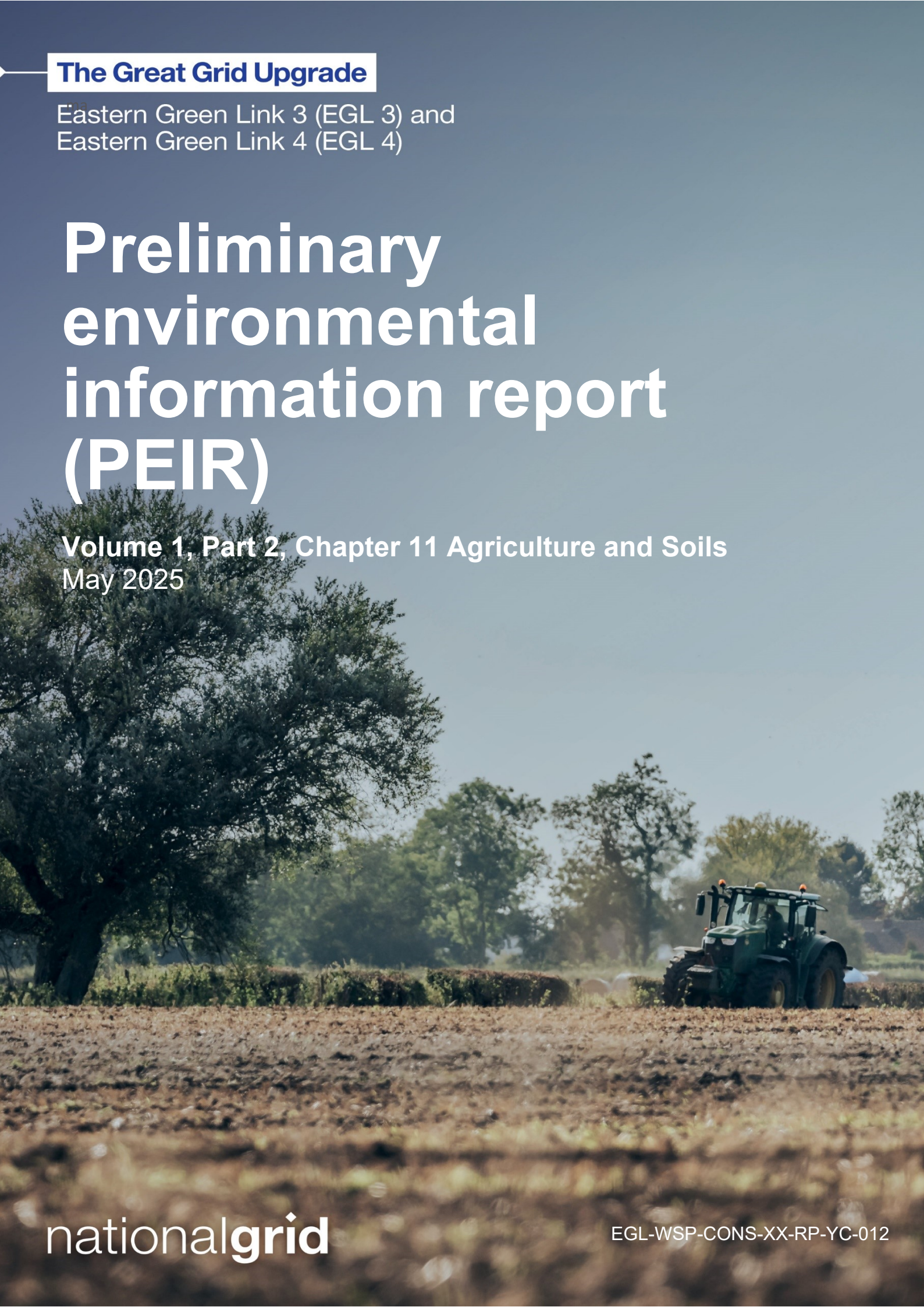
The Great Grid Upgrade

Eastern Green Link 3 (EGL 3) and
Eastern Green Link 4 (EGL 4)

Preliminary environmental information report (PEIR)

Volume 1, Part 2, Chapter 11 Agriculture and Soils

May 2025



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11. Agriculture and Soils

11.1 Introduction

11.1.1 This chapter presents the preliminary findings of the Environmental Impact Assessment (EIA) undertaken to date for the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) English Onshore Scheme, with respect to Agriculture and Soils including agricultural land quality (as defined by the Agricultural Land Classification (ALC) system), soils and their function and agricultural landholdings. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the description of the Projects provided in **Volume 1, Part 1, Chapter 4: Description of the Projects.**

11.1.2 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, environmental measures, and the preliminary Agriculture and Soils effects that could result from the English Onshore Scheme during the construction and operation (and maintenance) phases. Specifically, it relates to the English onshore elements of EGL 3 and EGL 4 (the English Onshore Scheme) landward of Mean Low Water Springs (MLWS).

11.1.3 This chapter should be read in conjunction with:

- **Volume 1, Part 2, Chapter 6: Biodiversity** due to the close association between soil and ecosystem factors;
- **Volume 1, Part 2, Chapter 8: Landscape and Visual Amenity** due to the close association with topography and land use;
- **Volume 1, Part 2, Chapter 9: Water Environment** due to the interaction between water and soil, for example infiltration rates, erosion risk and flood risk; and
- **Volume 1, Part 2, Chapter 10: Geology and Hydrogeology** due to the close association between underlying geology and soil characteristics and how soil characteristics may influence groundwater recharge.
- **Volume 1, Part 4, Chapter 28: Cumulative Effects.**

11.1.4 This chapter is supported by the following figures:

- **Volume 3, Part 2, Figure 11-1: National Soil Association**;
- **Volume 3, Part 2, Figure 11-2: Provisional Agricultural Land Classification**;
- **Volume 3, Part 2, Figure 11-3: Detailed Agricultural Land Classification**;
- **Volume 3, Part 2, Figure 11-4: Woodland and Forestry**; and
- **Volume 3, Part 2, Figure 11-5: Agri-environment Schemes**;

11.1.5 This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context;**
- **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures;** and

- **Volume 2, Part 1, Appendix 1.5.B: Outline Code of Conduction Practice**.

Limitations

11.1.6 The information provided in this Preliminary Environmental Information Report (PEIR) is preliminary, the final assessment of potential significant effects will be reported in the Environmental Statement (ES). The PEIR has been produced to fulfil National Grid Electricity Transmission plc (NGET's) consultation duties in accordance with Section 42 of the PA2008 and enable consultees to develop an informed view of the preliminary potential significant effects of the English Onshore Scheme.

11.1.7 The assessment has been undertaken based on the preliminary ProjectS design information. This is an iterative process, and the assessment will be updated in the ES to reflect the evolved design. These updates may lead to changes in areas of land-take and soil disturbance, both of which will be accounted for in the assessment presented in the ES.

11.1.8 For the preliminary assessment, it is assumed that all areas temporarily disturbed during construction would be reinstated and the existing land use resumed. It is assumed that permanent land take includes permanent access roads, converter stations and substations. All areas and aspects of the design will be reassessed in the ES based on the final design presented with the application for development consent.

11.1.9 These key parameters and assumptions will be reviewed based on the design presented in the Development Consent Order (DCO) application and, where required, updated, or refined, for the ES. The ES will present the final key limitations and assumptions used within the assessment, particularly drawing attention to any areas that may have changed from that presented in this preliminary assessment.

11.1.10 The preliminary assessment of agricultural land quality presented within this PEIR is based upon publicly available Provisional ALC mapping which does not differentiate between Grade 3a (best and most versatile (BMV) land) and Grade 3b (non-BMV land). Therefore, where Provisional ALC Grade 3 has been identified within the draft Order Limits a worst-case scenario has been assumed and this land has been assessed as potentially comprising BMV land for the purpose of assessing any significant impacts. A detailed ALC survey will be conducted prior to the ES and this will confirm the actual areas of each ALC grade and the total area of BMV land affected.

Preliminary significance conclusions

11.1.11 For ease of reference, a summary of the significant and potential significant effects from the preliminary Agriculture and Soils assessment is provided in **Table 11-1.** All other effects in relation to Agriculture and Soils have been assessed as not significant. Further details of the methodology behind the assessment, and a detailed narrative of the assessment itself are provided within the sections below.

