will continue to have regard to the remaining 'saved' policies from the previously adopted Suffolk Coastal Local Plan (incorporating the First & Second Alterations) until replacement by policies in the Site Allocations & Area-Specific Policies and the Area Action Plan for the Felixstowe Peninsula.

23.4.2 Data Sources

39. Data was collected between 2011 and 2014 for both the East Anglia ONE project and proposed East Anglia THREE project. Data collection for East Anglia ONE included a desk-based assessment, an Extended Phase 1 Habitat Survey and further field surveys (i.e. Phase 2 surveys) (refer to *Table 23.7* and *Appendix 23.2* for further details).

40. In 2014, an updated desk-based assessment was undertaken *(*refer to *Appendix 23.1* for further details). An Extended Phase 1 Habitat Survey and further field surveys (i.e. Phase 2 surveys) were undertaken of the areas which had not previously been accessible (refer to *Appendix 23.5* for further details). Note that these surveys also covered sites of potential works accesses for the proposed East Anglia THREE project which were not required for East Anglia ONE (as the construction strategy for the proposed East Anglia THREE project is different from that of East Anglia ONE). A full list of data sources which have been used to inform this EcIA is provided in *Table 23.7*.

23.4.2.1 Desk Based Assessment

41. A desk-based assessment was undertaken to provide information on statutory designated sites for bats and protected species within 5km of the onshore electrical transmission works. A search of 2km within the onshore electrical transmission works was made for any non-statutory designated sites for nature conservation as well as protected and notable species. Information was requested from a range of data sources including but not limited to Suffolk Biological Records Centre, SWT and county recorders. Additional sources such as the Multi-Agency Geographic Information for the Countryside (MAGIC), Natural England, the Joint Nature Conservation Committee (JNCC) and Google Maps (including aerial photography) were also used for a search area of within 2km of the onshore electrical transmission works. The desk-based assessment also included a review of the UK BAP (UK BAP; UK Biodiversity Steering Group 1998a-f, Biodiversity Reporting and Information Group 2007) and Suffolk's LBAP, as updated in January 2015 (Suffolk Biodiversity Partnership, 2015). These BAPs have been reviewed to identify national and local priority species and habitats of conservation concern.

23.4.2.2 Site Specific Surveys

42. RSK Environment undertook ecological scoping surveys in September and October 2011 and February to April 2012. These surveys comprised Extended Phase 1

Habitat Survey which included an assessment of the habitat for legally protected species. The aim of this survey was to identify habitats of conservation value or suitable for legally protected species and where further field surveys was required.

43. The requirement for further surveys and recommended survey methodologies was outlined in the East Anglia ONE Scoping Report (June 2011) and the East Anglia ONE PEIR (February 2012). As these reports were submitted prior to the completion of the Extended Phase 1 Habitat Survey taking place, the recommended surveys outlined in these documents were based on professional judgement and experience of similar schemes.

44. Following the submission of these reports, consultation responses and the results of the desk based assessment and Extended Phase 1 Habitat Survey, revisions to the proposed survey scopes and methodologies were made. Location maps of proposed survey areas for specific species and habitats and methodologies were issued to Natural England, SWT, SCC and MSDC for agreement prior to the commencement of these further surveys. In addition, details of breeding bird survey locations were issued to the Royal Society for the Protection of Birds (RSPB) for agreement.

45. A full list of the Phase 2 ecological surveys which were carried out between January and August 2012 (herein – along with the 2011 extended Phase 1 surveys described above – the '2011-2012 surveys') is provided in *Table 23.7*. Detailed accounts of survey methodologies are provided in the appropriate Technical Reports provided in *Appendix 23.2*.

46. For the purposes of the ecological surveys, a survey corridor of 160m width was used. A wider corridor was surveyed in areas such as the access routes and construction consolidation sites. These areas are shown on *Figures 23.3a-l*. All ecological surveys were carried out at the appropriate time of year and by suitably experienced and, where necessary, licensed ecologists. Figures showing the locations of these ecological surveys are provided in *Appendix 23.2*.

47. Further surveys were undertaken by Royal HaskoningDHV between June and July 2014 (herein referred to as the '2014 surveys'), and by the Ecology Consultancy in 2015 (herein referred to as the '2015 surveys').

48. The 2014 surveys were undertaken to update the information gathered during the 2012 surveys. The surveys focussed on badgers and ensuring a comprehensive Extended Phase 1 Habitat survey of the new areas within the red line boundary (including potential access routes for construction) which had been subsequently identified since the previous surveys.

49. The 2015 surveys consisted of an updated great crested newt survey in order to update surveys undertaken in 2012 and meet the requirements of a Natural England EPS mitigation licence where necessary.

50. The results of these surveys have been incorporated into the baseline for this EcIA (see Section 23.5), and the full survey report is provided in *Appendix 23.5*.

Table 23.7 Data Sources

Data	Year	Coverage	Confidence	Notes
2011-2012 surveys				
National Vegetation Classification (NVC) Surveys *Appendix 23.2*	May - June 2012	Selected locations *(Figure 23.5)*	High	Focused on potentially valuable botanical sites (as well as representative examples of the common habitat types) identified during the Phase 1 Habitat Survey including calcifugous grassland, unimproved and semi-improved neutral grassland, marshy grassland, woodland, waterbodies and coastal habitats. Habitats at these sites were described using the methodology of the NVC and detailed lists of vascular plants were compiled.
Hedgerow survey *Appendix 23.2*	May 2012	All hedges crossed by onshore cable route	High	Hedges were assessed against wildlife and landscape criteria in the Hedgerow Regulations 1997 to identify 'Important' hedgerows.
Waterbodies survey *Appendix 23.2*	May - June 2012	All river and stream crossings, selected ditches	High	Waterbodies were subjected to a detailed inspection of bank-side, marginal and aquatic vegetation upstream and downstream of the crossing points, and the compilation of species lists.
Invasive plant survey *Appendix 23.2*	March - June 2012	onshore cable route and substation compound (*Figure 23.6)*	High	Locations of invasive plant species were recorded.
Bat roost tree assessment survey	February - May 2012	All mature trees suitable for roosting bats	High	All suitable, mature trees were assessed from the ground using binoculars to identify

Data	Year	Coverage	Confidence	Notes
Appendix 23.2		along the onshore cable route and around the substation compound (*Figures 23.7a – 23.7g*)		any features that might be suitable for roosting bats. All trees were graded according to their potential to support roosting bats and their location marked on maps.
Bat roost tree assessment survey *Appendix 23.2*	June - July 2012	Trees identified as having features with high potential for roosting bats (*Figures 23.7a – 23.7g*)	High	Trees identified with bat potential were climbed for full inspection. The trees were climbed using ladders, ropes and harnesses and features examined in detail for evidence of bats.
Bat activity survey *Appendix 23.2*	June - July 2012	onshore cable route (*figures 23.15a –23.15g*)	High	Activity surveys were undertaken along linear features crossed by the onshore cable route and suitable for foraging and commuting bats. A combination of static detectors and manual surveys were used.
Dormouse survey *Appendix 23.2*	January – August 2012	Woods across the onshore cable route *(Figure 23.16a-23.16g)*	High	Nut searches were undertaken in winter in woods across the route. Dormouse tubes and boxes were positioned in suitable habitat crossed by the proposed cable route and checked for nests over five visits between May and August 2012.
Great crested newt survey *Appendix 23.2*	March - June 2012	Waterbodies were identified within a 250m buffer of the onshore cable route and Substation Refined Area of Search (*Figures 23.8a -23.8g*)	High	Waterbodies within 250m of the East Anglia ONE preferred cable corridor were assessed for their potential to support Great Crested Newt. Presence / absence surveys were undertaken on all suitable waterbodies followed by population assessment surveys if Great Crested Newt were found to be present.

Data	Year	Coverage	Confidence	Notes
Otter survey *Appendix 23.2*	June - July 2012	100m upstream and 100m downstream of cable route crossing points on all suitable watercourses (*Figures 23.9a – 23.9g*)	High	The watercourses were surveyed for signs of otter including footprints (padding), droppings (spraints), feeding evidence, slides, paths and holts or lying-up places.
Water vole survey *Appendix 23.2*	June - July 2012	100m upstream and 100m downstream of cable route crossing points on all suitable watercourses (*Figures 23.10a – 23.10g*).	High	Surveys concentrated in areas and involved the systematic searching for water vole field signs including feeding signs, latrines, burrows, footprints, runways, food piles and actual sightings.
Reptile survey *Appendix 23.2*	May - August 2012	Selected locations (*Figures 23.11a – 23.11g*)	High	Protected species presence / absence surveys were undertaken using artificial refuges placed in suitable habitat and checked on five separate occasions between May and August.
Terrestrial invertebrates survey *Appendix 23.2*	July - August 2012	Selected locations (*Figures 23.12a – 23.12c*)	High	Surveys were undertaken for target species in combination with general sampling for all terrestrial invertebrate groups focusing on high value habitats.
Aquatic invertebrates survey *Appendix 23.2*	June 2012	Onshore cable route (*Figures 23.13a – 23.13g*)	High	One-off samples were taken at watercourse crossing points and analysed in the laboratory.
Badger *Confidential Appendix 23.4*	February - June 2012	160m - onshore cable route and around the substation Refined Area of Search (**Confidential** *Figures 23.14a - 23.14g)*	High	Locations of setts and foraging activity were recorded. Any setts found were mapped and categorised.

Data	Year	Coverage	Confidence	Notes
2014 surveys				
East Anglia THREE Extended Phase 1 Habitat Survey *Appendix 23.5*	June - July 2014	Preferred onshore cable route corridor and substation plus a 50m buffer around these areas (*Figures 23.3a – 23.3l*)	High	Surveys covered data gaps from the 2011-2012 surveys, including the location of new haul roads.
Updated badger survey *Appendix 23.5*	June - July 2014	Preferred onshore cable route corridor and substation plus a 50m buffer around these areas (*Figures 23.14a - 23.14g*)	High	Setts recorded in 2012 were rechecked for activity. The change in status of any setts was recorded. The data gaps from the 2011-2012 surveys were also surveyed for evidence of badger activity.
2015 surveys				
Great crested newt survey *Appendix 23.6*	April - May 2015	Waterbodies were identified within a 250m buffer of the onshore electrical transmission (*Figures 23.8a - 23.8g*)	High	Waterbodies within 250m of the East Anglia THREE onshore electrical transmission were identified for their potential to support Great Crested Newt. Presence / likely absence surveys were undertaken on all suitable waterbodies followed by population assessment surveys if Great Crested Newt were found to be present.

23.4.3 Impact Assessment Methodology

51. The EcIA methodology employed in this chapter is based on the guidelines for Ecological Impact Assessment by the IEEM (2006) (now the Chartered Institute of Ecology and Environmental Management (CIEEM)). These guidelines aim to predict the residual impacts on important ecological features affected, either directly or indirectly by a development, once all the appropriate mitigation has been implemented.

52. For the purpose of this EcIA, a matrix is included as a guide to promote consistency in conducting the EcIA. This EcIA is based on the consistent application of expert opinion to ensure the assessed significance level is appropriate for each individual

receptor, taking account of local values for biodiversity to avoid a subjective assessment wherever possible as per the IEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix.

53. For the purposes of this assessment, it is assumed that all of the areas associated with the construction of the East Anglia ONE onshore electrical transmission works would be reinstated / replanted on completion of the construction works (with the exception of the permanent structures at the substation(s) at which habitat is permanently lost). Dependent upon the receptor, the baseline terrestrial ecology may not have entirely recovered in those areas affected by construction activities to the level described in this chapter (see section 23.5) prior to the commencement of construction of the other East Anglia projects. However, this assessment assumes that the areas affected are reinstated to their baseline condition as described in section 23.5. However, there are some exceptions to this for instance mature trees and hedgerows. There would be some loss of these along the onshore cable route from East Anglia ONE but by definition they could not be impacted twice.

23.4.3.1 Value and Sensitivity

54. The first stage of an EcIA is 'determining value' of ecological features or 'receptors'. CIEEM places the emphasis on using professional judgement when considering value of ecological receptors, based on available guidance, information and expert advice. Different aspects of ecological value should be taken into account, including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features. The value is further determined by the receptor's geographical context., i.e.:

- International;
- National;
- Regional;
- County;
- District;
- Local or Parish; and
- Within site only (i.e. within the red line boundary).

55. *Table 23.8* defines how value and sensitivity have been applied to the impact assessment process.

Table 23.8 Definitions of the different levels of sensitivity and value of terrestrial ecological receptors within a geographical context.

Value (and sensitivity)	Examples
International (High)	• An internationally designated site or candidate site or an area which the statutory nature conservation organisation has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified; • A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole; or • A EPS listed in The Conservation of Habitats and Species Regulations 2010.
National (High)	• A nationally designated site or a discrete area, which the statutory nature conservation organisation has determined meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified; • A viable area of a priority habitat or smaller areas of such habitat which are essential to maintain the viability of a larger whole; or • A regularly occurring, nationally significant population / number of any internationally important species.
Regional (Medium)	• Viable areas of key habitat identified in the Regional Authority BAP, or smaller areas of such habitat that are essential to maintain the viability of a larger whole; • Viable areas of key habitat identified as being of regional value in the appropriate Natural Area profile; • Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16 to 100 10km squares in the UK or in a Regional Authority BAP or relevant Natural Area on account of its regional rarity or localisation; • A regularly occurring, locally significant number of a species identified as important on a regional basis; or • Any regularly occurring population of a nationally important species which is threatened or rare in the region.
County (Medium)	• County Council / Unitary Authority designated sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on defined ecological criteria and Wildlife Trust sites; • Viable areas of habitat identified in a County BAP; • A regularly occurring, locally significant number of a species identified as important on a county basis; or • Semi-natural woodland greater than 0.5ha which is considered to be in 'good condition'.
District (Low)	• Semi-natural woodland greater than 0.25ha which is considered to be in 'good condition' or greater than 0.5ha in unfavourable condition; • Network of inter-connected hedgerows including some species-rich hedgerows; • Individual Important hedgerows or other ancient-countryside linear features; • Viable areas of habitat identified in a sub-county (District / Borough) BAP; • Any regularly occurring population of a nationally important species which is not threatened or rare in the region or county;

Value (and sensitivity)	Examples
	• Sites / features that are scarce within the District / Borough or which appreciably enrich the District / Borough habitat resource; or • Other features identified as wildlife corridors or migration routes
Local / Parish (Low - Negligible)	• Semi-natural woodland smaller than 0.25ha; • Diverse and / or ecologically valuable hedgerows; • Diverse and / or ecologically valuable grassland; • Habitat included in an agri-environment scheme but not otherwise containing species or habitats listed above; • Common species legally protected primarily for reasons of animal welfare (badger, reptiles); or • Established semi-natural or artificial habitats of limited ecological value when assessed in isolation but which offer a range of opportunities for widespread and commonly occurring species within the wider landscape.
Site (Low - Negligible)	Features of value to the immediate area e.g. within the site.

23.4.3.2 Magnitude

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

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

Table 23.9 Definitions of the Magnitude Levels for a Generic Receptor

Magnitude	Definition
High	Major impacts on the feature / population, which would have a sufficient effect to alter the nature of the feature in the short to long term and affect its long-term viability. For example, more than 20% habitat loss or damage.
Medium	Impacts that are detectable in short and long-term, but which should not alter the long-term viability of the feature / population. For example, between 10 - 20% habitat loss or damage.

Magnitude	Definition
Low	Minor impacts, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature / population. For example, less than 10% habitat loss or damage.
Negligible	A potential impact that is not expected to affect the feature / population in any way, therefore no effects are predicted.

23.4.3.3 Impact significance

57. The assessment of potential impacts has been undertaken assuming implementation of embedded mitigation and commitments for the project, as detailed in *Table 23.4*. Residual impacts include any additional mitigation measures required. An assessment is then made of residual impacts, after assuming implementation of additional mitigation measures where required, i.e. the significance of the effects that are predicted to remain after the implementation of all committed mitigation measures.

58. An ecologically significant impact is defined as an impact (adverse or beneficial) on the integrity of a defined site or ecosystem and / or the conservation status of habitats or species within a given geographical area. Impacts are unlikely to be significant where features of local value or sensitivity are subject to small scale or short-term impacts. If an impact is found not to be significant at the level at which the resource or feature has been valued, it may be significant at a more local level.

59. The integrity of 'defined' sites is described as follows and has been used in this assessment to determine whether the impacts of the proposals on a designated site are likely to be significant:

> '*The integrity of a site is the coherence of its ecological structure and function across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it was classified*' (IEEM 2006).

60. The conservation status of habitats and species within a defined geographical area is described as follows and has been used in this assessment to determine whether the impacts of the proposals on non-designated habitats and species are likely to be significant:

- 'For habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species, that may affect its long term distribution, structure and functions as well as the long term survival of its typical species within a given geographical area; and

- For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long term distribution and abundance of its population within a given geographical area' (IEEM 2006).

61. Significant beneficial or adverse impacts have been subdivided to include major and moderate impacts. These subdivisions scale impacts according to the nature conservation value of the feature being assessed and the magnitude or scale of the impact. This then makes it compatible with the other chapters.

62. Following the identification of receptor value and sensitivity and magnitude of the effect, the significance of the impact is considered using the matrix presented in *Table 23.10* below and knowledge of the ecological features affected.

Table 23.10 Impact Significance Matrix

Sensitivity / Value	Magnitude				
	High	Medium	Low	Negligible	No change
High	Major	Major	Moderate	Minor	No impact
Medium	Major	Moderate	Minor	Negligible	No impact
Low	Moderate	Minor	Minor	Negligible	No impact
Negligible	Minor	Negligible	Negligible	Negligible	No impact

63. Major and moderate impacts are deemed to be significant according to the EIA Directive and relevant EIA regulations. Minor impacts become more important when considering potential, cumulative impacts or interactions. The definition of the significance levels is provided as a guide in *Table 23.11*.

Table 23.11 Significance of impacts

Significance	Description
Major adverse	Impact is large-scale giving rise to substantial concern. The change is likely to cause a permanent negative effect on the receptor. It should be considered unacceptable and requires compensating or a significant change to the development if no alternative is available.
Moderate adverse	The impact gives rise to some concern but is tolerable in the short-term or there is considered to be a lower risk of the event occurring at all.
Minor adverse	The impact is small, being undesirable but acceptable or there is considered to be a low risk of the event occurring at all.
Negligible	The impact is sufficiently small as to be indeterminable and of no concern or there is considered to be almost no risk of the event occurring at all.
No change	No impact, therefore no change in receptor condition.

Significance	Description
Minor beneficial	The impact is sufficiently small and of slight significance providing some benefit to the environment.
Moderate beneficial	The impact provides a positive environmental gain.
Major beneficial	The benefit is large-scale providing a significant positive environmental gain. The change is likely to cause a permanent beneficial effect on the receptor.

64. In addition to determining the significance of the impacts on ecological receptors, this EcIA also identifies any additional legal requirements for mitigation measures.

23.4.3.4 Likelihood

65. In addition to the confidence in the assessment in relation to the quality of the data (Chapter 6 Environmental Impact Assessment Methodology), the IEEM Guidelines also emphasise consideration of the likelihood that '*a change / activity will occur and also the degree of confidence in the assessment of the impact on ecological structure and function*'. Likelihood is then specified using the following terms which are adapted from the IEEM guidance:

- Certain (95% probability or higher);
- Probable (50-94% probability);
- Likely (10-49% probability);
- Unlikely (less than 10% probability); or
- Extremely unlikely (less than 2% probability).

23.4.4 Cumulative Impact Assessment

66. For a general introduction to the methodology used for the CIA, please refer to Chapter 6 Environmental Impact Assessment Methodology. This chapter focuses on those cumulative impacts that are specific to terrestrial ecology.

67. The key consideration used in relation to linear development such as the onshore electrical transmission works is whether there is spatial or temporal overlap of effects from projects on the same receptors. For habitats and non-mobile species therefore unless there is a spatial overlap there is no pathway for cumulative impact between spatially separated projects. There is however a potential for a cumulative impact upon the overall resource of habitat at a regional or national level. Where potential regional or national level impacts are identified and considered to be relevant they are highlighted in the CIA.

68. For mobile species there is only a pathway for cumulative impact if there is spatial overlap of potential receptor ranges in addition to temporal overlap with the activity or its resultant impact i.e. where developments follow on from one another before the species has recovered from displacement or other impact. In addition, whilst it is assumed that any consented development would be subject to mitigation and management measures which would reduce impacts to non-significant unless there were exceptional circumstances, it is accepted that such projects may contribute to a wider cumulative impact.

69. Finally, in cases where this project has negligible or no impact on a receptor (through for example avoidance of impact through routeing or construction methodology) it is considered that there is no pathway for a cumulative impact.

70. The further details of the methods used for the CIA for terrestrial ecology, see section 23.7.

23.4.5 Transboundary Impact Assessment

71. There are no transboundary impacts with regards to terrestrial ecology as the proposed onshore electrical transmission works is not sited in close proximity to any international boundaries.

23.5 Existing Environment

72. This section describes the existing environment with respect to terrestrial ecology and is based on the results of the surveys (as detailed in *Table 23.7)* which have been undertaken to date. The ecological receptors potentially affected by the onshore electrical transmission works (and access) and their value is summarised in *Table 23.12*.

23.5.1 Statutory Designated Sites

73. Statutory sites identified within 2km of the onshore electrical transmission works are shown on *Figure 23.1*. Additional information is provided in *Appendix 23.1* and *Appendix 23.2*. The sites are listed in order of closest proximity to the onshore cable route. Two sites have multiple designations: namely the Deben Estuary Ramsar site, SPA and SSSI and the Alde-Ore Estuary SPA, Ramsar and SSSI. In addition, there are nine SSSIs, one SPA, one SAC, two LNRs and one AONB within 2km of the onshore electrical transmission works A HRA has been completed in support of the application for Natura 2000 sites (i.e. SACs and SPAs).

74. Three designated sites are situated within the footprint of the onshore electrical transmission works. These are: Bawdsey Cliff SSSI, Deben Estuary Ramsar SPA and SSSI and Suffolk Coast and Heaths AONB. Bawdsey Cliff SSSI is designated for its

geological value and is considered in Chapter 19 Geology and Ground Conditions, and is not considered further in this chapter. Therefore only the Deben Estuary and Suffolk Coast and Heaths are discussed in further detail within this chapter.

