FIVE ESTUARIES
OFFSHORE WIND FARM

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ENVIRONMENTAL STATEMENT

VOLUME 6, PART 3, CHAPTER 5: GROUND CONDITIONS AND LAND USE

Application Reference	EN010115
Application Document Number	6.3.5
Revision	A
APFP Regulation	5(2)(a)
Date	March 2024

Project	Five Estuaries Offshore Wind Farm
Sub-Project or Package	Environmental Statement
Document Title	Volume 6, Part 3: Chapter 5: Ground Conditions and Land Use
Application Document Number	6.3.5
Revision	A
APFP Regulation	5(2)(a)
Document Reference	005024213-01

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
A	Mar -24	ES	SLR	GoBe	VE OWFL

TABLES

ANNEX

FIGURES

GLOSSARY OF TERMS

Term	Definition
Ancient Woodland	Typically, a woodland that has existed continuously since 1600 or before (this can include areas where trees have been cut down and/ or replanted).
The Applicant	Refer to as Five Estuaries Offshore Wind Farm Limited (The Applicant) and refer to them as 'the Applicant' thereafter.
Array Areas	The areas where the WTGs will be located. These should be referred to as the northern and southern arrays to differentiate them.
BEIS	Department for Business, Energy and Industrial Strategy, now Department for Energy Security and Net Zero (DESNZ). Therefore, only use BEIS in past tense.
Construction Substation Access Zone	The area which will contain final OnSS access route during construction.
Development Consent Order	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP) from the Secretary of State (SoS) for the Department for Energy Security and Net Zero (DESNZ).
East Anglia Connection Node (EACN) Substation	The new NGET substation. This will be subject to a separate DCO application submitted by NGET as part of a wider NGET DCO project (Norwich to Tilbury HV network reinforcement).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact in question with the sensitivity of the receptor in question, in accordance with defined significance criteria.
Environmental Statement	The documents that collate the processes and results of the EIA.
European sites	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate

	Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan	A non-statutory, voluntary process to help agree the information to supply to the Planning Inspectorate (PINS) as part of a Development Consent Order (DCO) application.
Export Cable Corridor (ECC)	The area(s) where the export cables will be located. Refer to either the offshore or onshore ECC.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial, resulting from the activities associated with the construction, operation and maintenance, or decommissioning of the project.
Habitats Regulations	The Conservation of Habitats and Species Regulations 2010.
Jointing pits	There will be jointing pits which will require separate, smaller cable-testing pits (known as link boxes) to allow for fault testing. These will consist of a manhole set in a concrete plinth at ground level. These link boxes will fit within the standard cable route width.
Landfall	The area where the Export Cables come ashore and transition from the marine environment to the terrestrial environment.
Lawford Substation	Existing UKPN Substation located next to the proposed OnSS.
Local Nature Reserve	Statutory designation for places with wildlife or geological features that are of special interest locally.
Maximum Design Scenario (MDS)	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed.
Mitigation	Mitigation measures, or commitments, are commitments made by the project to reduce and/or eliminate the potential for significant effects to arise as a result of the project.
NGET	National Grid Electricity Transmission – the onshore transmission owner in England and Wales.
Norwich to Tilbury HV network reinforcement	Norwich to Tilbury high voltage network reinforcement (Formally East Anglia Green Energy Enablement (GREEN)), part of The Great Grid Upgrade.

Onshore ECC	The Onshore ECC is the working area for the onshore cable construction.
Onshore Substation (OnSS)	Where the power supplied from the wind farm is adjusted (including voltage, power quality and power factor as required) to meet the UK System-Operator Transmission-Owner Code for supply to the National Grid EACN substation.
OnSS TCC	Temporary Construction Compound associated with the OnSS.
Outline plan	An early version of a management plan produced to secure principles, which the final approved management plan will adhere to.
Operational Substation Access Zone	The area which will contain final OnSS access route during the operation of the substation.
PEIR	Preliminary Environmental Information Report. The PEIR was written in the style of a draft Environmental Statement (ES) and formed the basis of statutory consultation. Following that consultation, the PEIR documentation has been updated into the final ES that is accompanying the application for the Development Consent Order (DCO).
Proposed Order Limits	The extent of development including all works, access routes, TCCs, visibility splays and discharge points.
Special Area of Conservation	A special area of conservation is defined in the European Union's Habitats Directive, also known as the Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora.
Substation Zone	The area in which the final onshore substation (OnSS) footprint will be located.
Substation Search Area	The search areas were used for PEIR. There were two search areas. The design for DCO is fixed and this term should only be used when referred retrospectively to the site selection process.
TCC	Temporary Construction Compounds (TCC) associated with onshore cable works.

DEFINITION OF ACRONYMS

Term	Definition
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AoS	Area of Search
BEIS	Department for Business, Energy and Industrial Strategy
BMV	Best and Most Versatile
BGS	British Geological Survey
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practise
CSS	Countryside Stewardship Schemes
DCO	Development Consent Order
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environment Agency
ECC	Export Cable Corridor
EACN	East Anglia Connection Node
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act 1990
ES	Environmental Statement
ESS	Environmental Stewardship Schemes
ETG	Expert Topic Group
HDD	Horizontal Directional Drilling
IEMA	Institute of Environmental Management & Assessment
LCRM	Land Contamination Risk Management
LDP	Local Development Plan
LGS	Local Geological Site
MCA	Mineral Consultation Area
MDS	Maximum Design Scenario
MLP	Minerals Local Plan
MSA	Mineral Safeguarding Area
NE	Natural England
NF OWF	North Falls Offshore Wind Farm

Term	Definition
NPS	National Policy Statement
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
OWF	Offshore Wind Farm
OnSS	Onshore Substation
PEIR	Preliminary Environmental Information Report
PINS	The Planning Inspectorate
PPG	Planning Practice Guidance
RAG	Red, Amber, Green
RIGS	Regionally Important Geological Site
SAC	Special Area of Conservation
SPZ	Source Protection Zone
SSS	Site Selection Study
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TCC	Temporary Construction Compound
TJB	Transition Joint Bay
UXO	Unexploded Ordnance
VE	Five Estuaries Offshore Wind Farm. (The Project)
WTG	Wind Turbine Generator
m	Metre
km	Kilometre
ha	hectares

5 GROUND CONDITIONS AND LAND USE

5.1 INTRODUCTION

5.1.1 This chapter of the Environmental Statement (ES) has been prepared by SLR for GoBe on behalf of Five Estuaries Offshore Wind Farm Ltd (the Applicant) and presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of the Five Estuaries Offshore Wind Farm (VE) on Ground Conditions and Land Use. Specifically, this chapter considers the potential impact of VE from the landfall, along the onshore Export Cable Corridor (ECC) and incorporates the Onshore Substation (OnSS) during the construction, operation and maintenance (O&M), and decommissioning phases.

5.1.2 VE is a Nationally Significant Infrastructure Project (NSIP). An ES is provided as part of a Development Consent Order (DCO) application under the Planning Act 2008.

5.1.3 VE is a proposed extension to the operational Galloper Offshore Wind Farm (OWF). Full details of the development proposals are set out in Volume 6, Part 1, Chapter 1: Introduction, of this ES.

5.1.4 This chapter has been informed by the following Environmental Statement (ES) chapters:

- Volume 6, Part 3: Chapter 1 Onshore Project Description;
- Volume 6, Part 3: Chapter 4 Onshore Biodiversity and Nature Conservation; and
- Volume 6, Part 3: Chapter 6 Hydrology and Flood Risk.

5.1.5 This Ground Conditions and Land Use chapter will:

- Describe the existing baseline established from desk studies, dedicated surveys and consultation;
- Outline the potential environmental effects on Ground Conditions and Land Use arising from VE, based on the information gathered and the analysis and assessments undertaken to date;
- Provide an assessment of the potential direct and indirect impacts of VE, including the construction and operation and maintenance and decommissioning phases, on Ground Conditions and Land Use;
- Identify any assumptions and limitations encountered in compiling the environmental information; and
- Highlight any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified at the relevant stage in the ES process.

5.1.6 The effects considered in this chapter include those on geological conditions and resources that form part of the onshore physical environment. Effects on hydrogeology and groundwater (including groundwater abstractions) are considered in Volume 6, Part 3: Chapter 6 Hydrology and Flood Risk.

5.1.7 Compensatory measures are proposed at an onshore location for Lesser Black Backed Gull (LBBG) to compensate for the predicted worst-case impacts of VE on this species in relation to Habitats Regulation Assessment. Further details of the location of these measures and an assessment of the potential impacts are available in Volume 6, Part 8: LBBG EIA.

