East Anglia
Offshore Wind

VATTENFALL

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East Anglia THREE

Chapter 22
Land Use

Environmental Statement
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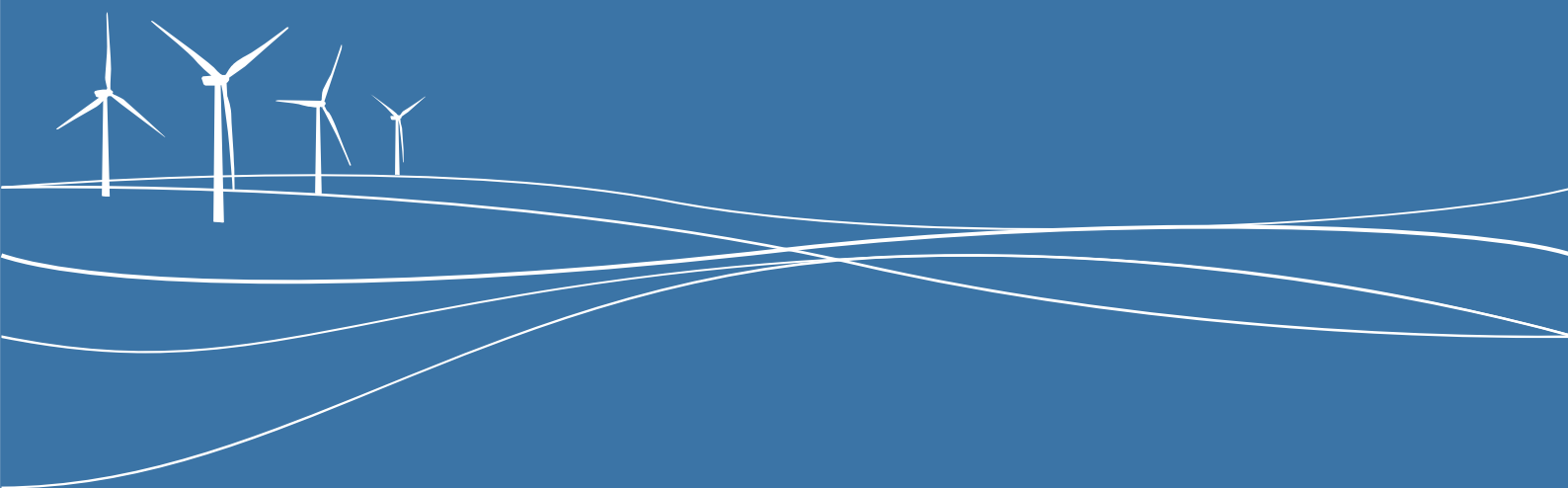

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22 LAND USE

22.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the potential impacts of the proposed East Anglia THREE project on land use. The chapter provides an overview of the existing land use located where the onshore electrical transmission works are proposed, followed by an assessment of the potential impacts of two construction approaches (Single Phase and Two Phased, described in section 22.3.2), operation and decommissioning of the onshore cable and associated infrastructure for the proposed East Anglia THREE project. The assessment considers cumulative impacts of existing and proposed projects. Further information regarding the approach taken towards impact assessment is discussed in Chapter 6 Environmental Impact Assessment Methodology. This chapter has been prepared by Royal HaskoningDHV.

2. Figures which accompany the text in this chapter are provided in *Volume 2 Figures*. This chapter is supported by *Appendix 22.1* Consultation for East Anglia ONE, and *Appendix 22.2* Land Use Tables.

3. It should be noted that the proposed East Anglia THREE project also has the potential to impact land uses discussed in other chapters within the ES and its appendices and supporting documents. These are referenced within this chapter where relevant:

- Chapter 19 Soils, Geology and Ground Conditions;
- Chapter 23 Terrestrial Ecology – covering nature conservation sites and land with ecological interest;
- Chapter 27 Traffic and Transport - covering roads and access;
- Chapter 28 Socio-economics, Tourism and Recreation;
- Chapter 29 Seascape, Landscape and Visual Amenity; and
- The Outline Code of Construction Practice (OCoCP).

22.2 Consultation

4. Consultation undertaken to date is provided in *Table 22.1*. The consultation includes responses from consultees in relation to the East Anglia ONE Offshore Windfarm Scoping Report (RSK 2011) and quoted as per the East Anglia ONE Environmental Statement (ES) (RSK 2013). *Appendix 22.1* details the East Anglia ONE PEIR consultation (RSK 2012a) and Phase 2 Consultation (RSK 2012b), which are also

considered relevant to the proposed East Anglia THREE project given that the onshore cable route is shared with East Anglia ONE.

Table 22.1 Consultation Responses

Consultee	Date /Document	Comment	Response / where addressed within the ES
Suffolk County Council (SCC)	Scoping Opinion / December 2012	With regard to paragraph 632 ['temporary diversions may be required…'], as a point of clarity, 'diversions' of rights of way should properly be referred to as temporary closures with alternative routes provided. On a similar theme, when access is restricted to National Cycle Routes, then Diversionary National Cycle Route signs must be used to guide cyclists back to the open route sections.	Works would comply with standards at the time of construction. Details of proposed management procedures are incorporated into the Outline Code of Construction Practice (OCoCP), submitted alongside the DCO application.
SCC	Scoping Opinion / December 2012	Paragraph 637 refers to mitigation though it is not stated where the provisions for the restoration of rights of way will be set out – we suggest that this is something the CoCP should consider. The same paragraph also refers to the role of Agricultural Liaison Officers (ALOs) – we suggest that they could also be the appointed contact for the restoration of rights of way.	Works would comply with standards at the time of construction. Details of proposed management procedures are incorporated into the outline CoCP submitted alongside the DCO application.
Planning Inspectorate	Scoping Opinion / December 2012	The PI highlights the potential for sterilisation of land along the cable route during all phases of the proposed project. This is a particular issue with underground connecting infrastructure and the Planning Inspectorate expects the ES to assess these impacts.	The potential impacts of land sterilisation are discussed in section 22.6
Planning Inspectorate	Scoping Opinion / December 2012	Consideration should be given to any gas and electricity pipelines buried onshore and the potential restrictions this may place on the location of the onshore cables. Please see National Grid's comments	Utilities are considered in section 22.5, 22.6 and 22.7 An updated utilities data search has been undertaken in 2015 and included in the final

Consultee	Date /Document	Comment	Response / where addressed within the ES
		(Appendix 2 of this Opinion) for further information.	ES and DCO application.
Planning Inspectorate	Scoping Opinion / December 2012	The Planning Inspectorate advises that this section should consider the interrelationship with ecology, in particular the impacts from the removal of grassland, trees and hedgerows ecological habitats. Appropriate reference should also be made to the socio-economic assessment in the ES.	Reference to ecology and consideration of ecological habitats is given in section 22.6. Reference is made to Chapter 28 Socio Economics as appropriate in this chapter.
SCC, Mid-Suffolk District Council (MSDC), Suffolk Coastal District Council (SCDC)	PEIR Response July 2014	The LA's confirm that there were no unresolved matters from the EA ONE development on this topic	Noted.
SCC, MSDC, SCDC	PEIR Response July 2014	In terms of local policy, reference should be made to SCC's statutory Rights of Way Improvement Plan (ROWIP)	Reference to the (ROWIP) is given in section 22.4.1.
SCC, MSDC, SCDC	PEIR Response July 2014	With respect to impact on agricultural activities, directly through land loss, but also indirectly through interference with drainage, we urge EAOW to work closely with landowners to address those concerns, including liaising with them on appropriate measures to be included in the OCoCP. In particular the location of jointing pits should have regard to their impact on the efficiency of farming operations.	The OCoCP includes liaison with landowners and includes measures to minimise disruption to agricultural activities as far as possible. Jointing bays would be located be located away from watercourses and adjacent to field boundaries. Reference should be made to embedded mitigation, in section 22.3.3.
SCC, MSDC, SCDC	PEIR Response July 2014	The presentation of the Public Rights of Way (PRoW) information could be improved as to evaluate impacts on them requires rather laborious cross-referencing between Figures 22a-g, Figures 27.2-27.5, Figures 5.2 – 5.11 and Appendix 27.5. The colour scheme and	Figures have been updated and are included in Volume 2 Figures. Figures now include all PRoW unique IDs.

Consultee	Date /Document	Comment	Response / where addressed within the ES
		key on the PRoW Figures 22a - 22g are also poor: the site boundary is red, the access roads are red and obscure the underlying PRoW and the National Cycle route is red as is the Regional cycle route (red dashes).	
SCC, MSDC, SCDC	PEIR Response July 2014	It would also be helpful in future iterations if the five promoted paths (paragraph 78) are explicitly mapped.	Promoted footpaths are shown on *Figure 22.7*.
SCC, MSDC, SCDC	PEIR Response July 2014	Our main concern with this chapter is that Section 22.6.1.6.2, in particular paragraph 137, should recognise that in Scenario 1 a number of the new proposed accesses along farm tracks are PRoW and depending on the volumes of vehicles involved may require temporary closures and alternative routes to be provided in the interests of safety of non-motorised users. We require further discussions on this matter (see also comments under the transport chapter).	PRoWs would only need closure or diversion where the PRoW itself is used as an access. In those locations where works simply cross a PRoW, no closure would be required whilst haul road is installed and then removed. Works would be limited to a couple of hours and access maintained by the use of banksmen. Where more substantial works are required, this would be discussed and agreed with SCC pre-construction. Measures for any temporary stopping or diversions are outlined in the OCoCP. A detailed list of the potential interactions on PRoW, including vehicle numbers is shown in *Appendix 22.2.*
SCC, MSDC, SCDC	PEIR Response July 2014	At the current time we have particular concerns with the proposals as set out below. To further discussions more detail is required on the volumes of vehicles on each PRoW and the duration of likely disruption.	Any interactions with PRoW, vehicle movements any temporary closures and alternative routes are discussed in section 22.6 of this chapter and detailed within *Appendix 22.2.* Details on any temporary closures have been discussed with SCC pre-submission and will be discussed again during pre-

Consultee	Date /Document	Comment	Response / where addressed within the ES
			construction.
SCC, MSDC, SCDC	PEIR Response July 2014	With respect to the converter station, we understand that on previous occasions National Grid has provided an alternative route for Bridleway 1 to the south the substation (on its land) where there has been a need to temporarily close it. We suggest this option is looked at by EAOW.	Any interactions with PRoW, vehicle movements, temporary closures and alternative routes are discussed in section 22.6 of this chapter and detailed within *Appendix 22.2*
SCC, MSDC, SCDC	PEIR Response July 2014	We would also note that the surfaces of PRoW are vested with SCC as the highway authority, consequently we would need to agree any changes to that surface, both during construction and on restoration. While in some circumstances a farmer may appreciate "an upgrade to the local infrastructure" (Chapter 5, paragraph 332), any permanent change in condition of a PRoW will need to be agreed with SCC who will take in to account the requirements of the users of that PRoW (for example horse riders who prefer softer conditions).	Sections of PRoWs affected by the works would be reinstated to existing condition or better following the works. An Outline CoCP would be submitted in support of the DCO application.
SCC, MSDC, SCDC	PEIR Response July 2014	In terms of mitigation we would support measures in the OCoCP in particular note the need for pre- and post-construction surveys and measures to publicise interruptions to access.	Noted.
Natural England	PEIR Response July 2014	EA 3 should make land owners aware that they should be discussing implications with their Natural England HLS advisor should the project cross	The OCoCP includes liaison with landowners and reference should be made to embedded mitigation, in section 22.3.3.

Consultee	Date /Document	Comment	Response / where addressed within the ES
		areas currently under agreement	
SCC	Consultation Meeting September 2015	Disagree that levels of traffic don't affect assessment on land use – PRoW would be affected Table 22.5 AP11 policy has been abandoned from the old local plan Access and diversions at substation site is dependent on NGET duct cable pulling at Bramford. If bridleway needs to be closed then the restricted byway could be used as a diversion through agreement with SCC	Noted. Any interactions with PRoW, vehicle movements, temporary closures and alternative routes are discussed in section 22.6 of this chapter and detailed within *Appendix 22.2.* Updated policy has been included within Table 22.5. Details on any temporary closures have been discussed with SCC pre-submission and will be discussed again during pre-construction.

22.2.1 Statement of Common Ground (East Anglia ONE)

5. The proposed East Anglia THREE project utilises the same onshore cable route and substation location as East Anglia ONE, hence the data sources and approach used by East Anglia ONE are the basis for the assessment of the proposed East Anglia THREE project. Therefore, the Statement of Common Ground (SoCG) developed and agreed for East Anglia ONE is relevant to this assessment.

6. The SoCG was produced for East Anglia ONE in July 2013 for electromagnetic fields and health impacts, and Public Rights of Way (PRoW). Consultees included Suffolk County Council (SCC), Mid-Suffolk District Council (MSDC), Suffolk Coastal District Council (SCDC), Natural England, East Suffolk Internal Drainage Board, and Suffolk Wildlife Trust (SWT). The next sections outline the matters agreed in the SoCG. Further details for the SoCG are provided in *Appendix 23.1.*

7. The matters agreed in the East Anglia ONE SoGC, deemed relevant to the proposed East Anglia THREE project by East Anglia THREE Limited (EATL), are outlined below. These matters have been considered during the assessment process within this chapter:

   - The parties agreed with the results of the assessment of impacts in relation to electromagnetic field impacts from East Anglia ONE, as outlined in ES Volume 3, Chapter 23.