23.5.1.1 Deben Estuary Ramsar, SPA and SSSI

75. The Deben Estuary Ramsar site, SPA and SSSI is of international and national importance for over-wintering populations of waders and wildfowl. The estuary qualifies as an SPA under Article 4.1 of the European Commission Bird Directive by regularly supporting 7.5% of the Great British wintering population of pied avocet *Recurvirostra avosetta*, and 0.8% of the north-west European population of dark-bellied Brent goose *Branta bernicla*. The site is additionally designated as a Ramsar site by meeting Ramsar criterion 2, supporting the Habitats Directive Annex II species narrow-mouthed whorl snail *Vertigo angustior*. The site is also designated as a SSSI. The SSSI also supports 40% of Suffolk's area of saltmarsh. Overall the Deben Estuary is considered to be of value at an international level.

76. Impacts to birds are discussed in Chapter 24 Onshore Ornithology. Impacts to the supporting habitats are considered in this current chapter.

23.5.1.2 Suffolk Coast and Heaths AONB

77. The Suffolk Coast and Heaths AONB extends south from Lowestoft to the River Stour. The AONB is a rich mixture of lowland landscapes and includes ancient open heathland, woodlands, wetlands, saltmarsh, mudflats and shingle beach habitats. The site is the nearest unspoilt coast to Greater London, indented by the estuaries of the Blyth, Alde, Deben, Orwell and Stour and bounded by the crumbling cliffs and tidal spits of the North Sea coastline.

78. The Suffolk Coast and Heaths AONB is considered to be of national value. The landscape features of the AONB are discussed separately in Chapter 29 Seascape, Landscape and Visual Amenity.

23.5.2 Non-statutory designated sites

79. There are 82 non-statutory designated sites within the 2km search area comprising ASNWs, Plantation Ancient Woodlands (PAWs), Woodland Trust Sites (WTs), CWSs, SWT sites and Regionally Important Geological Sites (RIGSs). Five of these sites are within the footprint of the onshore electrical transmission works and access. These sites are the River Gipping, Fore and Bushey Groves, Miller's Wood, the Mill River and Suffolk Shingle Beaches. The locations of the sites are shown on *Figure 23.2*. Further information in respect to these sites is provided in *Appendix 23.2.*

80. Non-statutory sites are considered to be of value at county level.

23.5.3 Habitats

81. This section provides a summary of the key habitats noted within the onshore electrical transmission works and access. Full details of the habitats present are provided in *Appendix 23.1* - Phase 1 Habitat Survey Technical Report and Phase 2 Botanical Report respectively. These reports include NVC categories and species lists. Supplementary information about the habitats found is contained within *Appendix 23.5* – Extended Phase 1 Habitat Survey Report (June 2015). Features of interest are described in 'target notes', which are numbered. The locations of the target notes (TN) are shown in *Figures 23.3a – 23.3l*, and further details are provided within the technical appendices.

23.5.3.1 Woodland

82. Woodland is a priority habitat under the UK BAP, which lists Lowland Mixed Deciduous Woodland as 'Priority Habitat' for conservation and enhancement. It is therefore recognised nationally as an important habitat. Lowland Mixed Deciduous Woodland is also listed as Priority Habitat on the Suffolk LBAP.

83. Some areas of woodland would be crossed by the installation of ducts as part of the East Anglia ONE works. These include woodland at TN (from east to west along the onshore cable route): 209, 161, 339, 35, 27 and 3 as well as TNX 226, 149 and 168 (as shown on *Figures 23.3a – 23.3l*).

84. The majority of woodland that is crossed is plantation woodland. However, there are areas of more natural, broad-leaved, semi-natural woodland (denoted by TN 1s, TN 3 (Millers Wood) and TN209) that is crossed.

85. A small area of woodland within the substation(s) (TN 1s) is dominated by English elm *Ulmus procera* and hawthorn *Crataegus monogyna* trees. Taller hybrid black-poplar *Populus × canadensis* trees are also present with a species-poor field-layer. This habitat composition is not representative of any NVC community.

86. Millers Wood (TN 3) is located within the onshore cable route. The woodland is ancient semi-natural woodland, designated as an ancient woodland resource and CWS, with a canopy of sycamore *Acer pseudoplatanus*, horse-chestnut *Aesculus hippocastanum*, ash *Fraxinus excelsior*, evergreen oak *Quercus ilex*, pedunculate oak *Quercus robur*, common lime *Tilia × europaea* and wych elm *Ulmus glabra* over a varied shrub-layer. The field layer is dominated by common nettle *Urtica dioica*. However, at the southern end the field-layer is species-rich and contains several ancient woodland indicators such as wood-sedge *Carex sylvatica*, wood spurge *Euphorbia amygdaloides* and greater stichwort *Stellaria holostea*. This woodland is representative of the NVC type W8e *Fraxinus excelsior-Acer campestre-Mercurialis*

perennis woodland, *Geranium robertianum* sub-community. The woodland is also noted to contain wild service tree *Sorbus torminalis*, which is a tree of ancient woodland.

87. A strip of broadleaved woodland south of Martlesham Creek (TN 209) is located within the onshore cable route. Its canopy is dominated by ash and pedunculate oak with several other species including horse-chestnut and common lime trees. The shrub-layer is variable, but generally species-rich and contains field maple *Acer campestre*, hawthorn, hazel *Corylus avellana*, Midland hawthorn *Crataegus laevigata*, holly *Ilex aquifolium*, blackthorn *Prunus spinosa*, elder *Sambucus nigra* and English elm. The field-layer of the western part is species-poor and dominated by ground-ivy *Glechoma hederacea*, ivy *Hedera helix* and dog's mercury *Mercurialis perennis.* Within the central section, it is dominated by bracken *Pteridium aquilinum* and bramble *Rubus fruticosus* agg. but in the eastern part contains ancient woodland indicators including moschatel *Adoxa moschatellina*, bluebell *Hyacinthoides non-scripta*, dog's mercury and wood dock *Rumex sanguineus*. This woodland is representative of the NVC type W8a *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, *Hedera helix* sub-community.

88. Plantation woodland of varying ages has been noted throughout the onshore cable route. There are many areas of mixed and broad-leaved plantation crossed by the cable route, including at TN 7, 25, 29, 35, 173, 221 and 296, and TNX 226 and 149. In addition, TN 15, 26, 166 and TN184 are situated within 50m of the onshore cable route. Most areas are 20 to 30 years old with trees of 10-15m in height and with species-poor field-layers. Some are older, but these also have species-poor field layers (e.g. at TN 302 Shepherds Wood) and are generally assessed as being of low value.

89. Two plantations have higher value because they are more species-rich in the field layer indicating that they may have been replanted all or in-part on older, possibly ancient, woodland sites, these include TN 1h (immediately adjacent to the substation(s)) and TN 296 (The Thicket, which is crossed by the onshore cable route). The woodland described in TN 1h is predominantly species-poor sycamore plantation with a grassy field-layer. However, at the western end it is more species-rich in the canopy with field maple, ash, Persian walnut *Juglans regia* and red oak *Quercus rubra* over a field layer containing several ancient woodland indicators (Kirby 2006) such as Enchanter's-nightshade *Circaea lutetiana*, grey sedge *Carex divulsa*, wood-sedge, dog's mercury and common dog-violet *Viola riviniana* indicating that at least some of this wood is probably older. This part is

representative of NVC type W8a *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, *Primula vulgaris-Glechoma hederacea* sub-community.

90. The Thicket (TN 296) is a broad-leaved plantation woodland, with key species of sweet chestnut *Castanea sativa* and wild cherry *Prunus avium*, with scattered, large pedunculate oak also being present. There are many ancient woodland indicator species (Kirby 2006) in the field-layer including bluebell, three-nerved sandwort *Moehringia trinervia* and greater stitchwort *Stellaria holostea*.

91. Woodland within the survey area is considered to be of value up to county level.

23.5.3.2 Scrub

92. Small patches of scrub occur commonly along field boundaries and watercourses, and typically they comprise hawthorn, blackthorn, bramble and elder. These areas are best described as fragmentary patches of the NVC communities W22 *Prunus spinosa-Rubus fruticosus* scrub, W24 *Rubus fruticosus-Holcus lanatus* underscrub or the proposed NVC type *Sambucus nigra-Urtica dioica* scrub. These are common and ubiquitous habitat types and therefore of value at a site level only.

23.5.3.3 Trees

93. Individual, mature trees are frequently associated with hedgerows and other linear features crossed by the route, such as watercourses. Occasionally these trees are scattered within fields. The majority of these open-grown trees are of one species, pedunculate oak – e.g. TN 136 and 349. TN 349 is a large pollarded pedunculate oak with a diameter at breast height of 2m. Trees with such large diameters, major hollowing or cavities, and dead wood in the canopy are likely to be veteran trees. Potential veteran trees are found at other locations, including a black poplar *Populus nigra* TNX 5 and pendunculate oaks at TNX 58, TNX 63, TNX 75 and TNX 91.

94. Lines of trees occur along field boundaries and track ways, tending to be recently planted trees or very mature ash and pedunculate oak that may once have been part of a hedgerow.

95. Individual trees are considered to be of value at site level whilst veteran trees may be valuable up to district level. No TPOs were identified during data searches for East Anglia ONE. An updated search undertaken in June 2015 identified no new TPOs within the study area.

96. Several private gardens have been classified as parkland (e.g. TNX 178), where scattered trees were noted e.g. cypress spp., sweet chestnuts, weeping willow, mature oak spp., within managed grassland.

23.5.3.4 Hedgerows

97. Hedgerows are a UK BAP priority habitat, and thus recognised as nationally important habitat. All hedgerows are also listed as Priority Habitats on the Suffolk LBAP.

98. Typically, hedgerows follow field and property boundaries, track ways and ditches, the majority of which are species-poor, and the average number of woody species per 30m surveyed is less than four. English elm is the most common species, and many hedgerows contain sections with dead stems. Other common species are hawthorn, blackthorn and elder. None of the hedgerows were considered to be ancient (e.g. none of the trunks are particularly large), and the ground flora is generally poor. Of the woodland herbs, false brome *Brachypodium sylvaticum* was the most commonly associated Schedule 2[1] species followed by dog's mercury. More than a third of the hedges do not contain any woodland herbs and only 15 contained three or more.

99. Hedgerows (370 no. in total) were surveyed as part of the East Anglia ONE application (2011), full details are provided in *Appendix 23.*2 (Phase 2 Botanical Report). As part of the East Anglia THREE surveys, an additional 23 hedgerows were surveyed in 2014, and 24 of the hedgerows surveyed in 2011 were resurveyed (see *Appendix 23.5* for further details). In total therefore the 393 hedgerows were surveyed to inform this EcIA. 230 of the hedgerows surveyed are located within the onshore electrical transmission works. Of these, 174 are classified as 'Important' following the criteria set out in The Hedgerow Regulations 1997. The findings of the 2011 survey, as amended by the 2014 survey, are shown and highlighted on *Figures 23.4a – 23.4l.* Details of hedgerows surveyed are shown in Appendix 1 of the OLEMS.

100. Important hedgerows within the onshore electrical transmission works are considered to be of county value and all other hedgerows of local value.

23.5.3.5 Grassland

23.5.3.5.1 Agricultural Grasslands

101. The onshore electrical transmission works crosses agriculturally improved and very species-poor grassland. It is typically dominated by perennial rye-grass *Lolium perenne* and occasional red fescue *Festuca rubra*, timothy *Phleum pratense* and ribwort plantain *Plantago lanceolata*. This grassland is considered to have negligible ecological value.

[1] Species listed on Schedule 2 of the Hedgerow Regulations 1997

23.5.3.5.2 Unimproved and Semi-improved Neutral Grassland

102. Most areas of semi-improved grassland crossed by the onshore electrical transmission works comprise coarse, ruderal grass species and ruderal herbs. Two species-rich neutral grasslands are found along the cable route at TN 23 and TNX44. TN23 is dominated by red fescue, dandelion *Taraxacum officinale* agg. and white clover *Trifolium repens*. Other common species include common knapweed *Centaurea nigra*, lesser trefoil *Trifolium dubium* and common vetch *Vicia sativa*. Patches of pyramidal orchid *Anacamptis pyramidalis*, bee orchid *Ophrys apifera* and common broomrape *Orobanche minor* were also present amongst the 25cm high sward. This grassland is representative of NVC type MG6a *Lolium perenne – Cynosurus cristatus* grassland, typical sub-community. Whilst the species that comprise the sward are not of any national value it has local nature conservation value. NVC classification was not conducted for TNX44 as it was identified in the 2014 surveys.

23.5.3.5.3 Calcifugous Grassland

103. Calcifugous grassland (Lowland heath (inc. acid grassland)) is a UK and Suffolk BAP Priority Habitat. It is a fairly widespread habitat type that is typical of abandoned grassland and waste ground around Woodbridge where it is typified by an abundance of the fine-leaved grass common bent *Agrostis capillaris* as well as broad-leaved species such as bird's-foot *Ornithopus perpusillus*, sheep's sorrel *Rumex acetosella* and cat's-ear *Hypochaeris radicata*, also calcifugous indicators.

104. Examples of species poor grassland areas are located at TN 372, 373 and 374a. These were generally dominated by common bent with scattered calcifuges such as common sorrel *Rumex acetosa* and common stork's-bill *Erodium cicutarium* and best described as being representative of NVC type U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland.

105. Mosaics of scrub and calcifugous grassland are present at TN 187a, 187b, 194 and 374. Here, there is a mixture of hawthorn and gorse *Ulex europaeus* scrub and species-rich calcifugous grassland dominated by the fine-leaved common bent with sheep's sorrel and high cover of bryophytes and forbs such as slender parsley-piert *Aphanes australis*, mossy stonecrop *Crassula tillaea*, early forget-me-not *Myosotis ramosissima*, *Polytrichum juniperinum*, and wall speedwell *Veronica arvensis*. This grassland is representative of the NVC type U1b *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland, typical sub-community.

106. At TN 346 calcifugous grassland has developed on sand. It is similar to the calcifugous grassland described above but with several herbs typical of more mesotrophic grassland. It is representative of the NVC type U1d *Festuca ovina-*

Agrostis capillaris-Rumex acetosella grassland, *Anthoxanthum odoratum – Lotus corniculatus* sub-community.

107. Calcifugous grassland within the onshore cable route is considered to be of county value.

23.5.3.5.4 Marshy Grassland and Swamp

108. Swamp is rare in the local context and adds to the overall diversity of habitats crossed by the onshore cable route. Examples, however, are generally species-poor.

109. Swamp vegetation is generally restricted to the sides of watercourses (TN 185 and 210), and generally consists of species-poor common reed *Phragmites australis* reedbed representative of the NVC type S4 *Phragmites australis* swamp and reed-beds.

110. At TN 342 and 344 there are two areas of swamp around clogged drains at the bottom of small valleys to the west of Woodbridge. Here, lesser pond-sedge *Carex acutiformis* is the most frequent species, together with broad-leaved herbs making this vegetation representative of NVC type M27 *Filipendula ulmaria – Angelica sylvestris* mire.

111. There is swamp at the bottom of a small valley (TN 375) co-dominated by false oat-grass *Arrhenatherum elatius* and meadowsweet *Filipendula ulmaria* equivalent to the NVC type M27b *Filipendula ulmaria – Angelica sylvestris* mire, *Urtica dioica – Vicia cracca* sub-community.

112. Marshy grassland and swamp vegetation within the onshore electrical transmission works is considered to be of local value.

23.5.3.6 Tall Herb Vegetation

113. Species-poor vegetation dominated by bracken was recorded at three locations. TN 161 is representative of the NVC type W25a *Pteridium aquilinum-Rubus fruticosus* underscrub, *Hyacinthoides non-scripta* sub-community and TN 186 to W25b *Pteridium aquilinum-Rubus fruticosus* underscrub, *Teucrium scorodonia* sub-community. Land adjacent to TN 100 also contained bracken-dominated flora community.

114. Other areas of tall ruderal vegetation were largely confined to ditch banks and as field-layers of the more species-poor woodlands. Due to the very common nature of these kinds of tall herb vegetation, this habitat is considered to be of site value only.

23.5.3.7 Shingle

115. Coastal shingle is only present at the landfall. At the time of the 2011-2012 surveys, most of the shingle (TN 250) was recorded as unvegetated. The majority of the beach is relatively narrow and probably too heavily disturbed by wave action for coastal plant species to become established. The shingle becomes wider and less disturbed by the waves at TN 250a. Consequently, coastal vegetation equivalent to a very species-poor SD1a *Rumex crispus-Glaucium flavum* shingle community, typical sub-community has become established. It comprises mostly sea-kale *Crambe maritima* scattered across the beach with occasional yellow horned-poppy *Glaucium flavum* and rare occasions of curled dock *Rumex crispus*.

116. Coastal Vegetated Shingle is a UK BAP and Suffolk LBAP Priority Habitat and is therefore of national value. The shingle at the landfall remains mostly un-vegetated, whereas the vegetated shingle is concentrated to the southerly end of the landfall. This area would not be affected by the proposed project.

23.5.3.8 Maritime Cliffs and Slopes

117. Maritime Cliffs and Slopes are a UK BAP and Suffolk LBAP Priority Habitat. As a result of erosion, much of the cliff slope within the landfall contains little to no vegetation. Vegetated cliff top and slope areas are concentrated to the southern end of the survey area. Due to the variable erosion along the coast there is a high degree of variation in plant communities as described in TN 251a, 251b, 251c and 251d.

118. The vegetation is representative of NVC types OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community, OV24a *Urtica dioica-Galium aparine* community, typical sub-community and NVC type U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland. Maritime Cliffs and Slopes within the landfall are considered to be of district value.

23.5.3.9 Saltmarsh

119. Saltmarsh is also a UK BAP and Suffolk LBAP Priority Habitat, and located in narrow strips on the east and west bank of the River Deben. The area crossed by the onshore electrical transmission works ranges from 5 to 50m, and is dissected by several small creeks. The vegetation is raised from the mudflats associated with the river by approximately 10 to 15cm with very little variation in slope resulting in no vegetation zonation typical of larger, more extensive saltmarshes. The majority of the vegetation cover is from common saltmarsh-grass *Puccinellia maritima* with frequent patches of common sea-lavender *Limonium vulgare* and sea-purslane *Atriplex portulacoides*. Both areas of saltmarsh are equivalent to the NVC type SM13f *Puccinellia maritima* saltmarsh community, *Puccinellia maritima-Spartina maritima* sub-community which is considered as vegetation characteristic of mudflat

/ saltmarsh transition zones. Saltmarsh within the onshore cable route is considered to be of county value.

23.5.3.10 Watercourses and Ponds

120. Rivers and streams are UK BAP and Suffolk LBAP Priority Habitats. The onshore electrical transmission works crosses several watercourses including the Rivers Deben, Fynn, Gipping and Lark as well as Kirton and Martlesham Creeks. The River Deben and Martlesham Creek are both tidal stretches contained by earth embankment flood defences. Their channels are dominated by extensive mudflats with algal beds. The River Deben has narrow bands of saltmarsh communities along the east and west banks.

121. Smaller rivers and streams crossed by the onshore electrical transmission works do not meet Suffolk LBAP criteria. However, the best examples may be of local interest. These include the more semi-natural watercourses supporting certain wetland vegetation types or adjacent areas of marshy grassland, or those with wooded banks. They are mostly eutrophic. The Queens Fleet (TN 286c) supports abundant aquatic vegetation and is of some value in the local context.

122. Most of the ditches crossed by the onshore electrical transmission works are along or within hedgerows and were un-managed. Therefore, vegetation associated with ditches was either shaded out by the associated hedge or dominated by Fool's-water-cress *Apium nodiflorum*, with occasional patches of common duckweed *Lemna minor.* Therefore, the vegetation type associated with ditches is most representative of NVC type OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community. A large wet ditch is present immediately to the west of the River Deben (TN 246), and supports abundant aquatic vegetation. It is considered to have value in the local context.

123. Ponds are also UK BAP and Suffolk LBAP Priority Habitats; there are few ponds within the onshore electrical transmission works and where ponds do exist they do not qualify under the UK BAP criteria as they are species-poor examples and of little botanical interest. This includes the ponds located at TN 18a, 25, 45, 126a and 286a (*Figures 23.3a-l*).

124. Watercourses and ditches within the onshore electrical transmission works are considered to be of up to international value where covered by nature conservation site designations (as discussed above), and local to site value for non-designated areas. Ponds are considered to be of local value.

23.5.3.11 Other Habitats

23.5.3.11.1 Arable Farmland

125. Arable farmland is a common habitat throughout the UK. These habitats can be considered to have negligible ecological value. Arable field margins are a UK BAP and Suffolk LBAP Priority Habitat, but the arable field margins along the onshore electrical transmission works do not qualify according to UK BAP criteria as they are on high-input agricultural land. The Suffolk LBAP is aimed at protection of several rarer arable weeds, but the habitat examples in the onshore electrical transmission works are species-poor and heavily affected by agricultural chemical application to support such plants, therefore, arable field margins are considered to be of local value. Arable land is discussed in further detail in Chapter 22 Land Use.

23.5.3.11.2 Buildings, Bare Ground

126. Several built-up areas were noted within the survey area. These areas consisted of residential villages, towns, and farms. These habitats are largely devoid of botanical interest and are not noted within the Suffolk LBAP. The associated Open Mosaic Habitats on Previously Developed Land (Brownfield) is included in the Suffolk LBAP. However the built-up areas recorded within the onshore cable route do not display the characteristics of this habitat type.

127. Built-up areas provide potential habitat for protected and notable species. All buildings were assessed for their suitability to support roosting bats. Areas of bare ground and debris were also assessed for it potential to provide basking and / or sheltering habitat for common reptile species.

128. A summary of the habitats and species baseline is provided in *Table 23.12* below.

23.5.4 Species

23.5.4.1 Notable Plant Species

23.5.4.1.1 Nationally Scarce

129. Three species listed as 'Nationally Scarce' i.e. were found in less than 100 ten-kilometre grid-squares nationally (Stewart et al. 1994) were found within the onshore electrical transmission works, and include:

- Mossy stonecrop *Crassula tillaea* found at TN 197, 194, 201, 374 and 379 on compacted, disturbed soils on sands around Woodbridge. It is widespread and increasing in the county in similar habitats, in particular tracks and car parks;

- Perennial glasswort *Sarcocornia perennis* occurs in both areas of saltmarsh along the River Deben TN 246 and 315. This species is generally a very local plant of well-developed saltmarshes and may have declined in eastern England due to extensive saltmarsh erosion and loss consequent upon rising sea level; and

- Suffocated clover *Trifolium suffocatum* was found abundantly at TN 191. This is a plant of relatively acidic, sandy soils and very local, probably commoner in the Suffolk Sandlings than anywhere else in Britain, where it is locally frequent on compacted tracks and car parks.