5.2 STATUTORY AND POLICY CONTEXT

5.2.1 This section identifies the legislation and policy that has informed the assessment of effects with respect to Ground Conditions and Land Use.

5.2.2 VE will be developed in accordance with the following European legislation, National legislation, National and Local Planning Policy and Strategy, and other relevant guidance.

5.2.3 A summary of the legislation and policies of relevance to this chapter are provided in the sections below and in Table 5.1 together with an indication of where each requirement is addressed.

NATIONAL LEGISLATION

5.2.4 There are a number of overarching pieces of legislation, applicable to the assessment of ground conditions and land use. These include:

- The Environmental Permitting (England and Wales) Regulations 2016;
- The Environment Act 1995 sets out roles and responsibilities for the Environment Agency (EA);
- The Environment Act 2021 sets out the new UK framework for environmental protection including biodiversity, nature conservation and waste reduction; and
- Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 set out the key stages in the assessment process, including review and monitoring.

NATIONAL POLICY STATEMENTS

5.2.5 The National Policy Statements (NPS) are the principal policy for determining Nationally Significant Infrastructure Project (NSIP) applications. As such, this assessment has made explicit reference to the relevant NPS requirements.

5.2.6 Those relevant to the ground conditions and land use aspects of the onshore elements of VE are:

- Overarching National Policy Statement for Energy (EN-1, (DESNZ 2023, 2023a));
- National Policy Statement for Renewable Energy Infrastructure (EN-3 (DESNZ, 2023b)); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5 (DESNZ 2023c)).

5.2.7 In November 2023, the government published revised versions of the NPS documents in reflection to the March 2023 consultation on the draft statements. Since publication, the guidance was updated in November 2023 and into effect in January 2024. It is expected that the statements will be reviewed every five years, which will ensure that they reflect evolving policy and legislative changes.

NATIONAL PLANNING POLICY

5.2.8 The National Planning Policy Framework (NPPF), prepared by the Department for Communities and Local Government, published in March 2012 and most recently revised in December 2023, sets out the Government's planning policies for England and how these are expected to be applied. This is supported by the National Planning Practice Guidance (PPG) which expands on policies contained in the NPPF.

5.2.9 Section 15 of the NPPF sets out the requirements for conserving and enhancing the natural environment. A core aim of the NPPF is to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. It sets out that applicants should seek to recognise benefits from natural capital and ecosystem services including the economic value and other benefits of best and most versatile agricultural land.

5.2.10 Section 17 of the NPPF sets out the requirements for planning policy to facilitate the sustainable use of minerals, including the requirement to safeguard minerals from sterilisation by non-mineral development.

5.2.11 It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation.

LOCAL PLANNING POLICY

5.2.12 The Essex Minerals Local Plan (MLP 2014) has been considered as part of this assessment. As part on an ongoing review to ensure the MLP meets the Test for Soundness of new plans (NPPF Paragraph 35) a Call for Sites exercise for mineral extraction and mineral infrastructure closed on 9 November 2022.

5.2.13 Policy S8 of the MLP requires that a non-mineral proposal located within a Mineral Safeguarding Area (MSA) which exceeds defined thresholds must be supported by a Minerals Resource Assessment to establish the existence, or otherwise, of a mineral resource capable of having economic importance.

5.2.14 This chapter also considers:

- Essex and Southend-on-Sea Waste Local Plan 2017; and
- Tendring District Local Plan 2013-2033 and Beyond Publication Draft and Tendring District Council, July 2017 Emerging Local Plan:
- Public Policy and Legislation (PPL) 4 Biodiversity and Geodiversity.

CONTAMINATED LAND

5.2.15 Specific UK legislation and guidance on the assessment of contaminated land is principally provided under:

- Part 2A of the Environmental Protection Act (EPA) 1990, as inserted by Section 57 of the Environment Act 1995;
- The Land Contamination Risk Management (LCRM)' guidance (EA, 2021) which indicates that a Conceptual Site Model (CSM) should identify those contamination sources, pathways and receptors which are "likely" to represent an "unacceptable" risk either to human health or the surrounding environment;
- Contaminated Land Statutory Guidance 2012 (ref: PB13735) is intended to explain how Local Authorities should implement the regime as detailed by EPA 1990, including how they should go about deciding whether land is contaminated land in the legal sense of the term;
- Construction Industry Research and Information Association (CIRIA) C552 (Contaminated Land Risk Assessment. A guide to good practice) examines the risk assessment of contaminated land and explains the key elements of risk assessment practices and procedures; and

- Design Manual for Roads and Bridges (DMRB), (2020) LA101 Sustainability and Environment Appraisal. Introduction to environmental assessment.

OTHER RELEVANT GUIDANCE

5.2.16 Relevant UK guidance on good practice for construction projects that will be referenced during assessment is detailed in the following documents:

- Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment (IEMA, 2004 and 2006 as amended);
- DMRB LA 109 Geology and Soils (DMRB 2019), which provides a framework for assessing and managing the effects associated with geology and soils;
- Department for Environment, Food & Rural Affairs (DEFRA) Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009);
- IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (February 2022);
- Ministry of Agriculture, Fisheries and Food, Agricultural land classification of England and Wales - revised guidelines and criteria for grading the quality of agricultural land (1988); and
- Good Practice Guide for Handling Soils (Institute of Quarrying, 2021) which is an updated publication of the Defra ‘‘Good Practice for Handling Soils’, published in 2000.

5.2.17 Table 5.1 outlines the relevant legislation and policy context in relation to this chapter.

Table 5.1: Legislation and policy context

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
EPA 1990. Part 2A - Contaminated Land Statutory Guidance	The legislation provides for the identification, assessment and management of contamination sources, pathways and receptors which are “likely” to represent an “unacceptable” risk either to human health or the surrounding environment; The legislation in relation to contaminated land thus enables central government to protect and improve environmental quality of historical contamination and in pursuing policies to re-use and redevelop sites ensures developers and local authorities are aware of potential contamination issues.	The identification of potential contamination is presented in Section 5.7. The order limits have been selected to avoid sites with high potential for contamination, such as landfills and heavy industrial land use areas.

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
LCRM Guidance	Makes provision for the identification and remediation of contaminated land under Part 2A of the Environmental Protection Act 1990.	The identification of potential contamination is presented in Section 5.7
Overarching National Policy Statement for Energy (NPS EN-1)	Paragraph 4.3.11 advises that *'In some instances, it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.'*	Volume 6, Part 3: Chapter 1 - Onshore Project Description sets out the details of the Project and which areas are, and are not, settled in precise detail. Section 5.9 sets out the maximum design parameters that have been defined to ensure that the worst-case ground conditions and land use effects are assessed.
NPS EN-1	In relation to Good Design, paragraph 4.7.11 advises that *'In doing so, the Secretary of State should be satisfied that the applicant has considered both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located, any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible.*	Section 5.10 sets out the mitigation that is included for VE and Section 5.12 assesses ground and land use impacts.
NPS EN-1	In relation to Good Design, paragraph 4.7.7 sets out that the applicants should be able to demonstrate how the design process was conducted, and how the design evolved and design decisions were made.	The evolution of the design is set out Volume 6, Part 1: Chapter 4 Site Selection and Consideration of Alternatives and Volume 6, Part 3: Chapter 1 Onshore Project Description. How the design has evolved in relation to

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
		ground condition impacts is included in Section 5.10 of this Chapter.
NPS EN-1	Paragraph 5.4.17: *'Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance'*	The effects of onshore infrastructure associated with VE on designated sites of geological conservation importance are considered in Section 5.11.
NPS EN-1	Paragraph 5.4.42: *'As a general principle, and subject to the specific policies below, development should, in line with the mitigation hierarchy, aim to avoid significant harm to biodiversity and geological conservation interests, including through consideration of reasonable alternatives (as set out in Section 4.3 above). Where significant harm cannot be avoided, impacts should be mitigated and as a last resort, appropriate compensation measures should be sought.*	The effects of onshore infrastructure associated with VE on designated sites of geological conservation importance are considered in Section 5.11.
NPS EN-1	Paragraph 5.11.12: *'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 Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5).'* Paragraph 5.11.13 *'Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into*	The evolution of the design is set out Volume 6, Part 1: Chapter 4 Site Selection and Alternatives and Volume 6, Part 2: Chapter 1 - Onshore Project Description. The effects of onshore infrastructure associated with VE on best and most versatile soils are considered in Section 5.12. Although the onshore infrastructure does not

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	account any mitigation measures proposed.' Paragraph 5.11.14 *'Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination.'* Paragraph 5.11.15 *'Developments should contribute to and enhance the natural and local environment by preventing new and existing developments from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.'*	utilise previously developed land, an assessment of the potential for impacts to occur from contamination is provided in Section 5.12.
NPS EN-1	Paragraph 5.11.19 '*Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.'*	The effects of onshore infrastructure associated with VE on safeguarded mineral are considered Volume 6, Chapter 5, Annex 6.5.2: Mineral Resource Assessment and summarised in Section 5.12.
National Policy Statement for Renewable Energy Infrastructure (EN-3)	Paragraph 3.8.85 '*Assessment of environmental effects of cabling infrastructure and any proposed offshore or onshore substations should assess effects both alone and cumulatively with other existing and proposed infrastructure.'*	The cumulative effects of onshore infrastructure associated with VE are considered in Section 5.115.15.