- The parties agreed that adherence to the requirements within the DCO (Version dated 12th July 2013), and the commitments to be contained within the OCoCP for East Anglia ONE, would ensure the avoidance of health related impacts from land contamination.
- The parties agreed that compliance with relevant national health and safety legislation and guidance would ensure the health and safety of construction, and operational personnel onshore, is appropriately managed.
- It was agreed that there were no other outstanding matters that had not been agreed with respect to health impacts in relation to the project application.
- It was agreed that there were no other outstanding matters that had not been agreed with respect to electro-magnetic fields.
- It was agreed that the assessment of impacts upon PRoW was sufficient and adequate for the purposes of the application and Environmental Statement. The parties agreed with the results of this assessment.
- The parties agreed with the provisions of the DCO (Version dated 12th July 2013) in regard to temporary stopping up of PRoW.
- The parties agreed the provisions of the OCoCP for East Anglia ONE in relation to PRoW. The detail in the OCoCP in relation to PRoW was agreed to be sufficient to inform a consenting decision.
- It was agreed that Schedule C Parts 1 & 2 submitted with the East Anglia ONE application should be replaced with the revised Schedules within the draft DCO (July 2013).
- It was agreed that there were no other outstanding matters that had not been agreed with respect to PRoW in relation to the Project Application.

8. Given the above, the assessment for the proposed East Anglia THREE project builds upon the logic of the East Anglia ONE assessment. For the proposed East Anglia THREE project, a SoCG would again be developed with the relevant parties.

22.3 Scope

22.3.1 Study Areas

9. For the purpose of this assessment, and to aid the baseline descriptions, the following study areas have been defined to assess the direct and indirect impacts associated with the project. These are shown in *Figure 22.1*, they are:

- Development footprint, referred to hereafter as the onshore electrical transmission works including access: This is outlined in Chapter 5 Description of the Development. It has been selected as it is considered to be the largest area over which direct impacts (e.g. soil degradation) would be experienced.

- Local or parish boundary: This study area is used to assess indirect impacts and provides the first point on the scale to put impacts into the local context. There are 118 civil parishes and towns in SCDC, and 122 town and parish councils in MSDC (MSDC undated; SCDC 2014). The onshore cable route crosses 23 of these boundaries and the substation(s) would be located in the Bramford parish.

- Local planning authority boundary: This is the study area for indirect impacts and provides the second point on the scale to put impacts into the district context. This incorporates the entire district boroughs of MSDC and SCDC. This has been selected as this is the spatial level at which local plan policy is made and development objectives applicable as the local planning authority.

- County Boundary: This study area is used to assess indirect impacts and provides the third point on the scale to put impacts into the county context of Suffolk. The onshore cable route and substation(s) are wholly within the county of Suffolk.

10. Detailed engineering design, route refinement, and additional information was sought for the onshore cable route, Construction Consolidation Sites (CCS) and associated temporary works (area / access roads) during the Environmental Impact Assessment (EIA) undertaken for East Anglia ONE. This assessment 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 Project). The ES for East Anglia ONE also identified the converter station / substation locations for the East Anglia ONE, the proposed East Anglia THREE project and a future East Anglia Offshore Wind (EAOW) project.

11. This chapter considers potential impacts of the onshore electrical transmission works (including access) of the proposed East Anglia THREE project in relation to:

- Agricultural Land Classification (ALC);

- Agri-environment schemes;

- Notifiable scheduled diseases and injurious weeds and invasive plant species (i.e. certain highly contagious animal diseases such as anthrax, foot and mouth disease and the presence of Japanese knotweed or giant hogweed etc.);
- Existing land uses, including PRoW and open access;
- Existing utilities;
- Planning designations from the relevant local development plans;
- Land sterilisation;
- Landowners, tenants and residents;
- Electro-magnetic fields (EMF); and
- Cumulative impacts.

22.3.2 Worst Case

12. 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).

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

14. 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.
- Construction Consolidation Sites (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.

15. 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.

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

17. The onshore cable route is approximately 37km long and is shown in *Figures 5.2 to 5.11*. Access to the onshore cable route would mainly be via existing roads and tracks (therefore minimal haul road required except for where joints are placed in remote areas). This would reduce disruption to arable fields (and hedgerows and other sensitive habitats). Use of the existing tracks by EATL has been subject to consultation in 2014 and 2015 with landowners and the general public.

18. For each impact, the assessment utilises a worst case approach for each of the two approaches to construction described above. The design parameters that constitute worst case vary depending on the potential impact under consideration and are used as detailed in *Table 22.2* below.

19. 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.

20. As discussed in Chapter 5 Description of the Development (section 5.6.6.2.2) 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 consider that for land use it would be more disruptive for all receptors to install and remove haul road twice under the Two Phased approach due to the increased disturbance to the ground, than to leave it in situ. In addition, given that locations where haul road would be left in place is dependent upon individual landowner decisions and local authority approval, at this stage it is not possible to determine where this may occur and which receptors would be affected. Therefore, this potential case is not assessed independently as it is considered that the impacts of leaving the haul road in situ between phases falls within the magnitude of effects assessed under the two construction approaches presented.

21. Only those design parameters with the potential to influence the level of impact are identified. Therefore, if the design parameter is not described below, it is not considered to have a material bearing on the outcome of the land use impact assessment. For example: the number of traffic movements required during construction would not affect either the sensitivity of the land use receptor or the magnitude of effect on that receptor and therefore is not considered relevant to the assessment in this chapter.

22. 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 22.7).

Table 22.2 Worst Case Assumptions

Impact	Key design parameters forming worst case scenario	Rationale
Construction		
All impacts	*Single Phase* • Footprint = area of haul road, maximum 62 x jointing bay compounds (each containing 775m2 of hardstanding), 1 x transition bay compound, substation(s) compound and 7 CCS = 37.85ha; • Total footprint of jointing bay compound (each) – 3,740m^2 • Total spoil = 121m^3 from pits to house jointing bays. • Total residual spoil for removal offsite = 4,404m^3 • Material to be stored onsite = 72,480m^3 • Onshore cable route - duration of works = 29 weeks (with approximately 10 weeks work required in any one section (see *Figure 5.14*) of the onshore cable route); • Substation(s) - duration of works 55 weeks. *Two Phased* • Footprint = area of haul road (laid twice), maximum 124 x jointing bay compounds (each containing 775m^2 of hardstanding), 2 x transition bay compounds, substation(s) compound and 7 CCS = 67.05ha; • Total footprint of jointing bay compound (each) – 3,400m^2 • Total spoil = 215,586m^3 from pits to house jointing bays • Total residual spoil for removal offsite = 4,404m^3 • Material to be stored onsite = 83,547m^3 • 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; • Substation(s) - duration of works 55 weeks, a gap of 20 weeks then further 55 weeks.	Values provided within Chapter 5 Description of the Development
Operation		
Impacts to agricultural land – land taken out of existing use. Impacts to environmental	*Both approaches* • Permanent land take at substation(s) compound (during operation) = 3.04ha; • Kiosks along cable route – Total (0.75m^2 x 248) 186m^2	Values provided within Chapter 5 Description of the Development.

Impact	Key design parameters forming worst case scenario	Rationale
stewardship schemes (ESS) – land taken out of existing use.		
EMFs– human health and soil heating	*Both approaches* • Under either the high voltage direct current (HVDC) or low frequency alternating current (LFAC) electrical solutions up to four cables would be installed into four sets of ducts.	Values provided within Chapter 5 Description of the Development.
Secondary impacts Impact on land drainage systems	*Both approaches* • Permanent land take at substation(s) compound (during operation) = 3.04ha; • Kiosks along cable route – Total (0.75m^2 x 248) 186m^2	Values provided within Chapter 5 Description of the Development.
Decommissioning		
All impacts	*Both approaches* • Buried cable system: Cables de-energised and left in situ; • Jointing bays left in situ; • Substation(s) removed and land returned to initial state; • Landscaping and reinstatement of the site; • Presence of plant and vehicles (see Chapter 27 Traffic and Transport).	Values provided within Chapter 5 Description of the Development.

22.3.3 Embedded Mitigation

23. Mitigation measures which are relevant to land use and which have been embedded into the project design are listed in *Table 22.3*. 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 including access. Specific mitigation measures, which apply to either the landfall, onshore cable route or substation(s), are described separately thereafter.

Table 22.3.Embedded Mitigation in relation to Land Use

Parameter	Mitigation measures embedded into the project design
General	
Code of Construction Practice (CoCP)	OCoCP is included with this application which sets out the management measures EATL for any onshore construction works associated with the East Anglia THREE project. The final versions of this document would be agreed with local authorities prior to the commencement of construction works.
Construction	Best practice soil handling to prevent the spread of plant and animal diseases, including following the Environment Agency (EA) (2010) guidance: Managing Invasive Non-native Plants. Should any animal remains be discovered during the construction phase that indicate a potential burial site, the main works contractor would cease all work and immediately advise the Animal Health Regional Office accordingly. Measures contained in relevant Department for the Environment, Food and Rural Affairs (Defra) and EA best practice guidance on the control and removal of invasive weed species would be implemented during the pre-construction and construction phases. A pre-construction land survey would be undertaken by a qualified ALO to record details of crop regimes, position and condition of field boundaries, existing drainage and access arrangements, and private water supplies. The construction footprint has been minimised as far as practicable (see Chapter 5 Description of the Development). Land would be reinstated to its pre-construction condition as soon as reasonably possible following cable installation, dependent on weather conditions and excluding the substation(s) and jointing bay locations. Potentially affected utility providers would be contacted and the location of existing services would be accurately identified on the ground prior to construction. EATL would undertake utility crossings in accordance with industry standard practice as agreed with the utility owners. The continuity of water supplies during the construction works would be ensured.
Operation	EATL would comply with Government policy on EMF exposure limits.
Landfall	
Project design	The use of HDD techniques beneath the cliffs (as part of East Anglia ONE). East Anglia ONE would 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.
Landfall and onshore cable route	
Project design – land take	Some small areas of land would need to be excluded from landowners, occupiers or the public. These areas have been minimised through the

Parameter	Mitigation measures embedded into the project design
	route selection process as described in Chapter 4 Site Selection and Alternatives. The onshore cable route has been designed to run along field boundaries where practical. This would minimise the loss of land under agricultural use. This design also optimises access to fields to maintain access for farm vehicles. Where land area is separated by the works, access for farm vehicles would be maintained where practicable, in consultation with individual landowners and occupiers. Where necessary, crossing points would be agreed prior to construction.
Onshore cable route	
Project design – routeing	Initial cable routeing and site selection to avoid key sensitive land uses e.g. development land, urban land, residential land, major utilities.
Project design	East Anglia ONE would 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.
Construction	Providing temporary means of access to severed fields for animals, vehicles and machinery. Appropriate planning and timing of works to reduce conflicts.
Construction – land drainage	Land drainage systems would be maintained during construction and reinstated on completion. In addition: • Following construction, field drainage systems and ditches would be fully reinstated where possible in consultation with landowners / occupiers; • Cable system buried at a depth to allow the continuation of current agricultural practices; and • In the event of any problems during post-construction monitoring further remediation work would be undertaken.
Construction – utilities	Potentially affected utility providers would be contacted and the location of existing services would be accurately identified on the ground prior to construction. 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.
Construction – agricultural features	Reinstatement of fences, and re-planting sections of hedgerows, hedgebanks, ditches and culverts removed or disturbed during construction (see Chapter 23 Terrestrial Ecology).
Construction – soil handling	The preparation and implementation of a CoCP throughout the construction works to include: • The separate storage of topsoil and excavated materials, to prevent mixing of subsoil and topsoil, thus improving reinstatement. • Minimising excavation volumes and disturbance to the surrounding areas, together with the replacement of any soils inadvertently disturbed during excavations in general accordance with their original structure and location.

Parameter	Mitigation measures embedded into the project design
	• The setting of vehicular speeds along the construction access routes to minimise soil trafficking. An OCoCP will be submitted in support of the DCO application.
Construction - PRoW	Use of pre-installed ducts limits the impacts upon PRoW, i.e. where there is no open trenching along the onshore cable route PRoW would only need closure or diversion where PRoW itself is used as an access. In those locations where works simply cross a PRoW, no closure would be required whilst haul road is installed and then removed. Works would be limited to a couple of hours and access maintained by the use of e.g. a banksman. Where more substantial works are required, the following mitigation would be in place: • A pre-construction survey of the affected PRoW, including those to be used for access, would be undertaken prior to construction. • County councils would require details of the scheme communications strategy and Parish Councils and councillors of the proposals and work programme. • Applications for legal orders for PRoW temporary closures and diversions would be made at least 3 months prior to construction to allow for administration and statutory advertising time; and • Sections of PRoWs affected by the works would be reinstated to existing condition or better following the works. • Alternative routes would be put in place for all PRoWs crossed and would be maintained to a standard agreed with the local authority. An Outline CoCP will be submitted in support of the DCO application.
Operation - maintenance	Suitable maintenance (typically 5 years for hedgerows along the cable route and 10 years on the substation(s) location) of any newly planted sections of hedgerow, shelterbelts and woodlands following construction.
Substation(s)	
No embedded mitigation further to the general measures listed above.	

22.4 Assessment Methodology

22.4.1 Legislation, Policy and Guidance

22.4.1.1 Legislation

24. The following UK legislation is considered the most relevant to land use and agriculture considered in this chapter. Further detail on this is provided in Chapter 3 Policy and Legislative Context.