23.5.4.1.2 Red List Species

130. Two species listed as 'Near Threatened' in Cheffing and Farrell (2005) were recorded. The classification of 'Near Threatened' relates to species that are close becoming classified as threatened taxa. This is the lowest-but-one Red-list category, just above 'Least Concern'.

- Common cudweed *Filago vulgaris* is a species of disturbed acidic soils and occurs throughout the cable route on waste ground. In the context of the county of Suffolk this species is widely-distributed and fairly common on disturbed sandy soils; and

- Hoary cinquefoil *Potentilla argentea* occurs occasionally in the grasslands covered by TN 139, 189b and 304, all within the onshore electrical transmission works, and TN 194 more than 150m north of the onshore cable route. It is classified as being locally frequent by Simpson (1982). It is a fairly common plant of forestry rides in some parts of the county.

23.5.4.2 Invasive Species

131. Four non-native invasive species that are listed on the Wildlife and Countryside Act 1981 Schedule 9 were recorded during the 2011 - 2012 surveys (*Appendix 23.2*). These were hottentot-fig *Carpobrotus edulis*, Canadian waterweed *Elodea canadensis*, Himalayan balsam *Impatiens glandulifera* and Japanese rose *Rosa rugosa*. It is an offence to cause to grow or spread these species in the wild.

- Hottentot-fig was found on the cliff face at the landfall location but is on the southerly limit of the survey area behind the Ministry of Defence (MoD) site and consequently unlikely to be affected by the onshore electrical transmission works;

- Canadian waterweed was found in the Queens Fleet (TN 286c), the River Gipping (TN 19) and in the ditch at TN 304a within the onshore electrical transmission works;
- Himalayan balsam was found growing as isolated stems along the banks of a ditch at TN 150 within the onshore electrical transmission works; and
- Japanese rose has been widely planted on roadside embankments at TN 194, 195, 196 and 197, all over 100m from the onshore cable route limits.

132. Several non-native invasive species not listed under Schedule 9 were also identified during the 2014 surveys. Buddleia was recorded in three locations and primarily growing in private gardens or on farmland areas of scrub or hardstanding (TNX69, TNX99 and TNX82). Other non-native, invasive species encountered during the 2014 survey included bamboo *Bambuseae spp.* (TNX54) and tree of heaven *Ailanthus altissima* (TNX81, TNX69, TNX70, TNX25 and TNX83).

133. Consultation with the Environment Agency has also identified that other invasive species, particularly giant hogweed and Japanese knotweed may be found along the onshore cable route. The locations of any stands of other invasive species have not been provided to date.

23.5.4.3 Badgers

134. A search for records of badger *Meles meles* within 100m of the onshore cable route was undertaken (full details are provided in *Appendix 23.1*), which produced a number of records.

135. Detailed surveys identified 35 active badger setts within the onshore electrical transmission works. Full details are provided within the accompanying Confidential Badger Report (*Appendix 23.4*), which provides figures with the locations of the setts.[2]

136. The 2014 surveys resurveyed these setts and revised this number of active setts within the study area down to seven, and found no new active setts in the additional areas surveyed associated with new access track locations. Thirteen setts identified as active in 2012 could not be accessed in 2014, and so these must be assumed to still be active. In total, the potential for there to still be 20 active badger setts within the study area remains. Full details are provided in the Confidential Badger Appendix within *Appendix 23.5*.

[2] Note due to risk of persecution to this species the confidential appendix will only be available to Natural England

137. Badgers are considered to be of local value.

23.5.4.4 Bats

138. The records obtained during the desk study showed the following species had been recorded within 5km of the onshore electrical transmission works:

- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *Pipistrellus pygmaeus*;
- Brown long-eared bat *Plecotus auritus*;
- Noctule *Nyctalus noctula*;
- Liesler's *Nyctalus leisleri*;
- Serotine *Eptesicus serotinus*;
- Natterer's bat *Myotis nattereri*;
- Whiskered bat *Myotis mystacinus*;
- Brandt's bat *Myotis brandtii*;
- Daubenton's bat *Myotis daubentonii*;
- Nathusius' pipistrelle *Pipistrellus nathusii;* and
- Barbastelle *Barbastella barbastellus*.

139. Barbastelle, brown long-eared bat, lesser horseshoe bat, noctule and soprano pipistrelle are Suffolk LBAP priority species and S41 species. In addition, Bechstein's bat and greater horseshoe bat are also S41 species. All bats are designated as EPS as defined by The Conservation of Habitats and Species Regulations 2010.

140. A suite of bat surveys were undertaken along the 160m long preferred cable route corridor for East Anglia ONE during 2012. These surveys included: ground level tree assessments; extensive tree climbing surveys; emergence and re-entry surveys; manual bat activity surveys; and automated bat activity surveys.

141. No bat roosts were recorded during the tree roost surveys in 2012.

142. The following areas crossed by the onshore electrical transmission works (and therefore likely to be severed) were subject to additional bat activity surveys in 2012:

- Continuous (non-gappy) linear features with trees and within 200m of known maternity roosts; or
- Within 200m of likely roost sources such as woodlands or groups of trees.

143. The rationale behind the survey was that the severance of linear features (for cable route construction) could impact commuting and foraging bats reliant on these features, particularly young bats learning to fly and forage for the first time. By surveying the best features for bats (those with trees) and close to potential roost sources it was also most likely to detect streams of commuting bats heading away from local roosts. Those features identified below as either having (i) high number of bat passes or (ii) rare or sensitive species are considered to be particularly vulnerable.

144. The automated bat activity surveys were conducted along 29 hedgerows / linear features (*Figures 23.15a – 23.15g*). Large numbers of bat passes (over 200 passes over a single night) were recorded at four individual locations (locations 27, 55, 64 / 65 and 119 / 120). Species recorded included common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* / *Plecotus* species and *Nyctalus* / *Eptesicus* species. The largest number of bat passes (1383 passes) was recorded at Location 64 / 65 on the 14th June 2012 and common and soprano pipistrelle were the two most common species recorded. Full details of the surveys are provided in *Appendix 23.2* Bat Technical Report and the four locations which large numbers of bat passes were recorded are highlighted on *Figures 23.15a – 23.15g* – Key Ecological Constraints Plan.

145. Barbastelle (an Annex II Species) were recorded at seven locations. The survey results indicate that only Locations 4 and 146 / 147 (see *Figures 23.7a - 23.7g*) recorded more than five Barbastelle passes. The largest number of passes (12 passes) in a single night was recorded at Location 146 / 147 on 12th June 2012.

146. After the first automated bat activity surveys, those sites with 30 or more *Myotis* or *Plecotus* passes (groups likely to be most vulnerable to habitat gaps) or more than 500 bat passes in total (the highest levels of activity recorded) on one night were surveyed by surveyors who could observe bat activity whilst light levels were still high enough. The manual bat activity surveys were undertaken at two locations (55 and 64 / 65). Common pipistrelle, soprano pipistrelle and *Nyctalus* species were recorded. The largest number of bat passes was recorded at Location 55, where 51 bats were recorded by one of the surveyors on 11th July 2012. Of these bats, 17 were recorded commuting in the same direction (east) along the hedgerow during

the survey period, indicating a nearby roost, which is away from the onshore cable route.

147. The ground level tree assessments conducted during the 2014 surveys identified a further two trees which contained definite bat potential within the onshore cable route (following tree categorisation guidelines in the BCT Good Practice Guidelines (Hundt, 2012)), located at TNX 165 and TNX 171. No evidence of roosting bats was observed at these trees during the daytime inspections in 2014.

148. All bats species are designated as EPS and are therefore of value at international level.

23.5.4.5 Dormouse

149. No records of dormouse *Muscardinus avellanarius* were identified within the 2km search area of the onshore electrical transmission works. However dormouse is known to be present within the county. Dormice are a Suffolk LBAP priority species and a S41 species. Dormice are designated as a EPS as defined by The Conservation of Habitats and Species Regulations 2010.

150. The following survey locations detailed below were agreed with relevant consultees as part of the consultation for East Anglia ONE (Suffolk Wildlife Trust, Suffolk Council and Natural England see *Appendix 23.3*).

151. Thirty-four wooded areas suitable for dormice were identified from mapping and during the 2011 Extended Phase 1 Habitat Survey (part of the 2011 - 2012 surveys). These areas were systematically searched for characteristic gnawed hazelnuts in January 2012. No evidence of dormouse was noted at the time of this survey.

152. Nest-tubes were placed, in appropriate densities and numbers, within appropriate habitats. A total of 925 nest-tubes were placed at 80 locations between March and April 2012. Nest-tubes were checked on six occasions between May and August 2012, twice in May, once in June, once in July and twice in August. These surveys correlate positively with the index of probability for finding dormice in any one month (English Nature 2006) where a minimum search effort score of 20 must be achieved (22 achieved for the 2012 surveys). No evidence of dormouse was identified during the nest-tube surveys.

153. Although there is suitable habitat for dormouse, no evidence was found during the surveys undertaken to date and therefore indicative that this species is absent. Therefore dormouse is not considered further in this EcIA. Full details are provided in the accompanying *Appendix 23.2 - Dormouse Technical Report*.

23.5.4.6 Great Crested Newts and other Amphibians

154. Nine records of great crested newt *Triturus cristatus* within the 2km search area of the onshore electrical transmission works were found during the background data search. Great crested newts are a Suffolk LBAP priority species and a S41 species, and designated as a EPS as defined by The Conservation of Habitats and Species Regulations 2010.

155. Eighty-three ponds were identified within 250m of the onshore electrical transmission works in 2015 and thus are considered to be within the typical range of great crested newts from their breeding ponds (as per the Great Crested Newt Mitigation Guidelines, English Nature 2001). Of these, fourteen ponds were inaccessible (due to landowner permission not being granted)).

156. Habitat Suitability Index (HSI) assessments were then undertaken for the remaining 69 ponds. Following the results of the HSI assessment, a further 28 ponds were ruled out due to being unsuitable (e.g. dry at the time of the survey; containing fast flowing water) or inaccessible (steep-sided, surrounded by dense vegetation or physical barriers (e.g. high fencing).. Five water bodies were subject to HSI only, as access was not possible for further survey. Altogether 36 water bodies were subject to a presence / likely absence survey for great crested newts. Of these, seven had confirmed presence, with five ponds supporting a low population and two ponds supporting a medium population (based on Natural England's population estimation guidance (English Nature 2001)) (*Figures 23.8e*, *23.8f* and *23.8g*). Three of these had been previously found to support great crested newts from surveys during surveys undertaken in relation to East Anglia ONE in 2012, whereas four were new records for ponds where great crested newts were not previously recorded. The majority of these ponds were isolated without any other ponds nearby, the exceptions being those near Westerfield which form a cluster of four ponds within approximately 700m of each other. It is likely that the ponds within this area are within the same 'metapopulation', with some movement of individuals between each of the ponds.

157. Full details are provided in the report provided in *Appendix 23.6 - East Anglia ONE Great Crested Newt Survey Report 2015* and *Appendix 23.2 - Great Crested Newt Technical Report*.

158. Great crested newts within the onshore cable route are considered to be of district value.

23.5.4.7 Otter

159. The BDS revealed 42 records of otter *Lutra lutra* from the 2km search area of the onshore electrical transmission works. Otter are a Suffolk LBAP priority species and a

S41 species, are designated as a EPS as defined by The Conservation of Habitats and Species Regulations 2010.

160. All watercourses features were surveyed for evidence of otter. Incidental evidence of otter located outside of the survey corridor was also recorded during the surveys. Otter spraint was identified on features 11, 26, 37, 61, 62, 80, 81, 83, 89 and 90. Incidental sightings (outside of the survey area) of spraint were recorded on features 12 and 21. Otter are highly mobile and could potentially commute through and / or forage in the majority of the features surveyed.

161. No holts or couches were positively identified during the surveys although suitable locations were observed.

162. Full details are provided in the report provided in *Appendix 23.2 - Otter and Water Vole Technical Report* and *Figures 23.9a - g* and *Figures 23.10a - g*.

163. Otters within the onshore electrical transmission works area are considered to be of county value.

23.5.4.8 Water Voles

164. The BDS revealed 40 records of water vole *Arvicola amphibius* within 2km search area of the onshore electrical transmission works. Water vole are a Suffolk LBAP priority species and a S41 species.

165. All watercourses features were surveyed for evidence of water voles. Of 82 features surveyed, evidence of water vole was found in 17. Five of these features were identified as 'key areas' for water vole, namely at feature 37, 45, 61, 62, and 90. These 'key areas' contained burrow networks and a high density of latrines. Medium to high abundances of water voles are currently using these features. A lower density of water vole evidence was found at features 19, 20, 23, 24, 35, 36, 43, 70, 74, 75, 80 and 81.

166. For full details in respect to water voles, refer to the report provided in *Appendix 23.2 - Otter and Water Vole Technical Report*. The locations of confirmed water vole presence are highlighted on *Figures 23.10a -23.10g*.

167. Water voles within the onshore electrical transmission works area are considered to be of local value.

23.5.4.9 Reptiles

168. The BDS showed that all four common reptile species adder *Vipera berus*, grass snake *Natrix natrix*, slow-worm *Anguis fragilis* and common lizard *Lacerta vivapara*

have been recorded within the 2km search area. All common reptile species are Suffolk LBAP priority species and S41 species.

169. Reptile presence/absence surveys were undertaken at 80 locations along the onshore electrical transmission works. These surveys recorded all species of reptile apart from adder.

170. Low numbers of reptiles were recorded in the majority of the locations. However, higher numbers were recorded in the following locations:

- Reptile location 002 - Sea cliff embankment at Bawdsey;
- Reptile location 003 - Area of open woodland plantation;
- Reptile location 007 - Area of scrub and bramble;
- Reptile locations 012, 018, 020 and 021 - Drainage ditches across the Alderton and Ramsholt Marshes;
- Reptile locations 022 and 023 - River flood defence embankments;
- Reptile Location 43 - Railway embankment;
- Reptile location 045 - Large area of grass and scrub;
- Reptile location 050 - Area of grass, scrub and bracken; and
- Reptile Location 69 - Roadside grass bank.

171. Full details are provided in *Appendix 23.2 - Reptile Technical Report* and locations where reptiles have been confirmed are highlighted on *Figures 23.11a – 23.11g.*

172. In 2014, optimal reptile habitat was observed at 11 locations along the onshore cable route. Given the results of the reptile survey undertaken during the 2011-2012 surveys, it is considered possible that these areas support reptile populations. Optimal habitat identified at TNX 17, 46, 85 and 159 are particularly likely to support populations of reptiles given their proximity to Reptile Locations 12, 23, 45 and 69, respectively. Full details are provided in the *Appendix 23.5 – Extended Phase 1 Habitat Survey Report*.

173. Reptiles within the onshore electrical transmission works area are considered to be of local value.

23.5.4.10 Terrestrial Invertebrates

174. The BDS revealed records of the following invertebrates (see *Appendix 23.2 - Terrestrial Invertebrate Technical Report* for full details);

- Moths – 16 species;
- Butterflies – five species;
- Beetles – 36 species; and
- Other species of conservation interest – 21 species, including whorl snail *Vertigo angustior* which is historically known to be present near Martlesham Creek.

175. As there is the potential for important invertebrate species and / or assemblages to be present along the onshore cable route, targeted invertebrate surveys were undertaken by Colin Plant Associates. The entire route was examined, making direct observations and judging habitat quality in May 2012. Where the potential for greater invertebrate interest was noted further detailed surveys where undertaken in June, July and August 2012 (*Figures 23.12a – 23.12c*).

176. Overall, the majority of the onshore electrical transmission works comprises arable fields and with species-poor arable field margins. Therefore this habitat is considered to be of low to negligible interest for invertebrates. Thirteen sites were identified during the initial examination of the onshore electrical transmission works (Areas A – M *Appendix 23.2*) as potentially having a higher invertebrate ecology value. On these visits, terrestrial invertebrate species sampling was undertaken at locations where it was deemed appropriate to facilitate an understanding of the invertebrate value of a particular area. Five sites were subjected to detailed surveys and assessment, in order to look for certain target invertebrate species. These sites are listed below and shown in *Figures 23.12a - 23.12c:*

- Area A - From east side of B1113 road to east side of A45 road;
- Area G – Degraded heathland, recorded as acid grassland mosaic within the 2011 Phase 1 survey (part of the 2011 - 2012 surveys), on a slope adjacent to the golf course (assessment undertaken in 2013);
- Area H – Land south of Seckford Roundabout on the A12 road Woodbridge;
- Area I – Elm hedge and associated field margin south east of Seckford Roundabout; and

- Area L - Landfall area.

177. Survey methods used for the detailed surveys included direct observations of invertebrates, sweep netting, suction sampling and beating trees and shrubs.

178. The following UK BAP, Suffolk LBAP and S41 species were identified:

- Wall brown butterfly *Lasiommata megera* – known to be present at the landfall location (Area L);
- Cinnabar moth *Tyria jacobaeae* – recorded in Areas A, H and L; and
- Shaded broad-bar moth *Scotopteryx chenopodiata* - recorded at the landfall location (Area L).

179. Three species listed in the British Red Data Books or of the status of Critically Endangered, Endangered, Nationally Vulnerable or Near Threatened were recorded, including:

- *Tuponia mixticolor* (a bug) – listed as Vulnerable and identified north of the landfall location;
- *Myrmica bessarabica* (an ant) – listed as Nationally Rare and identified in Area L; and
- The blue carpenter bee *Ceratina cyanea* - listed as Nationally Rare and identified in Area H.

180. Nine species recorded are listed in the Nationally Scarce Category and include (refer to *Figures 23.12a - 23.12c* for area locations):

- Mallow flea beetle *Podagrica fuscipes* - identified in Area A, I and L;
- The yellow-faced bee *Hylaeus signatus* - identified in Area L;
- A solitary bee *Lasioglossum malachurum* - identified in Area A;
- A ground bug *Megalonotus praetextus* - identified in Area L;
- A ground bug *Megalonotus sabulicola* - identified in Area L;
- Roesel's bush-cricket *Metrioptera roeselii* - identified in Area L;
- A weevil *Orthochaetes setiger* - identified in Area L;
- Mallow flea beetle *Podagrica fuscicornis* - identified in Area L; and

- A weevil *Trachyphloeas aristatus* - identified in Area L.

181. Forty-five species are listed as Nationally Local (as defined by the International Union for the Conservation of Nature criteria), see *Appendix 23.2* for further details.

182. Terrestrial invertebrates within the onshore electrical transmission works are considered to be of up to national value.

23.5.4.11 Aquatic Invertebrates

183. No records were provided by the BDS of any notable aquatic invertebrate species within 2km of the onshore electrical transmission works.

184. Consultation with the Environment Agency (see section 23.2) provided evidence that the Mill River supports a small population of white-clawed crayfish *Austropotamobius pallipes*, which are protected under the Wildlife and Countryside Act 1982 (as amended) and are Suffolk LBAP priority species and a S41 species.

185. Sixteen one-off samples were collected from proposed watercourse crossing points. The sample sites have water quality ranging between poor (Sites 1 and 9) to good (Sites 5, 8, 15 and 16), according to the biotic scores obtained for them. The remaining sites have moderate water quality. Whilst overall diversity is not particularly high, some of the better sites show relatively diverse beetle and mollusc assemblages, as would be expected for still and slow moving aquatic habitats.

186. The majority of species found are common and widespread either through the South east or through the UK as a whole. Four species classed as having a Local distribution have been recorded in four sites. No rare, notable or protected species have been recorded.

187. See the accompanying *Appendix 23.2 - Aquatic Invertebrate Technical Report* for full details.

188. Aquatic invertebrates within the onshore electrical transmission works are considered to be of site value.

23.5.4.12 Fish

189. During initial data collection for East Anglia ONE, the Environment Agency was contacted regarding fish populations within the vicinity of the onshore electrical transmission works. The Environment Agency does hold records of protected and rare fish species such as European eel *Anguilla Anguilla* (a Suffolk LBAP priority species and S41 species) and bullhead *Cottus gobio*, and as there are no in-channel works, the Environment Agency were not concerned by the potential impacts of the proposed project on fish species. Naturalised brown trout *Salmo trutta* (a Suffolk

LBAP priority species and S41 species) and eel are known to occur in the River Fynn and River Lark. Further mitigation is discussed in section 23.6.

23.5.5 Summary Assessment of Nature Conservation Value

190. A value has been applied to all ecological receptors potentially affected by the onshore electrical transmission works. See *Table 23.12* for details.

Table 23.12 Summary assessment of nature conservation value of ecological receptors

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
Designated Sites	Deben Estuary SPA, Ramsar and SSSI	International	International	Designated at European level due to the species / habitats it supports.
	Suffolk Coast & Heaths AONB	National	National	Key habitat identified within the designation are discussed separately below
	Suffolk Shingle Beaches CWS	County	County	Designated at county level for vegetated shingle, a rare and decreasing habitat, both in the British Isles and globally.
	Millers Wood ASNW & CWS	County	County	Designated at county level for botanical interest, particularly ancient woodland indicator species
	Seckford Hall Campsite CWS	County	County	Designated at county level as the site supports two nationally scarce plant species; Mossy Stonecrop and Suffocated Clover.
	River Gipping (Sections) CWS	County	County	Designated at county level and supports rare plant species in addition to being important for fish, invertebrates and birds.
	The Mill River CWS	County	County	Designated at county level and has good water quality which supports a wide variety of aquatic wildlife. The site is important as a wildlife corridor and for birds
	Fore and Bushey Groves CWS and ASNW	County	County	Designated at county level and comprises two small woods separated by a track and an area of dense scrub
	Lumber Wood ASNW and CWS	County	County	Designated at county level due to being ancient semi-natural woodland.

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
	Welham's Meadow CWS	County	County	Designated at county level and comprises wet-meadow flora supporting rare species of plants.
	Bullen Wood ASNW and CWS	County	County	Designated at county level due to being ancient semi-natural woodland and supporting uncommon plant species. Dead wood habitat on the site is important for birds and invertebrates.
	Round Wood and Elms Grove ASNW and CWS	County	County	Designated at county level due to being ancient semi-natural woodland and supporting uncommon plant species. The site is important for woodland birds particularly warblers.
Habitats	Woodland	National	Up to county level	Semi-natural woodland is a UK BAP (Lowland Mixed Deciduous Woodland) and Suffolk LBAP Priority Habitat. Millers Wood is valued at county level, whilst others have a local value.
	Scrub	-	Site	Examples are present throughout the onshore cable route however they have low ecological value and are typically dominated by ubiquitous species.
	Trees	-	District (veteran trees) Local (when assessed as a total) Site (for individual tree)	Many mature trees mainly associated with boundary features.
	'Important' Hedgerows	National	County	Hedgerows are Priority Habitats in the UK BAP and Suffolk LBAP. 174 'Important' hedges were identified within the onshore cable route and individually are of District value.