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
National Policy Statement for Electricity Networks Infrastructure (EN-5)	Paragraph 2.9.25 sets out the considerations of the Secretary of State when granting development consent of underground cables in favour of overhead alternatives. In relation to geology and soils the following bullet points apply: *'the potentially very disruptive effects of undergrounding on local communities, habitats, archaeological and heritage assets, marine environments, soil (including peat soils), hydrology, geology, and, for a substantial time after construction, landscape and visual amenity. (Undergrounding an overhead line will mean digging a trench along the length of the route, and so such works will often be disruptive – albeit temporarily – to the receptors listed above than would an overhead line of equivalent rating);* *the applicant's commitment, as set out in their ES, to mitigate the potential detrimental effects of undergrounding works on any relevant agricultural land and soils (including peat soils), particularly regarding Best and Most Versatile land, including development and implementation of a Soil Resources and Management Plan. Such a commitment must guarantee appropriate handling of soil, backfilling, and return of the land to the baseline Agricultural Land Classification (ALC), thus ensuring no loss or degradation of agricultural land.*	The evolution of the design is set out Volume 6, Part 1: Chapter 4 Site Selection and Alternatives and Volume 6, Part 2: Chapter 1 - Onshore Project Description. The effects of onshore infrastructure associated with VE on best and most versatile soils are considered in Section 5.12.

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	Such a commitment should be based on soil and ALC surveys in line with the 1988 ALC criteria and due consideration of the Defra Construction Code of Practice for Sustainable Use of Soils on Construction Sites.'	
NPPF (2023)	Para 180. *"Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of … geological value and soils …; … including the economic and other benefits of the best and most versatile agricultural land, preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, … pollution or land instability. …and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."*	The effects of onshore infrastructure associated with VE are considered in Section 5.12
	Para 189 a) *"a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination…"*	The identification of potential contamination is presented in Section 5.7
	Para 190 *"Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rest with the developer and/or landowner".*	The identification of potential contamination is presented in Section 5.7
	Para 216 c) *"safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas;*	The effects of onshore infrastructure associated with VE on safeguarded mineral are considered in

Legislation/ Policy	Key Provisions	Section Where Comment Addressed
	and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked); d) set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place;"	Volume 6, Chapter 5, Annex 6.5.2: Mineral Resource Assessment and summarised in Section 5.12
	Para 220 "*Minerals planning authorities should plan for a steady and adequate supply of industrial minerals by: b) encouraging safeguarding or stockpiling so that important minerals remain available for use;"*	The effects of onshore infrastructure associated with VE on safeguarded minerals are considered in Volume 6, Chapter 5, Annex 6.5.2: Mineral Resource Assessment and summarised Section 5.12

5.3 CONSULTATION

5.3.1 Consultation is a key part of the Development Consent Order (DCO) application process. Consultation regarding ground conditions and land use has been conducted through the Evidence Plan Process (EPP), ETG meetings, the EIA scoping process (VE, 2022) and the Preliminary Environmental Information Report (PEIR) process (VE, 2023).

5.3.2 A Scoping Opinion for VE was sought from the Secretary of State. The Scoping Opinion, which includes responses from the EA and Local Authorities, identifies areas of the assessment methodology for further consideration.

5.3.3 Statutory consultation was undertaken under Section 42 of the Planning Act 2008. A PEIR was published as part of formal consultation which provided preliminary information on ground conditions and land use within Volume 3, Chapter 5: ground conditions and land use.

5.3.4 The baseline assessment to inform the ES was completed through a desk-study exercise, including data requests from and consultation with relevant statutory bodies. Consultation has been undertaken with the EA, Essex County Council and Tendring District Council.

5.3.5 An overview of the technical consultation process is presented within Volume 6, Part 1, Chapter 1: Introduction and further consultation detail is presented in the Consultation Report (Volume 5, Report 1). As identified in Volume 6, Part 1, Chapter 4: Site Selection and Consideration of Alternatives and Volume 6, Part 3, Chapter 1: Onshore Project Description, the Project design envelope has been refined from the design envelope presented at the PEIR stage. This refinement has been based on stakeholder consultation feedback.

5.3.6 Given the changes in the project design between PEIR and ES, some areas of land will be affected differently by the proposals than consulted on at PEIR. Changes were made following feedback from the PEIR consultation, increased understanding of the local environment from dedicated surveys and coordination work with the North Falls project. To comply with the requirements of the Planning Act 2008, a targeted consultation was held with those affected by the changes from 5 December 2023 to Wednesday 31 January 2024.

5.3.7 Table 5.2 below summarises the issues relevant to this chapter which have been highlighted by consultees and indicates how, if possible, these issues have been addressed within the ES.

Table 5.2: Summary of consultation relating to Ground Conditions and Land Use

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
14 January 2020 Pre-Scoping Expert Topic Group Meeting	SCC disagreed with mineral deposits being screened out of the EIA Scoping Report.	Minerals have been screened into the Scoping and the PEIR, Section 5.4.
3 August 2021 Pre-Scoping Expert Topic Group Meeting	Essex County Council historic and existing landfill information should be requested from Essex County Council's Minerals and Waste Authority. The consideration of gravel and brick pits within the county should be included within the EIA.	The Environment Agency Essex County Council and Tendring District Council were contacted to request information on existing landfills and the relevant information was provided for consideration within this chapter. Identification of historic, existing landfill and mineral sites are included within Section 5.7.
November 2021 PINS on behalf of SoS Scoping Opinion	Operational impacts on geology and ground conditions: The Inspectorate notes that effects on the environment arising from ground disturbance during construction would be assessed as part of the ES.	Effects arising from ground disturbance are assessed during the construction phase and are included within Section 5.12.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	The Inspectorate agrees that this matter can be scoped out on the basis that further impacts on ground conditions are unlikely to lead to additional LSE.	
	The Planning Inspectorate does not agree to scope out loss of agricultural land during operation of underground cables on the basis *"that underground cables have the potential to restrict agricultural uses during operation and that the area of restricted use should be quantified both in terms of extent and agricultural land grade.* *Accordingly, the ES should include an assessment of this matters or evidence demonstrating agreement with the relevant consultation bodies and the absence of LSE."*	The onshore ECC does, route through areas of agricultural land. Whilst there is predicted to be a temporary impact upon agricultural land during the construction phase, the reinstatement of land above the buried cable will allow agricultural cultivation to re-commence once the cable has been installed. Loss of agricultural land during operation has been assessed within Section 5.12 in this Chapter.
	The Planning Inspectorate agrees that routine maintenance effects on sterilisation of minerals & loss of agricultural land can be scoped out of the assessment. The maintenance works which are expected to occur would be localised and subject to control measures to reduce risks and impacts. The Inspectorate notes that the sterilisation of mineral deposits is listed as an impact which would be covered in the assessment of construction effects.	The potential sterilisation of mineral deposits is Effects arising from ground disturbance are assessed during the construction phase and are included within Section 5.12 and Volume 6, Chapter 5, Annex 5.2: Mineral Resource Assessment.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	The Planning Inspectorate considers that an appropriate, consistent buffer zone around relevant receptors should be included with justification for the size of the buffer zone around the Study Area.	The study area for the baseline data collection for ground conditions and land use has been discussed and agreed with stakeholders and is described within Section 5.4 in this Chapter.
	The Planning Inspectorate notes on methodology – quantitative effects, that where ground investigation and quantitative assessments are available, they should be included within the assessment.	The methodology is described within Section 5.4 of this chapter. Where ground investigation and quantitative assessments are available, they are included within the assessment.
	The Planning Inspectorate notes that the ES should identify potential risks and contaminant linkages from potential sources of contamination on agricultural land from sources such as slurry, fertiliser, fuel storage and fertiliser use.	These comments are addressed in Section 5.12 in this Chapter.
	The Planning Inspectorate notes that the ES should indicate how leaks or spills of contaminants during construction or the bulk storage of potential contaminants is unlikely.	Measures to prevent leaks or spills of contaminants are included within the Mitigation Section 5.10 of this Chapter. See also, the measures included within the Volume 9, Report 21: Draft Code of Construction Practice.
	The Planning Inspectorate notes that the ES should also assess the potential for other sources of ground gas such as natural soils that are subject to contamination.	No potential sources of ground gas from natural soils have been identified (Section 5.7).
	The Planning Inspectorate notes that the ES should also consider the potential for natural soils and groundwater	Potential sources of aggressive ground conditions of sulphur bearing minerals in the bedrock geology which