- Marine and Coastal Access Act 2009;
- The Commons Act 2006;

- The Environmental Stewardship (England) Regulations 2005 (as amended);
- Weeds Act 1959 and Ragwort Control Act 2003;
- Countryside and Rights of Way Act 2000 (CRoW); and
- Animal Health Act 1981 (as amended)

22.4.1.2 Policy

- National Planning Policy Framework 2012; and
- Natural Environment White Paper 2011.

22.4.1.3 Guidance

25. There is no specific guidance on assessing the impact of projects on land use and agriculture; therefore a methodology has been developed for this assessment based on the following sources:

- Highways Agency (2009) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 6 (Land Use); and
- Ministry of Agriculture, Fisheries and Food (MAFF) (1988) Agricultural Land Classification of England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land (Revised Guidelines).

26. In addition to the sources of guidance outlined above there are a number of documents that provide best practice guidance on soil handling and construction management. These offer guidance on methods to reduce the impact on soils and land use, particularly during construction. They are:

- Defra (1996) Waste Management Duty of Care – A Code of Practice;
- Defra (2003) Biosecurity Guidance to Prevent the Spread of Animal Diseases;
- MAFF (1991) Practical Guide to Preventing the Spread of Plant and Animal Diseases;
- Environment Agency (2010) Managing Invasive Non-native Plants; and
- Natural England (2012c) Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land.

27. There are no statutory exposure limits for static EMFs in the UK, and UK policy is expected to comply with the following guidance:

- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998 guidelines (which considers public exposure in relation to AC fields); and
- ICNIRP Guidelines for static magnetic fields (1994) (which includes occupational exposure and DC fields).

28. In 2010, International Commission on Non-Ionising Radiation Protection (ICNIRP) produced new guidelines; however these do not automatically take effect in the UK.

29. The UK policy on exposure to AC EMFs remains based on 1998 ICNIRP. The exposure limits (which only apply where the time of exposure is significant) (from the 1998 guidelines) are currently:

- Public exposure (magnetic): 360µT;
- Public exposure (electric): 9kV/m;
- Occupational exposure (magnetic): 1800µT; and
- Occupational exposure (electric): 46 kV/m.

30. The UK Government considers that receptors to such exposure at potentially significant periods of time may be regarded as residential properties and properties where members of the public spend an appreciable proportion of their time (source: The Written Ministerial Statement of October 2009, para 42). However the period of time is not defined. Significance is further clarified in the guidelines, '*Power Lines: Demonstrating compliance with EMF public exposure guidelines – A voluntary Code of Practice*' (DECC 2012):

31. The Government has set guidelines for expose to EMF based on advice from Public Health England (previously the HPA). The guidelines adapted are based on those released from the (ICNIRP, 2010). These guidelines include permitted levels of exposure. The guidelines also provide reference levels for exposure, where reference levels of EMF are exceeded, further information is required to ensure that emitted fields are within the maximum permitted level.

32. Therefore, this guidance is referred to in the consideration of the potential impacts of electro-magnetic fields.

22.4.1.3.1 National Planning Policy

33. The assessment of potential impacts upon land use and agriculture has been made with specific reference to the relevant National Policy Statements (NPS); the relevant NPS in relation to land use is the Overarching NPS for Energy (EN-1) (DECC 2011).

34. The specific assessment requirements for land use and agriculture, as detailed in the NPS, are summarised in *Table 22.4*, together with an indication of the paragraph numbers of the PEIR 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 22.4 NPS assessment requirements

NPS requirement	NPS reference	ES reference
The ES should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan.	EN-1 Section 5.10.5	Section 22.5 and 22.7
During any pre-application discussions with the applicant the Local Planning Authority should identify any concerns it has about the impacts of the application on land use, having regard to the development plan and relevant applications and including, where relevant, whether it agrees with any independent assessment that the land is surplus to requirements.	EN-1 Section 5.10.7	Local authorities have identified their concerns as per *Table 22.1*, section 22.2
Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the ALC and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.	EN-1 Section 5.10.8	See sections 22.6.2 and 22.6.3. See also Chapter 19 Soils, Geology and Ground Conditions.
The general policies controlling development in the countryside apply with equal force in Green Belts but there is, in addition, a general presumption against inappropriate development within them. Such development should not be approved except in very special circumstances. Applicants should therefore determine whether their proposal, or any part of it, is within an established Green Belt and if it is, whether their proposal may be inappropriate development within the meaning of Green Belt policy.	EN-1 Section 5.10.10	No areas of Green Belt have been identified within the onshore electrical transmission works study area
An applicant may be able to demonstrate that a particular type of energy infrastructure, such as an underground pipeline, which, in Green Belt policy terms, may be considered as an "engineering operation" rather than a building, is not in the circumstances of the application inappropriate development.	EN-1 Section 5.10.12	No areas of Green Belt have been identified within the onshore electrical transmission

NPS requirement	NPS reference	ES reference
		works study area
Ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. It should give little weight to the loss of poorer quality agricultural land (in grades 3b, 4 and 5)	EN-1 Section 5.10.15	See section 22.6.2

22.4.1.3.2 Local planning policy

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

> '*Other matters that the Infrastructure Planning Commission (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*'.

36. The East Anglia THREE landfall location, onshore cable route and the substation(s) location fall within the following local authority boundaries:

- Suffolk County Council (SSC);
- Mid-Suffolk District Council (MSDC); and
- Suffolk Coastal District Council (SCDC).

2.1.4. *Table 22.5* provides details of the local planning policy documents and the policies contained within these relevant to land use and agriculture.

Table 22.5 Relevant local planning policies

Document	Policy / Guidance	Policy / Guidance purpose
SCC		
ROWIP	In Step with Suffolk - Rights of Way Improvement Plan 2006 - 2016	Through the Countryside and Rights of Way Act (2000) the Government recognises the value of PRoW and requires each Highways Authority to produce a ROWIP in order to identify changes that will 'improve provision for walkers, cyclists, horse riders and those with mobility problems.' In order to develop a ROWIP Highways Authorities are required to assess: • The extent to which local rights of way meet present and future needs of the public. • The opportunities provided by local rights of way and in particular by footpaths, cycle-tracks, bridleways and restricted byways for

Document	Policy / Guidance	Policy / Guidance purpose
		exercise and other forms of open-air recreation and the enjoyment of their area. • The accessibility of local rights of way to blind or partially sighted persons and others with mobility problems.
MSDC		
Mid Suffolk Adopted Core Strategy (2008)	H16 (saved policy)	Change to non-residential use where such a change would materially and detrimentally affect the character and amenity of the area by means of appearance, traffic generation, nuisance or safety. • Development that causes the loss of open spaces which contribute to the character or appearance of an area and which are important for recreation or amenity purposes. • Development that materially reduces the amenity and privacy of adjacent dwellings or erodes the character of the surrounding area. The cumulative effect of a series of proposals will be taken into account.
	CL11 (saved policy)	Affords protection to the best and most versatile agricultural land (grades 1, 2 and 3a of MAFF's Agricultural Land Classification), in order to retain high quality agricultural land.
	CL12 (saved policy)	States that proposals on agricultural land should have regard to the effect of severance and fragmentation upon the farm and its operational structure.
	CS2	Relates to development in the countryside and states that development will be restricted to defined categories including renewable energy projects.
New Babergh & Mid Suffolk Joint Local Plan (2015 Consultation)	DM5	Is aimed at encouraging and facilitating the development of renewable energy in the Babergh and Mid Suffolk Districts. The NPPF urges that local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources.
SCDC		
SCDC Local Plan - Core Strategy and Development Management Policies (2013)*	AP28 (saved policy)	Areas to be Protected from Development Development will not normally be permitted where it would materially detract from the character and appearance of: (i) those areas identified on the Proposals Map to be protected from development, or further development; and (ii) other sites, gaps, gardens and spaces which make an important contribution in their undeveloped form to a Town or Village, its setting, character, or the surrounding landscape or townscape. Outside of the physical limits boundaries of Towns and Villages, the area is defined as Countryside.
	AP51 (saved	General Employment Areas

Document	Policy / Guidance	Policy / Guidance purpose
	policy)	Unless otherwise stated in other policies of this Local Plan, on the Industrial Estates identified as General Employment Areas and shown on the Proposals Map, planning permission will normally be granted for Classes B1, B2 and B8 development as defined in the Town and Country Planning (Use Classes) Order, 1987. Proposals for Class A1 uses will be subject to Policy AP61.
	SP20 – Eastern Ipswich Plan Area	This policy has a number of strategic aims for the area east of Ipswich, including Martlesham, Newbourne and Waldringfield. The policy aims to promote sustainable housing; maximise employment; designates of a Strategic Employment Area at Martlesham Heath Business Campus; promote and upgrade foot and cycle paths; promote appropriate landscaping which contributes to ecological networks; preserve and enhance environmentally sensitive locations in the Eastern Ipswich Plan Area; maximise access to green space. The policy makes provisions for the improvement of infrastructure within the area, including green infrastructure. The policy aims to consider options for improving the A14.
	SP26- Woodbridge	This policy promotes sensitive development in order to conserve the existing character of the town and protect the landscape and nature conservation designations of the adjacent Deben Estuary.
	SP27 – Key Local Service Centres	This policy promotes a diverse network of communities; sensitive housing development; organic development; maintain the provision of services and facilities; and improved transport links to diminish rural isolation for key local service centres as defined in the Core Strategy document (page 62)
	SP28 – Other Villages	This policy primarily relates to sensitive housing development in villages as defined by the Core Strategy document (page 62).
	SP29 – The countryside	Development will not be permitted unless out of necessity, and which '*accords with other relevant policies within the Core Strategy, (e.g. Policies SP7 or DM13); or would otherwise accord with special circumstances outlined in paragraph 55 of the National Planning Policy Framework*' (SCDC 2013).
	SP30 - The coastal zone	Sets out SCDC's commitment to promote Integrated Coastal Zone Management (ICZM). Development which is consistent with ICZM plans and contributes to the sustainable future of coastal and estuarine environment will be supported as will investment and resources from the private sector for coastal defence and adaption measures. Development will be resisted where it conflicts with the '*adopted Strategic Flood Risk Assessment, the Shoreline Management Plan and Estuarine Plans as endorsed by the Council*' (SCDC 2013).

* 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.

22.4.2 Data Sources

37. The following data were used to inform the impact assessment (*Table 22.6*). The text in brackets in the 'Data' column of the table refers to the source of the information.

Table 22.6 Data Sources Features

Data	Source	Year	Coverage	Confidence	Notes
PRoW	SCC	2012 (received in July 2015)	Landfall, onshore cable route and substation(s) compound	High	Locations and details
Cycle routes	Sustrans	2012	Landfall, onshore cable route and substation(s) compound	High	Locations and details
Adopted Core Strategy	MSDC	2008	MSDC Boundary	High	-
Core Strategy and Development Management Policies	SCDC	2013	SCDC Boundary	High	-
Soil Survey of England and Wales	National Soil Resources Institute	2014	East Anglia	High	-
Utilities search	EMAP	2014	Landfall, onshore cable route and substation(s) compound	High	-
ALC and agri-environment schemes	Natural England	2012	England and Wales	High	Locations and details
Open Access Land	Natural England	2011	England and Wales	High	Locations and details

Data	Source	Year	Coverage	Confidence	Notes
Animal burials	Animal Health and Veterinary Laboratories Agency, and Food and Environment Research Agency	2012	Landfall, onshore cable route and substation(s) compound	Medium	Information on animal burials, records of outbreaks or occurrences of notifiable or quarantine plant pests diseases.
Aerial photography	APEM Ltd	2011	Landfall, onshore cable route and substation(s) compound	High	-

22.4.3 Impact Assessment Methodology

38. Following the characterisation of the existing environment, the impact of the onshore electrical transmission works including access on land use and agriculture was assessed based on the following methodology, adapted from the DMRB (Highways Agency 2009). The generic assessment methodology applied throughout the ES is explained in detail in Chapter 6 Environmental Impact Assessment Methodology.

39. Two key groups of impacts have been identified for the purpose of defining receptor sensitivity, value and impact magnitude in this chapter:

- Impacts upon land use and tenure: These are the potential impacts of the project on human beings, including landowners and occupiers, local communities and other land users.
- Impacts upon agricultural productivity and soil resources: These are potential project impacts on the bio-physical elements of soils, the surrounding environment and the productivity of the land. The focus of this chapter is on agricultural productivity. Soil resources are only discussed briefly as this receptor is covered in greater detail in Chapter 19 Soils, Geology and Ground Conditions.

40. Whilst there are clear links between the two impact groups, the assessment of receptor sensitivity and magnitude of effect will differ. The potential impact on agricultural productivity and soil resources is a function of the sensitivity of the receptor, examples of which are shown in *Table 22.7* and the magnitude of effect,

examples of which are shown in *Table 22.*8.