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
	Other hedgerows	-	Local	Species-poor hedges not qualifying as 'Important' are nonetheless of Local value as habitat corridors.
	Agricultural Grassland	-	Negligible	Examples are present throughout the onshore cable route however they have low ecological value.
	Unimproved and semi-improved neutral grassland	National	Local	Lowland meadows are Priority Habitats in the UK BAP and Suffolk LBAP and some good examples are crossed but the route but they are of local value only.
	Calcifugous Grassland	National	County	Lowland Dry Acid Grassland is a UK BAP and Suffolk LBAP Priority Habitat.
	Marshy Grassland and Swamp	National	Local	Areas crossed are generally species-poor although marshy grassland and swamp are rare in the local context.
	Tall-herb		Site	Examples were identified throughout the onshore cable route however they have low ecological value.
	Coastal Shingle	International	National	Coastal vegetated shingle is a UK BAP and Suffolk LBAP Priority Habitat, however only a very small area of shingle is present at the landfall which is not vegetated.

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
	Maritime Cliffs and Slopes	National	District	Maritime Cliffs and Slopes is a UK BAP and Suffolk LBAP Priority Habitat, however only a small area at the landfall is affected.
	Saltmarsh	National	County	Coastal Saltmarsh is a UK BAP and Suffolk LBAP Priority Habitat; however only a very small strip is present on the route either side of the River Deben and Martlesham Creek.
	Rivers and Streams	Up to International	International for nature conservation designated sites Local to site for non-designated areas	Rivers and streams are Priority Habitats in the UK BAP. The River Deben and Martlesham Creek are considered to be of international importance due to site designations. River Gipping (sections) and the Mill River are of county importance with the smaller streams crossed by the route having local value only.
	Ditches		Local	Ditches along the route support abundant vegetation and some are of local value.
	Ponds	National	Local	Ponds are a UK BAP Priority Habitat and Suffolk LBAP habitat, however no ponds are crossed by the onshore cable route.
Other habitats	Arable Field Margins	National	Local	Arable Field Margins is a UK BAP and Suffolk LBAP Priority Habitat, however only low value examples are present along the route

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
Notable Plant Species	Common cudweed	County	Local	Red listed as 'Near Threatened' although well distributed within Suffolk.
	Hoary cinquefoil	County	Local	Red listed as 'Near Threatened' although well distributed within Suffolk.
	Mossy stonecrop	National	Local	A Nationally Scarce species found in five areas within the onshore cable route.
	Perennial glasswort	National	County	A Nationally Scarce species found in two areas (saltmarsh either side of Deben) within undisturbed and fragile saltmarsh habitat on the onshore cable route.
	Suffocated clover	National	Local	A Nationally Scarce species found in one area within the onshore cable route.
Invasive Species	Hottentot-fig	National	National	Listed on Schedule 9 of the Wildlife & Countryside Act 1981. Present at one location on cliff face although south of the landfall location.
	Canadian waterweed	National	National	Listed on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended). Present in three locations within the onshore cable route
	Himalayan balsam	National	National	Listed on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended). Present in three locations within the onshore cable route.

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
	Japanese rose	National	National	Listed on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended). Present in four locations within the onshore cable route (typically roadside planting).
Protected species	Badger	National	Local	Badgers are protected under the Protection of Badgers Act (1992) which makes it unlawful for either an animal or its sett to be damaged or disturbed. However they are widespread in South east and are found in a range of habitats.
	Bats	International	Up to International (dependent on species and numbers affected)	Bats are listed as a EPS in the Conservation (Natural habitats, &c.) Regulations 1994. No tree roosts were identified within the onshore cable route although high levels of bat activity were recorded at four boundary features.
	Great crested newt	International	District	Great Crested Newt is a EPS. Presence was confirmed in seven ponds along the route.
	Otters	International	County	Otters are a EPS. Presence was confirmed at 12 locations although no confirmed evidence of couches or holts on the onshore cable route.
	Water voles	National	Local	Water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Water voles were confirmed at 17 locations.

	Ecological Receptor	UK Value based on designation status	Value in Context of Development Area (based on IEEM 2006 guidance)	Comments
	Reptiles	National	Local	The three common species of reptiles found on the route included Common lizard, grass snake and slow-worm. All are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).
	Terrestrial invertebrates	Up to National	Up to National	National for certain species and small areas for high invertebrate value (e.g. the landfall area) although the majority of the route is arable and of low value to invertebrates.
	Aquatic invertebrates	International	Site	All groups and species recorded are common.
	Fish	Up to national	Site	Protected fish species are likely to be present in main rivers, however these would be crossed via pre-installed ducts (installed by East Anglia ONE),avoiding impacts.

23.6 Potential Impacts

191. Reference should be made to Chapter 5 Description of the Development for full details of the activities proposed during the construction, operation and decommissioning phases of the proposed project. However, in summary, the activities considered likely to impact on terrestrial ecology are:

- Temporary habitat damage or loss from creation of CCS and transition bay and jointing bay compounds;
- Habitat damage or loss from temporary upgrade of existing access tracks, construction of new access tracks and haul roads (note some access tracks may have permanent upgrade if specifically requested by the landowner);
- Permanent habitat loss from the construction and operation of the substation(s) and associated infrastructure;
- Temporary habitat fragmentation and isolation from intersection of onshore cable route;
- Change in habitat from landscaping at the substation(s);
- Stockpiling of topsoil and subsoil;
- Damage and disturbance to habitats and species during all phases of the proposed project life from noise, air quality, lighting, and increased human presence;
- Temporary disturbance to roadside verges;
- As part of the onshore electrical transmission works construction phase, a number of roads and lanes have been identified for access by construction vehicles including excavators and cable drum trailers; and
- SCC designates most of these routes as suitable for HGV transit, and large agricultural vehicles already use the smaller lanes. Initial assessment has indicated the possible need for passing lay-bys and corner / verge enhancements within the verges, and that these works could be undertaken within the highway boundary. On this basis it is considered that trees and hedges would remain undisturbed along these access routes. The only anticipated impact associated with this work is therefore the temporary disturbance to roadside verges (note some improvements may be left in situ if agreed with the local authority / community etc.).

- Temporary habitat loss and damage from decommissioning works.

192. Embedded mitigation for terrestrial ecology is outlined in section 23.3.3. A CoCP and LEMS, which will include all ecological mitigation, is included within the embedded mitigation as well as the appointment of an ECoW to undertake compliance monitoring on site during construction. Reinstatement and enhancement measures are also included. The following section takes into account embedded mitigation and any other mitigation measures suggested within the section are additional.

193. Two different approaches to construction (as outlined in section 23.3.2 and Chapter 5 Description of the Development) are being considered for the installation of onshore cables. These approaches (Single Phase and Two Phased approach) are considered separately in the sections below, or grouped together where there is considered to be no difference in impact between the different approaches.

23.6.1 Potential Impacts during Construction

23.6.1.1 Impact 1: Impacts to Statutory Designated Sites

23.6.1.1.1 Landfall

Single Phase and Two Phased approach

194. The landfall is within the Suffolk Coast and Heaths AONB. No habitats of the AONB occur at the landfall, therefore there would be **no impact** for either approach. The landfall site is not located within any other statutory designated sites.

23.6.1.1.2 Onshore Cable Route

195. The onshore cable route crosses the Deben Estuary Ramsar, SPA and SSSI and Suffolk Coast and Heaths AONB designated nature conservation sites. These two sites are assessed in relation to both Single Phase and Two Phased approach to cable installation.

23.6.1.1.2.1 Deben Estuary Ramsar, SPA and SSSI

Single Phase and Two Phased approach

196. Under either approach, the Deben Estuary Ramsar, SPA and SSSI would be crossed by pre-installed ducts at both the River Deben and Martlesham Creek. Jointing bays would not be required within the designated site. The designated / supporting habitats would be avoided prior to cable installation, therefore there would be **no impact**. There is potential for disturbance impacts on bird species as a result of construction noise, however, these impacts are discussed in detail in Chapter 24 Onshore Ornithology with noise discussed in Chapter 26 Noise and Vibration.

197. A full assessment of the potential impacts upon European designated sites is included within the HRA submitted as part of the DCO application.

23.6.1.1.2.2 Suffolk Coast and Heaths AONB

Single Phase and Two Phased approach

198. The Suffolk Coast and Heaths AONB is designated for the presence of a number of habitats typical of the valued landscape of the AONB. These habitats are separately discussed within the assessments below. Habitats of particular relevance to this project are saltmarsh, mudflats, wetlands, shingle beaches and woodland.

199. The saltmarsh, mudflat and wetland habitats of the AONB would be avoided by the use of pre-installed ducts therefore there would be **no impact** on these habitats**.**

200. Woodland along the onshore cable route within the AONB has been avoided by routeing or by the use of pre-installed ducts therefore there would be **no impact** on this habitat type.

201. Mature trees are situated within hedgerows and as lines of trees throughout the route. Removal of any mature trees within the onshore cable route would have already been undertaken during East Anglia ONE prior to construction. There may be a requirement for removing a small number of mature trees for the new accesses for the proposed East Anglia THREE project. Any removed trees and / or hedgerows would be reinstated or replanted under either approach, with the exception that trees cannot be replanted directly above the buried cable (hedgerows can). All habitat removal would be minimised by micro-siting where possible. It is considered that these impacts would be negligible at the wider scale of the AONB, which results in a **minor adverse** impact at the scale of the AONB.

23.6.1.1.3 Substation

202. The substation(s) would not overlap with any statutory designated site and the nearest is Bramford Meadows LNR, which is located 2.7km at its closest point. Therefore, due to the distance of the site and the absence of habitat linkages between this site and the substation(s), **no impacts** on statutory designated sites are anticipated.

23.6.1.2 Impact 2: Impacts to Non-Statutory Designated Sites

23.6.1.2.1 Landfall

203. Suffolk Shingle Beaches CWS would be crossed by the onshore cable route at the landfall location. This site is designated for its vegetated shingle and associated

invertebrates. Further details on the potential coastal process effects on the shingle are discussed in Chapter 7 Marine Geology, Oceanography and Physical Processes.

Single Phase and Two Phased approach

204. Under either approach the feature would be crossed by pre-installed ducts, therefore avoiding trenching impacts on the beach. However, if the short HDD option is used by East Anglia ONE then there would be a requirement for some excavation on the shore to bring cables into the ducts. This would require construction machinery, a tracked excavator, to gain access to the beach (on two separate occasions, in the case of a Two Phased approach). The construction machinery would operate on the shore, accessed by ramp, in the area of the shingle habitat which is unvegetated, and less valuable than the vegetated shingle, which is located 300m south-west of the landfall. Therefore, **no impacts** to the sensitive vegetated shingle are predicted under either approach.

205. If the short HDD option is used, this could pose a risk of temporary disturbance to invertebrates associated with the unvegetated shingle (considered to be of low sensitivity) if present at the time of construction. The extent of this impact (including site access) would be limited to the immediate construction area (approximately 250m^2) and would be short term (up to ten weeks under a Single Phase approach, and up to a total of 20 weeks over two separate periods for a Two Phased approach) and reversible during the time of construction activities. Therefore the magnitude of the impact to this habitat is considered to be low and the impact significance **minor adverse**.

23.6.1.2.2 Onshore Cable Route

Single Phase and Two Phased approach

206. Due to the routeing of the onshore cable route a number of non-statutory sites are avoided - Seckford Hall Campsite CWS, Fore and Bushey Groves CWS, Bullen Wood ASNW & CWS, Round Wood and Elms Grove ASNW and CWS, Welham's Meadow CWS and Lumber Wood ASNW and CWS.

207. In addition, the following non-statutory sites would be avoided using pre-installed ducting and therefore not directly impacted: Millers Wood ASNW and CWS, River Gipping (Sections) CWS and The Mill River CWS.

208. Altogether, six non-statutory sites (out of nine passed by the onshore cable route) would be avoided completely and two sites would be crossed by using pre-installed ducting.

209. Eight non statutory sites are situated adjacent to the onshore cable route. Under both approaches, the interest features of these non-statutory designated sites would be subject to temporary disturbance, primarily from increased noise levels during construction activities. The duration of this impact is likely to be a maximum of 29 weeks under a Single Phase approach (for the entire onshore cable route), and up to a maximum of two 29 week periods (for the entire onshore cable route) for a Two Phased approach. As this impact is temporary and short term in relation to a medium sensitivity receptor these impacts are considered to result in a **minor adverse** at the site level.

23.6.1.2.3 Substation

Single Phase and Two Phased approach

210. The nearest non-statutory sites are Fore and Bushey Groves CWS and ASNW and Bullen Wood ASNW and CWS which are adjacent to the substation(s). There may be some temporary disturbance to species from increased noise levels during construction activities. The duration of this impact is likely to be at most 55 weeks under a Single Phase approach, and up to a total of 110 weeks over two separate periods for a Two Phased approach. These impacts are considered to be of low magnitude resulting in a **minor adverse** impact at the site level.

23.6.1.3 Impact 3: Impacts to Arable Land

23.6.1.3.1 Landfall, Onshore Cable Route and Substation(s)

211. Arable land is the dominant habitat across the landfall area, onshore cable route and at the substation(s). Arable land is typically of low ecological value due to the homogeneity of the habitat as well as farming practises and the presence of insecticides and herbicides within the crops. Impacts to soils are discussed in Chapter 22 Land Use.

Single Phase

212. Arable field margins are a UK BAP and Suffolk LBAP Priority Habitat but the examples here do not qualify as they are species-poor and heavily affected by agricultural inputs. There would be a change to field margins through temporary habitat loss; these habitats are of low value and would very quickly recover therefore this is assessed as **negligible**.

213. The footprint of construction works as a result of jointing bay compounds, transition bay compound and haul roads would result in the temporary but reversible loss of 34.81ha of arable land along the onshore cable route (this does not include the

substation site) as shown in *Table 23.13*. On completion of works, all arable areas would be returned to agricultural practice.

214. At the substation compound a limited amount of open trenching would be required to connect cables from pre-installed ducts to the substation and from the substation to the existing National Grid ducts. The cables would be laid directly into the ground. Excavated materials would be back-filled into the trenches, and the excavation within these areas will be limited in depth and extent and would equate to a negligible magnitude therefore the significance will be negligible. No further mitigation is considered necessary.

215. An additional 3.04ha of arable land would be lost at the substation site. This would not be returned to agricultural practice, and the construction of the substation(s) would result in 3.04ha of permanent loss in arable habitat.

216. Given the low sensitivity of this habitat and low magnitude of the effect the impact of permanent loss at the substation is considered **minor adverse**.

Table 23.13 Arable land lost to construction

Area of arable land within the redline boundary (ha)	Maximum area of temporary arable land lost during construction (ha)	Maximum area of temporary arable land lost during construction of substation (ha)	Area of arable land within Suffolk (ha)	% of total area impacted
	Single Phase approach			
277.21	34.81	3.04	205,672	0.018%
	Two Phased approach			
277.21	64.01	3.04	205,672	0.033%

Two Phased

217. Arable field margins are an UK BAP and Suffolk LBAP Priority Habitat but the examples here do not qualify as they are species-poor and heavily affected by agricultural inputs. There would be a change to field margins through temporary habitat loss; these habitats are of low value and would very quickly recover therefore this is assessed as **negligible**.

218. The construction of the jointing bay compounds, transition bay compound and haul roads under a Two Phased approach would result in the temporary, reversible loss of 64.01ha of arable land along the onshore cable route, as shown in *Table 23.13*. On completion of works, all arable areas would be returned to agricultural practice.

219. At the substation compound a limited amount of open trenching would be required to connect cables from pre-installed ducts to the substation and from the substation to the existing National Grid ducts. The cables would be laid directly into the ground. Excavated materials would be back-filled into the trenches, and the excavation within these areas will be limited in depth and extent and would equate to a negligible magnitude therefore the significance will be negligible. No further mitigation is considered necessary.

220. An additional 3.04ha of arable land would be lost at the substation site. This would not be returned to agricultural practice, and the construction of the substation(s) would result in 3.04ha of permanent loss of arable habitat.

221. Given the low sensitivity of this habitat and low magnitude of the effect the impact of permanent loss at the substation(s) is considered **minor adverse**.

23.6.1.4 Impact 4: Impacts to Woodland, Scrub and Trees

23.6.1.4.1 Landfall

Single Phase and Two Phased approach

222. There is no woodland, scrub habitat or trees at the landfall. Therefore **no impact** upon these habitats and features are anticipated at the landfall for either approach.

23.6.1.4.2 Onshore Cable Route

Single Phase and Two Phased approach

223. The route has been developed to, where possible, avoid direct impact to large areas of semi-natural woodland. The onshore cable route does cross Millers Wood, which is designated ancient woodland. This woodland would be crossed via pre-installed ducts (installed by East Anglia ONE), and access through the wood would use an existing farm track, negating the need for vegetation removal. Therefore, no direct impacts are anticipated. Indirect impacts may include increased noise, dust (see Chapter 20 Air Quality and Chapter 26 Noise and Vibration) and human presence disturbing species within the wooded areas. These impacts at Millers Wood would be temporary, lasting for the duration of the cable installation activities. Under a Single Phase approach, these impacts would last a maximum of ten weeks. Under a Two Phased approach, these impacts would last a maximum of 20 weeks over two separate periods. The magnitude of these effects is considered to be low upon a county level receptor. The impact significance is **minor adverse**.

224. The onshore cable route crosses nine areas of broadleaved and plantation woodland. Under the micro-siting approach for location of the jointing bays, these

areas would be avoided during construction. There would be no further loss of trees however there may be need for pruning to occur to enable access. The impact for both approaches is considered to be **negligible**.

225. There would be a maximum total direct loss of 1.98ha of scrub under both a Single Phase approach and a Two Phased approach, along the onshore cable route. Scrub is a common habitat and the impact would be temporary. The magnitude of the effect is predicted to be low under both approaches, and a **minor adverse** impact at the site level is predicted.

226. Mature trees are situated within hedgerows and as lines of trees throughout the route. Removal of any mature trees within the onshore cable route would have already been undertaken during East Anglia ONE prior to construction. There may be a requirement for removing a small number of mature trees for the new accesses for the proposed East Anglia THREE project. Impacts upon mature trees are identified as being **negligible**.

227. As part of embedded mitigation, a pre-construction walkover survey would be undertaken by an appropriately experienced arboriculturalist. They would define specific mitigation measures to protect trees situated adjacent to the working width, including defining root protection areas. The arboricultural report would be submitted to and agreed with the local authority prior to construction. In addition, the following mitigation measures would also be undertaken, as specified in the OLEMS:

- The roots of retained trees along the edge of the working width would be protected from soil compaction by the enforcement of Root Protection Areas that would be fenced off from the construction (the extent of which would be calculated using guidance from BS5837: 2012);
- Facilitation pruning may be recommended where tree crowns are at risk from impact by machinery or high sided vehicles;
- Where possible, removal of vegetation would be timed to avoid the bird breeding season (March to October inclusive); and
- If bat roosts are found in the trees then the measures set out in bat mitigation would be followed.

228. In addition, in relation to consultation undertaken, an ECoW would undertake a pre-construction check for *Hymenoscyphus fraxineus* (Chalara dieback of ash) of trees at Gobert's Grove if removal of any new trees is required. SCC's Ash Dieback specialists

would be consulted in any discussions regarding the need to remove any trees identified as suffering the disease.

229. The significance of impact is at a site level and the magnitude is predicted to be low, therefore and a **minor adverse** impact is predicted overall due to the avoidance measures taken around trees and woodland during construction activities.

23.6.1.4.3 Substation

230. The land at the substation is arable with no woodland, trees or scrub habitat therefore there would be **no impacts** to these habitats.

23.6.1.5 Impact 5: Impacts to Hedgerows

23.6.1.5.1 Landfall

Single Phase and Two Phased approach

231. No hedgerows are located within the landfall area and therefore **no impacts** to hedgerows are predicted under either approach.

23.6.1.5.2 Onshore Cable Route

232. Hedgerows are important landscape features, habitats and wildlife corridors in the generally intensively farmed land crossed by the route. The majority of the hedgerows are moderately species-rich in terms of shrub and field-layer species, but they typically support additional features such as standard trees and an adjacent ditch that increase their ecological value. In total, 230 hedges were identified within the onshore electrical transmission works during the 2011/2012 and 2015 surveys, of which 174 also qualified as 'Important' based on criteria specified in the Hedgerow Regulations 1997. The UK BAP and Suffolk LBAP for Hedgerows are primarily concerned with ancient and species-rich hedges such as these. Details of the hedgerows surveyed are provided in Appendix 1 of the OLEMS.

Single Phase and Two Phased approach

233. Loss of hedgerows associated with the onshore cable route would be limited to the removal and reinstatement of newly planted hedgerows from East Anglia ONE works (if required) and where access is needed to the onshore cable route. Any new breaches in hedgerows would be limited to a 5.5m swathe required for vehicle passage. At all other hedgerow locations it should be possible to micro-site jointing bays and laydown areas to avoid further impact. The worst case impact upon hedgerows would therefore require a gap in all hedgerows crossing the onshore cable route, which would result in a loss of 957m of important hedgerow, and 308m of other hedgerow, in 5.5m sections. Under a Two Phased approach the same

locations would be affected so there would be no increase of magnitude of effect. In the context the available hedgerow resource within the onshore cable route (15.97km), the magnitude of this effect is low.

234. Given this magnitude, there is potential for **minor adverse** impacts to occur during the recovery period for the reinstatement of the important hedgerows and **minor adverse** for other hedgerows.

235. The following mitigation measures would also be undertaken, as specified in the OLEMS and are consistent with those agreed for East Anglia ONE:

- Vegetation and topsoil from any associated ditch would be stripped and stored separately;
- Soil storage areas would be clearly signed and demarcated to prevent any mixing with other soils;
- Banks and ditches would be reformed to similar profiles as before;
- Topsoil would be replaced after works;
- Planting would use native species, preferably of local origin;
- Planting would use shrubs of the same species and in the same general proportions as existed pre-construction; and
- To aid establishment of replanted trees and shrubs, they would be protected by stock-proof and either rabbit-proof fencing or tree guards.