Table 11-1 – Preliminary summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Construction Phase				
Agricultural Land Quality - Any construction activity on agricultural land – temporary loss of BMV land	Very High to High	Minor adverse	Slight to Moderate adverse (Significant)	Temporary loss of 5,597.1 ha of BMV land during the construction phase will be reinstated/re-used within the English Onshore Scheme by the end of the construction phase in accordance with the Outline Soil Management Plan (SMP).
Agricultural Land Quality - Any construction activity on agricultural land – permanent loss of BMV land	Very High to High	Major adverse	Very Large adverse (Significant)	The permanent loss of BMV land ranges from of 33.9 ha to 35.1 ha during the construction phase depending on the converter station option.

[1] The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.8** and is defined as negligible, low, medium, high and very high.

[2] The magnitude of change on a receptor resulting from activities relating to the English Onshore Scheme is defined using the criteria set out in **Section 11.8** and is defined as negligible, minor, moderate, major.

[3]The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as very large (significant), large (significant), moderate (potentially significant) or slight/neutral (not significant), subject to the evaluation methodology outlined in **Section 11.8**.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Soil Function - soil disturbance for temporary construction areas, access routes and permanent infrastructure resulting in temporary loss of function	Very High to Low	Minor adverse	Moderate adverse to Neutral (Significant)	Temporary disturbance to soils across an area of 5,597.1 ha which will be reinstated/re-used within the English Onshore Scheme by the end of the construction phase in accordance with the Outline SMP.
Agricultural Landholdings – temporary disruption to agricultural enterprises	Low	Minor to Moderate adverse	Neutral (Not Significant)	The temporary removal of land from an agricultural enterprise would be dealt with through compensation in accordance with the compensation code (which would include consideration of any active agri-environment and/or forestry/woodland schemes).
Agricultural Landholdings – permanent loss of land from agricultural enterprises	Low	Minor to Moderate adverse	Neutral (Not Significant)	The permanent removal of land from an agricultural enterprise would be dealt with through compensation in accordance with the compensation code (which would include consideration of any active agri-environment

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
				and/or forestry/woodland schemes).
Operational Phase				
Agricultural Land Quality - Any maintenance or repair activity on agricultural land – temporary loss of BMV land	Very High to High	Minor adverse	Slight to Moderate adverse (Not Significant)	During the operation of the English Onshore Scheme, land taken temporarily by the English Onshore Scheme would have already been reinstated and returned to agricultural use, whilst land taken permanently by the English Onshore Scheme would remain out of agricultural use. Any maintenance or repair works are likely to be localised and temporary, with works undertaken in accordance with good practice at the time of the works as set out in the Outline SMP.
Soil Function - soil disturbance for temporary construction areas resulting in temporary loss of function	Very High to Low	Minor adverse	Moderate to Slight adverse (Not Significant)	During the operation of the English Onshore Scheme, land taken temporarily by the English Onshore Scheme would have already been reinstated and returned to agricultural use, whilst

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
				land taken permanently by the English Onshore Scheme would remain out of agricultural use. Any maintenance or repair works are likely to be localised and temporary, with works undertaken in accordance with good practice at the time of the works as set out in the Outline SMP.
Agricultural Landholdings – temporary disruption to agricultural enterprises	Low	Minor to Moderate adverse	Neutral (Not Significant)	Any maintenance or repair works are likely to be localised and temporary, with works undertaken in accordance with good practice at the time of the works and the temporary removal of land from an agricultural enterprise dealt with through compensation in accordance with the compensation code (which would include consideration of any active agri-environment and/or forestry/woodland schemes).

11.2 Relevant technical guidance

11.2.1 The legislation and planning policy which has informed the assessment of effects with respect to Agriculture and Soils is provided within **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context**. Further information on policies relevant to the English Onshore Scheme is provided in **Volume 1, Part 1, Chapter 2: Regulatory and Policy Overview.** Relevant technical guidance, specific to Agriculture and Soils, that has informed this PEIR and will inform the assessment within the ES is summarised below.

Technical guidance

11.2.2 A summary of the technical guidance for Agriculture and Soils is given in **Table 11-2.**

Table 11-2 – Technical guidance relevant to the Agriculture and Soils assessment

Technical guidance document	Context
Safeguarding Our Soils A Strategy for England Defra, 2009 (Ref 11.1).	This outlines how to better manage soils, reduce their degradation and build resilience to increasing impact on soil in order to provide a sustainable food supply.
Guide to Assessing Development Proposals on Agricultural Land, Natural England, 2021 (Ref 11.2) (considering Technical Information Note 049. ALC Protecting the Best and Most Versatile Land, Natural England, 2012 R (Ref 11.3).	This outlines how construction activities can manage soils sustainably while protecting them from damage and avoiding peat extraction.
Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (Ref 11.4).	This document assists soil professionals in developing SMPs.
British Standards Institute Specification for topsoil (BS3882:2015) (Ref 11.5).	This document outlines the specific characteristics required to be assessed for topsoil classification where topsoil is being imported/exported from a site.
Agricultural Land Classification of England and Wales, Revised Criteria and Guidelines for Grading the Quality of Agricultural Land, Ministry of Agriculture, Fisheries and Food, 1988 (Ref 11.6).	This sets out the methodology to be followed for the assessment of the quality of agricultural land across England and Wales.
Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, Defra, 2009 (Ref 11.7).	This document provides a practical guide to the protection of soil resources throughout construction work.
Good Practice Guide for Handling Soils in Mineral Workings, Institute of Quarrying, 2021 (Ref 11.8).	This document is a practical guide containing theory and knowledge to best protect soil during soil handling operations. It is considered to now supersede the Good

Technical guidance document	Context
	Practice Guide for Handling Soils produced by MAFF (see below).
Good Practice Guide for Handling Soils, Ministry of Agriculture, Fisheries and Food (MAFF), 2000 (Ref 11.9).	This document sets out good practice guidance for soil handling for a range of different earth-moving plant and approaches to protect soil quality.
A New Perspective on Land and Soil in Environmental Impact Assessment, Institute of Environmental Management and Assessment, 2022 (Ref 11.10).	This document outlines the EIA assessment approach to ensure all soil functions are accounted for in impact assessment.
Soil Survey Field Handbook: Describing and Sampling Soil Profiles (Ref 11.11).	This sets of the terminology to be used and the criteria applied to specific descriptors for the description of soil profiles.
The Design Manual for Road and Bridges (DMRB) LA112 Population and Human Health, National Highways, 2020 (Ref 11.12).	This document sets out the EIA assessment approach to ensure that impacts to agricultural land holdings are accounted for within the assessment.

11.3 Consultation and engagement

Overview

11.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Volume 1, Part 1, Section 5.9**, **Chapter 5: PEIR Approach and Methodology**.

Scoping Opinion

11.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 05 September 2024. A summary of the relevant responses received in the Scoping Opinion in relation to Agriculture and Soils and confirmation of how these have been addressed within the assessment to date is presented in **Table 11-3.**

11.3.3 Since issue of the Scoping Opinion changes to the Projects design has resulted in Fenland District Council and Cambridgeshire County Council falling within the draft Order Limits. Whilst the preliminary assessment has taken account of the relevant baseline information for these local planning authorities the scope of the assessment remains unchanged.

11.3.4 The information provided in the PEIR is preliminary and not all of the Scoping Opinion comments have been addressed at this stage, however all comments will be addressed within the ES.