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	conditions to lead to an aggressive chemical environment for services and structures.	could attack concrete have been identified in Section 5.7, and are assessed in Section 5.12.
	The Planning Inspectorate notes that the ES should consider whether a Materials Management Plan, and if required use of the Contaminated Land: Applications in Real Environments (CL: AIRE) Definition of Waste: Code of Practice (DOW:COP) and donor / receiver site process is required as a mitigation measure for the scheme.	Potential risks arising from land contamination have been assessed within Section 5.12 of this chapter. VE has been selected to avoid sites with high potential for contamination, such as landfills and industrial land use. Should unexpected contamination be identified during construction a series of measures are set out within Section 5.10 of this Chapter, and are included in Volume 9, Report 21: Code of Construction Practice (CoCP).
	The Planning Inspectorate notes that the ES should also describe how soil would be handled and stored.	Measures on the storage and handling of soil are included in the CoCP. Specific details are included within the Mitigation Section 5.10 of this Chapter.
	Tendring District Council Members raise concern that the proposed cable routes and tunnelling will impact large areas of farmland and residents' gardens. Further that underground cables will disturb agricultural land drains and irrigation systems.	VE has been selected to avoid residential properties and gardens. Whilst there is predicted to be a temporary impact upon agricultural land during the construction phase, the reinstatement of land above the buried cable will allow agricultural cultivation to re-commence once the cable has been installed. Field drainage will be reinstated. Discussed in Section 5.12 in this Chapter.
	Essex County Council	The MRA is included as Annex 6.5.2 to this chapter.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	"Part of the application site is located within land which is designated as a Mineral Safeguarding Area (MSA) and therefore the application is subject to Policy S8 of the Essex Minerals Local Plan 2014 (MLP)."	Identification of MSA is included within Section 5.7.
	Essex County Council A Waste Infrastructure Impact Assessment (WIIA) should be undertaken as *"the application site passes through a Waste Consultation Area associated with the Little Bentley Waste Water Treatment Works (WWTW)."*	VE onshore ECC route has been refined since the Scoping Report and no longer passes through or near the Waste Consultation Area. Therefore, a Waste Infrastructure Impact Assessment is no longer required.
	Essex County Council Raises the importance of a Site Waste Management Plan (SWMP). That it *"is vitally important that the best use is made of available resources."* As set out in the NPPF and development plan documents. *"Paragraph 8 of the NPPF recognises the importance of "using natural resources prudently and minimising waste" Policy S4 of the Minerals Local Plan (2014) advocates reducing the use of mineral resources through reusing and recycling minerals generated as a result of development/ redevelopment. Not only does this reduce the need for mineral extraction, it also reduces the amount sent to landfill. Clause 4 specifically requires: "The maximum possible recovery of minerals from construction, demolition and excavation wastes*	The approach to managing waste is set out within the CoCP. Information is included within the Mitigation Section 5.10 of this Chapter.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	produced at development or redevelopment sites. This will be promoted by on-site re-use/ recycling, or if not environmentally acceptable to do so, through re-use/ recycling at other nearby aggregate recycling facilities in proximity to the site."	
1 November 2022 Expert Topic Group Meeting	ETG members agreed the overall assessment strategy, key guidance, data sources and study areas to be included in the assessment.	The assessment methodology and the study area is detailed within Section 5.4, baseline characterisation is detailed within Section 5.7
12 August 2022 Essex County Council	**Minerals** State its response relates to the refined area of the larger area of search of October 2021. States part of the application site is located within land designated as a MSA and therefore subject to Policy S8 of the Essex Minerals Local Plan 2014 (MLP). States an MRA will be requires as the area of 308.8ha is larger than the 5ha threshold. Provides detailed information on what they scope of the MRA should be. States that the application site does not pass through a Mineral Consultation Area (MCA) and therefore, a Mineral Infrastructure Impact Assessment (MIIA) would not be required. **Waste** States a WIIA would be required as the project passes	A MRA is included as Annex 6.5.2 to this chapter. Identification of MSA is included within Section 5.7. VE onshore ECC route has been refined since the first stage of consultation and no longer passes near the Waste Consultation Area. Therefore, a WIIA is no longer required. The approach to managing waste is set out within the Volume 9, Report 21: CoCP. Information is included within

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	through a Waste Consultation Area. States the importance of a SWMP and provides information on the policy requirement and scope.	the Mitigation Section 5.10 of this Chapter.
May 2023 EA Stage 2 Consultation	Principally due to the low risk unproductive bedrock geology and due to a lack of Source Protection Zone 1/2 in the search area, and the avoidance of historically contaminative land uses, we are generally satisfied on land contamination issues. But it should be ensured that we are consulted if unexpected contamination is identified during the project which may be a significant risk to the water environment (including the numerous abstractions identified).	The approach to managing unexpected contamination is set out within Volume 9, Report 21: CoCP. Information is included within the Mitigation Section 5.10 of this Chapter.
May 2023 National Farmers Union (NFU), Stage 2 Consultation	Volume 3 Chapter 5 section 5.7.8 highlights that the district comprises a significant proportion of high-grade agricultural land, predominantly used for intensive farming. The NFU strongly feels that the project should avoid best and most versatile land wherever possible.	The project has undergone an extensive site selection process which has involved incorporating environmental considerations including best and most versatile land in collaboration with the engineering design requirements. The evolution of the design is set out Volume 6, Part 1, Chapter 4: Site Selection and Consideration of Alternatives and Volume 6, Part 3, Chapter 1: Onshore Project Description.
	The NFU also feels strongly that the impact the project will have on agricultural	Landowner engagement has been ongoing during the Project consultation stages.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	businesses needs to be considered in the development of the project. The construction and surface apparatus may cause significant disruption. The NFU would expect there to be consultation with farmers over practical matters including access, position of surface apparatus and accommodation works required to mitigate the impact on agricultural businesses.	Mitigation measures have been included in the project design to reduce the disruption to landowners. Information is included within the Mitigation Section 5.10 of this Chapter. The Project will seek to update the landowners on project progress and liaise with landowners to agree terms with affected parties including any loss of ongoing payments or penalties relating to agri-environmental stewardship schemes.
	Volume 3 Chapter 5 highlights the works which may impact soil quality and resource and how the direct impacts on soil quality have potential indirect impacts on soil fertility and drainage. Further that it has been stated potential long-term impacts resulting from the construction works is assessed as negligible but that careful soil handing will be required to preserve soil. The NFU is pleased that this has been acknowledged and that principles to manage potential impacts upon soil will be set out in a Soil Management Plan. The NFU would though like to see wording set out to cover soil reinstatement and field drainage in an outline management plan which is annexed to the Outline Code of Construction.	The CoCP (Volume 9, Report 21: CoCP) incorporates the outline principles of soil management and mitigation measures to ensure protection of soils. A Soil Management Plan (SMP) will be developed and will be produced in advance of construction.
May 2023 Essex County Council S42 Response	Previously at the non-statutory consultation ECC made a detailed response as it refers	A MRA is included as Annex 6.5.2 to this chapter.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	to the safeguarding of mineral reserves and the place the development should be within the waste hierarchy. It is noted that a Mineral Resource Assessment will be included within the suite of submitted DCO documents hence and until submission of the same the previous points as made in consultation are considered relevant at this time as far as mineral reserves are concerned. Hence the comments as made at the non-stat consultation remain as previously set out. For the purpose of brevity they are not repeated here but can be provided again on request.	Identification of MSA is included within Section 5.7.
May 2023 Tendring District Council S42 Response	Tendring District Council is concerned that the sterilisation of agricultural land along the route of the underground power connections seems to have been given little weight in combination with NG proposals.	The OnSS needs to be located in proximity to the proposed NGET EACN substation zone. The evolution of the design is set out Volume 6, Part 1: Chapter 4 Site Selection and Consideration of Alternatives. The permanent loss of agricultural land within the VE is restricted to the operational footprint of the OnSS and landscaping areas. This is addressed in further detail within Section 5.13 of the impact assessment.
September 2023 Joint North Falls / Five Estuaries Hydrology and Ground Conditions ETG Meeting	n/a	n/a

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
September 2023 Essex County Council	Consultation correspondence was held with Essex County Council in regard to mineral safeguarding to set out and agree the proposed methodology for the MRA.	The methodology is set out within the MRA as Annex 6.5.2 to this chapter. Identification of MSA is included within Section 5.7.