23.6.1.5.3 Substation

Single Phase and Two Phased approach

236. Two important hedgerows (Hedgerows 222 and 224) are situated at the substation location. Construction works are the substation location would result in the permanent loss of approximately 180m of important hedgerow. The substation would be subject to a specific Landscape Management Scheme which will include provision for replacement planting for all hedgerows permanently lost during substation construction. Full details are contained within the OLEMS.

237. This removal will result in the temporary loss of hedgerow at the substation site until the planting stipulated within the Landscape Management Scheme reaches semi-maturity. The lost hedgerow represents a small length in the context of available hedgerow resource within the onshore cable route (15.97km). The significance of

the impact to these hedgerows is predicted to be **minor adverse** due to the low magnitude of effect.

23.6.1.6 Impact 6: Impacts to grassland

23.6.1.6.1 Landfall

Single Phase and Two Phased approach

238. No grasslands are located at the landfall; therefore **no impacts** to grasslands are anticipated for either approach.

23.6.1.6.2 Onshore Cable Route

Single Phase and Two Phased approach

239. *Table 23.14* summarises the potential area of each type of grassland that could be affected by construction. Given that the exact locations of infrastructure (i.e. haul road, jointing bays and lay down areas) cannot be determined at this time, as a precautionary approach to the assessment the total area of each habitat type within the onshore cable route boundary is given. The areas affected would be smaller than these and areas affected would encompass the Single Phase or Two Phased approaches.

Table 23.14 Areas of grassland that would be lost to construction

Grassland type	Area of land within the onshore cable route boundary (ha)
Improved grassland	18.36
Unimproved and semi-improved neutral grassland	27.67
Calcifugous and acid grassland	5.36
Marshy grassland and swamp	2.72
Tall herb vegetation	5.24

23.6.1.6.2.1 Improved Grassland

240. Works would represent a direct, temporary, adverse impact on grassland associated with habitat loss during vegetation removal and topsoil stripping of the working width. In the worst case 18.36ha of improved grassland would be temporarily lost. Where grassland is agriculturally improved and species-poor it has negligible nature conservation value and would very quickly recover post-construction.

241. Reinstatement of improved grassland areas may be supplemented by seeding at the discretion of the landowner. Impacts under both approaches are considered to be of **negligible** significance.

23.6.1.6.2.2 Unimproved and Semi-Improved Neutral Grassland

242. TN 23, 337 and TNX44 are the only areas of species-rich neutral grassland in proximity to the onshore cable route and are outside the working width and therefore unaffected. The remaining areas of grassland crossed by the cable route are rough and dominated by coarse grass species and ruderal herbs. To retain the seed bank, all grassland topsoil would be stripped, stored and replaced. In the worst case 27.67ha of semi-improved grassland would be temporarily lost. Reinstatement would be by natural regeneration and no supplementary seeding would be used. Direct habitat loss would be a temporary, **minor adverse** impact.

23.6.1.6.2.3 Calcifugous and Acid Grassland

243. Calcifugous and acid grassland at TN 187a, 373, 374 379 (*Figures 23.3a-l*) would be directly affected whilst areas at TN 187b, 194, 372 and 374a have been avoided through cable route design. The seed bank of the grassland would be retained by stripping, storing and replacing the topsoil. In the worst case 5.36ha of calcifugous and acid grassland would be temporarily lost. Reinstatement would be by natural regeneration and no supplementary seeding would be used. There would be a temporary, **minor adverse** impact on grassland from habitat loss in the working width.

23.6.1.6.2.4 Marshy Grassland and Swamp

244. Swamp dominated by common reed is typical of the banks of Martlesham Creek and in the valley of the River Mill. It would be avoided as part of crossing the watercourses using pre-installed ducting.

245. Marshy grassland and swamp vegetation is crossed at TN 344 and TN 375. In all grassland topsoil would be stripped, stored and replaced to retain the seed bank. In the worst case 2.72ha of marsh grassland and swamp would be temporarily lost. Reinstatement would be by natural regeneration and no supplementary seeding would be used. The works would have a temporary, **minor adverse** impact through habitat loss in the working width.

23.6.1.6.2.5 Tall Herb Vegetation

246. Tall herb vegetation is ubiquitous and of low ecological value, and it is anticipated that there would be a temporary, **minor adverse** impact under both approaches from habitat loss in the working width (in the worst case 5.24ha of tall herb vegetation would be temporarily lost).

23.6.1.6.3 Substation

23.6.1.6.3.1 Grassland

Single Phase and Two Phased approach

247. The only grassland identified within the substation(s) location is arable land. At the substation compound a limited amount of open trenching would be required to connect cables from pre-installed ducts to the substation and from the substation to the existing National Grid ducts. The cables would be laid directly into the ground. Excavated materials would be back-filled into the trenches, and the excavation within these areas will be limited in depth and extent and would equate to a negligible magnitude therefore the significance will be **negligible**. No further mitigation is considered necessary.

23.6.1.7 Impact 7: Impacts to Coastal Habitats

23.6.1.7.1 Landfall

23.6.1.7.1.1 Shingle

Single Phase and Two Phased approach

248. Plant would be required to operate on the beach if the short duct at the landfall is used under either approach. Vegetated shingle lying approximately 300m south-west of the landfall would be avoided by construction activities. Only a small area (approximately 250m^2) of low value mobile un-vegetated shingle beach would be affected and the disturbance would only be temporary whilst duct ends are excavated by construction machinery therefore the magnitude of effect would be low. The impact is therefore considered to be **minor adverse**.

249. If the long duct method is used there would be **no impact** upon the shingle as works to excavate the duct end would be in the sublittoral.

23.6.1.7.1.2 Maritime Cliffs and Slopes

Single Phase and Two Phased approach

250. The cable installation at the landfall location has been designed to produce minimal habitat loss by using pre-installed ducts. However, access to the beach by construction vehicles would still be required if the short duct method at the landfall is used under either approach. Therefore a temporary access ramp would be constructed over the cliff, at present there is no available design for such a ramp and consequently no estimate of its footprint or exact location. In the worst case the ramp would have to be removed and constructed again under a Two Phased approach. It is considered that the cliffs are of high sensitivity at a local level as

there is a high variation in plant communities and that the individual communities within the landfall are of small area and at risk of loss during construction. The temporary effect is considered to be of low magnitude. The botanic survey information gathered in 2012 indicates that the botanic interest features are present in small-scale discreet areas within the survey area, and are not widespread. As discussed in section 23.5.3.8, as a result of erosion, much of the cliff slope within the landfall contains little to no vegetation and vegetated cliff top and slope areas are concentrated to the southern end of the survey area. In light of this, the likelihood of interest features falling within the footprint of the works is low. However, on a precautionary worst case basis, it is considered that there would be a **moderate adverse** impact through direct habitat loss of a small area of cliff.

251. Given the dynamic nature of the cliff in this location, pre-construction surveys would be required to determine any required specific mitigation measures.

252. If the long duct method is used there would be **no impact** upon the cliff as works to excavate the duct end would be in the sublittoral.

23.6.1.7.1.3 Saltmarsh

Single Phase and Two Phased approach

253. No saltmarsh has been identified at the landfall therefore **no impacts** are predicted.

23.6.1.7.2 Onshore Cable Route

Single Phase and Two Phased approach

254. The only coastal habitat identified within the onshore cable route is saltmarsh at the River Deben. As the River Deben would be crossed using pre-installed ducts there would be **no impact** upon saltmarsh under a Single or Two Phased approach.

23.6.1.7.3 Substation

Single Phase and Two Phased approach

255. There are no coastal habitats at the substation(s) location and therefore there would be **no impacts**.

23.6.1.8 Impact 8: Impacts to watercourses and ponds

23.6.1.8.1 Landfall

256. There are no watercourses and ponds at the landfall and therefore there would be **no impacts** under either approach.

23.6.1.8.2 Onshore Cable Route

23.6.1.8.2.1 Water courses

Single Phase and Two Phased approach

257. All watercourses would be crossed via pre-installed ducts. However, new access routes may require the upgrade of existing watercourse crossing points (e.g. small bridges and culverts) and this would be determined during detailed design. The exact methodology used to upgrade the crossings would be decided by the main works contractor in conjunction with the statutory authority. Method statements would be agreed with the statutory authority prior to any watercourse crossings taking place. Relevant measures from the PPG 5 (works and maintenance in or near water) would be included as part of the general measures section of the Final Code of Construction Practice (CoCP) and OLEMS. There is therefore considered to be negligible magnitude impacts on low value field ditches, of **negligible** significance.

23.6.1.8.2.2 Ponds

Single Phase and Two Phased approach

258. No ponds would be lost as a result of the onshore electrical transmission works; however there are several ponds within 50m. Relevant measures from the PPG 5 (works and maintenance in or near water) would be included as part of the general measures section of the Final CoCP and OLEMS. Following the implementation of these measures, **no impacts** are predicted to ponds under either construction approach.

23.6.1.8.3 Substation

Single Phase and Two Phased approach

259. No watercourses or ponds are located at the substation(s) location and therefore **no impacts** to these receptors are predicted.

Impact 9: Impacts to Notable Plant Species

23.6.1.8.4 Landfall

Single Phase and Two Phased approach

260. There are no notable plant species (Red List species) at the landfall and therefore there would be **no impacts** under either construction approach.

23.6.1.8.5 Onshore Cable Route

Single Phase

261. Mossy stonecrop, suffocated clover, common cudweed and hoary cinquefoil (Red List species) are all species of disturbed sandy soils. The maximum available suitable habitat for these species within the onshore cable route is approximately 5.36ha. A temporary loss of these species would occur over some of this area although an exact footprint of haul road and jointing bays is not possible to estimate prior to detailed design. However, it is likely that populations would quickly recover (and may even benefit from the disturbance due to their proclivity for disturbed soils). These impacts would be temporary, of low magnitude and of local value. The overall significance is assessed at **minor adverse**.

262. Perennial glasswort occurs in both areas of saltmarsh along the River Deben. Since cables would be installed in pre-installed ducts there would be **no impact** on this species.

Two Phased

263. Mossy stonecrop, common cudweed and hoary cinquefoil are present at a number of locations within the cable route. Given the size of the jointing bay compounds (0.37ha) and the size of the areas of habitat where these species have been identified, there is no single location where the full habitat area is at risk of being disturbed in its entirety. Suffocated clover is present in one location within the cable route (TN191), the area of which is 0.1ha and is at risk of being disturbed twice during construction. Historical records indicate that this species is locally prevalent and as such the potential loss of this species within the cable route is not considered to result in damage to the viability of the wider local population.

264. The worst case scenario is not anticipated to alter the long-term viability of this species within the local area. This medium magnitude impact upon a local value receptor would lead to a **minor adverse** impact.

23.6.1.8.6 Substation

Single Phase and Two Phased approach

265. No notable species were identified within the substation(s) location and therefore there would be **no impact**.

23.6.1.9 Impact 10: Spread of Invasive Non-Native Species

266. There is potential for the spread of invasive non-native species to occur between different agricultural land holdings and between individual fields, particularly where

tracked vehicles are crossing between field and landowner boundaries. A number of invasive non-native species have been identified, see *Figure 23.6*. The movement of vehicles, equipment and people between adjacent fields and properties enhances the risk of the spread of invasive non-native species from the baseline.

23.6.1.9.1 Landfall

Single Phase and Two Phased approach

267. The nearest identified non-native invasive species to the landfall was Canadian waterweed, 1.5km west of the landfall location. Due to the distance of the species from the landfall **no impacts** are predicted during construction under either approach.

23.6.1.9.2 Onshore Cable Route

Single Phase and Two Phased approach

268. Himalayan balsam, Canadian waterweed and Japanese rose were all located in the vicinity of the onshore cable route; refer to *Table 23.15* for further detail.

Table 23.15 Location of non-native invasive species.

Location (*Figure 23.6*)	Distance and direction	Description
Canadian waterweed		
TN 286c	0m	On the banks of the Queen's Fleet watercourse
TN 19	0m	On the banks of the River Gipping
TN 304a	0m	Target note not included in GIS dataset. See "modified EAOW great crested newt sheet"
Himalayan balsam		
TN 150	0m	On the banks of the River Fynn
Japanese rose		
TN 194	197m north of onshore cable route	Dissecting features present in the form of A12 road and roundabout
TN 195	105m north of onshore cable route	Dissecting features present in the form of A12 road and roundabout
TN 196	119m east of onshore cable route.	Dissecting features present in the form of Ipswich road
TN 197	110m north-east of onshore cable route.	Dissecting features present in the form of Ipswich road

269. The sensitivity of Himalayan balsam, Canadian waterweed and Japanese rose to the potential impacts of construction are considered to be high since these sources of contamination are recognised as such at a national level (*Table 23.7*), however the instances of these sources of contamination are few. In both instances Canadian

waterweed is avoided by the use of pre-installed ducting. Similarly, Himalayan balsam is also avoided by pre-installed ducting. Japanese rose is not directly crossed by the proposed onshore cable route and the nearest locations are approximately 95m at the closest point to the onshore electrical transmission works.

270. Embedded mitigation includes adhering to good practice construction and agricultural practices, minimising the transfer of any plant and animal diseases. These are outlined in *Table 23.4*. In addition, the following measures (previously agreed for East Anglia ONE) would also be undertaken:

- A pre-construction survey would be undertaken between April and September to obtain up-to-date information on the status of non-native invasive species identified within the onshore electrical transmission works that maybe affected including access; this can be combined with other pre-construction ecological surveys;
- A detailed method statement / protocol for dealing with invasive species identified within the onshore electrical transmission works would be prepared, focusing on preventing their spread. This would be agreed with the Environment Agency and Natural England and include a plan showing the location of identified invasive plant species. This protocol would be used if further stands were found during construction activities;
- Defra (2003) and the Food and Environment Research Agency (FERA) have identified a number of best practice measures to minimise the risk of non-native invasive species and these best practice measures would be incorporated into the OLEMS;
- If alien or invasive species were found on site the ECoW would be informed. The area would be demarcated and appropriate signage installed until the appropriate action can be taken; and
- A toolbox talk for contractors prior to construction on the known locations of and the identification of non-native invasive species, including the measures outlined above, would be undertaken. This talk would also include information about other common invasive species;

271. The implementation of the measures outlined above would ensure that the magnitude of this effect is reduced to negligible = for both approaches. As such a **negligible** impact is predicted for invasive, non-native species for both approaches.

23.6.1.9.3 Substation

Single Phase and Two Phased approach

272. The nearest identified non-native invasive species to the landfall was more than 1km north of the substation(s) location, therefore **no impacts** are predicted. A toolbox talk would be given to contractors on identification of common invasive species, and the protocol should any be found on site.

23.6.1.10 Impact 11: Impacts to Badgers

23.6.1.10.1 Landfall

Single Phase and Two Phased approach

273. **No impacts** on badgers are anticipated at the landfall location under either approach due to the absence of badgers within this area.

23.6.1.10.2 Onshore Cable Route

Single Phase and Two Phased approach

274. It is likely that badgers along the route might experience 'disturbance' (as defined by Natural England). Active setts have the potential to experience disturbance if construction activity occurs with 30m of an active sett. Potentially affected setts) include setts 5, 15, 18, 26, 28 and 35, plus 14, 19, 20, 24, 25 and 29, which were active in 2012 and could not be accessed in 2014 (refer to *Figures 23.14a – 23.14g*).

275. All active setts within the cable route (setts 14, 25 and 26) would have been closed (and badgers excluded) during the installation of ducts as part of the East Anglia ONE construction.

276. The construction of the jointing bays and haul road would represent a local scale loss of potential badger foraging habitat for the duration of the works. In addition, the haul route may constitute a temporary barrier to movement during construction or the fenced working width surrounding jointing bays may affect part of a badger's territory, which would result in an impact at a local level during the time this barrier is present (a maximum of ten weeks under a Single Phase approach or a total of 20 weeks in two periods under a Two Phased approach).

277. Badgers are considered to be of local value, and given the extent of potential territory in the wider area, with temporary loss of such a small proportion, the impact is considered to be of low magnitude and **minor adverse.**

278. Pre-construction surveys would be undertaken to check whether any inactive setts have become active prior to construction, or whether any new setts have appeared

since the 2014 survey. Should any active setts be identified within the footprint of the proposed works, these setts would need to be closed prior to construction. Closure of setts would require a licence from Natural England and badgers would need to be excluded from the setts between 1st July and 30th November prior to sett closure. Any setts which need to be closed during construction would remain closed for the duration of both phases of construction under a Two Phased approach.

279. The following mitigation measures should be in place during construction to minimise the risk of disturbing badgers in setts within 30m of the onshore cable route:

- As a general rule, the use of noisy plant and machinery in the vicinity of the 30m disturbance zone around active setts. Upon further details of the works specific to within 30m of an active sett, where appropriate and proportional to the works, and as agreed with Natural England prior to works commencing, the ECoW may reduce the buffer to less than 30m where it is considered the works will not result in obstruction or disturbance.
- Flood lighting should be directed away from 30m disturbance zone around setts;
- Chemicals should be stored as far away from the setts and badger paths as possible;
- Trenches deeper than 1m must be covered at the end of each working day, or include a means of escape for any animal falling in (badgers would continue to use established paths across a site even when construction work has started); and
- Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.

23.6.1.10.3 Substation

Single Phase and Two Phased approach

280. **No impacts** on badgers are anticipated at the substation(s) location due to the absence of badgers within this area. The impact assessment for nearby Miller's Wood is considered in section 23.6.1.11.2 (onshore cable route).

23.6.1.11 Impact 12: Impacts to Bats

23.6.1.11.1 Landfall

Single Phase and Two Phased approach

281. **No impacts** on bats are anticipated at the landfall location under either approach. Key habitat for bats identified within the landfall area was hedgerows. However, none of these hedgerows were shown as being important for commuting and foraging bats (*Figure 23.7a - 23.7g*) through the surveys which have been undertaken to date.

23.6.1.11.2 Onshore Cable Route

23.6.1.11.2.1 Roosting Bats

Single Phase and Two Phased approach

282. No tree roosts were recorded along the onshore cable route and no tree removal would be required (any trees having been removed under prior duct installation works by East Anglia ONE) and so **no impacts** to known roosts are anticipated.

23.6.1.11.2.2 Commuting and Foraging Bats

Single Phase and Two Phased approach

283. There are potential impacts to commuting and foraging bats as a result of vegetation clearance and construction along the onshore cable route. The brown long-eared bat is known to forage over a small area (between 500m - 1km) of their roosts (Entwistle et al. 1997) and so the reduction in available foraging habitat may be more of a concern for this species. In order to facilitate construction of the haul roads and jointing bays along the onshore cable route, sections of hedgerow may be removed and areas of grassland may be soil-stripped. The removal of vegetation would reduce the insect biomass of the area and therefore would reduce the foraging habitat available to bats within the working width. The area of grassland and length of hedgerow (as a worst case, 27.67ha and 851m respectively) is small in the context of the available resource, although in a Two Phased approach there would be two periods of disturbance of the same areas. This has the potential to cause a temporary **minor adverse** impact to bats.

284. The actual level of impact is likely to vary depending on how regularly used and important a hedgerow is to bats. For example, the reduction in foraging habitat caused by the hedgerow section removals may have a greater impact on regularly used hedgerows where a high level of bat activity was recorded (i.e. at locations 27, 55, 64 / 65 and 119 / 120, see *Figures 23.15a - g*, where 200 bat passes were

recorded at each), compared to hedgerows where lower bat activity was recorded. Hedgerows which have been recorded as having a high level of bat activity (usage) are considered to be 'important' for bats. In addition, due to the rarity of the bat species, any hedgerow with at least one barbastelle pass should be considered as an 'important' hedgerow. The survey results indicate that survey locations 4, 23, 28, 63, 95, 124 and 146/147 recorded at least one barbastelle pass.

285. Bats are known to use hedgerows to commute along in order to navigate around the landscape and some species are potentially sensitive to gaps in hedgerows such as species in the genera *Myotis* and *Plecotus* due to the nature of their flight pattern. Species from the genera *Nyctalus* and *Eptesicus*, and Nathusius' pipistrelle bats are known to fly high and in open habitats and therefore are unlikely to be impacted by hedgerow severance. Common pipistrelle and soprano pipistrelle bats are generalist species and would tolerate gaps in hedgerows. There is very limited research regarding whether gaps actually negatively affect *Myotis* / *Plecotus* species. The gaps in hedgerows also have the potential to increase the risk of predation of bats. Bats would be more visible to potential predators while they fly across the gaps as they would have no cover. It is probable that without mitigation the hedgerow severance at 'important bat hedgerows' (see *Figures 23.15a - g* for locations) would have a temporary, **minor adverse** impact on bats during the period of time the gaps are present for, which is considered temporarily significant at district level during this time.

286. If the proposed works are undertaken during the night, lighting would be required, which has the potential to impact on bats. Lighting would only be required at CCS locations and effects are considered to be of negligible magnitude. Different bat species vary in their sensitivity to lighting. *Myotis* and *Plecotus* species are the most light-sensitive species which have been recorded in the survey area. The impact of the lighting has the potential to reduce the available foraging and roosting habitat for bats as the lighting may deter bat from using a hedgerow or reaching a favoured roosting site. It may also increase the risk of bats to predation although under very different conditions likely to occur as part of the proposed works (BCT and ILE 2009). The temporary impact of lighting under a Single Phase approach has the potential to have a **minor adverse** impact on bats at a local level. Under a Two Phased approach the duration of this impact would increase from a maximum of ten weeks under a Single Phase approach to a total of 20 weeks in two periods over a Two Phased approach. This duration is still short term and the impact remains **minor adverse** and not significant in EIA terms.

287. Little Blakenham Pit SSSI is a known hibernation site for bats and is situated approximately 970m to the north-west of the onshore cable route and approximately 3km from the substation(s) location. There is therefore the potential for lighting impacts on favoured commuting corridors in proximity to the onshore cable route and substation(s). There would be no 24 hour lighting along the cable route except at CCS and substation compound locations. A lighting strategy would be produced to minimise impacts on the Little Blakenham Pit SSSI. Pre-construction activity surveys would be undertaken to identify key commuting routes around the substation(s) if necessary following review of the East Anglia ONE lighting strategy. These would follow the same methodology as the baseline surveys undertaken for the ES. This information would then form the basis of the lighting strategy focused on minimising impacts during sensitive construction months. This strategy would be agreed with the local authorities and construction implemented in line with the strategy. The pre-construction activity surveys and a pre-construction walkover survey would also be used to inform micro-routeing decisions for during-construction mitigation.