Table 11-3 – Summary of EIA Scoping Opinion responses for Agriculture and Soils

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate	Temporary and permanent loss of agricultural land (including BMV land) - maintenance: The Scoping Report notes that access for maintenance may require temporary access tracks and small compound areas, but these are likely to be limited in extent and all soil handling would be undertaken in line with published good practice. The Planning Inspectorate notes this; however, there is uncertainty as to works which are required for maintenance of the Proposed Development. As such, the Planning Inspectorate is unable to scope this matter out at this stage. The Planning Inspectorate would expect a soil management plan and the other mitigation measures relied upon for this to be included in the application documents and secured within the DCO.	The Planning Inspectorate's comment is noted. A description of likely/regular maintenance activities will be developed and set out in the ES. The assessment will be undertaken based on this and presented in the ES and the outline Soil Management Plan (Outline SMP) will include reference to the measures required to be implemented during maintenance operations.
Planning Inspectorate	Impacts upon soil ecosystem services – maintenance: The Scoping Report notes that maintenance works would impact soils at a smaller scale than construction. Furthermore, any disturbance to soils during maintenance would also be undertaken in accordance with good practice soil handling methods. The Planning Inspectorate notes this; however, there is uncertainty as to works which are required for maintenance of the Proposed Development. As such, the Planning Inspectorate is unable to scope this matter out at this stage. The Planning Inspectorate would expect a soil management plan and the other mitigation measures relied upon for this to be included in the application documents and secured within the DCO.	The Planning Inspectorate's comment is noted. A description of likely/regular maintenance activities will be developed and set out in the ES. The assessment will be undertaken based on this and presented in the ES and the Outline SMP will include reference to the measures required to be implemented during maintenance operations.
	Temporary acquisition and permanent loss of agricultural land holdings - maintenance: The Scoping Report proposes to scope out this matter on the basis that access for maintenance may require temporary access tracks and small compound areas, but these are likely to be limited in extent. The Planning Inspectorate notes this, however there is uncertainty as to works which are required for maintenance of the	The Planning Inspectorate's comment is noted. A description of likely/regular maintenance activities will be developed and set out in the ES. The assessment will be undertaken based on

Consultee	Consideration	How addressed in this PEIR
	Proposed Development. As such, the Planning Inspectorate is unable to scope this matter out at this stage. The Planning Inspectorate would expect a soil management plan and the other mitigation measures relied upon for this to be included in the application documents and secured within the DCO.	this and presented in the ES. Any additional mitigation measures identified will be included in the Outline SMP.
Planning Inspectorate	Effects upon soil ecosystem services – operation: The Scoping Report proposes to scope this matter out as no further soil disturbance (beyond normal land management activities) would be undertaken. The Planning Inspectorate agrees that an assessment of effects upon soil ecosystem services during the operational phase (excluding maintenance) can be scoped out of the ES. The Planning Inspectorate would expect however a soil management plan and the other mitigation measures relied upon for this to be included in the application documents and secured within the DCO.	The Planning Inspectorate's agreement is noted and this matter has been scoped out of further assessment. An Outline SMP will be submitted with the DCO.
Planning Inspectorate	Use of soil description terminology: The Scoping Report Paragraph 11.4.6 lists 14 soil associations, however these do not appear to be represented on a figure. **Figure 11-1** refers to soilscapes which do not have a subsequent description. The ES should ensure to explain all datasets used and represent these on an appropriate figure where required. The ES should also explain how the soilscapes or soil associations described are related to the sensitivity and magnitude criteria given in **Table 11-10** to **Table 11-13**.	The Planning Inspectorate's comment is noted. The Soil Association mapping was not available for publishing with the Scoping Report but has now been received and is presented in the PEIR (and will be used in the ES) alongside the association descriptions (see **Volume 3, Part 2, Figure 11-1: National Soil Association**). The approach to how the sensitivity of soils is assessed is set out and further details will be provided of individual soil type sensitivity once the full survey data is available.

Consultee	Consideration	How addressed in this PEIR
	The Applicant's attention is drawn to the Written Ministerial Statement (UIN HCWS466) issued on 15 May 2024. The ES should contain a clear tabulation of the areas of land in each Best Most Versatile (BMV) classification to be temporarily or permanently lost as a result of the Proposed Development, with reference to accompanying map(s) depicting the grades. Specific justification for the use of the land by grade should be provided. Consideration should be given to the use of BMV land in the Applicant's discussion of alternatives.	The Planning Inspectorate's comment is noted. A full characterisation of the ALC grades (including BMV) within the Order Limits will be presented in the ES, following the completion of detailed ALC surveys.
Planning Inspectorate	Impact on agri-environmental and forestry schemes: Whilst the Planning Inspectorate notes that impacts to agricultural land holdings is proposed to be assessed within the ES, the specific details of the assessment are not given. The Planning Inspectorate considers that the assessment should include impacts to the agri-environmental and forestry schemes given in **Figure 11-4** and **Figure 11-5**.	The presence of agri-environment and forestry schemes will be highlighted where relevant. The assessment in relation to the ecological impacts will be dealt with in **Volume 1, Part 2, Chapter 6 Biodiversity.** The impacts in relation to the associated agricultural landholding will be assessed as part of this chapter.

Technical engagement

11.3.5 Technical engagement with consultees in relation to Agriculture and Soils is ongoing. A summary of the technical engagement undertaken to date is outlined in **Table 11-4.**

Table 11-4 – Technical engagement on the environmental aspect assessment

Consultee	Consideration	How addressed in this PEIR
Natural England	Technical meeting on 06 December 2024 presenting the proposed scope and approach to the ALC surveys supporting the EGL 3& 4 Projects.	Although the survey information is not available to inform this PEIR, a description of the proposed survey is presented.

11.3.6 Engagement with Natural England will continue to inform the ES, where survey data collected will be presented and the content of the Outline SMP will be discussed and further developed. In advance of the ES, engagement will also be undertaken with the

following key stakeholders relevant to Agriculture and Soils to discuss the proposed assessment methodology and the survey data:

- East Lindsey District Council;
- Boston Borough District Council;
- South Holland District Council;
- Borough Council of King's Lynn and West Norfolk;
- Lincolnshire County Council;
- Norfolk County Council;
- Fenland District Council; and
- Cambridgeshire County Council.

11.4 Data gathering methodology

11.4.1 The assessment presented in the PEIR has been supported by a collation and review of available baseline data. This includes:

- Soil data and map from National Soils Resources Institute at Cranfield University (NSRI) (Ref 11.13);
- Provisional ALC map available via Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref 11.14);
- Likelihood of BMV Agricultural Land map (Ref 11.15);
- Post 1988 ALC survey data and map via MAGIC (Ref 11.14); and
- Climate data sets for ALC assessment.

11.4.2 Field data collection will be undertaken through a soil and ALC survey. The survey outcome will be used to finalise the assessment of impacts on agricultural land and soils as a result of the Projects and will be presented in the ES.

Study area

11.4.3 The study area for the assessment of Agriculture and Soils comprises the draft Order Limits. This is considered appropriate as no Agriculture and Soil receptors will be affected outside of the draft Order Limits.

Desk study

11.4.4 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 11-5.**

Table 11-5 – Data sources used to inform the Agriculture and Soils assessment

Organisation	Data source	Data provided
Cranfield University	National Soils Resources (Ref 11.13)	Soil data and map
Department for Environment, Food and Rural Affairs	MAGIC (Ref 11.15)	Provisional ALC map
Department for Environment, Food and Rural Affairs	MAGIC (Ref 11.15)	Post 1988 ALC survey data and map
Natural England	Natural England (Ref 11.14)	Likelihood of BMV Agricultural Land map
Met Office	Climatological Data for Agricultural Land Classification	Climate data sets for ALC assessment

Survey work

11.4.5 Field data collection, through soil and ALC surveys, is being undertaken throughout 2025. This information will not be available for the PEIR but will be used to inform the assessment presented in the ES. The survey outcome will be used to confirm the extent of each ALC grade affected and the characteristics of the associated soils as a result of the English Onshore Scheme; this will be presented in the ES.

11.4.6 The soil and ALC survey and assessment will be undertaken in accordance with the Soil Survey Field Handbook (Ref 11.11) and the ALC guidelines (Ref 11.6).

11.4.7 The detailed ALC survey will involve the examination of the soil's physical properties, from which agricultural land grade as well as soil resilience can be calculated and assessed. Soil profiles will be examined with a hand-held soil auger and a spade at a sampling density of approximately one auger point per 100 m for linear sections of the Projects, and one auger point per hectare (ha) for wider areas such as the converter stations. The soil profile will be examined at each sample location to a maximum depth of approximately 1.2 m by hand with the use of a 5 cm diameter Dutch (Edelman) soil auger. Soil pits will also be excavated by hand with a spade to examine certain soil physical properties, such as stone content and the structural condition of the subsoil, more closely.

11.5 Overall baseline

Current baseline

11.5.1 The following sections present the existing baseline for the Agriculture and Soils study area. For reporting purposes, the draft Order Limits have been described from north to south, landfall to the Walpole Station Area.

Geology

11.5.2 The geology within the draft Order Limits varies from north to south.

11.5.3 From the landfall at Anderby Creek to just north of Burgh le Marsh, the solid geology comprises a number of chalk bedrock types as follows:

- Burnham Chalk Formation - Chalk. Sedimentary bedrock formed between 93.9 and 83.6 million years ago during the Cretaceous period.
- Welton Chalk Formation - Chalk. Sedimentary bedrock formed between 100.5 and 89.8 million years ago during the Cretaceous period.
- Ferriby Chalk Formation - Chalk. Sedimentary bedrock formed between 100.5 and 93.9 million years ago during the Cretaceous period.