22.4.3.1 Sensitivity

41. Guidance for the definitions of levels of sensitivity is provided in *Table 22.7*.

Table 22.7 Sensitivity definitions for land use receptors

Sensitivity	Land Use	Agriculture and soils
High	• Internationally and nationally designated planning policy areas; • Higher level ESSs, considered regionally scarce; • Land uses that are not possible elsewhere or regionally scarce and cannot be adapted or replaced; • Land with invasive species; • Future planning applications for large scale planning uses; and/or • National trails and cycle routes.	• Farming practices with specific requirements; • Land with Notifiable Weeds (risk of spread); • Land with Notifiable Scheduled diseases (risk of spread); • ALC Grade 1 or 2 land (*Table 22.1 in Appendix 22.2*); • Non-irrigated annual cropping; • Highly valued soils for agriculture; and/or • Soil vulnerable to structural damage and erosion or unrecoverable or not adaptable to changes
Medium	• Local planning policy designated sites; • Entry level ESSs; • Regionally scarce land uses; • PRoW and cycle routes of high use; • Open access land under the CRoW Act 2000; and/or • Marginal agricultural holdings.	• ALC Grades 3a and 3b land (*Table 22.1 in Appendix 22.2*); • Non-irrigated annual cropping; • Medium valued soils for agriculture; and/or • Seasonally susceptible to structural damage or erosion.
Low	• No designated planning policy areas; • No ESSs but under other environmental management; • Land used for ordinary agriculture or horticulture; • Large agricultural holdings; and/or • PRoW and cycle routes of low use.	• ALC Grade 4 land (*Table 22.1 in Appendix 22.2*); • Arable or grassland; • Low valued soils for agriculture; and/or • Medium to course material, some resistance to structural damage the majority of the year.
Negligible	• No designated planning policy areas; • No ESSs; and/or • No PRoW or cycle routes.	• ALC Grade 5 land (*Table 22.1* in *Appendix 22.2*); • Non-agricultural and urban, non-arable or grassland; • Low or no value soils for agriculture; and/or • Greater resistance to soil structural damage.

22.4.3.2 Magnitude

42. Example definitions of the magnitude levels for land use are given in *Table 22.8*.

Table 22.8 Magnitude of effect definitions for land use receptors

Magnitude	Land use	Soils and agriculture
High	• Impacts of permanent or long term (>10 years) duration • Existing land use would not be able to continue on more than 5ha of land or the entire landowner / occupier's available land (where smaller); where • The land would be rendered unviable for agricultural purposes; or • Permanent changes to land management would be required.	• Permanent loss of over 20ha of the best and most versatile agricultural land [grades 1, 2 and 3a] or more than 60% total regional resource. (Natural England 2012a; DMRB); and • Full recovery of land would take more than 10 years.
Medium	• Impacts of medium duration (5 to 10 years); • Existing land use would not be able to continue on less than 5ha of land; and • Noticeable changes to the existing land use although it may continue.	• Medium to long term loss of more than 20ha of the best and most versatile agricultural land or more than 60% of the regional resource; • Permanent loss of more than 10ha of ALC (grade 3b) agricultural land or more than 10% of the regional resource; • Full recovery of land is expected within 5 to 10 years; and • More than 20ha of soil is temporarily unsuitable for agriculture.
Low	• Impacts of short-term duration (<5 years) to land use.	• Short-term loss of more than 20ha, or permanent loss of more than 10ha of ALC grade 4 agricultural land or more than 10% of the regional resource; • Full recovery of land is expected within 5 years; and • Less than 20ha of soil is temporarily unsuitable for agriculture.
Negligible	• No material change to land use of any duration has been identified.	• No material change to the soil resource has been identified.

22.4.3.3 Impact significance

43. Following the identification of receptor value and sensitivity and magnitude of the effect, it is possible to determine the significance of the impact based on the matrix presented in *Table 22.9* below.

Table 22.9. Impact Significance Matrix

Sensitivity	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

44. As with the definitions of magnitude and sensitivity, the matrix used for a topic is clearly defined by the assessor within the context of that assessment. The impact significance categories are divided as shown in *Table 22.10*.

Table 22.10. Impact Significance Definitions

Impact Significance	Definition
Major	Very large or large changes in receptor condition, either adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedence of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local to regional level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be significant at a regional level or above
Negligible	No discernible change in receptor condition.
No impact	No change in receptor condition.

45. Potential impacts identified as major and moderate impacts are deemed to be significant in terms of the EIA and have been avoided or reduced through mitigation, where possible. Minor impacts become more important when considering potential cumulative impacts or interactions.

46. Embedded mitigation and existing commitments to good practice are discussed in section 22.3, and are referred to throughout the impact assessment. The impact assessment takes into account the embedded mitigation before coming to a conclusion of the potential impact to a receptor. If any additional mitigation is required, this is included within the impact assessment in section 22.6, and a description of any residual impact post-mitigation is provided.

22.4.4 Cumulative Impact Assessment

47. For a general introduction to the methodology used for the CIA, please refer to Chapter 6 Environmental Impact Assessment Methodology. This chapter will focus on those cumulative impacts that are specific to land use and agriculture.

48. For further details of the methods used for the cumulative impact assessment for land use, see section 22.7.

22.4.5 Transboundary Impact Assessment

49. There are no transboundary impacts with regards to land use as the onshore electrical transmission works including access would not be sited in close proximity to any international boundaries.

22.5 Existing Environment

50. The characterisation of the existing environment is undertaken using data sources listed in *Table 22.6* plus other relevant literature.

22.5.1 Land use policies and designations

51. A review of MSDC and SCDC Local Plans was undertaken to identify any parcels of land that are allocated for, or restrict, future development or changes of use. This included a review of the proposals map for allocations for each of the local authorities.

52. Nature conservation, heritage and landscape designations are discussed in detail in Chapter 23 Terrestrial Ecology, Chapter 25 Onshore Archaeology and Cultural Heritage and Chapter 29 Seascape, Landscape and Visual Amenity of the ES respectively.

53. The relevant planning policies with regard to land use and agriculture are outlined in section 22.4.

54. Upon a review of the MSDC, and SCDC Local Plan Proposal maps, Special Landscape Areas (SLAs) are considered in Chapter 29 Seascape, Landscape and Visual Amenity, Conservation Areas are considered under Chapter 25 Onshore Archaeology and Cultural Heritage.

55. The following planning designations are present in areas crossed by the onshore cable route: AP28 (an area to be protected from development) at Little Bealings (SCDC). Although the onshore cable route crosses the AP28 at Little Bealings, development as such would not take place as cables would be pulled through pre-existing ducts . No other planning designations as per the site allocations shown in the proposals maps produced for the SCDC, and MSDC Local Plans were located at the landfall, along the onshore cable route or at the substation(s). Therefore no impacts are predicted on planning designations under either cable installation scenario and this is not considered further.

22.5.2 Agricultural activities

56. This section describes the baseline environment in terms of agricultural land cover. It describes the crops grown and agricultural practices adopted where these are known. Where semi-natural vegetation persists this is also characterised. It should be noted that this assessment is based on high level datasets which are only accurate at the time of data collection. They should only be considered indicative of the land uses found within the study areas.

57. This section draws on the following sources of information, which were combined and cross checked:

- The map covering East Anglia of the Soil Survey of England and Wales was reviewed (sheet 6) for East Anglia ONE. The maps are at a scale of 1:250,000 and show soils categorised into a variety of soil associations.
- Information is provided on the soil type, parent material (e.g. underlying geology) and likely land uses for the different soils from the National Soil Resources Institute via Cranfield University;
- Landowner feedback from East Anglia ONE: Initial feedback from landowners and occupiers was obtained to provide information on general cropping and rotation practices employed within the study areas;
- The June Survey of Agricultural and Horticultural Activity (Defra 2013): Detailed information collected through Defra surveys to provide data on arable and horticultural cropping activities, populations of livestock, land usage and agricultural labour force figures; and
- Aerial photography 2011 (APEM Ltd).

58. The following sections describe the land cover and agricultural environment baseline at both a regional level, as this is the level at which data is collected by Defra (2013a;

b), and also within the onshore electrical transmission works including access. It should be noted that the regional level is considered to be Suffolk County.

59. The primary land use within the area covered by the onshore electrical transmission works including access is agricultural, with a number of small rural towns and villages and some areas of woodland. Ipswich and Woodbridge are the largest urban areas in the vicinity of the proposed project.

60. Agriculture in Suffolk is primarily arable or mixed use. Farm sizes range from less than 5ha to more than 100ha (Defra 2013a). Soil types vary from heavy clays to light sands. Crops grown include winter wheat, winter barley, sugar beet, oilseed rape, winter and spring beans and linseed, and smaller areas of rye, oats and other vegetables can be found.

61. Agriculture in Suffolk was worth £330 million in crops and livestock output in 2004, and thus is an important part of the county's economy (Transforming Suffolk Strategy 2008 – 2028).

62. Agriculture accounted for 2,748 businesses in Suffolk in 2007 and in 2009 employed just over 10,000 people in agricultural labour. Cereal crop farming accounts for almost half of the agricultural land in Suffolk; the majority being wheat but also barley (Suffolk County Council 2011).

22.5.3 Agricultural Land Classification

63. Agricultural land in England and Wales has been classified according to the quality and versatility of soil in a grading system which is called the ALC. It is a national system in which maps have been produced for the whole of England and Wales. The grading system was defined by the former MAFF (now Defra), and is described in *Table 22.11 in Appendix 22.2*. Soils cross the onshore electrical transmission works including access range from ALC grades 1 to 4 (*Figure 22.2*).

64. The onshore cable route runs through an area of grade 3 land at the landfall, and a short stretch of grade 2 and 3 land after crossing the River Deben. Near Newbourne and Martlesham the onshore cable route crosses a large stretch of grade 4 land. It then crosses mostly grade 3 land across the north of Ipswich until Little Blakenham. From Little Blakenham, the onshore cable route crosses grade 2 land towards the substation(s). At the substation(s) the majority of land is grade 2, with a small area of grade 3 land to the north. The percentage of land of different ALC grades within the onshore electrical transmission works including access is presented in *Table 22.11*.

Table 22.11. Percentage of land of different ALC grades within the onshore electrical transmission works including access.

ALC Grade	% land within onshore electrical transmission works including access
1	0.0
2	28.8
3 (undifferentiated)	51.7
4	19.5
5	0.0
Non-agricultural / Urban	0.0

22.5.4 Soil Type

65. The National Soil Research Institute categorises soils into a variety of associations, with information provided on the soil type, parent material (e.g. underlying geology) and likely land uses for the different soils. The different soils types along the electrical transmission works including accesses are shown in *Figure 22.3.*

66. Further details of the soil associations present along the onshore cable route and at the substation(s) location are provided in *Table 22.2* in *Appendix 22.2*.

22.5.5 Environmental Stewardship Schemes

67. Environmental Stewardship Schemes (ESS) provide funding and advice to farmers, tenants and other land managers to encourage effective environmental management of land (Natural England 2015). They are a key tool for the delivery of the Rural Development Programme for England 2007-2013, funded by the European Union and UK Government. The schemes are administered by Natural England for Department of Environment, Food and Rural Affairs (Defra).

68. There are three levels to the scheme:

- Entry Level Stewardship (ELS) – includes Uplands ELS (UELS): simple and effective land management agreements with priority options;
- Organic (OELS) – includes Uplands OELS: organic and conventional mixed farming agreements; and
- Higher Level Stewardship (HLS): more complex types of management and agreements tailored to local circumstances.

69. The Environmental Stewardship Scheme builds on Defra's previous agri-environmental schemes. Historical agreements under the Environmentally Sensitive Areas Scheme and Countryside Stewardship Scheme are in some cases still continuing and are therefore also discussed where relevant in this chapter. The

objectives of these are similar to the objectives of the ESS.

70. The location of the agreements within the onshore electrical transmission works including access is shown in *Figure 22.4*.

71. Within the area of the onshore electrical transmission works - including accesses, around half the land is under some form of management, these are listed below. However, it should be noted that the mapping from Natural England identifies the parcels of land that are subject to agreements. It does not identify the specific areas of land that are under specific management (e.g. the location of wildlife friendly strips within parcels of land).

72. In reference to the above, the following schemes have been identified:

- ELS Agreements;
- Entry Level plus Higher Level Agreements (i.e. both type of agreements are in place);
- Higher Level Agreements; and
- Organic Entry Level Agreements plus HLS.

22.5.6 Notifiable Scheduled Diseases

73. The potential exists for cable installation to transmit agricultural crop and animal diseases between adjacent land holdings and fields, since installation activity would cross between these land holdings and fields.

74. No records of animal burials within the onshore electrical transmission works including access were provided following consultation with the Animal Health and Veterinary Laboratories Agency and the Food and Environment Research Agency.

75. There are three Statutory Notices in place for the plant pest potato cyst nematode within the area of the onshore electrical transmission works including access. These locations are shown in *Figure 22.5.*

22.5.7 Injurious Weeds and Invasive Plant Species

76. The Phase 1 habitat survey recorded four non-native invasive species that are listed on the Wildlife and Countryside Act 1981 Schedule 9. These were Hottentot-fig *Carpobrotus edulis*, Canadian waterweed *Elodea canadiensis*, Himalayan balsam *Impatiens glandulifera*, and Japanese rose *Rosa rugosa*.

- Hottentot-fig was found on a cliff face at the landfall location but is on the southerly limit of the survey area behind the MoD site and consequently

unlikely to be affected by the route. Therefore this species is not considered further in the impact assessment.

- Canadian waterweed was found in the Queens Fleet (Target Note 286c), the River Gipping (Target Note 19) and in the ditch at Target Note 305a.
- Himalayan balsam was found growing as isolated stems along the banks of a watercourse at Target Note 150.
- Japanese rose has been widely planted on roadside embankments at Target Notes 194, 195, 196 and 197.

22.5.8 Public Rights of Way

77. PRoW that cross the onshore cable route are shown in *Figures 22.6 a-g*. Promoted footpaths are shown in *Figure 22.7.* Four of these PRoW are promoted footpaths:

- The Suffolk Coastal Path;
- The Fynn Valley Walk;
- The Gipping Valley River Path; and
- Martlesham Circular Walk.