288. The following additional mitigation measures to minimise the effect of lighting upon bats is provided in *Table 23.16* below.

Table 23.16 Additional mitigation measures in relation to bats and lighting

Mitigation measures
Flood lighting would be directed away from woods likely to be used as commuting routes. General recommendations in relation to bats and lighting are provided in the publication by the Bat BCT and the ILE, *Bats and Lighting in the UK; Bats and the Built Environment Series* (2009). Key measures are summarised below and would serve as a basis for mitigation prior to more site-specific information provided by additional bat activity surveys proposed above. • Light spill should be reduced by directing the light to where it is needed. The design of the luminaire and use of accessories such as hoods, cowls, louvres can achieve this; • The height of any lighting columns generally should be as short as is possible as light at a low level reduces the ecological impact. Where taller columns are required, light should be directed at more acute angles to minimise light spill; • As worst case it is assumed that the bats use the woodlands adjacent to the substation(s) location to commute to the SSSI, lighting of these woods would be avoided; and • Periods of 24 hour lighting at the substation(s) would be minimised where possible during construction.

289. Following these best practice mitigation measures, the impact of lighting on bats would remain **minor adverse**.

23.6.1.11.3 Substation

Single Phase and Two Phased approach

290. Twenty-four hour lighting, during some limited periods, may affect bats at the substation(s) location. Different bat species vary in their sensitivity to lighting. *Myotis* and *Plecotus* species are the most light-sensitive species which have been recorded in the survey area. The impact of the lighting has the potential to reduce the available foraging and roosting habitat for bats as the lighting may deter bat from using a hedgerow or reaching a favoured roosting site. It may also increase the risk of bats to predation. Given the localised nature of the impact, this is considered to be of low magnitude. The temporary impact of lighting under a Single Phase approach has the potential to have a **minor adverse** impact on bats.

291. Under a Two Phased approach, during the second phase of construction operational lighting at the substation(s) site would be in place which would cause a negligible impact upon foraging and commuting bats (see section 23.6.2). The second Phase would increase this impact to a **minor adverse** impact in line with the Single Phase approach.

23.6.1.12 Impact 13: Impacts to Great Crested Newts

23.6.1.12.1 Landfall

Single Phase and Two Phased approach

292. **No impacts** on great crested newts are anticipated at the landfall location under either approach as no breeding ponds with newts were present within 250m.

23.6.1.12.2 Onshore Cable Route

Single Phase and Two Phased approach

293. No great crested newt breeding ponds would be lost as a result of the onshore cable route and therefore newts would only be at risk in their terrestrial phase. Direct impacts could include individual newts being affected by machinery, either directly or as a result of vibration. Also, the works may affect dispersal routes as haul routes are used during construction across suitable habitat near the seven confirmed breeding ponds.

294. No permanent loss of great crested newt terrestrial habitat would occur; however it is probable there would be a temporary, **minor adverse** impact of low magnitude through habitat loss and dispersal routes during construction under both approaches.

295. There are four discrete areas along the onshore cable route where great crested newt breeding ponds are present within a 250m radius of the onshore cable route (see *Figure 23.8a-g*). The following mitigation strategy is proposed, as agreed for East Anglia ONE (*see the OLEMS for further details*):

- All ponds within 250m of the proposed works will be surveyed for Great Crested Newts prior to construction. This is to ensure that the surveys meet Natural England's data requirements for informing a mitigation licence, which is typically between 2 – 4 years old. These surveys will be undertaken between March and mid-June in accordance with the latest guidance (of which the Great Crested Newt Mitigation Guidelines (English Nature 2001) are current at the time of writing).

- An exclusion programme of newts under licence from Natural England. This would involve the installation of amphibian-proof fencing around the working width (e.g. junction bay compounds and haul roads) in all areas identified as great crested newt breeding ponds during the pre-construction survey and using pit-fall trapping and carpet tiles to catch and remove all great crested newts from the working width prior to construction. This would take place during suitable conditions in the newt active season March-October inclusive for a period of time appropriate to the population size, and all in accordance with the Natural England Great Crested Newts mitigation licence.

- Newts would be transported to suitable habitat at least 50m away from construction works. These receptor sites would be identified during the pre-construction survey and clearly marked on maps to enable landowner permission to be gained prior to works commencing. The amphibian fence would remain in place until the works were complete in that area and the ground was remade.

296. Following the implementation of the strategy detailed below, impacts are considered to be of low magnitude and **minor adverse** significance under both approaches.

23.6.1.12.3 Substation

Single Phase and Two Phased approach

297. **No impacts** on great crested newts are anticipated at the substation compound as no breeding ponds were located within 250m of the substation location.

23.6.1.13 Impact 14: Impacts to Otter

23.6.1.13.1 Landfall

Single Phase and Two Phased approach

298. **No impacts** on otters are anticipated at the landfall location under either approach as signs for otter where located more than 1km west with no clear pathway via watercourses to the area.

23.6.1.13.2 Onshore Cable Route

299. Evidence of otter was recorded at 12 locations during the otter survey. Impacts on otters arising from construction may include temporary disruption to movement or foraging along watercourses and possible disturbance at resting or breeding places such as couches and holts. However, no confirmed holts or couches were identified along the onshore cable route during the 2012 water vole and otter survey.

Single Phase and Two Phased approach

300. All watercourses would be crossed and ducted prior to cable installation, therefore there would be **no impact** to habitat loss and disruption to commuting and foraging. Therefore the only potential impacts to otters from the installation of cables are likely to come from disturbance of increased noise, lighting and human presence. This would occur for a maximum of 10 weeks in any one location under a Single Phase approach to a total of 20 weeks in any one location in two periods under a Two Phased approach. This is likely to produce an effect of low to negligible magnitude under both approaches depending on the proximity of the ducting locations to the watercourse, since the impact would be temporary, short-term, and localised. Therefore the impact is considered to be **negligible**.

301. Additional mitigation measures are proposed below, as agreed for East Anglia ONE:

- Wherever possible, night-time working near watercourses would be avoided or else minimised;
- Obstructions to otter movement along watercourses would, wherever possible, be temporarily removed, beached or bridged at night (to the extent that otters could use either bank or the bed of the watercourse); and
- Exit ramps from excavations would be provided at night near watercourses with confirmed presence, so that otters can escape if they fall in.

302. Since otters are largely nocturnal, mitigation measures during construction would focus on the limiting the impact of night-time working or directional lighting (to

avoid disturbance to roaming otters), and the maintenance of barrier-free, night access along banks. Following the implementation of these measures the significance of the impact remains **negligible**.

23.6.1.13.3 Substation

Single Phase and Two Phased approach

303. No watercourses were identified within or adjacent to the substation(s) location and no otter field signs were identified there, therefore **no impacts** on otters are anticipated at the substation(s) for either approach.

23.6.1.14 Impact 15: Impacts to Water Voles

23.6.1.14.1 Landfall

Single Phase and Two Phased approach

304. No watercourses are located within the landfall area and no water voles were present in watercourses in the vicinity of the landfall (*Figures 23.10a - g*). Therefore, **no impacts** to water voles are anticipated under either approach.

23.6.1.14.2 Onshore Cable Route

Single Phase and Two Phased approach

305. All watercourses would be crossed and ducted prior to cable installation under both approaches, therefore there would be no direct habitat loss and disruption to commuting and foraging from cable installation. Potential loss of water vole escape holes arises from the installation of bailey bridges for haul route crossing points, and this represents the potential for killing or injuring water vole at six watercourses with water vole presence within the onshore cable route (23, 46, 70, 75, 80 and 90). This would impact a small area of each watercourse and likely produce a low magnitude impact upon a local value receptor under both approaches, leading to a **minor adverse** impact.

306. Potential impacts to water vole may arise from the use of the installation of cables through pre-installed ducts are likely to come from disturbance of increased noise, lighting and human presence. This would occur for a maximum of ten weeks in any one location under a Single Phase approach to a total of 20 weeks in any one location in two periods under a Two Phased approach. This is likely to produce an impact of low to negligible magnitude under both approaches depending on the proximity of the ducting locations to the watercourse, since the impact would be temporary, short-term, and localised. This would result in a **minor adverse** impact.

307. To mitigate the risk of damaging water vole escape holes through the installation of bailey bridges, a pre-construction survey is required prior to the installation of bailey bridges. Bridges would not be located within 50m of any water vole signs in the watercourses identified. These surveys would be conducted between April to October. The locations identified for bridge placement would be subject to habitat manipulation works prior to construction to ensure water voles do not move into these areas prior to construction.

308. Habitat manipulation works would involve:

- Strimming back to bare earth would begin as early as possible in the season (as water voles are less likely to stay in areas where predation is likely). Remove vegetation from the affected areas and a suitable buffer zone (up to 5m either side) with a strimmer until only bare earth remains. The strimmed area must extend to at least the top of the bank and, where suitable vegetation exists adjacent to the bank-top this would need to be strimmed as well; and
- Re-strim again if the vegetation grows longer than 5cm.

309. Following the implementation of the mitigation proposed, the impacts to water voles at the site are predicted to be **minor adverse**.

23.6.1.14.3 Substation

Single Phase and Two Phased approach

310. No watercourses were identified within or adjacent to the substation(s) location and no water vole field signs were identified here, therefore **no impacts** on water voles are anticipated at the substation(s).

23.6.1.15 Impact 16: Impacts to Reptiles

23.6.1.15.1 Landfall

Single Phase and Two Phased approach

311. There are potential direct impacts on reptiles associated with potential injury or harm to individuals which could occur during vegetation clearance of the working area (approximately 250m^2). Indirect impacts are associated loss of habitat as a result of vegetation clearance, which could restrict the breeding success of populations of reptiles.

312. At the landfall location, potential impacts to one area (002) at the cliff edge could arise from temporary habitat loss caused by construction plant accessing the beach under the short duct method. Access would take place along an existing track, but

there may be requirement for limited localised habitat removal at the coastal fringe to allow passage of the tracked excavator. This area had a moderate population of reptiles and the small size (e.g. narrow linear feature) and difficult access means that it is inappropriate to implement a translocation program here. At this area, a thorough hand search by a suitably qualified ecologist followed by habitat clearance and strimming would dissuade reptiles from the area and would be sufficient, as suitable unaffected habitat would remain. Under a Two Phased approach, this would be completed prior to each Phase.

313. The impact is considered to be temporary, short-term and localised, and of low magnitude, on a population of local value. A **minor adverse** impact is predicted under both approaches.

23.6.1.15.2 Onshore Cable Route

314. Impacts on reptiles could be both direct and indirect. Direct impacts are associated with potential injury or harm to individuals which could occur during vegetation clearance of the working width along the entire route including strimming of areas of rough grassland, patches of scrub, and removal of discrete sections of hedgerow.

315. Indirect impacts are associated with the loss of habitat as a result of vegetation clearance, which could restrict the breeding success of localised populations of reptile until the vegetation has time to re-establish.

316. Based on the 14 areas identified with moderate populations of reptiles, TN Areas 003, 007, 050 have been avoided through route selection. The following areas would be avoided through using pre-installed ducting (*Table 23.17*).

Table 23.17 Reptile locations avoided by using pre-installed ducting.

Location	Population Status
070	Low
071	Low
069	Medium
043	Low
042	Low
041	Low
031	Low
030	Low
023	Medium
022	Medium
021	Medium
002	Medium

Single Phase and Two Phased approach

317. Fourteen survey areas were highlighted on the onshore cable route where moderate numbers of reptiles were recorded, eight of which are avoided, for instance at the crossing of the River Deben using pre-installed ducting. For six remaining areas (2, 12, 18, 20, 45, 69) which may be affected by the proposed works, a precautionary method of working (PMoW) has been proposed to be adhered to during construction in any area identified as supporting reptiles. The PMoW would cover the following points:

- The jointing bays are frequently located near to field boundaries (for example to minimise impacts on agricultural land). Field boundaries (hedgerow, for example) are wildlife corridors for reptiles and the results of the reptile surveys strengthen this. As part of the embedded mitigation, a buffer against field boundaries in order to protect sensitive features such as hedges, trees (>5m) and watercourses (>10m) from construction activities would be in place. This would reduce the potential risk of affecting reptiles along the route. In addition, an ECoW would be present to supervise works, and the habitat affected would be fully reinstated (section 23.3.3);

- Where reptiles have been recorded in low numbers (i.e. at the majority of the 80 reptile survey sites) and at the optimal reptile habitat areas identified in the 2014 survey, the working areas would be made unsuitable prior to any works commencing by reducing cover as much as possible (by mowing or strimming to 5cm above ground-level) to discourage reptiles from the area during the reptile active season (March – October). These sections would then be left for one week to allow reptiles to move out of the area. Sections of hedge that are to be removed to facilitate construction would be coppiced using hand tools to prevent injuring any reptiles resting at the bases. Vegetation bases would only be removed once the area has been deemed clear of reptiles. These processes would be undertaken under a watching brief by a suitably qualified ecologist and any reptiles found would be transported to suitable habitat at least 50m away from construction works but where possible within development area. These receptor sites would be identified during the pre-construction walkover survey and clearly marked on maps to enable landowner permission to be gained where necessary prior to works commencing;

- If the affected reptile capture and release programme would be implemented at one location, specifically Reptile location 045 - Large area of grass and scrub. As only a small proportion of the site would be temporarily lost (as a worst case) a capture and release programme would be implemented and reptiles

would be moved to the large area of unaffected remaining habitat at least 50m away from the work. This is a worst case scenario – should it be possible to avoid siting a jointing bay in Reptile location 045, then no capture and release programme would be required;

- At the remaining nine locations the areas concerned are small in size (e.g. narrow linear features such as hedgerows) or have difficult access and therefore it is inappropriate to implement a translocation program here. Here, a thorough hand-search would be undertaken followed by strimming to dissuade reptiles from the area prior to construction; and
- A toolbox talk would be given to contractors prior to construction, covering legal responsibilities in relation to reptiles, reptile identification and procedure in case of a reptile find.

318. Following the embedded mitigation in the PMoW, injury of individual reptiles is considered extremely unlikely. Overall, impacts through habitat loss, typically at narrow habitats at boundaries are considered to be temporary, **minor adverse** and significant at a local level under both approaches. No additional mitigation measures are proposed.

23.6.1.15.3 Substation

Single Phase and Two Phased approach

319. Impacts on reptiles could be both direct and indirect. Direct impacts are associated with potential injury or harm to individuals which could occur during vegetation clearance of the working width along the entire route including strimming of areas of rough grassland, patches of scrub, and removal of discrete sections of hedgerow.

320. Indirect impacts are associated with the loss of habitat as a result of vegetation clearance, which could restrict the breeding success of localised populations of reptile.

321. At the substation(s) although no reptiles were identified, a small population was identified to the south. Impacts are considered to include the permanent loss of suitable habitat (up to 3.04ha) in the locality although the risk of injury is extremely unlikely. The magnitude of the impact is considered to be low and a **minor adverse** impact is predicted.

23.6.1.16 Impact 17: Impacts to Terrestrial Invertebrates

23.6.1.16.1 Landfall

Single Phase and Two Phased approach

322. The location with the greatest invertebrate value across the area covered by the onshore electrical transmissions works was Area L (*Figures 23.12b and c*), identified at the landfall. This site was deemed to be the most valuable site with regards to invertebrates due to the habitats present. The Wall Brown butterfly is the key invertebrate species potentially impacted at the landfall.

323. The landfall has been selected for being the least ecologically valuable area of the coast in the vicinity. The majority of the coastal area, including the vegetated shingle habitat would be avoided as cables would be pulled through pre-installed ducts. However, there is potential for impacts from vehicles accessing the shore in the short duct method and for methods from disturbance from increased noise, dust (see Chapter 20 Air Quality and Chapter 26 Noise and Vibration) and human presence.

324. The impacts would be temporary and the duration of works at the landfall is anticipated to be ten weeks for a Single Phase approach, and a total of 20 weeks over two periods for a Two Phased approach. The removal of flowering plants for feeding and pupal location by the placement of the ramp for intertidal access for the short duct method would lead to damage to the Wall Brown habitat. The temporary loss of habitat is a considered to be of medium magnitude, due to the long duration of the potential impact when considered in relation to the lifecycle of the Wall Brown, under both approaches resulting in a moderate adverse impact if short duct method is used. Embedded mitigation includes the production of a CoCP, including provision for an ECoW to ensure compliance with mitigation measures and for full reinstatement of habitats affected by the works. Following the implementation of these measures the impact is predicted to be **minor adverse**, which, although significant in the context of the landfall site, is not significant overall.

325. Given the dynamic nature of the cliff in this location, pre-construction surveys would be required to determine any required specific mitigation measures.

326. If the long duct method is used there would be **no impact** upon the cliff as works to excavate the duct end would be in the sublittoral.

23.6.1.16.2 Onshore Cable Route

Single Phase and Two Phased approach

327. The impacts of the works to invertebrates along the route would include temporary habitat loss and fragmentation, and disturbance from increased noise, dust (see Chapter 20 Air Quality and Chapter 26 Noise and Vibration) and human presence. Over the entire onshore cable route, habitat for invertebrates is generally of low value, since the majority is arable fields. The magnitude of the impacts to this habitat is considered low and a **negligible** impact is predicted. If jointing bays or haul roads are located close to key areas for invertebrates, the embedded mitigation proposed in *Table 23.4* would be employed. However, the terrestrial invertebrate survey (*Appendix 23.2*) identified several areas crossed by the onshore cable route with a more diverse invertebrate assemblage; these are detailed below.

328. Key invertebrate sites (*Figures 23.12a – 23.12c*)

- Area A – The majority of this area would remain unaffected due to the use of pre-installed ducting (River Gipping and surrounding grasslands) and therefore no impacts are anticipated on these areas. There is the potential for limited indirect impacts on ruderal and scrub habitats adjacent to construction areas and where access is taken from Paper Mill Lane;
- Area G – Whilst it is certain that construction would result in a temporary reduction in the invertebrates present through habitat loss, during the invertebrate surveys the area was noted to be degraded;
- Area H – Whilst it is certain that construction would result in a temporary reduction in the invertebrates present through habitat loss, the disturbance of the ground may increase the invertebrate assemblage post construction; and
- Area I – This is an elm hedge and would have already been removed during the construction works for East Anglia ONE.

329. Embedded mitigation includes the production of a CoCP, including provision for an ECoW to ensure compliance with mitigation measures and for full reinstatement of habitats affected by the works. In addition, the following mitigation measures were also agreed for East Anglia ONE (see *OLEMS*) and would be implemented for the proposed East Anglia THREE project:

- CSSs would have a minimum 5m buffer from boundary features in order to minimise habitat damage; and

330. These mitigation measures are only required if the jointing bay locations are situated within invertebrate areas. Once the final positions of the jointing bays are determined, the necessary mitigation from the worst case list outlined above would be enacted.

331. Following implementation of the mitigation proposed, the magnitude of the impact is predicted as low resulting in a **minor adverse** (in relation to Area A) and **minor beneficial** (in the case of Area G and H) under both approaches.

Key Invertebrate Species

332. Narrow-mouthed whorl snail – this species is known to historically have been present in vegetation along Martlesham Creek. However, embedded mitigation involves pre-installed ducts across the creek from East Anglia ONE and avoiding suitable habitat and therefore there would be **no impact**.

333. Stag beetle – with the exception recorded presence at a small number of mature oaks within Area G this species is unlikely to occur elsewhere due to habitats present within the onshore cable route, therefore there is limited potential for effect and therefore the impact is considered to be **negligible**.

334. Silver-studded blue butterfly – this species was highlighted by Butterfly Conservation but no habitat for this species was evident within the onshore cable route during the invertebrate survey. Therefore **no impacts** are anticipated.

335. Therefore, no impacts are anticipated on key invertebrate species. Other terrestrial invertebrate species would be impacted through temporary habitat loss of low magnitude. As most habitats are considered to be of low value to invertebrates, the impact is considered to be **minor adverse**.

23.6.1.16.3 Substation

Single Phase and Two Phased approach

336. The substation(s) station is located on arable fields which are considered to be of poor value to invertebrates. The site was not identified as a key area of interest by the terrestrial invertebrate survey. Therefore the magnitude of the impact to invertebrates at the substation(s) location is predicted to be negligible and the impact significance **negligible**.

23.6.1.17 Impact 18: Impacts to Aquatic Invertebrates

23.6.1.17.1 Landfall

Single Phase and Two Phased approach

337. No watercourses are located at the landfall location and therefore **no impacts** to aquatic invertebrates are anticipated.

23.6.1.17.2 Onshore Cable Route

Single Phase and Two Phased approach

338. Cables would be pulled through pre-installed ducts under the River Deben, Mill River, Martlesham Creek and River Gipping. Therefore **no impacts** to aquatic invertebrates (including white-clawed crayfish in Mill River) are predicted.

23.6.1.17.3 Substation

Single Phase and Two Phased approach

339. No watercourses have been identified within the substation(s) location and therefore **no impacts** on aquatic invertebrates are anticipated during construction.

340. Impact 19: Impacts to Fish

23.6.1.17.4 Landfall

Single Phase and Two Phased approach

341. There are no watercourses at the landfall location and therefore **no impacts** to fish are anticipated in the freshwater environment. Impacts to fish in the marine environment are discussed in Chapter 11 Fish and Shellfish Ecology.

23.6.1.17.5 Onshore Cable Route

Single Phase and Two Phased approach

342. Cables would be pulled through pre-installed ducts under the River Deben, Mill River, Martlesham Creek and River Gipping. Therefore **no impacts** to fish are predicted.

23.6.1.17.6 Substation

Single Phase and Two Phased approach

343. No watercourses have been identified within the substation(s) location and therefore **no impacts** on fish are anticipated during construction.

23.6.2 Potential Impacts during Operation

344. Whichever approach is undertaken for construction along the onshore electrical transmission works, the operational impacts (i.e. from occasional maintenance activities) would be the same therefore these are not considered separately as in the section 23.6.1.

23.6.2.1 Impact 1: Disturbance of Habitats and Species from Maintenance Activities

23.6.2.1.1 Landfall and Onshore Cable Route

345. Routine maintenance works would be required during the operational phase; however, this access would be via jointing bays or kiosks. Maintenance may include the excavation of soil in order to access the cables and disturbance of habitats for the footprint of these kiosks. This would be 0.02ha in total and is of an inconsequential size. It is anticipated that these events would be highly localised, temporary and of short duration. There may therefore be disturbance impacts to species (from noise, dust (see Chapter 20 Air Quality and Chapter 26 Noise and Vibration), and vehicle and human presence) and excavation of land disturbing habitats. In addition, jointing bays would be located away from watercourses and adjacent to field boundaries (avoiding rootzone) or roads and appropriate off-road vehicles would be used to access each of these. Overall a **negligible** impact is predicted.