5.4 SCOPE AND METHODOLOGY

SCOPE OF THE ASSESSMENT

IMPACTS SCOPED IN FOR THE ASSESSMENT

5.4.1 It was proposed at scoping to assess the loss of agricultural land during operation as part of the construction phase impacts. However, to provide a clear assessment of the loss of agricultural land during the operational phase, it has been agreed to separate out this impact. It has been addressed independently as Impact 8.

5.4.2 The following impacts have been scoped into this assessment:

- Construction:
  - Impact 1: Short term risks to construction workers during works activities on landfall, OnSS and onshore cable routes;
  - Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering landfall, OnSS and onshore cable routes;
  - Impact 3: Construction phase impacts upon soil/land quality;
  - Impact 4: Sterilisation of mineral deposit;
  - Impact 5: Risk from unexploded ordnance to construction workers and nearby residents; and
  - Impact 6: Risk to environmental designations.
- Operation and Maintenance:
  - Impact 7: Loss of agricultural land during operation of underground cables;
  - Impact 8: Loss of agricultural land during operation of the OnSS;
  - Impact 9: Ingress and accumulation of hazardous ground gases; and
  - Impact 10: Structures and services laid in direct contact with contaminated soils and groundwater.
- Decommissioning:
  - Impact 11: Short term risks to construction workers during decommissioning of OnSS, ECC and associated infrastructure; and

- Impact 12: Risks to offsite human receptors, such as occupants of residential properties bordering infrastructure associated with VE.

IMPACTS SCOPED OUT OF THE ASSESSMENT

5.4.3 On the basis of the baseline environment and the project description outlined in Volume 6, Part 3: Chapter 1 Onshore Project Description and in accordance with the Scoping Opinion (PINS, 2021), a number of impacts have been scoped out, these include:

- Construction and decommissioning:
  - Risks posed to sensitive surface water and groundwater resources will be addressed as part of the hydrology and hydrogeology chapter.
- Operation and Maintenance:
  - Operational impacts on geology and ground conditions; and
  - Routine maintenance effects on sterilisation of minerals and loss of agricultural land.

STUDY AREA

5.4.4 The study area for baseline data collection for ground conditions and land use is shown on Table 5.1 and comprises onshore elements of VE from Landfall to the East Anglia Connection Node (EACN) Substation, plus a buffer of 1 km around the proposed OnSS area, and a 250 m buffer around the landfall and the onshore Export Cable Corridor (ECC) (including haul roads and Temporary Construction Compound (TCC) areas). These buffers encapsulate the Zone of Influence (ZoI) of the impacts as identified and therefore all receptors within have been characterised for the purposes of assessment.

610000 615000 620000 625000

230000 225000 220000 215000

Section 7
Section 6
Section 5
Section 4B
Section 4A
Section 3
Section 2
Section 1

N

LEGEND

- Onshore Order Limits
- Offshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Substation Operational Boundary
- North Falls Indicative Substation Operational Boundary
- Landfall Compound Zone
- Landfall Exit Pit Sheet Piling Zone
- National Grid EACN Substation Zone
- Substation Works Area
- Substation Study Area (Substation Works Area 1 km Buffer)

0 0.5 1 2

Kilometres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

STUDY AREA

VER	DATE	REMARKS	Drawn	Checked
1	20/02/2024	ES Submission	MM	JRS

DRAWING NUMBER: 5.1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:60,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WINDFARM

5.4.5 The 250 m buffer is from relatively shallow excavations for the onshore ECC, with no disturbance outside the ECC and reinstatement of current land use following construction. The wider 1 km buffer for the OnSS zone reflects the permanent nature of this development. The study area and available data have been discussed and agreed with stakeholders. It is considered that distances beyond this result in geographic separation between development and receptor and therefore an absence of an effect on ground conditions and land use.

5.4.6 For agricultural land classification and soils, the study area comprises the onshore ECC, TCC's, construction phase off route haul roads, VE Onshore substation zone and the Ardleigh Road drainage zone. The O&M access routes have been excluded as they utilise existing access tracks. The rationale for this is that agricultural land quality is impacted by the direct deterioration and loss of the resource itself. This predominately occurs by direct actions on soil quality via construction related activities.

5.4.7 This study area has been separated into several Onshore Route Sections which are shown on Figure 5.2 Agricultural Land Classification Overview and described as follows:

- Route Section 1- Landfall to the south of the Eastern main railway line thorough Thorpe le Soken;
- Route Section 2 - Land north of the Eastern main railway line thorough Thorpe le Soken, to the B1033 road;
- Route Section 3 - Land north of the B1033 road to the B1035 road;
- Route Section 4 - Land north of the B1035 road to the A120 road;
- Route Section 5 - Land north of the A120 to Bentley Road;
- Route Section 6 - Bentley Road to the crossing of Ardleigh Road; and
- Route Section 7 - North from the crossing of Ardleigh Road to the proposed location of the NGET substation (includes the OnSS).

DATA SOURCES

5.4.8 Baseline data with respect to ground conditions and land use has been collected from publicly available information and open-source data from a range of sources.

5.4.9 A desk-based review of soil and geological maps, Ordnance Survey (OS) mapping and Digital Terrain Model (DTM) mapping has been undertaken. Third party data from bodies such as the EA and DEFRA's MAGIC website has been used to characterise the geological features and identify any geological designated areas. Table 5.3: Data Sources below provides a list of data sources.

Table 5.3: Data Sources

Data	Reference/ source
Agricultural Land Classification (ALC)	Natural England
Soil Type and Character	UK Soil Observatory; http://www.ukso.org/static-maps/soils-of-england-and-wales.html and Cranfield Soil and Agrifood Institute Soilscapes map viewer
Geology	British Geological Survey (BGS) Onshore Geoindex; https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
Groundwater Source Protection Zones (SPZ)	
Mines and quarries	
Coal Authority Map	The Coal Authority website interactive mapping https://mapapps2.bgs.ac.uk/coalauthority/home.html
Historic Active Landfills and Waste Management Sites	EA (data.gov.uk) and Essex County Council & Groundsure Enviro Data Viewer https://www.groundsure.io/#
Statutory and Non-Statutory Environmental Designations	DEFRA Multi-Agency Geographic Information for the Countryside (MAGIC) https://magic.defra.gov.uk/magicmap.aspx
Locally Important Geological Sites	GeoEssex records relating to Local Geological Sites (LGS) formerly Regionally Important Geological/Geomorphological Sites (RIGS). http://www.geoessex.org.uk/
Radon	Public Health England: UK Radon Map
Unexploded Ordnance (UXO)	Zetica UXO: Risk Maps
Land use	Google Earth aerial photography
Historical Maps	Historical Ordnance Survey maps (where available). https://www.oldmapsonline.org/
Minerals Local Plan (adopted July 2014) and; Essex and Southend on Sea Waste Local Plan (adopted July 2017)	Essex County Council https://www.essex.gov.uk/minerals-waste-planning-policy/waste-local-plan

5.4.10 A site walkover survey of the study area was undertaken on 13 September 2022 and 14 September 2022. This ground truthing survey was undertaken by SLR Consulting Ltd, access to the proposed OnSS search areas and ECC route was obtained on foot by Public Rights of Way and local roads.

5.4.11 Data sources have also included Envirocheck reports obtained for the substation search areas at PEIR and the overall onshore ECC. Geotechnical and Geo-environmental Desk Study documents for the substation search areas at PEIR have also been reviewed.

ASSESSMENT METHODOLOGY

5.4.1 There are no published guidelines or criteria for assessing and evaluating effects on ground conditions and land use within the context of an EIA. In the absence of this, the proposed assessment is based on a methodology derived from the Institute of Environmental Management and Assessment (IEMA) guidance, Design Manual for Roads and Bridges (2019) and the Land Contamination Risk Management (LCRM).

5.4.2 Professional judgement and a qualitative risk assessment methodology have been used to assess the findings in relation to each of these criteria to give an assessment of significance for each potential impact. Once the magnitude of impact and sensitivity of the receptor has been assessed, these are then combined to determine the likelihood of each potential overall effect occurring.