22.5.9 Cycle Routes

78. A network of cycle routes exists within the area and the locations of crossed cycle routes have been obtained from Sustrans. The cycle routes are listed in in *Table 22.4 in Appendix 22.2* and illustrated in *Figure 22.6a-g.*

22.5.10 Open Access & Common Land

79. Under the CRoW Act 2000 the public are not restricted to paths, but can freely walk on mapped areas of mountain, moor, heath, downland and registered common land, known as open access land.

80. There is a small area of open access land adjacent to the onshore cable route on the southern edge of Woodbridge (*Figure 22.6d*), along the railway line. No other areas of open access land or common land have been identified within or adjacent to the onshore electrical transmission works (including access).

22.5.11 Existing Utilities

81. There are a number of utilities that are located in the region of the onshore cable route, as identified by a commissioned utilities search (*Figure 22.8 a -g*). These include major and minor (domestic) utilities, with the domestic utilities often being

routed underneath the public highway. The majority of the identified utilities crossing the onshore cable route are related to domestic services for gas, electricity, water and sewerage connections. *Table 22.12* provides information of the utilities of major and national importance that cross the onshore electrical transmission works.

82. Existing utilities at the substation(s) location include the existing Bramford substation(s) as well as overhead power lines which connect to the substation(s).

Table 22.12 Major utilities located within the onshore electrical transmission works

Utility Type	Number of crossings	Provider
Water	21	Anglian Water
Overhead Electric	24	UK Power Networks/Linesearch-ESP Utilities Group
Electric	24	UK Power Networks/Linesearch-ESP Utilities Group
Gas	19	Gas Distribution - National Grid/GTC Pipelines Ltd
Network Rail	5	Network Rail
Telecommunications	54 (BT) 14 (other)	BT & Atkins, Interoute, Level 3, Virgin Media)

22.5.12 Electromagnetic Fields

83. Potential sources of power-frequency electric fields can come from anything that uses or carries electricity. The strength (or amplitude) of the electric field depends on the voltage of the equipment. In general, the higher the voltage the stronger the electric field that is produced. The strength of an electric field is measured in volts per metre (V/m). At ground level, the natural atmospheric electric field in fine weather is normally about 100 V/m. During electrical storms this can rise to many thousands of volts per metre (kV/m).

84. Electric fields attenuate rapidly with distance from source and most ordinary building materials, trees and hedges provide screening from electric fields. Even slightly conducting objects have a screening effect. For this reason, the electric field produced by domestic power supply inside a house is much less than the field outside the house.

85. Magnetic fields are produced by the current within a conductor. The current varies according to the electrical power requirement. The higher the current the stronger the magnetic field that is produced. Microteslas (µT) are the unit of measurement

used for magnetic fields. In the UK, the Earth has a natural magnetic field of approximately 50µT.

86. In contrast with electric fields, magnetic fields are not readily screened by trees and ordinary building materials. However, they diminish rapidly with distance from the source. The East Anglia THREE onshore export cables would follow the East Anglia ONE onshore cable route from the landfall to the substation at Bramford. Under either the HVDC or LFAC (see Chapter 5 Description of Development) electrical solutions up to four cables would be installed into the four ducts (or 12 single core cables in the LFAC solution, with three installed in each duct) installed by East Anglia ONE. The proposed substation(s) would be connected to the existing National Grid substation at Bramford by means of underground cables to be installed within ducts pre-laid by National Grid. Space would also be required for the HVAC equipment to link the substation to the existing National Grid equipment.

22.6 Potential Impacts

87. Reference should be made to Chapter 5 Description of the Development, for full details of the activities proposed during the construction phase. However, in summary, the activities considered likely to impact on land use and agriculture are as follows:

- Construction of onshore cable systems including landfall joint transition bay and jointing bay locations – installation techniques include pulling cables through existing ducts;
- Construction of onshore substation(s), associated infrastructure and landscaping;
- Creation of temporary construction compounds;
- Temporary upgrade of existing access tracks, construction of new access tracks and haul roads;
- Stockpiling of topsoil and subsoil;
- Re-use of excavated soil in jointing bays;
- Disposal of excess spoil offsite to a suitably licenced facility; and
- Removal and reinstatement of existing drainage systems.

88. An outline CoCP is included with this DCO application which sets out the embedded mitigation to be applied. The following section already takes into account the

potential proposed embedded mitigation, other mitigation measures suggested within the section are considered to be additional.

89. Two different approaches to construction (as outlined in section 22.3 and Chapter 5 Description of the Development) are being considered for the onshore export cable installation. These approaches to construction are considered separately where relevant, or grouped where there is considered to be no difference in impact between the different approaches.

22.6.1 Potential Impacts During Construction

22.6.1.1 Impact 1: Land taken out of existing use

90. Land would be directly taken out of existing use or isolated due to construction activities and effectively taken out of use. Due to health, safety and technical requirements during construction, works areas would be fenced off and not accessible to landowners or occupiers for the duration of the construction period. This could result in loss of a growing season in the area affected for each farmer (plus possible severance) and loss of income which would be addressed via commercial agreement.

22.6.1.1.1 Landfall and onshore cable route

91. *Table 22.2* shows the total construction land take area for the Single Phase and Two Phased approach based on worst case assumptions.

92. The area of land that would need to be excluded from landowners, occupiers or the public has been minimised through the route selection process as described in Chapter 4 Site Selection and Alternatives. Access for farm vehicles, to land severed by the works, would be maintained where practicable in consultation and subject to individual agreements with individual landowners and occupiers. Where necessary, crossing points would be agreed pre-construction.

93. At this stage it is not possible to calculate the area of land that would become isolated or inaccessible, as access to individual fields would be determined as part of detailed design and construction planning. It is however likely that relatively small areas or strips of land would be affected.

94. Based on the information provided in section 22.5, the majority of the construction footprint would be within areas currently associated with agricultural production.

95. Temporary land take would come from the footprint of the haul road, laydown areas and jointing locations (see *Table 22.2*), much of which would be agricultural land taken out of use. In addition, some agricultural land would be isolated.

96. Other land uses encompassed by the onshore cable route include roads and associated verges, field boundaries and watercourses.

97. The total area of farmed land in Suffolk is 283,701ha (Defra 2013b). The footprint of the onshore electrical transmission works including access constitutes 0.01% under Single Phase and 0.02% under Two Phased approach of the county resource (using total footprint of jointing bay compounds, transition bay compounds, haul road and CCS areas, see *Table 22.2*).

98. The precise duration of impacts on land take is dependent on the timing of the construction sequence. Under a Single Phase approach, the duration of construction works for the onshore cable route is 29 weeks (including approximately 10 weeks work required at the landfall). Under a Two Phased approach, the duration of construction works for the onshore cable route is 29 weeks (including approximately 10 weeks work required at the landfall), with a gap of up to 49 weeks and then a further 29 weeks.

99. Where possible, reinstatement of hedgerows and their associated features (banks and ditches), and drainage systems would occur following the installation of each section of cable. Removal of trees or interference with roots would be avoided where possible (for further details see Chapter 23 Terrestrial Ecology). The exact timing and duration of works at any location are not known at this time.

100. The sensitivity of the receptor is considered to be medium, because although the quality of the land varies from grades 2 – 4, the majority of the land area is either grades 2 or 3 (see *Table 22.11*). The magnitude of effect is considered to be low (*Table 22.8*) for Single Phase and Two Phased approach, based on the areas of land take stated above and given that there is no permanent change to land use for the onshore cable route, with only temporary restriction to agricultural activities. Furthermore the area affected along the onshore cable route is low as a percentage of the county resource. In the context of the county resource the impact significance is considered to be negligible and in the context of the local resource **minor adverse**.

101. During construction it is unavoidable that land along the onshore cable route would temporarily be taken out of its existing land use, however the embedded mitigation measures, (see *Table 22.3*) reduce the potential impacts as far as practicable. No further mitigation measures are recommended. Ecological features such as hedgerows and trees are considered further in Chapter 23 Terrestrial Ecology, where mitigation is provided in relation to these features.

22.6.1.1.2 Substation(s)

102. Land take at the substation(s) is considered a permanent impact, or an impact with the duration of the project lifespan (i.e. 25 years). This impact is discussed as an operational impact (see section 22.6.2).

22.6.1.2 Impact 2: Impacts to ESSs

103. During the construction period there would be the potential for impacts on ESS. The effect on individual landowners / occupiers is likely to be specific to their own scheme, which would need to be discussed between EATL, landowners, occupiers and Natural England prior to construction. The impacts could range from the agreement ceasing entirely to no impact on the agreement, depending on the agreement objectives and location of the works. As such, this assessment looks at the impacts in general terms rather than on an agreement by agreement basis. Two potential connected impacts are anticipated as a result of this:

- Ecological – in terms of the loss of the agreements and the substantive agri-environmental objectives of the scheme; and
- Financial - in terms of the loss of the agreements and the impact on overall farming income (this would be addressed via commercial agreement).

104. Following the completion of construction, all areas subject to ESS (with the exception of any permanent infrastructure e.g. the substation(s) location) would be reinstated (see Chapter 23 Terrestrial Ecology) and it is likely that the same or similar agreements would be reinstated following construction.

105. At the substation(s) location impacts to ESS would be permanently altered as the land would be taken out of use during the operation of the project; this is discussed further in section 22.6.2.

22.6.1.2.1 Landfall and onshore cable route

106. During construction for either a Single Phase or Two Phased approach, there would be the potential for impacts from the onshore cable route on ESS, as described in section 22.6 above.

107. Under a Single Phase approach, the duration of construction works for the onshore cable route is stated in *Table 22.2.* Features that are likely to be subject to agreements, such as trees and ponds have been avoided where practicable. A number of ditches and hedgerows would be crossed; however these would be crossed at right angles to minimise disturbance to those features, and replanted / reinstated following completion of the works.

108. There is potential for a certain amount of disruption to Environmentally Sensitive Areas (ESAs) as a direct result of loss of land during the construction affecting such features as field margins. A number of landowners within an ESS would be affected by the proposed East Anglia THREE project. In the wider context (Suffolk) of which 204,545ha is within an ESS, this represents approximately 0.02% and 0.03% of the county resource for Single Phase and Two Phased approached respectively (using total footprint of jointing bay compounds, transition bay compounds, haul road and CCS areas, see *Table 22.2*). It is considered that the overall magnitude of effect would be negligible due to the area affected, the extent of agreements within the onshore cable route, and the nature of the ESAs. The sensitivity of receptors is considered to be medium (*Table 22.7*).

109. Following consultation with landowners to agree appropriate compensation or mitigation measures, the significance of the impacts to land within Environmental Stewardship is considered to be **negligible.**

22.6.1.3 Impact 3: Impacts to land drainage

110. During construction some temporary impacts on land drainage within agricultural fields would be unavoidable. This includes field drains, ditches and dykes. The largest impact is expected where field drains are present, whether subsurface, surface or mole drains. Drains are likely to be at a depth of between 0.5m and 1.5m, be made of ceramic, plastic or other appropriate materials and therefore would be impacted by any excavation works planned through agricultural fields. It would be necessary to truncate drainage systems temporarily during excavation and installation and reinstate following construction within the onshore cable route and at landfall.

22.6.1.3.1 Landfall and onshore cable route

111. Given the soil types found along the onshore cable route, some sections would have existing field drainage systems in place and the sensitivity of receptor is considered to be high overall (*Table 22.7*).

112. Embedded mitigation measures are proposed in *Table 22.3*. Embedded mitigation includes the provision of an ALO (see *Table 22.3*), and the implementation of the final CoCP. These include provisions for a water management design / drainage plan.

113. The mitigation measures would be dependent upon the field by field characteristics of soils, weather conditions, existing drainage arrangements and crops grown. Land drainage reinstatement techniques are well established and are often required periodically within agricultural land as part of general maintenance requirements.

This has been taken into account when considering the residual impact of the two approaches to construction.

114. For both the Single Phase and Two Phased approach disturbing drains, ditches and dykes from the onshore cable route would be mostly avoided (as these have already been crossed by pre-installed ducts). However, the magnitude of the effect is considered to be low where site tracks / haul road cross existing watercourses, as it may be necessary to install temporary watercourse crossings to maintain flows within the existing watercourse (see Chapter 21 Water Resource and Flood Risk). Taking into account the embedded mitigation described above, the impact significance is therefore considered to be **minor adverse**.

22.6.1.3.2 Substation(s)

115. At the substation(s) site any existing field drainage would be permanently altered as the land would be taken out of use during the operation of the project; this is discussed further in section 22.6.2.

22.6.1.4 Impact 4: Impacts to soils

22.6.1.4.1 Landfall and onshore cable route

116. Soils would be impacted by excavation of the transition bay chamber and jointing bay, to a maximum depth of 2.5m. Impacts to soil include degradation and loss of the overall soil resource. Degradation of soil occurs through compaction and deterioration of soil structure. This can occur along haul routes or where heavy plant and materials are stored. Loss of the soil resource occurs through exposure to wind and water, and inadequate storage thus eroding the soil. Impacts to soil quality are considered within Chapter 19 Soils, Geology and Ground Conditions. Following cable installation, soils would be immediately reinstated, and thus the impact would be of short duration. Excess spoil would be removed to a suitably licenced facility. The OCoCP includes a protocol for removing and storing topsoil and excavated materials, and appropriate reinstatement (see section 22.3.3). No soils of significant environmental value were identified within the landfall and onshore cable route and therefore the sensitivity of the receptor is considered to be low.

117. For the proposed East Anglia THREE project, under the Single Phase approach, the amount of spoil generated would be limited to the jointing bays. Due to a small volume of spoil generated by the activity (approximately 121,241m^3, with approximately 4,404m^3 residual for offsite disposal), and the short term nature of the works the magnitude of the impact is considered to be low. Therefore the

impact significance is considered to be **negligible**. No further mitigation measures are recommended.