346. In the event of a cable failure, it may be necessary to re-excavate the cable ducts and replace / repair the faulty cable along limited stretches. Works would be based around jointing bays. It is anticipated that these events would be highly localised, temporary and of short duration. Overall a **negligible** impact is predicted.

23.6.2.1.2 Substation

347. Routine maintenance of the substation(s) is anticipated to involve few vehicles and staff and thus disturbance from noise and human presence (above general operational movements on and off site) is predicted to be of low magnitude and only affect receptors in the immediate vicinity of the substation(s). Overall a **negligible** impact is predicted.

23.6.2.2 Impact 2: Impacts to Fauna from Operational Lighting and Noise

23.6.2.2.1 Landfall and Onshore Cable Route

348. No lighting would be in place along the landfall or onshore cable route and the only noise anticipated is expected to arise from maintenance, which is discussed above. Therefore there would be **no impact**.

23.6.2.2.2 Substation

349. The maintenance regime for the substation(s) would depend on the design of the station adopted but operational impacts are predicted to be limited to lighting and noise only since the main impacts to terrestrial ecology would have occurred already during the construction phase (see section 23.6.1 above).

350. During operation of the substation(s) there would be continual operational noise (Chapter 26 Noise and Vibration) and lighting impacts which have the potential to impact birds and bats through illumination of adjacent habitats, including the non-statutory sites Bullen Wood and Bushey and Fore Groves.

351. Operational lighting requirements at the substation(s) site may include;

- Security lighting round perimeter fence of compound to allow CCTV coverage;
- Car park lighting – as per standard car park lighting, possibly motion sensitive; and
- Repair / maintenance – if large works, then task related flood lighting may be necessary.

352. No additional lighting is proposed along Bullen Road or along the additional access roads at the substation(s).

353. Sensitive lighting should be used (as outlined in *Table 23.16*). Once the landscape planting is established the additional woodland would provide further foraging in the long-term (>10 years) and potentially roosting opportunities. Therefore over the lifetime of the project (25 years) a **negligible** impact is predicted for bats and birds from lighting.

354. Ambient noise levels around the substation(s) location were measured at between 41 to 44 dB(A) during the day and 33 to 36 dB(A) during the night. East Anglia THREE will commit to a requirement that noise emissions attributable to the substation shall not result in a noise level which exceeds 5dB above the current background noise level (LA_{90},1hr) during the day and 35dB LA_{eq} 15min during the night at Bullenhall Farm, Hill Farm and Woodlands Farm. Since the noise emitted would be continuous with little variation in pitch and volume, it is considered likely that wildlife would become accustomed to it and it is expected to be less disruptive than intermittent noise. The existing East Anglia ONE substation currently present within the site already produces a continuous level of noise which is similar in nature. Noise is discussed further in Chapter 26 Noise and Vibration. Following implementation of

embedded mitigation the magnitude of the impact is considered to be low and a **minor adverse** impact is predicted.

23.6.3 Potential Impacts during Decommissioning

355. This section describes the potential impacts of the decommissioning of the onshore electrical transmission works with regards to impacts on terrestrial ecology. The decommissioning of the project would be as required by the requirements in the DCO. The approach provided below provides a high level likely approach which could be taken. Further details are provided in Chapter 5 Description of the Development.

356. The onshore cable would be decommissioned (de-energised) and the cables and jointing bays left in situ, therefore there would be **no impact** for any receptor upon decommissioning at the landfall or along the onshore cable route.

357. In relation to the substation(s), the programme for decommissioning is expected to be similar in duration to the construction phase. The detailed activities and methodology would be determined later within the project lifetime, but are expected to include:

- Dismantling and removal of outside electrical equipment from site located outside of the substation(s) buildings;
- Removal of cabling from site;
- Dismantling and removal of electrical equipment from within the substation(s) buildings;
- Removal of main substation(s) building and minor services equipment;
- Demolition of the support buildings and removal of fence;
- Landscaping and reinstatement of the site (including land drainage); and
- Removal of hard standing.

358. Whilst details regarding the decommissioning of the substation(s) are currently unknown, considering the worst case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be similar to those during construction.

359. The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the project so as to be in line with current guidance, policy and

legislation at that point. Any such methodology would be agreed with the relevant authorities and statutory consultees.

23.7 Cumulative Impacts

360. Potential cumulative impacts to land could arise from interaction with other developments within the vicinity of the proposed East Anglia THREE project either temporally or spatially. Given that the ecological impacts of the proposed East Anglia THREE project mostly affect receptors within the onshore electrical transmission works, there is limited potential for interaction with any developments which do not have direct overlap with the proposed project. With regard to the receptors assessed in this chapter a potential for cumulative impact would only occur if those same receptors are affected. Whilst there may be additive cumulative impacts at the wider regional scale (e.g. several developments may affect the same watercourse or footprint, for example Adastral Park or the Bramford to Twinstead line) these activities would be managed and mitigated in a similar way to impacts described above for the proposed East Anglia THREE project and there would be few impacts.

361. A full list of projects that have been scoped into the CIA is provided in *Table 23.18*. These cover major known developments in the vicinity of the onshore electrical transmission works. The two key projects which have been identified as potentially causing cumulative impacts are the East Anglia ONE project and a future EAOW project which share the landfall and onshore cable route with the proposed East Anglia THREE project. These projects also propose to locate substation(s) within close proximity of the substation(s) proposed for the proposed East Anglia THREE project.

Table 23.18 Summary of Projects considered for the CIA in Relation to the Terrestrial Ecology

Project	Status	Construction / Operation period	[3]Approx. Distance from East Anglia THREE (km)	Project definition	Project data status	Included in CIA	Rationale
East Anglia ONE	Consented	2018 –2019 / 25 years	0	Offshore Windfarm Project Project description available	Complete/high	Yes	Construction would not overlap but consecutive disturbance possible. Operational and decommissioning impacts considered.
Future EAOW project	Pre-application	Unknown	0	Offshore Windfarm Project Outline project data only	Incomplete/low	Yes	Construction would not overlap but consecutive disturbance possible. Operational and decommissioning impacts considered.
Sizewell C	Pre-application	Unknown	24.7	Nuclear Power Station No project detail available	Low	No	No overlap with landfall, onshore cable route or substation(s) location, too distant to impact same receptors.
Bramford-Twinstead	Pre-application	Unknown	0	Outline only	Complete/high	No	Detail unknown, may affect land around the substation(s) location.
SITA (EfW plant)	Operational	Unknown	0.5	Energy From Waste	Complete/high	No	Would be operational before construction

[3] Shortest distance between the considered project and East Anglia THREE– unless specified otherwise.

Project	Status	Construction / Operation period	[3]Approx. Distance from East Anglia THREE (km)	Project definition	Project data status	Included in CIA	Rationale
				Plant Project description available			commences. No overlap with landfall, onshore cable route or substation(s) location
SnOasis	Planning permission granted	Unknown	0.7	Winter sport centre. Master plans available	Incomplete/low	No	Brownfield site, landfall, onshore cable route or substation(s) location
Old Fisons site (land west of Paper Mill Lane)	Planning Application TBD	Unknown	0.7	Business park and housing scheme. Master plans available	Complete/high	No	Brownfield site, landfall, onshore cable route or substation(s) location
Adastral park	Planning permission granted	Unknown	0.8	Business park and housing scheme. Master plans available	Complete/high	No	Mostly Brownfield site, landfall, onshore cable route or substation(s) location
Ipswich Garden Suburb	Identified in adopted Core Strategy	Primarily after 2020	3	Urban development north of Ipswich. Master Plan at consultation phase.	Incomplete / medium	No	Greenfield site. No overlap with landfall, onshore cable route or substation(s) location. Due to distance recreational pressure would focus on Orwell Estuary and not Deben Estuary.

Project	Status	Construction / Operation period	[3]Approx. Distance from East Anglia THREE (km)	Project definition	Project data status	Included in CIA	Rationale
Progress Power, Eye, Suffolk	Planning permission granted	Construction 2017-18, operation by 2019.	28	Gas fired power station development	Complete/ high	No	No overlap with landfall, onshore cable route or substation(s) location. Likely to be constructed prior to East Anglia THREE commencement
Land North Of Woods Lane, Melton, Suffolk	Conditionally Allowed	Unknown	2.7	Outline planning for a residential development for 180 dwellings (8.27ha in size) to include open space and provision of ecological habitat areas.	High	No	No overlap with landfall, onshore cable route or substation(s) location.

23.7.1 Potential Cumulative Impacts during Construction

362. East Anglia ONE would be constructed prior to the commencement of all other East Anglia zone projects (the proposed East Anglia THREE project – under both a Single or Two Phased approach – and a future EAOW project). East Anglia ONE would undertake specific preparatory works for the two subsequent projects (i.e. installation of cable ducts within the ground for future cable pull-through), therefore the cumulative impacts would arise from cable pulling and jointing operations (and construction of jointing bays) and the construction of the substation(s) for the different projects. For the CIA, it is considered that East Anglia ONE would have the greatest magnitude of impact, with the other projects having smaller and more localised overall magnitudes of impacts (i.e. at the jointing bays, access points to these and at the substation(s) location).

363. All of the areas associated with the construction of the East Anglia ONE onshore electrical transmission works would be reinstated / replanted on completion of the construction works (with the exception of the permanent structures at the substation(s) at which habitat is permanently lost). The baseline terrestrial ecology may not have entirely recovered in those areas affected by construction activities to the level described in this chapter (see section 23.5) prior to the commencement of construction of the other East Anglia projects. However, the CIA assumes that the areas affected are reinstated to their baseline condition as described above.

364. Although an EIA has not been undertaken for a future EAOW project, it is assumed for the purpose of this CIA that the impacts would be similar to those identified for the proposed East Anglia THREE project, i.e. for the installation of cables into pre-installed ducts.

23.7.1.1 Cumulative Impact 1: Impacts to Statutory Designated Sites

365. Only two statutory designated sites are within the footprint of the onshore electrical transmission works (see section 23.6.1.1).

23.7.1.1.1 Deben Estuary Ramsar, SPA and SSSI

366. There would be no impact upon the Deben Estuary Ramsar, SPA and SSSI from the proposed East Anglia THREE project and future EAOW projects, as the site would be avoided via pre-installed ducts (installed by East Anglia ONE). The subsequent projects would be pulling cables through pre-installed ducts and again avoid this site. As there would be **no impact** from East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project, there would be **no pathway** for cumulative impacts.

23.7.1.1.2 Suffolk Coast and Heaths AONB

367. The landfall and eastern part of the onshore cable route (up to the north side of the Martlesham Creek HDD crossing) are within the AONB.

368. For the saltmarsh, mudflat and wetland habitats of the AONB **no impacts** have been identified at a project level from East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project (as the habitats would be avoided via pre-installed ducts (installed by East Anglia ONE). It is considered that there is **no pathway** for cumulative impacts.

369. There would be **no impact** on woodland habitats from East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project at the landfall and substation(s) locations as this habitat has not been recorded during the surveys to date in these locations. Woodland along the onshore cable route within the AONB has been avoided via pre-installed ducts (installed by East Anglia ONE); therefore there would be **no pathway** for cumulative impacts.

370. Mature trees are present both within hedgerows and as lines of trees throughout the route. There would be some loss of mature trees along the onshore cable route from East Anglia ONE but by definition these trees could not be impacted twice. The impacts likely to arise due to subsequent projects would be in some limited areas and associated with the short term removal and subsequent replacement of reinstated hedgerows. Small sections of new hedgerow (5.5m each) would need to be removed for new access routes as part of the proposed East Anglia THREE project. Mature trees would be avoided where possible for the creation of new accesses but removal of isolated mature trees cannot be ruled out. Therefore the impact of multiple projects would remain **minor adverse** at the site level and impacts would be avoided where possible.

371. The only other major project within the AONB is the proposed development of Sizewell C. There are **no pathways** for cumulative impacts with Sizewell C on those features of the AONB for which East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project would have impact on. With regard to mature trees the impact of East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project would be **minor adverse** at the site level, but **negligible** at the wider scale of the AONB. No details of potential impacts from Sizewell C are available, however any impacts would ideally be avoided or mitigated and would be confined to the footprint of that project and would not be significant at the wider scale of the AONB. Therefore cumulative impacts across the AONB would be **negligible**.

23.7.1.2 Cumulative Impact 2: Impacts to Non-Statutory Designated Sites

372. All non-statutory designated sites are either avoided by the cable routeing or via pre-installed ducts (installed by East Anglia ONE) (refer to section 23.6.1.2). For those sites crossed by pre-installed ducts there is potential for indirect temporary noise disturbance, however direct physical impacts are avoided. Therefore the cumulative impact would be consecutive **minor adverse** noise and disturbance impacts from East Anglia ONE followed by lower magnitude disturbance impacts from cable pulling of future projects. It is therefore considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.3 Cumulative Impact 3: Impacts to Arable Land

373. Whilst there would be a short term, minor adverse impact on field margins through temporary habitat loss, these habitats are of low ecological value and anticipated to recover quickly. There would be **minor adverse** impacts from East Anglia ONE with **negligible** impacts for subsequent projects. It is therefore considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.4 Cumulative Impact 4: Impacts to woodland, scrub and trees

374. There would be **no impact** on woodland from East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project at the landfall and substation(s) as this habitat has not been recorded during the surveys to date.

375. Woodland along the onshore cable route has largely been avoided by routeing or by HDD or by pre-installed ducts from East Anglia ONE. Where impacts are unavoidable and mature trees are lost (a **minor adverse** impact), by definition these trees could not be impacted twice. Once East Anglia ONE is constructed and habitat reinstatement or replanting works undertaken, it is likely that the location of cable pulling works and the jointing bays would be micro-sited for subsequent projects to avoid further impacts on these areas. Therefore there would be **no pathway** for cumulative impact as the impacts would be associated with East Anglia ONE.

376. There would be a direct loss of scrub in numerous places along the onshore cable route. Scrub is a common habitat and the impacts would be temporary. The magnitude of the impact is predicted to be low, and a minor adverse impact is predicted for East Anglia ONE. There may be direct loss of scrub with subsequent projects but given the footprint of cable pulling works and the jointing bays compared with open trenching for East Anglia ONE, subsequent impacts are considered to be negligible. It is therefore considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.5 Cumulative Impact 5: Impacts to Hedgerows

377. There would be **no impact** on hedgerows at the landfall area as hedgerows are not present at this location.

378. Along the onshore cable route, impacts on species poor hedgerows would be **minor adverse** for East Anglia ONE at the local level. For hedgerows where there are protected species issues or those that are species rich (i.e. of county value), there is potential for **moderate adverse** impacts to occur at the local level for East Anglia ONE during the recovery period for the reinstatement of these features. Once the first project is constructed and there is habitat reinstatement or replanting, it is likely that the location of cable pulling works and the jointing bays would be micro-sited for subsequent projects to avoid further impacts upon those areas except in those areas where access to the cable route would be required. The removal of short sections of hedgerow for the installation of haul roads would still be required.

379. Impacts as a result of the proposed East Anglia THREE project have been minimised as a result of pulling cables through pre-installed ducts. However, it is considered that there is potential for sequential impacts and cumulatively there is potential for **moderate adverse** impacts for hedgerows where the short sections of hedgerow to be removed for the installation of haul roads contain protected species issues or those are species rich.

380. At the substation(s) location only one hedgerow would be directly impacted during construction of East Anglia ONE, with this impact being **minor adverse**. Subsequent projects would micro-site to avoid further impacts. Therefore there would be **no pathway** for cumulative impact as the impact would sit with the East Anglia ONE.

23.7.1.6 Cumulative Impact 6: Impacts to Grassland

381. There would be **no impact** on semi-natural grassland habitat at the landfall area as this habitat has not been recorded during the surveys to date within this location.

382. Along the cable route there is the potential for **minor adverse** impacts upon calcifugous and acid grassland, tall herb vegetation, unimproved and semi-improved neutral grassland, marshy grassland and swamp with **negligible** impacts on improved grassland for East Anglia ONE. Impacts would be temporary and reinstatement through natural regeneration would be expected to occur. Construction of subsequent projects would lead to sequential impacts at the location of cable pulling works, the jointing bays and access, but the overall footprint would be lower and given the low sensitivity of the grassland habitats it is considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.7 Cumulative Impact 7: Impacts to Coastal Habitats

383. Maritime cliffs and slopes and shingle only occur at the landfall. As East Anglia ONE would install ducts for subsequent projects impacts upon these habitats would only occur once. There would be a **moderate adverse** impact for East Anglia ONE. Should the short HDD construction option be followed there would be the need for construction plant, a tracked excavator, to access the beach. This disturbance may result in minor adverse impacts upon coastal habitats as part of the subsequent project construction. Ecology on coastal habitats tends to be dynamic and quick to recover. It is considered that cumulatively the impact would not be greater than **moderate adverse** at the site level.

384. Saltmarsh is only present on onshore cable route (see section 23.6.1.7). As the crossing at the River Deben would be made via pre-installed ducts (installed by East Anglia ONE) and ducts would be installed for future EAOW projects, there would be **no impact**.

23.7.1.8 Cumulative Impact 8: Impacts to Watercourses and Ponds

385. There would be **no impact** on watercourses and ponds at the landfall and substation(s) as these habitats have not been recorded during the surveys to date within these locations.

386. East Anglia ONE would use HDD to cross all main rivers including the River Deben, Kirton Creek, Martlesham Creek and the River Gipping, avoiding impacts on major watercourses and those of international value. All other watercourses would be crossed by East Anglia ONE and ducts installed for subsequent projects. The impact for East Anglia ONE would be **minor adverse** and locally significant. There would be no impact upon watercourses from subsequent projects as these would use the pre-installed ducts. There would be **no pathway** for cumulative impact as the impacts would sit with the first project.

387. No ponds are to be lost by the onshore electrical transmission works; however there are several ponds within 50m. Following the implementation of relevant pollution prevention measures in the Final OLEMS, there would be **no impacts** upon ponds.

23.7.1.9 Cumulative Impact 9: Impacts to Notable Plant Species

388. There would be **no impact** on notable plant species (Red List species) at the landfall and substation(s) as these habitats are not present at these locations.

389. Mossy stonecrop, suffocated clover, common cudweed and hoary cinquefoil are all present along the onshore cable route. Temporary loss of these species would occur, and whilst it is likely that populations would quickly recover (and may even

benefit from the disturbance) under a Single Phase approach, a Two Phase approach may restrict the regeneration for three growing seasons. There would be a **minor adverse** impact at the local level for East Anglia ONE with subsequent projects likely to have a greater magnitude of effect but still with potential for **moderate adverse** impacts. Cumulatively these impacts are likely to be no greater than **moderate adverse**.

390. There would be **no impact** on perennial glasswort, which occurs in both areas of saltmarsh along the River Deben, as the river would be crossed using pre-installed ducts by East Anglia ONE.

23.7.1.10 Cumulative Impact 10: Spread of Invasive Non-Native Species

391. Due to the distance of the occurrence non-native species from the landfall and substation(s) it is considered that there would be **no impact** from these species at these locations (see section 23.6.1.10).

392. Himalayan balsam, Canadian waterweed and Japanese rose all occur in the vicinity of the onshore cable route (see section 23.6.1.10). By adhering to good construction practices minimising the transfer of any plant and animal diseases it is considered that there would be **negligible** impact for all projects.

23.7.1.11 Cumulative Impact 11: Impacts to Badgers

393. **No impacts** on badgers are anticipated at the landfall and substation(s) due to the absence of badgers within this area.

394. There is potential for disturbance to badgers along the onshore cable route during construction for all East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project. For construction of East Anglia ONE the impact would be **minor adverse** which would be locally significant. Whilst the location cable pulling works, jointing bays and access would be micro-sited for subsequent projects to avoid further impacts, given the mobile nature of badgers it may be difficult to avoid all setts; however the impacts of subsequent projects should be of lower magnitude than the East Anglia ONE. It is considered that cumulatively the impact would not be greater than **minor adverse**, and not significant in EIA terms.

23.7.1.12 Cumulative Impact 12: Impacts to Bats

395. **No impacts** on roosting bats are anticipated along the onshore electrical transmission works due to the absence of confirmed tree roosts (see section 23.6.1.12). However, 45 trees within the onshore cable route have been identified as having potential to support roosting bats, therefore mitigation has been outlined to prevent the reduction of the potential roost 'stock' of the area. Given that that

removal of trees would only occur during the construction of East Anglia ONE and micro-siting of cable pulling works, jointing bays and access routes could be used to ensure that no further potential roosts are lost, it is considered that there is **no pathway** for cumulative impact.

396. There is therefore potential temporary **minor adverse** impact on commuting and foraging bats as a result of vegetation clearance and construction along the onshore cable route during construction of East Anglia ONE. These impacts would occur during the period of time when gaps are present in 'important bat hedgerows'. This is considered significant at district level during this time, until the hedgerows are replanted or reinstated. For subsequent projects micro-siting of cable pulling works, jointing bays and access routes could be used to minimise potential impacts, and overall these temporary impacts are considered to be of lower than for the East Anglia ONE project. Given that these impacts are temporary, it is considered that cumulatively the impact would be **minor adverse**.

397. Temporary lighting may be required along the onshore cable route and at CCS and HDD sites (East Anglia ONE only) and at the substation(s). The impact of the lighting has the potential to reduce the available foraging and roosting habitat for bats and may also increase the risk of bats to predation. The temporary impact of lighting has the potential to have a **minor adverse** impact on bats on a local level (see section 23.6.1.12). Given that these impacts are temporary, it is considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.13 Cumulative Impact 13: Impacts to Great Crested Newts

398. **No impacts** on great crested newts are anticipated at the landfall and substation(s) as no breeding ponds with newts are present within 250m of these locations (see section 23.6.1.13).

399. No great crested newt breeding ponds have been identified along the onshore cable route. However, there is potential to affect newts in their terrestrial phase through wider habitat loss and disruption of dispersal routes or mortality from machinery. There are five discrete areas along the onshore cable route where great crested newt breeding ponds are present within a 250m radius of the onshore cable route (see section 23.6.1.13). Mitigation would be implemented to reduce impacts to **minor adverse** for East Anglia ONE. Subsequent projects would have a smaller footprint and magnitude of impact and micro-siting of cable pulling works, jointing bays and access routes could be used to minimise potential impacts. Given that these impacts are temporary, it is considered that cumulatively the impact would be **minor adverse**.