11.5.4 From just north of Burgh le Marsh to the Walpole Station Area the solid geology then comprises a number of sedimentary rocks as follows:

- Carstone Formation - Sandstone. Sedimentary bedrock formed between 113 and 100.5 million years ago during the Cretaceous period.
- Claxby Ironstone Formation, Tealby Formation and Roach Formation - Mudstone and limestone, interbedded. Sedimentary bedrock formed between 139.4 and 126.3 million years ago during the Cretaceous period.
- Spilsby Sandstone Formation - Sandstone. Sedimentary bedrock formed between 152.1 and 133.9 million years ago during the Jurassic and Cretaceous periods.
- Kimmeridge Clay Formation - Mudstone. Sedimentary bedrock formed between 157.3 and 152.1 million years ago during the Jurassic period.
- Ampthill Clay Formation - Mudstone. Sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.
- West Walton Formation - Mudstone and siltstone. Sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.
- Oxford Clay Formation - Mudstone. Sedimentary bedrock formed between 166.1 and 157.3 million years ago during the Jurassic period.

11.5.5 Around the Walpole Station Area the solid geology then comprises the following:

- West Walton Formation - Mudstone and siltstone. Sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.
- Ampthill Clay Formation - Mudstone. Sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.

11.5.6 The majority of the solid geology is overlain by drift deposits comprising Tidal Flat Deposits - Clay and silt, a sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

Soils

11.5.7 The Soil Associations describe the different types of soil found within the UK. Within the draft Order Limits, there are 14 different Soil Associations shown on available national survey mapping. The study area largely comprises deep loamy and clay mineral soils; however, peat soils are expected to be present east of the A14 and south of Steeping River. These are described below and presented on **Figure 11-1: National Soil Association**:

- Saline 1: soils of variable texture flooded by high tides. Many are soft and unripened, others, often on higher sites or of sandy texture, are firm and ripened. Frequently calcareous.

- Sandwich: mainly deep well drained calcareous and non-calcareous sandy soils. Some sparsely vegetated unstable soils. Waterlogged soils in hollows locally. Shingle bars and spits locally extensive. Risk of wind erosion.
- Wallasea 2: deep stoneless clayey soils. Calcareous in places. Some deep calcareous silty soils. Flat land often with low ridges giving a complex soil pattern. Groundwater controlled by ditches and pumps.
- Holderness: slowly permeable seasonally waterlogged fine loamy soils and similar soils with only slight waterlogging. Narrow strips of clayey alluvial soils.
- Fladbury 2: stoneless clayey soils variably affected by groundwater some with sandy subsoils. Some similar fine loamy soils. Flat land. Risk of flooding.
- Wick 1: deep well drained coarse loamy and sandy soils locally over gravel. Some similar soils affected by groundwater. Slight risk of water erosion.
- Salop: slowly permeable seasonally waterlogged reddish fine loamy over clayey, fine loamy and clayey soils associated with fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging.
- Blackwood: deep permeable sandy and coarse loamy soils. Groundwater controlled by ditches.
- Downholland 1: deep stoneless humose clayey soils, calcareous in places. Some peat soils and deep humose calcareous silty soils. Flat land. Groundwater usually controlled by ditches and pumps. Risk of wind erosion.
- Downholland 2: deep stoneless clayey or calcareous silty soils, mainly with a humose surface horizon. Flat land. Groundwater controlled by ditches and pumps.
- Wisbech: deep stoneless calcareous coarse silty soils. Groundwater usually controlled by ditches or pumps. Flat land with low ridges. Risk of wind erosion locally.
- Agney: deep stoneless calcareous fine and coarse silty soils. Groundwater usually controlled by ditches and pumps. Flat land.
- Tanvats: deep stoneless fine and coarse silty and clayey soils with groundwater levels controlled by ditches and pumps. Flat land.
- Rockcliffe: deep stoneless silty and fine sandy soils variably affected by groundwater depending on artificial drainage. Flat land.

Agricultural Land Classification

11.5.8 ALC is a classification system used to assess the agricultural quality of land within England and Wales. Provisional ALC mapping for the study area is presented on **Figure 11-2: Provisional ALC Mapping** and shows that the draft Order Limits are likely to comprise predominantly BMV land.

11.5.9 The northern section of the draft Order Limits between the landfall and Little Steeping is largely Provisionally mapped as ALC Grade 3. The central section of the draft Order Limits, between Little Steeping and Boston is predominantly Provisionally mapped as ALC Grade 2, whilst the draft Order Limits south of Boston to the Walpole Station Area is comprised largely of Provisional ALC Grade 1 land.

11.5.10 The Provisional ALC mapping does not split Grade 3 land into Subgrades 3a and 3b. Subgrade 3a land, along with Grade 1 and Grade 2 land, comprises BMV agricultural land. The distinction between Grade 3a and Grade 3b can only be confirmed through a detailed ALC survey (which will be undertaken to inform the ES). As such, land mapped as Provisional ALC Grade 3, along with land mapped as Grade 1 and Grade 2, is assumed to be BMV land for the purpose of the PEIR assessment.

11.5.11 **Figure 11-3: Detailed ALC Mapping (Post-1988)** identifies that there are areas of detailed ALC mapping to the west of Boston, Lincolnshire (lying immediately north of the A1121) which identifies the land as Grade 1 and Grade 2. Additionally, there is information from a historical detailed survey directly southeast of Sutton Bridge (immediately south of the A17) which has identified land of Grade 1 and 2 with a very small area of Grade 3a land. These findings are consistent with the Provisional ALC mapping within the draft Order Limits and add weight to the likelihood that BMV land will be present throughout much of the draft Order Limits.

Land holdings

11.5.12 Satellite imagery indicates that the agricultural land within the draft Order Limits is predominately arable land with small areas of grassland. Field boundaries are lined with hedges, trees, drainage ditches and roads throughout the draft Order Limits. Extensive areas of land within the draft Order Limits are covered by Countryside Stewardship or Environmental Stewardship Agreements (**Figure 11-4 Agri-Environment Schemes)** and there are more limited areas covered by Woodland Grant Schemes and Felling Licences (**Figure 11-5: Woodland and Forestry Schemes**).

11.5.13 Agri Environment Schemes comprise government funding to farmers and land managers to support activities which improve the local environment. There are different levels of Environmental Stewardship schemes which have increasing complexity and land management requirements but also therefore have greater environmental benefits.

11.5.14 Woodland and Forestry Schemes are government provided incentives that reward landowners for the creation and management of woodlands.

Future baseline

11.5.15 The future baseline relates to known or foreseeable changes to the current baseline in the future which will be assessed as part of the English Onshore Scheme in the ES.

11.5.16 It is considered that the baseline conditions for soils and ALC grades will remain unchanged from those described in the baseline during the construction period of the English Onshore Scheme. While there may be potential changes in relation to climate change, including greater rainfall intensity and frequency of droughts, that could affect soil conditions, land grade, and farming practices, it is likely that these would only become apparent over longer time frames.

11.5.17 There could potentially be future changes to land management practices and business approaches across the landowners/ land managers irrespective of whether the English Onshore Scheme goes ahead; these cannot be known or assessed currently as any future changes would be driven by third parties.

11.5.18 The baseline details as presented above are not anticipated to change in the absence of the English Onshore Scheme.

11.6 Environmental measures

11.6.1 As set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, the environmental measures are characterised as design measures or control and management measures. A range of environmental measures would be implemented as part of the English Onshore Scheme and will be secured in the DCO as relevant.

11.6.2 **Table 11-6** outlines how these design and control measures will influence the Agriculture and Soils assessment. In addition to the measures listed in **Table 11-6**, standard mitigation measures, comprising management activities and techniques, would be implemented during the construction of the Projects to limit effects through adherence to good site practices and achieving legal compliance. These are listed in **Volume 2, Part 1, Appendix 1.5.B: Outline CoCP** and are not repeated below.

11.6.3 Measures listed in **Table 11-6** have been assigned references, for example (AS01). These align with the references provided in **Volume 2, Part 1, Appendix 1.5.B: Outline CoCP** for ease of cross-reference. Any references identified with ID MT (for example, MT01) include measures which may also be listed in other aspects considered as part of this PEIR therefore have been identified as measures which apply to multiple aspects.