5.4.3 This approach provides a mechanism for identifying the areas where site specific mitigation measures will be required, in addition to typical mitigation, and for identifying mitigation measures appropriate to the risk presented by the development proposals. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

5.4.4 Volume 6, Part 1, Chapter 3: EIA Methodology details the general impact assessment method, and the following sections describe more specifically the methodology used to assess the potential impacts of the project on ground conditions and land use.

5.5 ASSESSMENT CRITERIA AND ASSIGNMENT OF SIGNIFICANCE

SENSITIVITY

5.5.1 The approach for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts on those receptors. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. Unless stated otherwise the terms used to define sensitivity and magnitude are based on those described in the LA109 Geology and Soils methodology (DMRB, 2019) and A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022).

5.5.2 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria which is set out in Table 5.4. Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

5.5.3 It should be noted that the sensitivity criteria adopted for land quality relating to contamination was based on the tolerance of the site to change i.e. that known contaminated sites will be more sensitive to the ground-breaking aspects of development, during the construction phase, than those areas where no contamination is present.

Table 5.4: Sensitivity/importance of the environment

Receptor sensitivity/ importance	Description	Receptor
High	Receptor is high value and critical importance at a national or regional level. Receptor is vulnerable to impacts that may arise from the project and recoverability is long term and receptor has limited potential for substitution.	Geology: > UNESCO Geoparks, Sites of Special Scientific Interest (SSSI) or Geological Conservation Review sites (GCR) with internationally important geomorphological or geological features; and > Special Area of Conservation (SAC), SSSI or GCR with nationally important geomorphological or geological features. Soils: > Soils supporting protected features within a European site and/ or UK designated site (e.g., UNESCO Geoparks, SPA, SAC SSSI or Areas of Outstanding Natural Beauty (AONB), Special Landscape Area, and GCR); and/ or > ALC Classes 1, 2 and 3a- Excellent to Good Quality agricultural land. Contamination: > Presence of regulatory determined contaminated land (Part 2A EPA designated). Human: > VE construction workers.
Medium	Receptor is of moderate value with regional or local importance. Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability.	Geology: > Regionally Important Geological Site (RIGS) or Local Geological Sites (LGS). Soils: > Soils supporting protected or valued non-statutory designated sites (e.g. Local Nature Reserves (LNR), Local Geological Site's, Sites of Nature Conservation Importance); and / or > ALC Classes 3b Moderate Land capable of producing a moderate range of crops. Mineral Resources:

Receptor sensitivity/ importance	Description	Receptor
		> Mineral Safeguarding Area (regionally important resource). Contamination: > Areas of potential concern identified by Local Authority under their statutory investigation of contaminated land (under Part 2A; EPA 1990). Human: > Off-site and nearby neighbours.
Low	Receptor is of low value with local or no importance. Receptor is not generally vulnerable to the impacts that may arise from the project and/or has a high recoverability.	Geology: > Locally important sites (e.g. non designated geological exposures, former quarry's / mining sites). Soils: > Soils supporting valued features within non-designated notable or priority habitats/landscapes; and > ALC Classes 4 and 5 Poor to Very Poor Quality– Improved grassland and rough grazing or Urban soils.
Negligible	Receptor is of negligible value with no importance. Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability.	Geology: > Common geological features of limited use for knowledge/study. Soils: > Urban (Built-up or 'hard' uses). Contamination: > No areas of previously developed land with no areas of potential concern relating to contaminated land identified.

MAGNITUDE

5.5.4 The potential magnitude of impact would depend upon whether the potential effect would cause a fundamental, material or detectable change. In addition, the timing, scale, size and duration of the potential effect resulting from VE are also determining factors.

5.5.5 The following definitions apply to the time periods used in the magnitude assessment:

- Long term: greater than five years;
- Medium term: two to five years; and
- Short term: less than two years.

5.5.6 For the purposes of this assessment, construction related impacts that do not extend beyond the construction phase of VE; a short-term magnitude will be assigned.

5.5.7 The criteria that have been used to assess the magnitude of impact are defined in Table 5.5. This approach uses the term “beneficial” for an advantageous or positive effect on an environmental resource or receptor, and “adverse”, for a detrimental or negative effect on an environmental resource or receptor.

Table 5.5: Impact magnitude definitions

Magnitude	Description/ reason
High	Permanent loss of over 20 ha of BMV agricultural land (Grades 1, 2, and 3a) or more than 60% total regional BMV resource. Permanent loss of geological feature likely to cause exceedance of statutory objectives and/or breaches of legislation; severe damage to key characteristics, features or elements Contamination - significant contamination identified, contamination heavily restricts future use of land. (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major long-term improvement of attribute quality (Beneficial).
Medium	Permanent loss of between 5 – 20 ha of BMV agricultural land, or long term loss of more than 20 ha of BMV land or more than 30% of the regional BMV resource. Partial loss of geological feature but not adversely affecting the overall integrity; partial loss of/damage to key characteristics, features or elements with/without exceedance of statutory objectives or with/without breaches of legislation. Contamination – Significant contamination could be present. Control/remediation measures are required to reduce risks to human health/make land suitable for intended use (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).

Low	Permanent loss over less than 5 ha of BMV land, or long term loss of between 5 and 20 ha of BMV or more than 10% of the regional BMV resource. Short term loss of more than 20 ha of BMV land. Some measurable change to geological feature attributes, quality or vulnerability; reversible or minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Contamination - Significant contamination is unlikely with a low risk to receptors. Best practice measures can be implemented to minimise risks (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	No discernible loss or detrimental alteration to one or more characteristics, features or elements; impact of insufficient magnitude to affect the overall use/integrity Contamination – no risks identified, no requirement for control measures to reduce risks to receptors or to make land suitable for intended use (Adverse).
	Very minor or no benefit to or positive addition of one or more characteristics, features or elements; impact of insufficient magnitude to affect the use/integrity (Beneficial).

SIGNIFICANCE OF EFFECTS

5.5.8 The sensitivity of the receiving environment together with the magnitude of the impact determines the significance of the effect, which can be categorised into level of significance as identified in Table 5.6.

5.5.9 Table 5.6 provides a guide to assist in decision making. However, it should not be considered as a substitute for professional judgment and interpretation. In some cases, the potential sensitivity of the receiving environment or the magnitude of potential impact cannot be quantified with certainty and, therefore, professional judgement remains the most robust method for identifying the predicted significance of a potential effect.

5.5.10 Effects of '**major'** and '**moderate'** significance are considered to be 'significant' in terms of the EIA Regulations. A statement of residual effects, following consideration of any further specific mitigation measures where identified, is then given.

Table 5.6: Matrix to determine effect significance

			Sensitivity			
			High	Medium	Low	Negligible
Magnitude	Adverse	High	Major	Major	Moderate	Minor
		Medium	Major	Moderate	Minor	Negligible
		Low	Moderate	Minor	Minor	Negligible
	Neutral	Negligible	Minor	Minor	Negligible	Negligible
	Beneficial	Low	Moderate	Minor	Minor	Negligible
		Medium	Major	Moderate	Minor	Negligible
		High	Major	Major	Moderate	Minor

5.6 UNCERTAINTY AND TECHNICAL DIFFICULTIES ENCOUNTERED

5.6.1 This assessment is based on design information and publicly available data obtained from the EA, Natural England, local authorities and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.

5.6.2 Overall, a moderate level of certainty has been applied to the study. The information accessible in order to complete the assessment is considered sufficient to establish the comprehensive baseline, for the purposes of undertaking the EIA, within the VE onshore Ground Conditions and Land Use study area, therefore, there are no data limitations that would affect the conclusions of this assessment.

5.6.3 The Maximum Design Scenario (MDS) identified in Section 5.9 have been selected as that having the potential to result in the greatest impact on an identified receptor or receptor group. These scenarios have been selected from the details provided in the onshore project description (Volume 6, Part 3: Chapter 1). Effects of greater significance are not predicted to arise should any other development scenario to that assessed here be taken forward in the final design scheme, within the assessed boundaries.

5.7 EXISTING ENVIRONMENT

5.7.1 This section describes the potential environmental receptors within the Ground Conditions and Land Use study area (Figure 5.2))where significant effects may arise as a result of the Project, based on the MDS. Observations from the baseline survey and desk study have been included where relevant.

5.7.2 The onshore ECC has been broken down into a number of Route Sections which describe the route in relation to significant local features. The Route Sections are listed in Table 5.7 along with a short description defining the extent of each respective section.

Table 5.7 Route sections for the Onshore ECC.