23.7.1.14 Cumulative Impact 14: Impacts to Otter

400. **No impacts** on otters are anticipated at the landfall location as evidence of otter activity was recorded over 1km west from the proposed working areas. Furthermore, there are no connecting pathways (i.e. watercourses) between these areas of otter activity and the proposed working areas. No watercourses were identified within or adjacent to the substation(s) location and no otter field signs were recorded (refer to section 23.6.1.14).

401. Where watercourses are open-cut for construction of East Anglia ONE then there it is likely that a temporary, localised **minor adverse** impact would occur to the use of these watercourses for otter for commuting. There would be no impact upon watercourses from subsequent projects although there may be some disturbance effects if works occur close to otter habitats. Given that these impacts are temporary, and subsequent projects would have negligible disturbance impact only it is considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.15 Cumulative Impact 15: Impacts to Water Voles

402. No watercourses are located within the landfall or substation(s) location and no water voles have been recorded during the surveys undertaken to date. Therefore **no impacts** on water voles are anticipated at either location (see section 23.6.1.15).

403. Where watercourses are open-cut there would be potential for habitat loss and disruption to commuting and foraging for water voles, as well as disturbance from noise, lighting and human presence. **Minor adverse** impacts at eight locations along the onshore cable route are likely for East Anglia ONE. There would be **no impact** on watercourses from subsequent projects although there may be some disturbance effects if works occur close to water vole habitats. Given that these impacts are temporary, and subsequent projects would have negligible disturbance impact only it is considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.16 Cumulative Impact 16: Impacts to Reptiles

404. Reptiles or suitable habitat is present at the landfall, along the onshore cable route and at the substation(s) location. There are potential direct impacts on reptiles associated with potential injury or mortality to individuals, as well as direct impacts. Temporary, **minor adverse** impacts are predicted for the construction of East Anglia ONE which would be significant at a local level. For subsequent projects, although the footprint of works would be smaller at the landfall and onshore cable route, there would be permanent loss of habitat at the substation(s) location for the construction of up to three projects substations. However no reptiles have been

recorded during the surveys to date apart from a small population found to the south (refer to section 23.6.1.16). Given that the impacts at the landfall and onshore cable route are temporary and no reptiles were found (although suitable habitat is present) at the substation(s) location, it is considered that cumulatively the impact would not be greater than **minor adverse**.

23.7.1.17 Cumulative Impact 17: Impacts to Terrestrial Invertebrates

405. Suitable habitat for terrestrial invertebrates is present at the landfall, along the onshore cable route and at the substation(s) location. HDD activities would only occur during construction of East Anglia ONE however for terrestrial invertebrates the worst case scenario would be the use of short HDD, where access would be required to the beach by tracked excavator for each project. Creating access for this may require localised habitat clearance of a small area of cliff top vegetation, of local importance for the wall brown butterfly, on multiple occasions. Embedded mitigation includes the production of an OLEMS, including provision for an ECoW to ensure compliance and mitigation measures for full reinstatement of habitats affected by the works. The habitat reinstatement would take account of the habitat requirements of the wall brown to support a returning population at this location. The magnitude is considered to be low, due to the localised and short term reversible nature of the works, and the habitat for this species is considered to be of regional value. Overall, the cumulative impact is considered to be of **minor adverse** significance.

406. Along the onshore cable route, once East Anglia ONE is constructed and there is habitat reinstatement or replanting, it is likely that the location of cable pulling works and the jointing bays would be micro-sited for subsequent projects to avoid further impacts upon areas of importance for terrestrial invertebrates except in those areas where access to the cable route would be required. Mitigation is also detailed in section 23.6.1.17.

407. Therefore it is considered that there would be potential for sequential impacts and cumulatively there would be a **minor adverse** impact for areas of importance for terrestrial invertebrates.

408. The substation(s) is located on arable fields which are considered to be of poor value to terrestrial invertebrates. The site was not identified as a key area of interest by the terrestrial invertebrate survey. Therefore the magnitude of the impact to invertebrates at the substation(s) location is predicted to be negligible and the cumulative impact significance **negligible**.

23.7.1.18 Cumulative Impact 18: Impacts to Aquatic Invertebrates

409. No watercourses are located at the landfall location and therefore **no impacts** to aquatic invertebrates are anticipated.

410. Where watercourses are open-cut for construction of East Anglia ONE then there it is likely that a temporary, localised **minor adverse** impact would occur to aquatic invertebrates. There would be no impact on watercourses from subsequent projects. Therefore it is considered that cumulatively the impact would not be greater than **minor adverse**.

411. No watercourses have been identified within the substation(s) location and therefore **no impacts** on aquatic invertebrates are anticipated during construction.

23.7.1.19 Cumulative Impact 19: Impacts to Fish

412. No watercourses are located at the landfall location and therefore **no impacts** to fish are anticipated.

413. Where watercourses are open-cut for construction of East Anglia ONE then there it is likely that a temporary, localised **minor adverse** impact would occur to fish. There would be no impact upon watercourses from subsequent projects. Therefore it is considered that cumulatively the impact would not be greater than **minor adverse**.

414. No watercourses have been identified at the substation(s) location and therefore **no impacts** on fish are anticipated during construction.

23.7.2 Potential Cumulative Impacts during Operation

23.7.2.1 Cumulative Impact 1: Maintenance

23.7.2.1.1 Landfall and Onshore Cable Route

415. The presence of East Anglia ONE and the proposed East Anglia THREE project and a future EAOW project may bring the potential for maintenance to be undertaken more frequently than the proposed East Anglia THREE project in isolation. However, these events are still anticipated to be highly localised, temporary and of short duration and overall, no increase in the level of impact to ecological receptors is anticipated. Therefore, following construction mitigation measures described above, the impact significance is predicted to remain **minor adverse** for works required in watercourses and **negligible** for terrestrial maintenance works.

23.7.2.1.2 Substation

416. Routine maintenance would be required of the converter stations / substation(s) for all three projects. Therefore the frequency of visits to the converter stations / substation(s) is considered to be greater than for the proposed East Anglia THREE

project alone. There is potential for disturbance impacts to fauna off-site in the vicinity of the converter station / substation(s). However given that the area around the three converter station / substation(s) would be screened for some visual disturbance, noise and light impacts any indirect off-site impacts would be temporary and of negligible or low magnitude. Overall the impact is predicted to be **negligible**.

23.7.2.2 Cumulative Impact 2: Impacts to Wildlife from Operational Lighting and Noise

23.7.2.2.1 Landfall and Onshore Cable Route

417. No lighting would be in place along the landfall or onshore cable route and the only noise anticipated is expected to arise from maintenance which is discussed above.

23.7.2.2.2 Substation

418. Increased lighting and noise is predicted as a result of an additional number of converter stations / substation(s) in the vicinity of the substation(s). The cumulative increased human activity, lighting and vehicle movement at all three projects' substation(s) may be considered to have up to a **minor adverse** (not significant in EIA terms) cumulative impact on wildlife. This would be partly offset by landscaping areas having planting schemes designed and managed to promote use by local wildlife.

419. To mitigate impacts, sensitive lighting should be used (as outlined in *Table 23.16*). Once the landscape planting is established, the additional woodland would provide further foraging in the long-term (>10 years) and potentially roosting opportunities. In the long-term; therefore over the lifetime of the project (25 years) a **negligible** cumulative impact is predicted for wildlife from lighting during the operational phase of the proposed project.

420. Since the noise emitted would be continuous, it is expected to be less disruptive an intermittent noise. Potential screening of the proposed substation(s) may attenuate up to 10dB of the operational noise emitted (See Chapter 26 Noise and Vibration and Chapter 29 Seascape Landscape and Visual Amenity for further details on screening). Following implementation of the mitigation across the projects the magnitude of the cumulative impact is considered to be low and **minor adverse**.

23.7.3 Potential Impacts during Decommissioning

23.7.3.1 Landfall and Onshore Cable Route

421. The onshore cable would be decommissioned (de-energised) and the cables left in situ. Jointing and transition bays would also be left in situ. Kiosks would be removed

and so there would be negligible impacts at the landfall or along the onshore cable route.

23.7.3.2 Substation

422. The details regarding the decommissioning of the substation(s) are currently unknown. The worst case scenario is considered to be sequential removal and reinstatement as this would lead to sequential disturbance impacts. Impacts would be similar to but of lower magnitude for construction as discussed in section 23.6.1. Decommissioning would be undertaken in line with legislation, policy and best-practice guidance current at the time.

23.8 Inter-relationships

423. Table 23.19 shows the other ES chapters which have been identified as having inter-relationships with Terrestrial Ecology.

Table 23.19 Inter-relationships between terrestrial ecology and other topics

Topic and description	Related ES Chapter	Section where this has been addressed in this Chapter
Water Resource and Flood Risk	21	23.4 , 23.5, 23.6
Ornithology	13 / 24	23.4 , 23.5, 23.6
Air Quality	20	20.6
Noise and vibration	26	23.4 and 23.6
Traffic and transport	27	23.6

23.9 Summary

424. This section summarises the main findings from the EcIA. This is outlined in *Table 23.20.*

425. Potential impacts have been assessed for a number of ecological receptors (as outlined in section 23.6). Embedded mitigation has been provided as well as receptor specific additional mitigation. The majority of impacts that have been assessed are not significant but for some receptors there are locally significant impacts expected to occur.

426. The onshore electrical transmission works, including access, would cross a number of statutory and non-statutory designated sites. The landfall is within the Suffolk Coast and Heaths AONB and the only statutory nature conservation designated sites crossed or likely to be affected directly or indirectly by the onshore cable route (including CCS and access routes) are Deben Estuary Ramsar, SPA and SSSI and

Suffolk Coast and Heaths AONB. No impact is predicted to the interest features of these sites with the exception of loss of a small number of mature trees within the Suffolk Coast and Heaths AONB during construction.

427. Minor adverse impacts are predicted at landfall and along the onshore cable route for woodland, scrub and arable land mainly of a temporary nature as a result of increased disturbance, habitat loss and noise. Arable field margins are an UK BAP and Suffolk LBAP Priority Habitat but the examples here do not qualify as they are species-poor and heavily affected by agricultural input. Mitigation measures are provided in section 23.6.

428. Installation of cables along the onshore cable route would result in a loss of small sections of hedgerow to new haul routes which poses a significant impact at local level however considerable recovery would be achieved through re-planting. During this reinstatement and recovery period a moderate adverse impact is predicted. Additionally for coastal habitats, direct habitat loss during the cable installation would lead to a moderate adverse impact on cliffs and slopes.

429. Moderate adverse impacts upon notable plants were predicted under a Two Phase approach. No other impacts upon species were assessed as being significant in EIA terms (of moderate or greater significance).

430. With the exception of the impacts described in the paragraphs above no impacts during construction were considered to result in more than a minor adverse impact. Impacts for decommissioning were predicted to be similar to construction in the absence of further information on the likely process of decommissioning at this time.

431. The EcIA has been informed by a suite of desk and field studies undertaken between 2011 and 2014 by RSK and Royal HaskoningDHV.

Table 23.20 Summary of potential impacts Identified for ecological receptors

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
Construction						
Impact to statutory designated sites	Landfall	International / National / County	No change	No impact	No further mitigation needed	Not impact
	Onshore cable route	International / National / County	Negligible	Minor adverse	No further mitigation needed	Minor adverse Not significant
	Substation	International / National / County	No change	No impact	No further mitigation needed	No impact
Impact to non-statutory designated sites	Landfall	County	Low	Minor adverse	No further mitigation needed	Minor adverse Not significant
	Onshore cable route	County	Low	Minor adverse	No further mitigation needed	Minor adverse Not significant
	Substation	County	Low	Minor adverse	No further mitigation needed	Minor adverse Not significant

[4] Relevant to both a Single Phase and Two Phased approach, unless otherwise stated.
[5] Relevant to both a Single Phase and Two Phased approach, unless otherwise stated.

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
Impacts to arable land	Landfall /onshore cable route/ Substation	County	Low	Minor adverse to Negligible	No further mitigation needed	Minor adverse to Negligible
Impacts to woodland , scrub and trees	Landfall	County	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	County	Low	Minor adverse to negligible	Embedded mitigation (23.3.3) would include: Initial routeing and site selection to avoid Millers Wood Ancient Woodland. (This was undertaken by East Anglia ONE). Routeing of the cable to avoid areas of woodland and key features highlighted within the Suffolk landscape including trees, mature hedge trees and orchards. Careful routeing of the onshore cable route to avoid key areas of sensitivity e.g. near Howes Farm, meadows near Martlesham Hall, Fynn Valley. (This was undertaken by East Anglia ONE). Jointing bays would be located close to field boundaries and, where possible, away from sensitive features such as sensitive hedgerows and trees, if kiosks are used, these would, where possible, be sited close to field boundaries and hedgerows for visual screening, avoiding root zone. (This was undertaken by East Anglia ONE). Early installation of protective fencing would be utilised in order to minimise impacts to trees and their roots.	Minor adverse Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
	Substation	County	No impact	No impact	No further mitigation needed	No impact
Impacts to hedgerows	Landfall	County / Local	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	County / Local	Low	Minor adverse	Embedded mitigation (section 23.3.3) would include: Routeing of the cable to avoid areas mature hedge trees. Jointing bays would be located close to field boundaries and, where possible, away from sensitive features such as sensitive hedgerows and trees, if kiosks are used, these would, where possible, be sited close to field boundaries and hedgerows for visual screening, avoiding root zone. (This was undertaken by East Anglia ONE). An Arboricultural Method Statement and replanting scheme for each hedgerow crossing must be agreed with MSDC and SCDC as applicable, via the ACoW, prior to commencement of work at each hedgerow crossing. Refer to the OLEMS for full details of the mitigation put in place with respect to hedgerows. This will include: Early installation of protective fencing would be utilised in order to minimise impacts to trees and their roots. Reinstatement following cable installation to include: • Retain and relay vegetation to ditch sides; • Reinstatement of affected field boundaries and hedges in the same style or with the same species mix of the original and / or to match	Minor adverse (To occur during recovery period for reinstatement of these features) Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					adjacent boundaries for up to 5 years. Suitable maintenance (typically 5 years) of any newly planted sections of hedgerow, shelterbelts and woodlands following construction.	
	Substation	County / Local	Low	Minor adverse	Mitigation as for Onshore cable route.	Minor adverse Not significant
Impacts to grassland	Landfall	Local / County / Site	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	Local / County / Site	Low	Negligible - Minor adverse	No further mitigation needed	Minor adverse-Negligible Not Significant
	Substation	Local / County / Site	No change	Negligible	No further mitigation needed	Negligible
Impacts to coastal habitats	Landfall	National / District / County	Low	Minor adverse - Moderate adverse	Impact temporary and reversible. Pre-construction surveys would be required to determine any required specific mitigation measures.	Minor adverse - Moderate adverse
	Onshore cable route	National / District / County	No change	No impact	No further mitigation needed	No impact
	Substation	National / District / County	No change	No impact	No further mitigation needed	No impact

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
Impacts to watercourses and ponds	Landfall	International / Local	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	International / Local	Low	Negligible	Embedded mitigation (23.3.3). This would include: Pollution prevention measures would be implemented in accordance to Environment Agency PPG series, in particular • Working at construction and demolition sites: PPG6; and • Works and maintenance near water: PPG5 • Water vole mitigation in the form of dissuasion and / or capture and release.	Negligible Not significant
	Substation	International / Local	No change	No impact	No further mitigation needed	No impact
Impacts to notable plant species	Landfall	Local / County	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	Local / County	Low	Minor adverse	Mitigation outlined in section 23.6.1.9: • A pre-construction survey would be undertaken between April and September to obtain up-to-date information on the status of non-native invasive species within the footprint of the onshore electrical transmission works; • A detailed method statement/ protocol for dealing with invasive species (including common invasive species not identified during ecological surveys) would be prepared, focusing on	Minor adverse Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					preventing their spread. This would be agreed with the Environment Agency and Natural England and include a plan showing the location of identified invasive plant species; • Best practice measures with respect to invasive species adhered to; • If alien or invasive species were found on site the ECoW would be informed. The area would be demarcated and appropriate signage installed until the appropriate action can be taken; • A toolbox talk for contractors prior to construction on the known locations of and the identification of non-native invasive species, including the measures outlined above, would be undertaken; • Post construction monitoring would take place in areas where invasive species have been treated / removed.	
	Substation	Local / County	No change	No impact	No further mitigation needed	No impact
Spread of non-invasive species	Landfall	National	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	National	High	Negligible	Embedded mitigation (section 23.3.3) would include: A detailed method statement / protocol for dealing with invasive species would be prepared, focusing on preventing their spread. This would be agreed with the	Negligible Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					Environment Agency and Natural England and include a plan showing the location of identified invasive plant species. This protocol would be used if further stands were found during construction activities.	
	Substation	National	No change	No impact	No further mitigation needed	No impact
Badgers	Landfall	Local	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	Local	Low	Minor adverse	Pre-construction surveys would be undertaken to check whether any inactive setts have become active prior to construction, or whether any new setts have appeared since the 2014 survey. Should any active setts be identified within the footprint of the proposed works, these setts would need to be closed prior to construction. Closure of setts would require a licence from Natural England. The following mitigation measures should be in place during construction to minimise the risk of disturbing badgers in setts within 30m of the onshore cable route: • As a general rule, the use of noisy plant and machinery in the vicinity of the 30m disturbance zone around active setts. Upon further details of the works specific to within 30m of an active sett, where appropriate and proportional to the works, and as agreed with Natural England prior to works commencing, the ECoW may reduce the buffer to less than 30m where it is considered	Minor Adverse Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					the works will not result in obstruction or disturbance. • Flood lighting should be directed away from 30m disturbance zone around setts; • Chemicals should be stored as far away from the setts and badger paths as possible; • Trenches deeper than 1m must be covered at the end of each working day, or include a means of escape for any animal falling in (badgers would continue to use established paths across a site even when construction work has started); and • Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.	
	Substation	Local	No change	No impact	No further mitigation needed	No impact
Bats	Landfall	International	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	International	Negligible	Minor adverse	Mitigation *Table 23.16* 'additional mitigation to bats and lighting' • Flood lighting would be directed away from woods likely to be used as commuting routes; • The light should be as low as guidelines permit. If lighting is not needed, do not light;	Minor adverse Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					• The type of lamp is important and impacts to bats can be minimised by using low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its UV filtration characteristics; • Light spill should be reduced by directing the light to where it is needed. The design of the luminaire and use of accessories such as hoods, cowls, louvres can achieve this; • The height of any lighting columns generally should be as short as is possible as light at a low level reduces the ecological impact. Where taller columns are required, light should be directed at more acute angles to minimise light spill; • As worst case it is assumed that the bats use the woodlands adjacent to the substation(s) location to commute to the SSSI, lighting of these woods would be avoided. • periods of 24 hour lighting at the substation(s) would be minimised where possible during construction; and • Where health and safety requirements allow, roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10m in length either side of	

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					commuting route.	
	Substation	International	Low	Minor adverse	Mitigation outlined in *Table 23.16* 'additional mitigation to bats and lighting' (see above)	Minor adverse Not significant
Great crested newts	Landfall	District	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	District	Low	Minor adverse	Embedded mitigation (section 23.3.3). This would include: Provision of great crested newt mitigation under licence from Natural England as outline in the OLEMS.	Minor adverse Not significant
	Substation	District	No change	No impact	No further mitigation needed	No impact
Otter	Landfall	County	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	County	Low - negligible	Negligible	Embedded mitigation (section 23.3.3)	Negligible Not significant
	Substation	County	No change	No impact	No further mitigation needed	No impact
Water voles	Landfall	Local	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	Local	Low - negligible	Minor adverse	Embedded mitigation (section 23.3.3)	Minor adverse Not significant
	Substation	Local	No change	No impact	No further mitigation needed	No impact
Reptiles	Landfall	Local	Low	Minor adverse	A thorough hand search by a suitably qualified ecologist	Minor adverse

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
					followed by habitat clearance and strimming would dissuade reptiles from the area and would be sufficient, as suitable unaffected habitat would remain.	Not significant
	Onshore cable route	Local	Low	Minor adverse	Embedded mitigation (section 23.3.3)	Minor adverse Not significant
	Substation	Local	Low	Minor adverse	No further mitigation needed	Minor adverse Not significant
Terrestrial invertebrates	Landfall	Up to National	Medium	Minor adverse	Embedded mitigation (section 23.3.3)	Minor adverse Not significant
	Onshore cable route	Up to National	Low	Negligible	Embedded mitigation (section 23.3.3)	Minor adverse / minor beneficial Not significant
	Substation	Up to National	Negligible	Negligible	No further mitigation needed	Negligible Not significant
Aquatic invertebrates	Landfall	Site	No change	No impact	No further mitigation needed	No impact
	Onshore cable route	Site	No change	No impact	Embedded mitigation (section 23.3.3)	Minor adverse Not significant
	Substation	Site	No change	No impact	No further mitigation needed	No impact
Fish	Landfall	Site	No change	No impact	No further mitigation needed	No impact

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
	Onshore cable route	Site	No change	No impact	Embedded mitigation (section 23.3.3)	Minor adverse Not significant
	Substation	Site	No change	No impact	No further mitigation needed	No impact
Operation						
Disturbance of habitats and species from maintenance activities	Landfall and onshore cable route	Local / District / County / International	Low	Negligible	Embedded mitigation (section 23.3.3)	Negligible Not significant
	Substation	Local / District / County / International	Low	Negligible	No further mitigation needed	Negligible Not significant
Impacts to fauna from operational lighting and noise	Landfall and onshore cable route	International / County	No change	No impact	No further mitigation needed	No impact
	Substation	International / County	Low	Minor adverse to Negligible	Embedded mitigation (section 23.3.3) and mitigation detailed in *Table 23.16*	Minor adverse to Negligible Not significant

Potential Impact	Receptor	Value / Sensitivity	Magnitude[4]	Significance[5]	Mitigation	Residual Impact
Decommissioning						
Terrestrial ecology	Onshore cable de-energised	Local / District / County / International	No change	No impact	No further mitigation needed	N / A
Terrestrial ecology	Substation	Local / District / County / International	As outlined in construction	As outlined in construction	As outlined in construction	As outlined in construction

23.10 References

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Chapter 23 Ends Here