11.6.4 Relevant environmental measures will be developed to avoid and minimise the impact on agricultural land, soils and agricultural landholdings. Of particular relevance will be the development of an Outline SMP which would be provided as part of the ES and would sit alongside the Outline CoCP (**Volume 2, Part 1, Appendix 1.5.B**).

11.6.5 In addition, design measures identified through the EIA process have been applied to avoid or reduce potential significant effects. Design measures included that a relevant to agriculture and soils receptors are included in **Table 11-6** below under Design and Operation and are also included in **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**. Compliance with these measures will be secured by the DCO.

Table 11-6 – Summary of the environmental measures

Receptor	Potential changes and effects	Embedded measures	ID reference
Construction			
ALC Grade / Soil Function / Landholdings	Potential impacts from temporary and permanent land take	The English Onshore Scheme will be run in compliance with all relevant legislation, consents and permits, ensuring the soil is handled correctly.	AS01
Landholdings	Potential disruption to agricultural operations	A record of condition will be carried out (photographic and descriptive) of the working areas that may be affected by the construction activities. This record will be available for comparison following reinstatement after the works have been completed to ensure that the standard of reinstatement at least meets that recorded in the pre-condition survey. This record will ensure that agricultural land is reinstated to its preconstruction condition and can be used for agricultural purposes post-construction.	AS02
ALC Grade / Soil Function / Landholdings	Potential impacts on land grade and soil function, and thus the productivity of the land	Land used temporarily will be reinstated where practicable to its pre-construction condition (including pre-construction ALC grade) and use (or a condition agreed with the landowner). Hedgerows, fences, and walls (including associated earthworks and boundary features) will be reinstated to a similar style and quality to those that were removed, with landowner agreement. Soils will be reinstated to a minimum depth of 0.9m over the cable protective tiles (or the maximum natural soil depth if this is shallower). Deeper depths may be used if required upon consultation with individual stakeholders.	AS03
Soil Function	Potential impacts on soil function	Soil excavated from the Projects will be reused on site through the backfilling of trenches and for landscaping where practicable and where soil is suitable for reuse (for example, not contaminated and giving consideration to land holdings and applicable biosecurity measures). It is intended that all soil will	AS04

Receptor	Potential changes and effects	Embedded measures	ID reference
		be reused on site, however if it arises that excess spoil topsoil or subsoil cannot be reused on site, this soil will be taken off site in accordance with measures outlined within the Outline SMP and in line with the requirements of the Site Waste Management Plan.	
ALC Grade / Soil Function / Landholdings	Potential impacts on land grade and soil function, and thus the productivity of the land	An Outline SMP will provide guidelines to mitigate likely significant effects on Agriculture and Soils by ensuring proper soil handling and reinstatement of pre-construction condition. Measures will include but not be limited to the following: 1. Details of the soil resources and ALC grades present; 2. Roles and responsibilities (and required competencies and training); 3. How different topsoil and subsoil resources will be stripped and stockpiled separately; 4. Suitable conditions for when handling soil will be undertaken, for example avoiding handling of waterlogged soil; 5. Indicative soil storage locations; 6. How soil stockpiles will be designed taking into consideration site conditions and the nature/composition of the soil; 7. Specific measures for managing sensitive soils, such as peaty soils or those supporting valuable habitats; 8. Suitable protective surfacing (such as Trackway or similar products) where soil stripping can be avoided, and weed suppression encouraged, based on sensitivity of the environment and proposed works; 9. Approach to reinstating soil that has been compacted; 10. Details of measures required for and objectives of soil restoration; 11. Requirements for monitoring; and	MT14

Receptor	Potential changes and effects	Embedded measures	ID reference
		12. Requirements for aftercare, including details of what surveys/testing will be required at defined times during aftercare and in advance of land hand back.	
Landholdings	Potential disruption to agricultural operations	Access to and from residential, commercial, community and agricultural land uses will be maintained throughout the construction period or as agreed through the landowner discussions. This may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels will be communicated to affected parties at the start of the English Onshore Scheme, with any changes communicated in advance of the change being implemented. Where field-to-field access points require alteration as a result of construction, alternative field access will be provided in consultation with the landowner/occupier. By only accessing the land with agreed permission from the landowner it minimises the impact to the landowners business by preventing any unnecessary damage to their land	AS05
Landholdings	Potential disruption to agricultural operations	Existing water supplies for livestock will be identified pre-construction. Where supplies will be lost or access compromised by construction works, temporary alternative supplies will be provided. Water supplies will be reinstated following construction. By providing alternative supplies during construction it allows farm operations to continue and reduces any potential significant effects to Agricultural Landholdings	AS06
ALC Grade / Soil Function / Landholdings	Potential impacts on land grade and soil function, and thus the productivity of the land	Consultation with affected landowners will be carried out to investigate the current extent of land drainage. Existing land drainage systems impacted by the English Onshore Scheme during their construction would be re-provided to maintain the land drainage regime. Severance of existing land drainage routes, including agricultural field drainage systems would be	MT10

Receptor	Potential changes and effects	Embedded measures	ID reference
		managed during construction through provision of temporary alternative drainage routes, and these drainage systems would be permanently reinstated or rerouted ensuring their existing function is maintained. The English Onshore Scheme may include a system of 'cut-off' drains which feed into a new header drain and the English Onshore Scheme will also take into account surface water runoff measures.	
Landholdings	Potential disruption to agricultural operations	Should animal bones be discovered during construction, which may indicate a potential burial site, works will cease, and advice will be sought from the Animal Health Regional Office on how to proceed, relevant to the origin and age of the materials found.	AS07
Landholdings	Potential disruption to agricultural operations	All movement of plant and vehicles between fields will cease in the event of a notification by the Department for Environment, Food and Rural Affairs (DEFRA) of a disease outbreak in the vicinity of the site that requires the cessation of activities. Advice will be sought from the DEFRA in order to develop suitable working methods required to reduce the biosecurity risk associated with the continuation of works.	AS08
ALC Grade / Soil Function / Landholdings	Potential impacts on land grade and soil function, and thus the productivity of the land	Clay bungs or other vertical barriers will be constructed within trench excavations where deemed necessary, to prevent the creation of preferential drainage pathways.	AS09
Design and Operation			
ALC Grade / Soil Function / Landholdings	Potential impacts from temporary land take	The design will be rationalised to minimise the total quantum of land required as far as practicable.	AS01

Receptor	Potential changes and effects	Embedded measures	ID reference
ALC Grade / Soil Function / Landholdings	Potential impacts on land grade and soil function, and thus the productivity of the land	An Outline SMP will provide guidelines to mitigate likely significant effects on Agriculture and Soils by ensuring proper soil handling and reinstatement of pre-construction condition.	AS02
Landholdings	Potential disruption to agricultural operations	The Projects design would be compliant with the guidelines and policies relating to electric and magnetic fields which set limits on the permitted emissions, including Technical Specification 1 – Ratings and General requirements for plant, equipment and apparatus for the NGET system. These technical specifications and policies ensure that the proposed design would be compliant with the requirements stated in the National Policy Statement (NPS) for Electricity Networks Infrastructure EN-5. (Ref 11.16).	MT01

11.7 Scope of the assessment

Spatial scope and study area

11.7.1 The spatial scope of the assessment of Agriculture and Soils covers the area of the English Onshore Scheme contained within the draft Order Limits. The study area for Agriculture and Soils is shown on **Figure 11-1: National Soil Association**. Since the submission of the EIA Scoping Report, the Scoping Boundary has been refined to form the draft Order Limits and the Theddlethorpe landfall option has been removed. There have also been other minor changes and updates to form the draft Order Limits, for example the inclusion of localised areas of highway improvements along access routes.

Temporal scope

11.7.2 The temporal scope of the assessment of Agriculture and Soils is consistent with the period over which the English Onshore Scheme would be constructed and operated. Impacts to soils and the ALC grades they support (both temporary and permanent) would occur during both the construction and operational phases.

11.7.3 The English Onshore Scheme is expected to have an ongoing function, subject to maintenance, reinforcement and for assets to be replaced when they come to the end of their lifespan. If decommissioning is required, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration of two years. Acknowledging the complexities of completing a detailed assessment for decommissioning works at some point in the future, it is considered that the significance of effects relating to the decommissioning phase would be no greater than those from the construction phase and decommissioning effects are not discussed in detail in this chapter; however, **Table 4.21** in **Volume 1, Part 1, Chapter 4: Project Description** provides a high level summary assessment of the likely significant effects associated with decommissioning. Furthermore, should decommissioning take place it is expected that an assessment in accordance with the legislation and guidance at the time of decommissioning would be undertaken.