118. Under the Two Phased approach, the amount of spoil generated by the activity would be larger (approximately 215,586m^3, with approximately 4,404m^3 residual for offsite disposal). The overall area of soil excavation and disturbance would be limited to that required for the jointing bays. Although the calculated volume of soil is increased through the process of the Two Phased approach, the overall area would not change as the volume variation is due to the re-excavation of some soils. The volume of soils disturbed through the Two Phased approach is still considered to be small and the short term nature of the works means that the magnitude of the impact is considered to be low. Therefore the impact significance is considered to be **negligible**. No further mitigation measures are recommended.

22.6.1.4.2 Substation(s)

119. 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.

120. Soil would also be excavated for the foundations of the substation(s). It is anticipated that all excavated material would be used in the creation of bunds around the substation(s) and there would be no offsite disposal. The magnitude of the impact is therefore considered to be medium. The soils identified at the indication substation(s) location are considered to be of low environmental value and thus of low sensitivity. Therefore the impact significance is predicted to be **minor adverse**.

22.6.1.5 Impact 5: Potential spread of disease

121. This section considers the potential spread of disease that could be caused by construction works. For potential impacts of construction to invasive non-native species, please see Chapter 23 Terrestrial Ecology.

22.6.1.5.1 Landfall and onshore cable route

122. The nearest incidence of a notified scheduled disease (for potato cyst nematode) to the landfall was more than 5km west of the landfall. There are three incidences of potato cyst nematode along the onshore cable route. These are located at Kirton

Lodge and Kembroke Hall (between Kirton and Newbourne) and at Sycamore Farm (south of Little Blakenham) (*Figure 22.5*).

123. The sensitivity of the potato cyst nematode to the potential impacts of construction is considered to be high since this source of contamination is recognised as such at a national level (*Table 22.7*), however the instances of these sources of contamination are few, as one location is located approximately 300m away from the onshore cable route, while two other locations cross the route. Embedded mitigation includes adhering to good practice construction and agricultural practices, thus minimising the transfer of any plant and animal diseases. These are outlined in *Table 22.3*. Additional mitigation is suggested in *Table 22.13* below.

124. A pre-construction survey would be undertaken to obtain up-to-date information on the status of non-native invasive species within the landfall and onshore cable route; this can be combined with other pre-construction ecological surveys (see Chapter 23 Ecology).

Table 22.13. Biological contamination – mitigation measures for both Single Phase and Two Phased approach

Mitigation measures

• Defra (2003) and the Food and Environment Research Agency (FERA (undated)) have identified a number of best practice measures to minimise the risk of spreading disease. These measures include but are not limited to:
  ○ Landowners would be informed via an ALO;
  ○ Minimising where possible the movements of people, vehicles or equipment into areas where farm animals are kept;
  ○ Cleaning equipment upon arrival and departure; and
  ○ Ensuring waste disposal is compliant with the Waste Management Regulations.
• In addition, a toolbox talk for contractors prior to construction on the identification and known locations of potato cyst nematode would be undertaken.

125. The implementation of the measures outlined above would ensure that the magnitude of this effect is reduced to negligible for both approaches to construction. As such a **negligible** residual impact is predicted for notifiable scheduled diseases for Single Phase and Two Phased approach.

22.6.1.5.2 Substation(s)

126. The nearest identified non-native invasive species to the landfall was more than 1km north of the substation(s) location. Therefore transfer of soil or seeds to the substation(s) location is not anticipated and **no impact** is predicted.

22.6.1.6 Impact 6: Impacts to PRoW and Cycle Routes

22.6.1.6.1 Landfall

127. There are two PRoW within the landfall area. One is a bridleway and the second is The Suffolk Coastal Path (see *Figures 22.6a-g)*. This path has significantly eroded away to a state whereby it is currently impassable. However, a worst case assumption has been made whereby the path has been considered as reinstated by the relevant authorities prior to EATL commencing construction. The footpath is therefore considered to be of medium sensitivity.

128. The cables at the landfall would be installed through pre-installed ducts. The exact locations of the transition bay compounds for the pre-installed ducts would not be identified until the pre-construction stage; however the locations would be chosen to avoid PRoWs where possible. Access along the bridleway would remain open during the construction at the landfall. The Suffolk Coastal Path would also remain open, unless temporary access from the cliff top to the beach area is required (in the event of so that the end of the short duct method of cable installation).

129. Access would most likely comprise a temporary ramp constructed to enable safe vehicular access down the cliff. The beach access would remain in position for the duration of the cable landing, but actual access to the beach would only be required for a few hours to excavate and rebury the exit pit each time a cable is pulled into each duct.

130. Under a Single Phase approach to construction, there are 10 weeks of construction operations required at the landfall so any disturbance to PRoWs would happen in a single construction period. Under a Two Phased approach to construction, there would be two separate 10 week construction periods required at the landfall, with a maximum gap of up to 49 weeks between.

131. As the bridleway is likely to remain open, and the small scale and temporary nature of the disturbance to The Suffolk Coastal Path as a result of the ramp, the inconvenience caused is expected to be limited and thus be of negligible magnitude. Mitigation measures are provided in *Table 22.3*. Following implementation of these measures, the impact significance to the PRoW is predicted to be **negligible**.

22.6.1.6.2 Onshore cable route

132. A number of public footpaths are crossed and therefore a number of temporary closures, soft management measures or diversions could be required along the onshore cable route. Impacts to PRoW are detailed in *Table 22.3 in Appendix 22.2* and summarised below (see also *Figures 22.6a-g*). It is considered that if the PRoW

interaction is limited to the installation of haul road across the PRoW, then no closure and diversion would be required whilst the short section of haul road is laid (and removed at the end of the construction period). During the installation and removal of the haul road, the ongoing use of the PRoW by the public would be maintained by the use of banksmen to ensure temporary cessation of haul road laying works and safe passage of users. Once the haul road is installed across the PRoW, further management measures (i.e. signage) would ensure that haul road users are aware of the potential for PRoW users to cross their path, and PRoW users are aware of the hazards to allow both to operate together safely. It has been agreed between SCC and EATL that only where a haul road or upgraded access track is formed from an existing PRoW would there need to be a diversion.

133. The onshore cable route crosses or interacts with cycle routes 14 times and details are presented in *Table 22.6 in Appendix 22.2*. Some cycle routes (e.g. Regional Route 41 at Ferry Lane) would require soft management techniques would be used (e.g. pilot vehicles, stop and go signs) and none of the cycle routes would require closure, therefore there would be **no impact** upon them.

Single Phase

134. The exact locations of the jointing bay locations for the pre-installed ducts would not be identified until the pre-construction stage; however the locations would be chosen to avoid PRoWs where possible.

135. Fourteen PRoWs would be crossed by the haul road (see *Appendix 22.2)*. As described above no closures would be required whilst haul road is installed and removed across PRoW (a couple of hours in each instance). At all other times during construction traffic along the haul roads would be managed as it crosses the PRoW to enable the PRoW to operate normally. Footpaths are considered to be of medium sensitivity while bridleways are considered to be of high sensitivity. The magnitude is therefore predicted to be negligible. This results in an impact significance of **negligible**.

136. Twenty PRoWs are intended to be used as haul road routes (see *Appendix 22.2)*; therefore temporary diversions would be required during construction. It is intended that any diversions would be simple and where possible run parallel to the original route. Due to the short duration of the disturbance the magnitude of this impact is considered to be low. Therefore, the impact significance is predicted to be **minor adverse**.

Two Phased

137. Under a Two Phased approach to construction PRoWs would also be temporarily affected during construction (see *Table 22.3 in Appendix 22.2*), but there would be two separate periods of disturbance as the duration of works is 29 weeks (a gap of up to 49 weeks) then a further 29 weeks. The same methodology for closures and diversions would be taken would be taken as per the Single Phase approach and the impacts are considered to also be **minor adverse**.

22.6.1.6.3 Substation(s)

138. 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 200m. PRoW W-155/001/0 would be diverted to the south via alternative PROW. The whole extent of PRoW W-155/001/0 would be diverted (1320m).

139. Due to the short duration of the closure, likely to be a matter of weeks (it will not be closed for the full duration of substation construction works), and the access for recreational users being maintained via the diversion the magnitude of this impact is considered to be low. Therefore, the impact significance is predicted to be **minor adverse**.

140. The nearest cycle route is approximately 500m north east of the substation(s) location and is assessed under the onshore cable route impact assessment above.

22.6.1.7 Impact 7: Impacts to utilities

22.6.1.7.1 Landfall, onshore cable route & substation(s)

141. The onshore cable route has been selected to avoid major utilities. East Anglia ONE would 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 the potential to impact utilities is greatly reduced. In addition, EATL would be required to contact potentially affected utility providers and identify the location of existing services on the ground prior to construction. EATL would undertake utility crossings or diversions in accordance with the appropriate standards for such crossings or works. Therefore, **no impacts** associated with existing utilities are anticipated during the construction for either the Single Phase or Two Phased approach.

22.6.1.8 Impact 8: Impacts to open access or common land

22.6.1.8.1 Landfall and onshore cable route

142. One area of open access land or common land has been identified adjacent to the landfall, however access to this area would not be restricted and therefore **no impact** is predicted.

143. A small area of open access land is located adjacent to the onshore cable route on the southern edge of Woodbridge (*Figure 22.6d*), along the railway line. The parcel of land is accessible from a road to the east, while the onshore cable route is to the west of the open access land. No PRoWs join the open access land from the direction of the onshore cable route. Therefore users of the land are unlikely to be affected in terms of access and **no impact** is predicted.

22.6.1.8.2 Substation(s)

144. No areas of open access land or common land have been identified within or adjacent to the substation(s) location, therefore **no impacts** are predicted.

22.6.1.9 Impact 9: Impacts from EMFs

Potential impacts of EMF are considered during the operational phase. See section 22.6.3 for the impact assessment.

22.6.2 Potential Impacts During Operation

145. This section describes the potential impacts arising during the operational phase of the proposed East Anglia THREE project. Reference should also be made to Chapter 5 Description of the Development for full details of the operational phase.

146. The differences between Single Phase and Two Phased are mainly related to the construction phase only, and therefore the impact assessment for operation is the same regardless of approach to construction. Full details are discussed in Chapter 5 Description of the Development.

147. Suitable maintenance of any newly planted sections of hedgerow, shelterbelts and woodlands (typically 10 years) would occur following construction.

22.6.2.1 Impact 1: Permanent change to land use

148. A permanent easement has been sought by EATL directly over the cables. The easement would seek to restrict activities which would penetrate the ground by more than 0.65m. As such, it is expected that normal agricultural activities would be able to continue.

149. Routine maintenance is anticipated as consisting of one annual visit to each jointing bay to carry out routine integrity tests, which would be accessed via the kiosks or by

man-hole covers and possible non-intrusive checking of the cable in between jointing bays with, for instance, ground penetrating radar.

150. Appropriate off-road vehicles would be used to access each jointing bay. Jointing bays would therefore be located adjacent to field boundaries or roads as far as possible.

151. Non-scheduled maintenance to address faults as and when these may arise would also be necessary, and this maintenance could be required in between jointing bays or kiosk locations.

22.6.2.1.1 Landfall and onshore cable route

152. The areas of land that would be affected by permanent easement restrictions have been minimised through the route selection process as described in Chapter 4 Site Selection and Alternatives.

153. The sensitivity of the receptor is considered to be medium because the land is of grades 2 – 4. The magnitude of the effect is considered to be low (*Table 22.8*) due to small area of land affected and the temporary nature of the impact (i.e. only when access is required). Therefore the impact significance is considered to be **minor adverse** at the local level.

154. It is anticipated that non-scheduled maintenance events would be highly localised, temporary and of short duration. Jointing bays and kiosks 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.

155. In terms of potential impacts to the root growth zone, any impacts would be highly localised, immediately surrounding the cables / ducts themselves. This is considered to be **negligible**.

156. Discussions with landowners regarding potential future land uses and any restrictions on these would be undertaken as part of ongoing discussions between landowners and EATL.

22.6.2.1.2 Substation(s)

157. The total land take at the substation(s) would be 3.04ha (*Table 22.2*). This land is ALC grade 2 and is considered to be of high sensitivity. The land would be taken out of use permanently. Due to the small area of the substation(s) in the context of the regional resource (as outlined above), the magnitude of the impact is considered to be low. Although the impact significance is therefore predicted to be moderate

adverse at a site level of the substation(s) compound, the impact is considered to be of **minor adverse** significance in the context of the county.

22.6.2.2 Impact 2: Impacts to ESS

22.6.2.2.1 Landfall and onshore cable route

158. Following construction, it is expected that all ESS affected would be reinstated. There would be a total of 248 kiosks along the onshore cable route, however each one measures 0.75m^2 and would be located adjacent to field boundaries where possible, in terms of impacts to ESS compared to overall regional resource this is considered to be **negligible**. Potential impacts regarding permanent easement are discussed in permanent changes to land use above.

22.6.2.2.2 Substation(s)

159. The land at the substation(s) is fully included within an Entry Level stewardship scheme. The land would be permanently taken out of use during the operation of the proposed East Anglia THREE project. This level of stewardship is considered to be of medium sensitivity and the magnitude of the potential impact is considered to be low. This is due to the limited number of management options applicable to the centre of fields, where the substation(s) would be located. Minimisation of the footprint of the substation(s) would mitigate impact as far as practicable. The predicted impact is therefore **minor adverse** at the site level but **negligible** at the wider scale.