Route Section – Onshore	Description
Route Section 1	Encompasses the landfall at Sandy Point between Frinton-on-sea and Holland-on-sea. From the Landfall HDD compound, located to the north west of Frinton golf course, adjacent to Short Lane, the onshore ECC continues northward to the East Coast Main Line spur between Holland Brook and Park Lane.
Route Section 2	Continues north from the Great Eastern Mainline spur to the west of Kirby Cross across agricultural fields towards the B1033 (Thorpe Road).
Route Section 3	Passes north of the B1033 (Thorpe Road) and the B1034 (Sneating Hall Lane) then continues north-west through agricultural land around Thorpe Le Soken crossing Landermere Road, Golden Lane towards the intersection of Thorpe Road/Swan Road.
Route Section 4	continues northwards through agricultural fields to the east of Tendring village, passing to the east of Tendring Heath towards the A120 (Harwich Road). The section is divided into Section 4A (south of Tendring Brook) and 4B (north of Tendring Brook).
Route Section 5	Continues to the north of the A120 continuing westwards through agricultural fields passing Clacton Road to Bentley Road.
Route Section 6	Extends from Bentley Road to the crossing of Ardleigh road. It crosses Payne's Lane, Spratts Lane and Barlon Road.
Route Section 7	Extends north from the crossing of Ardleigh Road to the proposed location of the NGET substation and includes the OnSS.

GENERAL DESCRIPTION AND LAND USE

5.7.3 Land use within the ground conditions and land use study area is predominantly agricultural, situated between the coastal settlements of Holland-on-Sea, Frinton-on-Sea and Ardleigh.

5.7.4 The coastal area of the proposed landfall is between the relatively populated towns of Holland-on-sea and Frinton-on-sea. There are pedestrian walkways adjacent to the coast in the form of a promenade. A water treatment plant is located to the north of Manor Lane. Natural England sites and Holland Haven Marshes SSSI extends parallel to the coast along the hydrology and flood risk study site. Frinton Golf Course is to the east of the site. Man-made sea-defences are present including Frinton promenade embankment, groynes and Princes Esplanade Wall.

5.7.5 The land to the north west between Great Holland and Ardleigh is predominantly agricultural, low lying land with a network of brooks and ditches. Hedgerows and woodland are limited to field boundaries. The A120 near Horsley Cross and a number of other B roads, minor roads and the Eastern Mainline railway spur to Walton-on-the-Naze also cross or are evident within the Onshore ECC study area.

5.7.6 Ground level data across the study area indicates that the land is relatively flat with shallow gradients. The lowest elevations are noted around Holland Brook and the coastal area of Holland Haven Marshes at around 5 m above ordnance datum (AOD). The majority of the study area lies between 10 and 20 m AOD.

SOIL & AGRICULTURAL LAND CLASSIFICATION

5.7.7 The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscapes) online mapping identifies the soils across the study area as loamy clayey soils, further defining them as four soilscapes:

- Loamy and clayey soils (coastal flats with naturally high groundwater);
- Loamy and clayey soils (floodplain with naturally high groundwater);
- Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils; and
- Slightly acid loamy and clayey soils (impeded drainage).

5.7.8 The district comprises a significant proportion of high grade agricultural land, predominantly used for intensive farming. A review of the available ALC mapping has been undertaken, the land is categorised into one of the following grades:

- Grade 1: excellent quality agricultural land;
- Grade 2: good quality agricultural land;
- Grade 3a: good to moderate quality agricultural land;
- Grade 3b: moderate quality agricultural land;
- Grade 4: poor quality agricultural land;
- Grade 5: very poor quality agricultural land; or
- Urban.

5.7.9 The ALC classification is also presented in Figure 5.4 and Figure 5.5. The published ALC mapping indicates where Grade 3 may be present, but does not differentiate between Grade 3a and 3b. Table 5.8 below provides a breakdown of the ALC for each section of the study area.

610000 615000 620000 625000

230000 225000 220000 215000

Section 7
Section 6
Section 5
Section 4B
Section 4A
Section 3
Section 2
Section 1

N

LEGEND

- Onshore Order Limits
- Offshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Substation Operational Boundary
- North Falls Indicative Substation Operational Boundary
- Landfall Compound Zone
- Landfall Exit Pit Sheet Piling
- National Grid EACN Substation Zone
- Substation Works Area
- Substation Study Area (Substation Works Area 1 km Buffer)

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Non-Agricultural
- Urban

0 0.5 1 2
Kilometres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

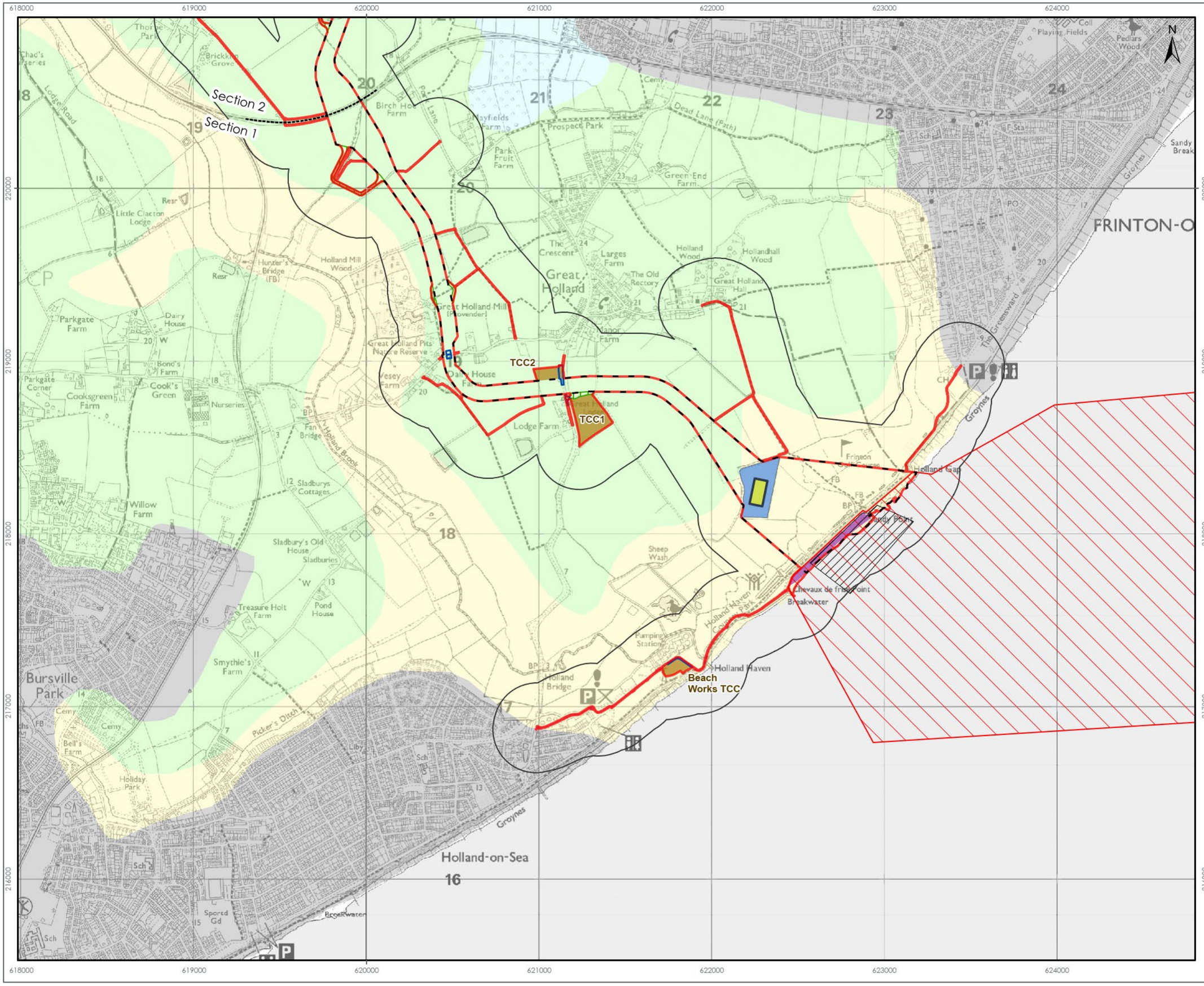
DRAWING TITLE:
AGRICULTURAL LAND CLASSIFICATION OVERVIEW

VER	DATE	REMARKS	Drawn	Checked
1	14/02/2024	ES Submission	MM	JRS

DRAWING NUMBER: 5.2

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:60,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM



LEGEND

- Onshore Order Limits
- Offshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Landfall Exit Pit Sheet Piling Zone
- Landfall Compound Zone
- Indicative Landfall Compound
- Temporary Beach Access Zone
- Temporary Construction Compound
- Off Route Haul Road
- Access and Crossing Zone

Agricultural Land Classification (ALC)