Identification of receptors

11.7.4 The principal Agriculture and Soils receptors that have been identified as being potentially subject to significant effects are summarised in **Table 11-7.** The baseline for these receptors is shown in:

- **Volume 3, Part 2, Figure 11-1: National Soil Association;**
- **Volume 3, Part 2, Figure 11-2: Provisional Agricultural Land Classification;**
- **Volume 3, Part 2, Figure 11-3: Detailed Agricultural Land Classification;**
- **Volume 3, Part 2, Figure 11-4: Woodland and Forestry**; and
- **Volume 3, Part 2, Figure 11-5: Agri-environment Schemes**.

Table 11-7 – Agriculture and Soils receptors subject to potential effects

Receptor	Reason for consideration
Agricultural land quality (as defined by the ALC system)	Potential for temporary and permanent loss of BMV land
Soil function	Potential for temporary and permanent loss of soil functions
Agricultural landholdings/land use	Potential for temporary and permanent disruption to agricultural enterprises

Potential effects considered within this assessment

11.7.5 During the construction phase there would be a potential for both permanent and temporary loss of agricultural land. A very large proportion of land within the draft Order Limits is predicted to be BMV land and thus the English Onshore Scheme could have potential significant effects on the quality of this land and on the associated agricultural productivity. The resulting effect on agricultural land and the associated landholdings could potentially be significant adverse. Therefore, agricultural land and landholdings at construction are scoped into ES.

11.7.6 The English Onshore Scheme would potentially result in soil quality being adversely affected during construction. Due to the presence of clayey soils and possible humic/peaty soils within the draft Order Limits, a potential significant effect on soil function cannot be ruled out during the construction phase and as such soil function is scoped into ES.

11.7.7 The effects on Agriculture and Soils receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 11-8.**

Table 11-8 – Agriculture and Soils receptors scoped in for further assessment

Receptor	Significant effects
Agricultural land quality during construction	During the construction phase there would be a potential for both permanent and temporary loss of agricultural land. A very large proportion of land within the draft Order Limits is likely to comprise BMV land and thus the English Onshore Scheme could have potential significant effects on land grade.
Soil function during construction	The extent of soils which will be disturbed to enable construction and the presence of clayey soils and possible humic/peaty soils results in the potential for significant effects on soil function and associated ecosystem services.

11.7.8 The receptors/effects detailed in **Table 11-9** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 11-9 – Summary of effects scoped out of the Agriculture and Soils assessment

Receptors/potential effects	Justification
Agricultural land quality / soil function / agricultural landholdings during operation	During the operation of the English Onshore Scheme, land taken temporarily will have been reinstated and returned to agricultural use, whilst land taken permanently will remain out of agricultural use. As the construction phase will account for both the temporary and permanent losses, there would be no further permanent losses of agricultural land as a result of operation of the English Onshore Scheme. Maintenance and repair work that may result in the disturbance to agricultural land and soils during operation would be undertaken in accordance with standard good practice soil handling methods and are likely to be small-scale and temporary in nature.

11.8 Key parameters for assessment

Realistic worst-case design scenario

11.8.1 The assessment has followed the Rochdale Envelope approach as outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects** and **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology** of the PEIR**.** The assessment of effects has been based on the description of the Projects and parameters outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects**. However, where there is uncertainty regarding a particular design parameter, the realistic worst-case design parameters are provided below with regards to Agriculture and Soils along with the reasons why these parameters are considered worst-case. The preliminary assessment for Agriculture and Soils has been undertaken on this basis. Effects of greater adverse significance are not likely to arise should any other development scenario, based on details within the Rochdale Envelope (e.g., different infrastructure layout within the draft Order Limits), to that assessed here be taken forward in the final design of the Projects.

11.8.2 In relation to Agriculture and Soils the following assumptions are made regarding the Projects design parameters in order to ensure a realistic worst-case assessment has been undertaken.

- With regards to construction, it is assumed that there would be a potential loss of BMV land (defined as ALC Grades 1, 2 and 3a) from agricultural productivity. To undertake this assessment, publicly available Provisional ALC data, and detailed data (where available), has been used. The Provisional ALC mapping does not differentiate between Grade 3a (BMV) and Grade 3b (non-BMV); as such a worst-

case approach has been taken for the assessment presented, with all land provisionally mapped as Grade 1, 2 and 3 being considered to be BMV land. This approach has been taken at PEIR stage as currently detailed ALC surveys have not been undertaken. The ES submitted with the DCO application will include detailed ALC survey data that will show the split between Grade 3a and 3b land.

- With regards to the extents of temporary and permanent land take, the assessment presented in the PEIR is based on the emerging design overlain on the Provisional ALC mapping. The elements of the English Onshore Scheme shown within the draft Order Limits (compounds, cable routes, access/haul routes, River Nene Temporary Quay etc) have the potential to be moved within or removed from the draft Order Limits post PEIR/S42 consultation and as such the assessment takes account of the potential for higher grade land to be affected should a design change occur. The assessment presented in this PEIR has therefore focused on the likely total extent of BMV land affected; the impact on individual grades will be fully presented in the ES based on the outcome of the ALC surveys.
- At this stage in the design process, four options have been identified with regards to the proposed siting of the Walpole converter stations (as detailed in **Volume 1, Part 1, Chapter 4: Description of the Projects** and specifically in **Section 4.4**). All land within the draft Order Limits and therefore all four options (Options A-D), has been included in the baseline study to enable flexibility to assess the final chosen design. The assessment presented in the PEIR will assume the worst-case scenario in terms of the total area of land which will be required, and an assessment will be undertaken of the potential for one or more options to have a potentially lesser impact on BMV land. Where an option or options affects the findings of the agricultural and soils assessment reference to the specific option(s) is made in **Section 11.10**.

Consideration of construction scenarios

11.8.3 As detailed in **Volume 1, Part 1, Chapter 4: Description of the Projects**, the timing of construction activities set out within this PEIR is indicative. It has been identified that elements of the Projects could be constructed sequentially or concurrently. This could result in some reinstatement of land taking place over shorter or longer timeframes, depending on whether some elements of the construction works took place sequentially or concurrently. To account for this, the assessment assumes all land within the draft Order Limits will be required for construction and disturbed for the maximum duration of the construction phase.

11.9 Assessment methodology

Overview

11.9.1 The generic project-wide approach to the assessment methodology is set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, and specifically in **Sections 5.4** to **5.6**. However, whilst this has informed the approach that has been used in this Agriculture and Soils assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Agriculture and Soils assessment. Details are provided below.

11.9.2 The IEMA guidance (Ref 11.10) will be used to assess the impact on Agriculture and Soils. The DMRB LA112 (Ref 11.12) will be used to assess the impact on agricultural land holdings.

11.9.3 **Table 11-10** to **Table 11-13** set out the criteria which would be used to determine the sensitivity of and the magnitude of impacts on agricultural and soil receptors through assessing soil function, BMV land and agricultural landholdings. Terminology used within the criteria tables are consistent with the terminology used within the IEMA guidance.

Receptor sensitivity/value

Table 11-10 – Determination of sensitivity of soil resources / functions

Receptor Sensitivity	Description
Very High	**Biomass production**: ALC Grades 1 and 2. **Ecological habitat, soil biodiversity and platform for landscape:** soils supporting protected features within a European site (e.g., Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar); peat soils; soils supporting a National Park, or Ancient Woodland. **Soil carbon:** Peat soils; soils with potential for ecological/landscape restoration. **Soil hydrology:** very important catchment pathway for water flows and flood risk management. **Archaeology, cultural heritage, community benefits and geodiversity:** scheduled monuments and adjacent areas; World Heritage and European designated sites; soils with known archaeological interest; soils supporting community/recreational/educational access to land covered by National Park designation. **Source of materials:** important surface mineral reserves that would be sterilised (i.e., without future access).
High	**Biomass production**: ALC Grade 3a. **Ecological habitat, soil biodiversity and platform for landscape:** soils supporting protected features within a UK designated site (e.g., United Nations Educational, Scientific and Cultural Organisation (UNESCO), Geoparks, Site of Special Scientific Interest (SSSI) or Areas of Outstanding National Beauty (AONB)[4], Special Landscape Area, and Geological Conservation Review sites); native forest and woodland soils; unaltered soils supporting semi-natural vegetation (including United Kingdom Biodiversity Action Plan (UKBAP) Priority habitats). **Soil carbon:** Organo-mineral soils (e.g., peaty soils).**Soil hydrology:** Important catchment pathway for water flows and flood risk management.