22.6.2.3 Impact 3: Alterations to land drainage

22.6.2.3.1 Landfall, onshore cable route and substation(s)

160. Land drains are present throughout the onshore electrical transmission works area. The following measures would ensure the impact on land drainage, is minimised through embedded mitigation outlined in *Table 22.3*.

161. The potential drainage requirements and strategy for avoiding flood risk at the substation(s) are discussed in Chapter 21 Water Resource and Flood Risk.

162. Given that all drainage would be reinstated and drainage requirements at the substation(s) would be compliant with any flood risk assessment, it is considered that there would be **no impact** upon drainage during operation.

22.6.2.4 Impact 4: Impacts to soils

22.6.2.4.1 Landfall, onshore cable route and substation(s)

163. Routine maintenance along the onshore cable route is anticipated. Non-scheduled maintenance to address faults as and when these may arise would also be necessary,

and this maintenance could be required in between jointing bays or kiosk locations which may be necessary to excavate soil to access the cable ducts for maintenance activities. The design of the substation(s) would allow most of the maintenance work to be done with no interruption to operation. There would be the occasional maintenance visits and an area for storage of key components.

164. It is anticipated that maintenance events would be highly localised and of short duration. Soil handling would be undertaken as described in the embedded mitigation section 22.3.3. It is likely that soils would be re-used on site appropriately. Soils that cannot be reused would follow a waste hierarchy. Following implementation of measures committed to within embedded mitigation, the magnitude of this impact is therefore considered to be low and the sensitivity of local soils is considered to be low. Therefore the impact significance is considered to be **negligible**.

165. Impact 5: Biological contamination

22.6.2.4.2 Landfall, onshore cable route and substation(s).

166. Vehicle movements would only be needed in the event of maintaining cables and this would be a much lower level of movements than during construction. Mitigation measures would ensure there is **no impact** from biological contamination during operation.

22.6.2.5 Impact 6: Impacts to PRoW and Cycle Routes

22.6.2.5.1 Landfall and onshore cable route

167. As all diversions would be removed and PRoW reinstated post-construction **no impact** is predicted during operation.

22.6.2.5.2 Substation(s)

168. PRoW may be subject to visual impacts during operation, these are discussed within Chapter 29 Seascape, Landscape and Visual Amenity. During operation, access along the bridleway W-155/001/0 would be open and no diversion would be required, therefore **no impact** is predicted.

22.6.2.6 Impact 7: Impacts to Existing Utilities

22.6.2.6.1 Landfall, onshore cable route and substation(s)

169. The potential exists for maintenance activities to affect utilities, since these activities may require access to the buried cables. Utilities are considered to be highly sensitive, in particular electricity, gas and water, due to the potential disruption that could be caused should the services be disrupted. As described in section 22.6.1.7,

potentially affected utility providers would be contacted and the location of existing services would be identified prior to maintenance works to ensure there would be **no impact**.

22.6.2.7 Impact 8: Impacts to Open Access and Common Land

22.6.2.7.1 Landfall, onshore cable route and substation(s)

170. There would be **no impact** to open access or common land during operation.

22.6.2.8 Impact 9: Impacts from EMFs

22.6.2.8.1 Landfall, onshore cable route

22.6.2.8.1.1 Human Health

171. If the LFAC solution is used cable system would consist of up to 12 single core cables contained within four ducts. Each duct could contain up to 3 cables which could potentially cancel out the effects of each other's magnetic fields. Buried cables are usually shielded LFAC cables are not considered to emit significant electrical fields, particularly once buried. For a comparison, unburied (overhead) LFAC powerlines have been recorded to emit magnetic fields of between 0.3-5µT which is between 0.08% & 1.3% of the permitted exposure limit, whilst buried cables have reported fields of 2-3 µT within 5m of buried cable (Forewind, 2014).

172. If the HVDC solution is used the cable system would consist of up to four single core cables contained within up to four ducts. Magnetic fields from HVDC overhead lines have been measured at between 5 & 10 µT (EU, 2009), which represents between 1.3% & 2.7% of the maximum exposure levels. It would be anticipated that once buried, exposure levels would be less than 5-10 µT. It is generally accepted that as DC magnetic fields are static and are similar in behaviour and strength as naturally occurring magnetic fields.

173. For both the LFAC and HVDC systems there is predicted to be no exposure to electrical fields and exposure to magnetic fields is expected to be much lower than the maximum permitted exposure level. In addition, electrical infrastructure will be installed in agricultural land and away from any areas of permeant residence; therefore the potential for exposure is limited. Therefore it is anticipated that there would be **no impact** to **negligible** impact on health from exposure to electric or magnetic fields generated by the projects electrical infrastructure.

22.6.2.8.1.2 Soils and Plants

174. Field studies looking at exposure to crops and plants subject to 50-60 Hz have found no evidence to suggest that exposure at these levels cause impacts on plants or

crops. Damage to trees is well known to occur at sites with strong electric field strengths, however, field strength that damage occurs at are far above ICNIRP's levels. Such field levels are found only close to the conductors of very high voltage power lines (WHO 2005).

175. Cables and infrastructure of both the HVDC and LFAC solutions are expected to generate negligible electric and magnetic fields, well outside to field strengths that have observed to result in effects on crops and plants.

176. Therefore it is anticipated that there would be **no impact** to **negligible** impact on soils and plants from exposure to electric or magnetic fields generated by the projects electrical infrastructure.

22.6.2.8.2 Substation(s)

177. The substation(s) would produce both DC and AC electromagnetic fields, but these are very short range and would be shielded by the building and perimeter fence. EATL would require the Contractor to evaluate the electromagnetic fields at the onshore substation(s) with respect to human exposure. This study would be followed up with a Site Acceptance Test to demonstrate that the substation(s) and AC connection comply with UK Government guidelines on occupational and public exposure limits.

178. The substation(s) would be designed to immediately sever all power to any cable that fails in service in much the same way as domestic electrical circuits are protected by modern consumer units to avoid health risks associated with cable fracture. A cable failure underground is not considered to have a visible effect at the surface. The cable would, however, be electrically inert immediately after the failure event.

179. Following the implementation of the embedded mitigation above, **no impacts** are predicted at the substation(s).

22.6.3 Potential Impacts During Decommissioning

180. This section describes the potential impacts of the decommissioning of the onshore electrical transmission works including access with regards to impacts on land use and agriculture. The decommissioning of the project would be subject to a detailed decommissioning programme process controlled 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.

22.6.3.1 Landfall and onshore cable route

181. It is anticipated that the onshore cable would be decommissioned (de-energised) and left in-situ, the jointing bays and ducts would also be left in-situ. Kiosks would be removed.

22.6.3.2 Substation(s)

182. 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;
- Removal of cabling from site;
- Dismantling and removal of electrical equipment from within the substation(s) buildings;
- Removal of main substation(s) and minor services equipment;
- Demolition of the support buildings and removal of fence;
- Removal of hard standing; and,
- Landscaping and reinstatement of the site (including land drainage).

183. 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 those during construction The decommissioning methodology would be finalised towards the end of the project's lifetime and in line with up to date guidance, policy and legislation.

22.7 Cumulative Impacts

184. 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 land use impacts of the proposed East Anglia THREE project mostly affect receptors within the onshore electrical transmission works including access, there is limited potential for interaction with any developments which do not have direct overlap with the proposed East Anglia THREE project. With regard to the land use 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 PRoWs temporarily during construction or drainage systems may be affected) 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 long term impacts.

185. A full list of projects that have been scoped into the CIA is provided in *Table 22.14*. These cover major known developments in the vicinity of the onshore electrical transmission works including access. The majority of these are on predominantly brownfield land and therefore there is no potential to impact land use receptors. The two key projects which have been identified as potentially causing cumulative impacts are the proposed East Anglia ONE 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 converter stations / substation(s) within close proximity to the substation(s) proposed for the proposed East Anglia THREE project.

Table 22.14 Summary of Projects considered for the CIA in relation to land use

Project	Status	Construction / operation period	Distance from Direct Impacts Study Area (km)	Project definition	Project data status	Included in CIA	Rationale
East Anglia ONE	Consented	2017	0	Offshore Windfarm Project Project description available	Complete/ high	Yes	Construction would not overlap. Operational and decommissioning impacts only
Future EAOW Project	Pre-Application	No information	0	Offshore Windfarm Project Outline project data only	None	Yes	Construction would not overlap but consecutive disturbance possible. Operational and decommissioning impacts only
Sizewell C	Pre-Application	Unknown - connection agreement with NG remains 2020-2021, so construction (up to 10 years) would overlap in that circumstance.	24.7	Nuclear Power Station http://sizewell.edfenergyconsultation.info/proposals/	Low	No	No spatial overlap with onshore electrical transmission works, overlap of socio-economic impacts – same labour market, economic area etc, also traffic on Woodbridge bypass
Bramford-Twinstead	Pre-Application	Unknown	0	Outline only	Complete/ high	Yes	May adjoin converter station location

Project	Status	Construction / operation period	Distance from Direct Impacts Study Area (km)	Project definition	Project data status	Included in CIA	Rationale
SITA (EfW plant)	In operation	Operational	0.5	Energy From Waste Plant Project description available	Complete/ high	No	Would be operational before construction commences. No spatial overlap with onshore electrical transmission works
SnOasis	Planning permission granted	Unknown The permission is still 'live'	0.7	Winter sport centre. Master plans available	Incomplete/ low	No	No spatial overlap traffic flows would be on same routes
Old Fisons site (land west of Paper Mill Lane)	Planning Application TBD	Unknown There is a resolution to grant permission subject to the completion of a legal agreement. Implementation date unknown.	0.7	Business park and housing scheme. Master plans available	Complete/ high	No	No spatial overlap traffic flows would be on same routes
Adastral park	Planning Application TBD	Unknown	0.8	Business park and housing scheme. Master plans available	Complete/high	No	No spatial overlap [traffic flows would be on same routes.
Ipswich Garden Suburb	Identified in adopted Core Strategy	Primarily after 2020	3	Urban development north of Ipswich. Master Plan at consultation phase. Interim guidance now in place and will be adopted when the Core Strategy update is complete likely early	Incomplete / medium	No	Greenfield site. No overlap with landfall, Onshore Cable Route or converter station location. Due to distance recreational

Project	Status	Construction / operation period	Distance from Direct Impacts Study Area (km)	Project definition	Project data status	Included in CIA	Rationale
				2016. 1st application is in]			pressure will focus on Orwell Estuary and not Deben Estuary. [traffic flows would be on same routes]
Progress Power, Eye, Suffolk	Planning permission granted	Construction 2017-18, operation by 2019.	28	Gas fired power station development. http://infrastructure.planningportal.gov.uk/projects/eastern/progress-power-station/	Complete/ high	no	No overlap with landfall, Onshore Cable Route or converter station location. Likely to be constructed prior to EA3 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.

22.7.1 Potential Cumulative Impacts During Construction

186. Under either Single Phase or Two Phased approach to construction, East Anglia ONE would be constructed and ducts installed for the proposed East Anglia THREE project and a future EAOW project followed by reinstatement of disturbed ground and selected terrestrial habitats (e.g. hedges). The East Anglia THREE cables are pulled through and at a later date the future project cables are also pulled through.

187. East Anglia ONE would undertake major preparatory works for the following projects therefore cumulative impacts would arise from cable pulling and jointing operations (and construction of jointing bays and haul roads) and the construction of the substation(s). For the cumulative impact therefore East Anglia ONE would have the greatest magnitude of impact with subsequent projects having smaller and more localised overall impact magnitudes (at the jointing bays, access points to these and at the substation(s)).

188. The area covered by the onshore electrical transmission works including access would be reinstated / replanted after construction of East Anglia ONE (with the exception of the permanent structures at the converter station / substation(s) locations at which habitat is permanently lost).

189. The majority of major schemes listed in *Table 22.14* have no spatial overlap with the proposed East Anglia THREE project onshore electrical transmission works including access.

22.7.1.1 Cumulative Impact 1: Land taken out of existing use

190. For East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project, all land would be reinstated with exception of the permanent structures at the converter station / substation(s) compound. Following this, sections of the onshore cable route would be revisited for the construction of the subsequent projects for the same time periods. Although the land would be taken out of use up to three times, given the smaller area used for cable installation on subsequent projects, it is considered that this cumulative impact would be no greater than **minor adverse** significance.

22.7.1.2 Cumulative Impact 2: ESSs

191. All land would be reinstated with exception of the permanent structures at the converter station / substation(s) compound and kiosks. Following this, sections of the onshore cable route would be revisited for the construction of the subsequent projects for the same time periods. Although the land would be taken out of use up to three times, given the smaller area used for cable installation on subsequent

projects it is considered that this cumulative impact would be no greater than **minor adverse** significance.

22.7.1.3 Cumulative Impact 3: Land drainage

192. As part of construction of East Anglia ONE, all water crossings would be in place and ducted prior to construction of subsequent projects. There would be a minor adverse impact from East Anglia ONE. There would be limited cumulative impact from subsequent projects as disturbance to drainage infrastructure would be limited and there would be little spoil from jointing bay excavation, overall this impact would be negligible. The cumulative impact of undertaking excavations and cable pulling operations is not considered to increase above **minor adverse**.

22.7.1.4 Cumulative Impact 4: Impacts to soils

193. The construction of East Anglia ONE would lead to minor adverse impacts (see section 22.6.1.4). Impacts from installation of cables into pre-installed ducts for subsequent projects would be negligible therefore the cumulative impact of all three projects is considered to remain **minor adverse**.