[4] Now known as National Landscapes

Receptor Sensitivity	Description
	Archaeology, cultural heritage, community benefits and geodiversity: soils with probable (e.g. where an archaeological site is likely to exist based on previous research/assessment) but as yet unproven (prior to being revealed by construction) archaeological interest; historic parks and gardens; Regionally Important Geological Site (RIGS); Soils supporting community/recreational/educational access to RIGS and AONBs. **Source of materials:** surface mineral reserves that would be sterilised (i.e. without future access).
Medium	**Biomass production**: ALC Grade 3b. **Ecological habitat, soil biodiversity and platform for landscape:** soils supporting protected or valued features within non-statutory designated sites (e.g. Local Nature Reserves (LNR), Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), Special Landscape Areas; non-native forest and woodland soils. **Soil carbon:** mineral soils with elevated soil carbon resulting from land management practices such as addition of organic amendments or minimisation of soil disturbance (for example under long-term pasture). **Soil hydrology:** important minor catchment pathway for water flows and flood risk management. **Archaeology, cultural heritage, community benefits and geodiversity:** soils with possible (e.g. where professional judgement but as yet unproven (prior to being revealed by construction) archaeological interest; soils supporting community/recreational/educational access to land. **Source of materials:** surface mineral reserves that would remain accessible for extraction.
Low	**Biomass production:** ALC Grades 4 and 5 **Ecological habitat, soil biodiversity and platform for landscape:** soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils. **Soil carbon**: mineral soils. **Soil hydrology:** Pathway for local water flows and flood risk management **Archaeology, cultural heritage, community benefits and Geodiversity:** soils supporting no notable cultural heritage, geodiversity nor community benefits; soils supporting limited community/recreational/educational access to land. **Source of materials:** surface mineral reserves that would remain accessible for extraction.
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions

Table 11-11 – Determination of sensitivity of soils in handling

Soil Texture, Field Capacity Days (FCD) and Wetness Class	Soil Texture, Field Capacity Days (FCD) and Wetness Class
High Sensitivity (low resilience to structural damage)	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the FCD are 150 or greater; Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater; and All soils in wetness class (WC) WCV or WCVI.
Medium Sensitivity (medium resilience to structural damage)	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150; Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225; and Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Low sensitivity (high resilience to structural damage)	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

Table 11-12 - Determination of sensitivity of agricultural land holdings

Receptor Sensitivity	Description
Very High	Agricultural land holdings: 1) Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a frequent basis (daily).
High	Agricultural land holdings: 1) Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a frequent basis (weekly).
Medium	Agricultural land holdings: 1) Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and

Receptor Sensitivity	Description
	2) Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).
Low	Agricultural land holdings: 1) Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent)
Negligible	Agricultural land holdings: 1) Areas of land which are infrequently used on a non-commercial basis.

Table 11-13 - Determination of magnitude criteria for impact on agricultural land and soils

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20 ha or loss of soil-related features set out in **Table 11-10**, as advised by other topic specialists (including effects from 'Temporary Developments) Or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20 ha or gain in soil-related features set out in **Table 11-10**, as advised by other topic specialists (including effects from 'Temporary Developments').
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 and 20 ha or loss of soil-related features set out in **Table 11-10** as advised by other topic specialists (including effects from 'Temporary Developments') or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20 ha or gain in soil-related features set out in **Table 11-10**, as advised by other topic specialists.
Minor	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes), or temporary, reversible loss of soil related features set out in **Table 11-10** above, as advised by other topic specialists. or

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
	Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5 ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features set out in **Table 11-10**, as advised by other topic specialists.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

Magnitude of impact

Table 11-14 – Determination of magnitude criteria for impact of agricultural land holdings

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
Major	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) Loss of resource and / or quality and integrity of resource; Severe damage to key characteristics, features or elements. e.g., direct acquisition and demolition of buildings and direct development of land to accommodate highway assets; and / or 2) Introduction (adverse) or removal (beneficial) of complete severance with no / full accessibility provision.
Moderate	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) Partial loss of / damage to key characteristics, features or elements, e.g., partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) Introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision.
Minor	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g., amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
	viability of property, businesses, community assets or agricultural holdings; and / or 2) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision.
Negligible	Private property and housing, community land and assets, development land and businesses and agricultural land holdings: 1) Very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g., acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and / or 2) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision.
No Change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

Significance of effect

11.9.4 The significance of the effect is determined using the matrix as set out in **Table 11-15**. Where there is a choice, for example between Moderate and Large, professional judgement is used to determine which one is relevant.

Table 11-15 - Determination of significance matrix

Nature of Receptor (Sensitivity / Value / Importance)	Nature of Impact (Magnitude / Probability / Reversibility)			
	Major	Moderate	Minor	Negligible
Very High	Large or Very Large	Moderate or Large	Slight or Moderate	Slight
High	Moderate or Large	Moderate	Slight	Neutral
Medium	Slight or Moderate	Slight	Neutral or Slight	Neutral
Low	Slight	Neutral	Neutral	Neutral
Negligible	Neutral	Neutral	Neutral	Neutral

Table 11-16 – Significance categories

Significance Category	Description
Very Large	Effects at this level are material in the decision-making progress
Large	Effects at this level are likely to be material in the decision-making progress
Moderate	Effects at this level can be considered to be material in the decision-making process
Slight	Effects at this level are not material in the decision-making process
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error

Preliminary assessment of cumulative effects

11.9.5 At the current stage of the Projects (PEIR stage), design information for the Projects is insufficient to allow for a robust cumulative assessment to be undertaken. Furthermore, given the current position in relation to baseline data collection, with much of the environmental surveys still to be undertaken during 2025, the baseline identified at this PEIR stage cannot be taken as a complete picture of the potential presence and significance of sensitive receptors. Therefore, a cumulative assessment has not been undertaken at this stage; however, **Volume 1, Part 4, Chapter 28 Cumulative Effects**, presents the long and short lists of 'other developments' which will be considered at the ES stage, and the methodology which allowed for the identification of these other developments, to allow consultation bodies to form a view and provide comment on the other developments included. The long list will be reviewed and if necessary, updated, in the lead up to the ES, as the Projects design further evolves and in response to any comments raised at statutory consultation.

11.9.6 Combined effects (sometimes called intra-project effects) result principally from different types of impacts from one development acting in combination on a specific receptor. The following combined effects will be considered as part of the ongoing assessment:

- Combined effects on agricultural landholdings arising from noise, dust and traffic impacts during construction and from additional land take resulting from required ecological mitigation. For further information regarding these impacts, please also refer to:
  - **Volume 1, Part 2, Chapter 6: Biodiversity**;
  - **Volume 1, Part 2, Chapter 13: Noise and Vibration**;
  - **Volume 1, Part 2, Chapter 14: Air Quality**; and
  - **Volume 1, Part 2, Chapter 12: Traffic and Transport**.

11.10 Preliminary assessment of Agriculture and Soils effects

11.10.1 The following section presents the findings of the preliminary assessment of effects upon the Agriculture and Soils receptors as a result of the construction, maintenance and/or operational activities.

11.10.2 It is noted that this is an ongoing assessment and is subject to change due to the ongoing design development of the Projects and the soil and ALC surveys which will be completed during 2025 (and so are not available for inclusion in the PEIR). A full assessment will be included within the ES submitted with the DCO application.

Preliminary assessment of effects: Agricultural land quality (as defined by the ALC system)

11.10.3 During construction there would be a potential loss (temporary and permanent) of BMV land (defined as ALC Grades 1, 2 and 3a) from agricultural productivity as a result of permanent infrastructure and facilities required for construction, such as compounds and access roads.

11.10.4 The available baseline information indicates that a large proportion of the draft Order Limits will comprise BMV land and so for the purpose of the assessment presented in the PEIR it is assumed that all land within the draft Order Limits is likely to comprise BMV land which could be temporarily impacted and temporarily removed from agricultural production.

11.10.5 Grade 1 and Grade 2 land is considered to have a **Very High** sensitivity, with Grade 3a land considered to have a **High** sensitivity. Whilst the extent of land required during construction is large (5,597.1 ha), land required temporarily would be restored to its preconstruction condition and ALC grade. As such it is considered the impact on land required temporarily (and which will be restored) is likely to be of **Minor** magnitude which would be a **Slight** to **Moderate adverse** effect and **Significant**.