22.7.1.5 Cumulative Impact 5: Biological contamination

194. Due to distance from possible contamination sources, **no impact** is predicted at landfall or converter station / substation(s) location (see section 22.6.1.5).

195. Given the distance to the nearest reported source of contamination and assuming adherence to embedded mitigation, the cumulative impact for the onshore cable route would be **negligible** (see section 22.6.1.5).

22.7.1.6 Cumulative Impact 6: Impacts to PRoW and cycle routes

196. Any PRoW affected would be discussed with SCC in advance of construction and no cycle routes impacted by the project (see section 22.6.1.6). The impact from East Anglia ONE and any subsequent projects would be **negligible** as the same mitigation would be employed for all. There are potential impacts upon different PRoW from Adastral Park and potentially from Bramford-Twinstead works. However, as there is no overlap of impacts upon PRoW it is considered that the cumulative impact would be **negligible**.

22.7.1.7 Cumulative Impact 7: Impacts to utilities

197. Utilities would be identified prior to construction and impacts either avoided or mitigated in agreement with their owners (see section 22.6.1.7). Therefore cumulatively there would be **no impact**.

22.7.1.8 Cumulative Impact 8 Impacts to open access and common land

198. No open access or common land would be affected by East Anglia ONE, the proposed East Anglia THREE project and any future EAOW project (see section 22.6.1). Therefore cumulatively there would be **no impact**.

22.7.2 Potential Cumulative Impacts During Operation

199. During operation, impacts would be restricted to those required for maintenance. In the event that East Anglia ONE, the proposed East Anglia THREE project and a proposed future project are all constructed these impacts are likely to be within the converter station / substation(s) location or at discrete points along the onshore cable route where cable testing is required.

22.7.2.1 Cumulative Impact 1: Permanent change to land use

200. The land areas of up to three converter stations / substation(s) would be taken permanently out of use. Bramford-Twinstead may affect land to the west of the converter station / substation(s) location although no detail is available. Together this impact would be moderate adverse at the local level, given that the land at the converter station is ALC grade 2 and 3, but is **minor adverse** at the wider county scale.

201. With regard to the onshore cable route, the permanent easement would cover cables for up to three projects and would only affect land owners when access is required. Therefore the cumulative impact would not increase above **minor adverse**.

22.7.2.2 Cumulative Impact 2: ESSs

202. Along the onshore cable route, previous use would be reinstated during operation, with **no impact** predicted.

203. At the converter station / substation location(s), land is within entry level stewardship and not considered of high sensitivity. Bramford-Twinstead may also affect land in entry level stewardship to the west of the converter station / substation(s) location although no detail is available. Given the total area of land affected, the cumulative impact would be **minor adverse** at the local level but **negligible** at the wider scale.

22.7.2.3 Cumulative Impact 3: Land drainage

204. Drainage along the onshore cable route would be reinstated and compliant drainage installed at the converter station / substation location(s). Cumulatively there would therefore be **no impact**.

22.7.2.4 Cumulative Impact 4: Impacts to soils

205. Mitigation measures in the event of requirement to maintain cables would ensure **negligible** or **no impact**.

22.7.2.5 Cumulative Impact 5: Biological contamination

206. Mitigation measures applied for all plant and vehicles undertaking maintenance activities would ensure **no impact**.

22.7.2.6 Cumulative Impact 6: Impacts to PRoW and Cycle Routes

207. All PRoW would be reinstated after construction and no operational impacts are anticipated therefore **no impact** is predicted cumulatively from East Anglia ONE, East Anglia THREE and a future EAOW project.

22.7.2.7 Cumulative Impact 7: Impacts to utilities

208. Utility providers would be contacted prior to any maintenance works and works undertaken to ensure **no impact**.

22.7.2.8 Cumulative Impact 8: Impacts to open access and common land

209. No open access or common land would be affected by any of the projects therefore there would be **no impact**.

22.7.2.9 Cumulative Impact 9: EMF

210. Should East Anglia ONE, the proposed East Anglia THREE project and a future EAOW project all be constructed, each would have to comply with UK Government guidelines on occupational and public exposure limits to EMF cumulatively.

22.7.3 Potential Cumulative Impacts During Decommissioning

22.7.3.1 Landfall and onshore cable route

211. It is anticipated that the onshore cable would be decommissioned (de-energised) and the cables and jointing bays left in-situ. Kiosks would be removed. In this case there would be **no impact** for any receptor upon decommissioning.

22.7.3.2 Substation

212. The details regarding the decommissioning of the converter station and substation(s) are currently unknown. The worst case scenario is considered to be consecutive removal and reinstatement. Decommissioning would be undertaken in line with legislation, policy and best-practice guidance in place at the time.

22.8 Inter-relationships

213. Parameters or "sources" that are considered to interact with receptors identified in this chapter are listed in *Table22.15* below.

Table 22.15. Inter-relationships with Land Use

Inter-relationship All Phases	Section where addressed	Linked Chapter
Soils, Geology and Ground Conditions	22.5, 22.6, 22.7	Chapter 19
Terrestrial Ecology (Invasive species and Nature Conservation Sites)	22.5, 22.6, 22.7	Chapter 23
Onshore Archaeology and Cultural heritage	22.5, 22.6,	Chapter 25
Traffic and Transport (Roads and Access)	22.5, 22.6, 22.7	Chapter 27
Socioeconomics	22.5, 22.6, 22.7	Chapter 28
Seascape, Landscape and Visual Amenity	22.5, 22.6, 22.7	Chapter 29

22.9 Summary

214. This section summarises the main findings from the impact assessment. This is outlined in *Table 22.16*.

215. The onshore electrical transmission works including access would cross land in agricultural use. This land is predominantly of low ALC grade (between grades 2 and 3), with the substation(s) located in grade 2 land. The majority of the land at landfall, along the onshore cable route and at the substation(s) is included under an ESS. The haul road may need to cross land drains. These receptors are considered to be highly sensitive. An ALO would be employed to undertake pre-construction land surveys to provide a baseline for reinstatement following the works, as well as to assist with appropriate micro-siting of works. Due to embedded mitigation no significant impacts are predicted to land take, ESS or land drains.

216. Several different soil types would be crossed by the onshore transmission works, however the value of these soils was considered to be low. A CoCP would be produced, incorporating a number of requirements to apply best practice techniques to all aspects of the project. This document would ensure that the potential risks relating to ground or groundwater contamination do not result in a significant impact during the project. Key aspects of the CoCP would include removal, storage and reinstatement of topsoil and subsoil layers; vehicle control to prevent soil damage by traffic movements; pollution control measures; fuel and materials storage and waste management. Following adherence to CoCP, no significant impacts are predicted to soils as a result of the proposed East Anglia THREE project.

217. The onshore electrical transmission works cross a number of PRoWs which may be disrupted during construction depending on extent of haul roads and location of infrastructure (e.g. jointing bays) determined during detailed design. PRoWs would

only need closure or diversion where the PRoW itself is used as an access. In those locations where works simply cross a PRoW, no closure would be required whilst haul road is installed and then removed. Works would be limited to a couple of hours and access maintained by the use of banksmen. Where more substantial works are required, this would be discussed and agreed with SCC pre-construction. Measures for any temporary stopping or diversions are outlined in the OCoCP. The bridleway near to the substation(s) may experience some visual impacts, which are discussed in Chapter 29 Seascape, Landscape and Visual Amenity.

218. The landfall and onshore cable route cross a number of utilities related to domestic services for gas, electricity, water and sewerage connections. EATL would identify services on the ground prior to construction in consultation with utility providers, and undertake utility crossings or diversions in accordance with the appropriate standards for such crossings or works, avoiding any potential impacts to utilities.

219. A **moderate adverse** impact was predicted at the local level for the construction and operation of the onshore substation(s), since it would result in permanent land take, this is not significant at the county scale.

220. The potential effects arising from EMF of the cables during operation were considered, and the embedded mitigation within the design of the cables and cable installation process are considered to reduce any potential impacts to **negligible**.

221. No impacts during operation were considered to result in more than a **minor adverse** impact.

222. 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.

Table 22.16 Potential Impacts Identified for Land Use

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Construction						
Land taken out of existing use	Landfall	Medium	Low	Single Phase or Two Phased: Minor adverse	Embedded mitigation (*Table 22.3*)	N/A
	Onshore cable route	Medium	Low	Single Phase or Two Phased: Minor adverse	Embedded mitigation (*Table 22.3*)	N/A
ESS	Landfall and onshore cable route	Medium	Low	Single Phase or Two Phased: Negligible	Embedded mitigation (*Table 22.3*) and consultation with landowners affected	Negligible
Impacts to land drainage	Landfall and onshore cable route	High	Low	Single Phase or Two Phased: Minor adverse	Embedded mitigation (*Table 22.3*)	N/A
Impacts to soils	Landfall and onshore cable route	Low	Single Phase: Low Two Phased: Low	Single Phase: Negligible Two Phased: Negligible	Embedded mitigation (*Table 22.3*)	N/A
	Substation(s)	Low	Medium	Single Phase	Embedded mitigation (*Table 22.3*)	N/A

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
				or Two Phased: Minor adverse		
Biological contamination	Landfall	High	Negligible	Single Phase or Two Phased: Negligible	Embedded mitigation (*Table 22.3*) and additional mitigation (*Table 22.13)*	Negligible
	Onshore cable route	High	Negligible	Single Phase or Two Phased: Negligible		N/A
	Substation(s)	High	None	Single Phase or Two Phased: No impact	No mitigation needed	N/A
Impacts to PRoW	Landfall	Medium	Single Phase or Two Phased: Negligible	Negligible	Embedded mitigation (*Table 22.3*)	N/A
	Cable route	High-Medium	Single Phase: Negligible	Single Phase: Negligible Two Phased: Negligible	Embedded mitigation (*Table 22.3*)	N/A

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
	Substation(s)	High-Medium	Low	Single Phase or Two Phased: Minor adverse	Embedded mitigation (*Table 22.3*)	N/A
Impacts to cycle routes	Landfall and onshore cable route and substation(s)	Medium	None	Single Phase or Two Phased: No impact	N/A	N/A
Impacts to utilities	Landfall and onshore cable route and substation(s)	High	None	Single Phase or Two Phased: No impact	N/A	N/A
Impacts to open access and common land	Landfall and onshore cable route and substation(s)	Medium	None	Single Phase or Two Phased: No impact	N/A	N/A
Operation						
Land taken out of existing use	Landfall	Medium	Low	Minor adverse-Negligible	Embedded mitigation (*Table 22.3*)	Negligible
	Cable route	Medium	Low	Minor adverse-Negligible	As above	Minor adverse
	Substation(s)	High	Low	Minor adverse	No further mitigation proposed	N/A

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Impacts to Environment Stewardship Schemes	Landfall and onshore cable route	Medium	None	Negligible	No further mitigation proposed	Negligible
	Substation(s)	Medium	Low	Minor adverse	None available, permanent loss of land	Minor adverse
Land drainage system altered	Landfall, cable route, substation(s)	Low	None	No impact	Embedded mitigation from construction (*Table 22.3*)	N/A
Impacts to soils	Landfall, cable route, substation(s)	Low	Low	Negligible	No further mitigation proposed	N/A
Biological contamination	Landfall, cable route, substation(s)	High	None	No impact	No further mitigation proposed	N/A
Impacts to PRoW	Landfall, and onshore cable route	High – medium	None	No impact	No further mitigation proposed	N/A
	Substation(s)	High	None	No impact	No further mitigation proposed	N/A
Impacts to cycle routes	Landfall, cable route, substation(s)	Medium	None	No impact	No further mitigation proposed	N/A
Impacts to utilities	Landfall, onshore cable route and substation(s)	High	None	No impact	No further mitigation proposed	N/A

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Impacts to open access and common land	Landfall, onshore cable route and substation(s)	High	None	No impact	No further mitigation proposed	N/A
Impacts from EMF	High	High	None	No impact - Negligible	Embedded mitigation (*Table 22.3*)	N/A
Decommissioning						
Land taken out of existing use	Landfall	Medium	None	No impact	Mitigation to be designed in accordance with current legislation, policy and guidance of the time.	N/A
	Onshore cable route	Medium	None	No impact		N/A
ESSs	Landfall	Medium	None	No impact		N/A
	Onshore cable route	Medium	None	No impact		N/A
Impacts to land drainage	Landfall	High	None	No impact	No further mitigation proposed	N/A
	Onshore cable route	High	None	No impact		N/A
Impacts to soils	Landfall and onshore cable route	Low	None	No impact		N/A
	Substation(s)	Low	Medium	Minor adverse		N/A
Biological contamination	Landfall	High	None	No impact		N/A
	Onshore cable	High	None	No impact		N/A

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
	route					
	Substation(s)	High	None	No impact		N/A
Impacts to PRoW	Landfall	Medium	None	No impact		N/A
	Onshore cable route	High – medium	None	No impact		N/A
	Substation(s)	High	None	No impact		N/A
Impacts to cycle routes	Landfall	Medium	None	No impact	No further mitigation proposed	N/A
	Cable route	Medium	None	No impact		N/A
	Substation(s)	Medium	None	No impact		N/A
Impacts to utilities	Landfall	High	None	No impact		N/A
	Cable route	High	None	No impact		N/A
	Substation(s)	High	None	No impact		N/A
Impacts to open access and common land	Landfall	Medium	None	No impact		N/A
	Cable route	Medium	None	No impact		N/A
	Substation(s)	Medium	None	No impact		N/A

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Chapter 22 Ends Here