11.10.6 With all land required temporarily for construction being reinstated by the end of the construction phase there will be, depending on the option chosen for the siting of the converter stations, a range of permanent impacts as presented on **Table 11-7**. This relates to land and permanent infrastructure associated with the Walpole B substation (inclusive of cable sealing end compounds and pylons), Converter Stations and permanent access routes.

Table 11-17 – Permanent loss of each ALC grade affected

ALC Grade	Option A*	Option B*	Option C*	Option D*
Grade 1	0.3 ha	0 ha	9.9 ha	10.6 ha
Grade 2	33.6 ha	34.3 ha	24.6 ha	24.6 ha
Grade 3	0 ha	0 ha	0 ha	0 ha
Non-agricultural	0 ha	0 ha	0 ha	0 ha
Total Area of BMV land	33.9 ha	34.3 ha	34.5 ha	35.1 ha

*Area calculations for each option include land for permanent infrastructure associated with the Walpole B substation (inclusive of cable sealing end compounds and pylons), Converter Stations and permanent access routes

11.10.7 The permanent loss of agricultural land (assumed to be BMV land) in each option presented in **Table 11-17** would be of **Major** magnitude which would be a **Very Large adverse** effect which would be **Significant**.

11.10.8 During operation and maintenance, no likely significant permanent effects are expected to occur on land quality as all infrastructure will be in place and no additional land will be required.

11.10.9 During operation, the buried cables should not limit agricultural activities, and any maintenance or repair works are likely to be small-scale and temporary, with works undertaken in accordance with good practice at the time of the works. An indication of typical maintenance activities is presented in **Volume 1, Part 1, Chapter 4: Description of the Projects**, and this will be expanded where needed for the ES and the potential for impacts re-assessed. It is considered this would comprise an impact of **Minor** magnitude which would be a **Slight** to **Moderate adverse** effect and, based on the small-scale and temporary nature would be considered **Not Significant**.

Preliminary assessment of effects: Soil function

11.10.10 During construction there would be disturbance to soils, from the soil stripping required to create the cable trench, access routes and working areas and for the footprint of above ground infrastructure.

11.10.11 The soils within the draft Order Limits will be providing a range of soil functions, and as such are considered to have a range of sensitivities from **Very High** (for example in relation to carbon storage in organic soils) to **Low** (for example as a pathway for local water flows and flood risk management).

11.10.12 The stripping and stockpiling of soil resources would have a temporary effect on the soil function and the ecosystem services provided. This could include affecting soil hydrology as well as a soils' natural carbon storage ability. The implementation of effective soil handling, storage and reinstatement measures, which will be detailed in an Outline SMP (submitted as part of the DCO application), would therefore be critical in ensuring minimisation of effects on these functions and the successful restoration and re-use of soils.

11.10.13 It is assumed that all land within the draft Order Limits may be temporarily impacted by construction activities involving soil handling, with soils temporarily affected reinstated to their pre-construction condition. The permanent loss of soils for each option is presented in **Table 11-17** and would affect the associated soil ecosystem services. However, where practicable, all surplus soil resources would be re-used within the English Onshore Scheme where, depending on the proposed land use, some soil ecosystem services will be retained, restored or potentially enhanced. As such, it is considered that the effect of the construction phase on soil function and associated ecosystem services is assessed as being of **Minor** magnitude and thus a **Moderate** to **Neutral** effect and therefore **Significant** where the sensitivity is considered to be higher (for example should organic-rich soils be disturbed).

11.10.14 During operation and maintenance, no likely significant permanent effects are expected to occur on soil receptors as all infrastructure will be in place and no additional land will be required.

11.10.15 During operation, any maintenance or repair works are likely to be small-scale and temporary, with works undertaken in accordance with good practice at the time of the works. An indication of typical maintenance activities is presented in **Volume 1, Part 1, Chapter 4: Description of the Projects**, and this will be expanded where needed for the ES and the potential for impacts re-assessed. It is considered this would comprise an impact of **Minor** magnitude which would be a **Slight** to **Moderate adverse** effect and, based on the small-scale and temporary nature would be considered **Not Significant**.

Preliminary assessment of effects: Agricultural landholdings/land use

11.10.16 Land use within the draft Order Limits is predominantly arable, and as such would be considered of **Low** sensitivity (i.e. the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure and access between land and infrastructure is required on an infrequent basis). For the purposes of the assessment presented here, the presence of an agri-environment, forestry or woodland scheme is considered in relation to potential commercial benefits received; the potential impacts on biodiversity will be addressed in **Volume 1, Part 2, Chapter 6: Biodiversity**.

11.10.17 During construction, agricultural land within the draft Order Limits would be taken out of use and there would be a temporary and permanent loss of productive agricultural land. The removal of land from an agricultural enterprise would be dealt with through compensation in accordance with the compensation code (which would include consideration of any active agri-environment and/or forestry/woodland schemes). As such it is considered that the temporary and permanent impacts would be of **Minor** to **Moderate** magnitude and thus a **Neutral** effect and therefore **Not Significant**

11.10.18 During operation and maintenance, no likely significant permanent effects are expected to occur on agricultural landholdings as all infrastructure will be in place and no additional land will be required.

11.10.19 During operation, any maintenance or repair works are likely to be small-scale and temporary, with works undertaken in accordance with good practice at the time of the works and the temporary removal of land from an agricultural enterprise dealt with through compensation in accordance with the compensation code (which would include consideration of any active agri-environment and/or forestry/woodland schemes). An indication of typical maintenance activities is presented in **Volume 1, Part 1, Chapter 4: Description of the Projects**, and this will be expanded where needed for the ES and the potential for impacts re-assessed. It is considered this would comprise an impact of

Minor magnitude which would be a **Slight** to **Moderate adverse** effect and, based on the small-scale and temporary nature would be considered **Not Significant**.

11.11 Further work to be undertaken

11.11.1 The information provided in this PEIR is preliminary, the final assessment of significant effects will be reported in the ES. This section describes the further work to be undertaken to support the Agriculture and Soils assessment presented in the ES.

Baseline

11.11.2 Field data collection (soil and ALC survey) will continue to be undertaken through 2025 to inform the assessment presented in the ES. The survey outcome will be used to confirm the extent of each ALC grade affected and the characteristics of the associated soils as a result of the English Onshore Scheme; this will be presented in the ES.

11.11.3 The soil and ALC survey and assessment will be undertaken in accordance with the Soil Survey Field Handbook (Ref 11.11) and the ALC guidelines (Ref 11.6).

11.11.4 The detailed ALC survey will involve the examination of the soil's physical properties, from which agricultural land grade as well as soil resilience can be calculated and assessed. Soil profiles will be examined with a hand-held soil auger and a spade at a sampling density of approximately one auger point per 100 m for linear sections of the Projects, and one auger point per hectare for wider areas such as the converter stations. The soil profile will be examined at each sample location to a maximum depth of approximately 1.2 m by hand with the use of a 5 cm diameter Dutch (Edelman) soil auger. Soil pits will also be excavated by hand with a spade to examine certain soil physical properties, such as stone content and the structural condition of the subsoil, more closely.

11.11.5 Where required, as the Projects' design evolves, further data would be acquired.

11.11.6 Information on agricultural landholdings will be gathered to enable a further assessment of the potential impacts on agricultural operations.

Assessment

11.11.7 The assessments undertaken for the PEIR will be reviewed following stakeholder consultation feedback and further design refinement. The following assessments will then either be updated or undertaken where they have not been undertaken for this PEIR:

- updated impact assessment on BMV land;
- updated impact assessment on soil function;
- Updated impact assessment on agricultural landholdings; and
- Cumulative effects assessment.

11.11.8 Should the assessment of potential thermal impacts, as set out in **Volume 1, Part 2, Chapter 10: Geology and Hydrogeology**, identify any potential impact pathways to agriculture and soil receptors, this would be addressed in the ES.

Further environmental measures

11.11.9 Further consultation with relevant statutory consultees will be undertaken to define the scope and extents of the environmental measures set out in the assessment above. If, following stakeholder consultation feedback, further design refinement and further assessment, it is identified that additional measures are required, these will be detailed as part of the ES. Any further measures are likely to form part of the Outline CoCP and Outline SMP.

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