- Grade 2
- Grade 3
- Grade 4
- Urban

0 0.25 0.5 1

Kilometres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

AGRICULTURAL LAND CLASSIFICATION

VER	DATE	REMARKS	Drawn	Checked
1	20/02/2024	ES Submission	MM	JRS

DRAWING NUMBER: 5.3

Sheet No: 1 of 4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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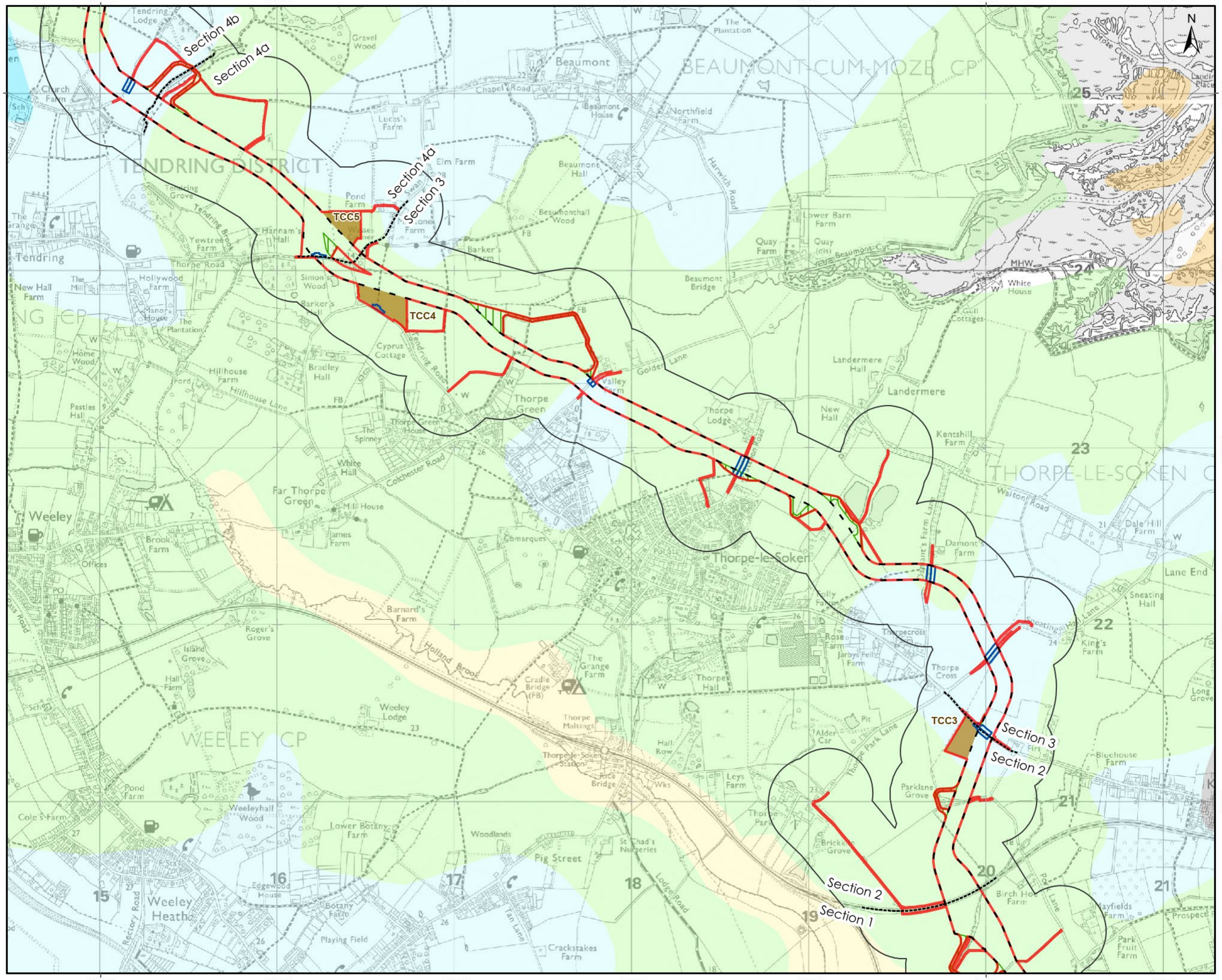
FIVE ESTUARIES OFFSHORE WIND FARM



LEGEND

- Onshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Temporary Construction Compound
- Off Route Haul Road
- Access and Crossing Zone

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Non-Agricultural
- Urban

0 0.25 0.5 1

Kilometres

Data Source:
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PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

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VER	DATE	REMARKS	Drawn	Checked
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SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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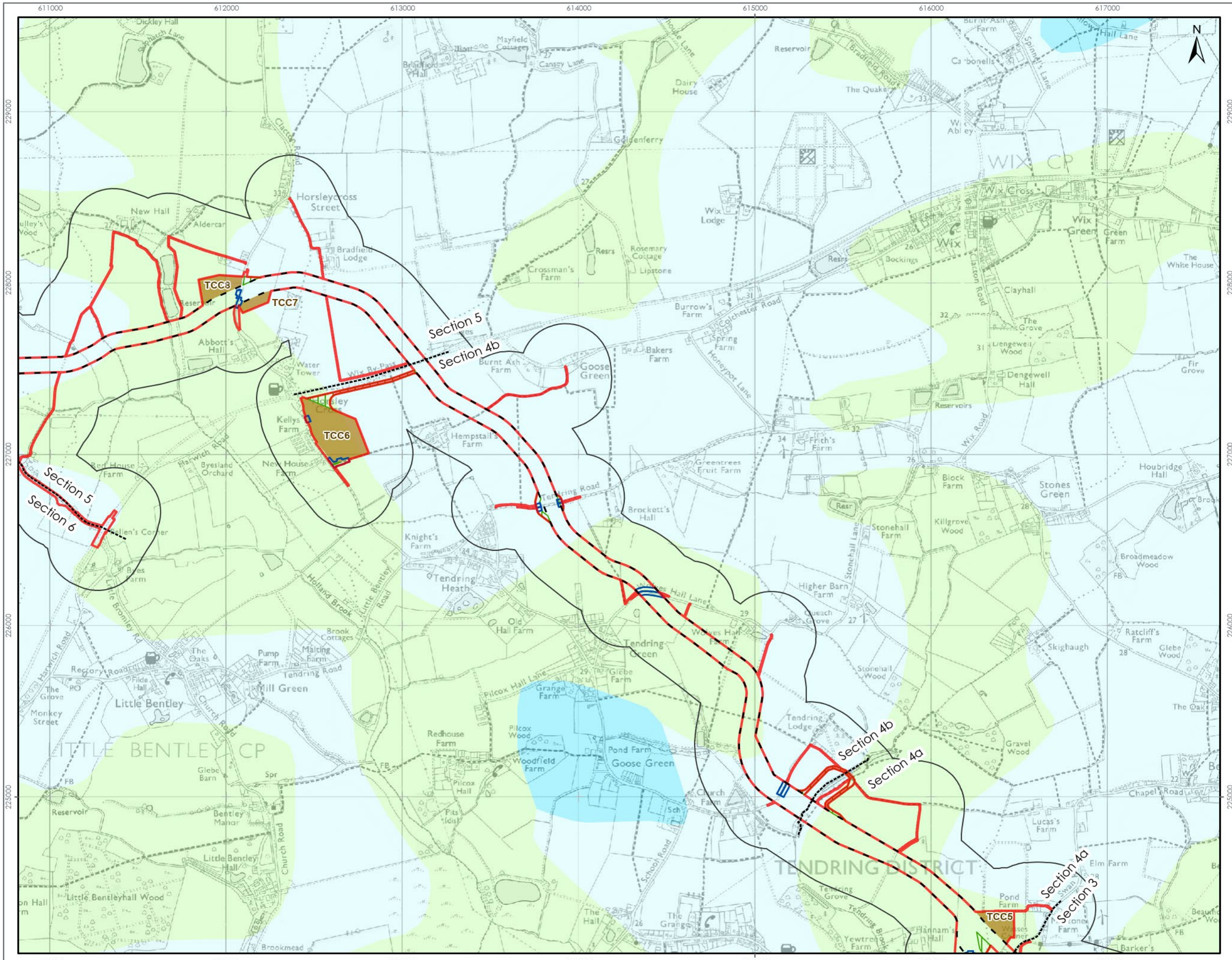
FIVE ESTUARIES
OFFSHORE WIND FARM



LEGEND

- Onshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Temporary Construction Compound
- Off Route Haul Road
- Access and Crossing Zone

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3

0 0.25 0.5 1

Kilometres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

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Sheet No: 3 of 4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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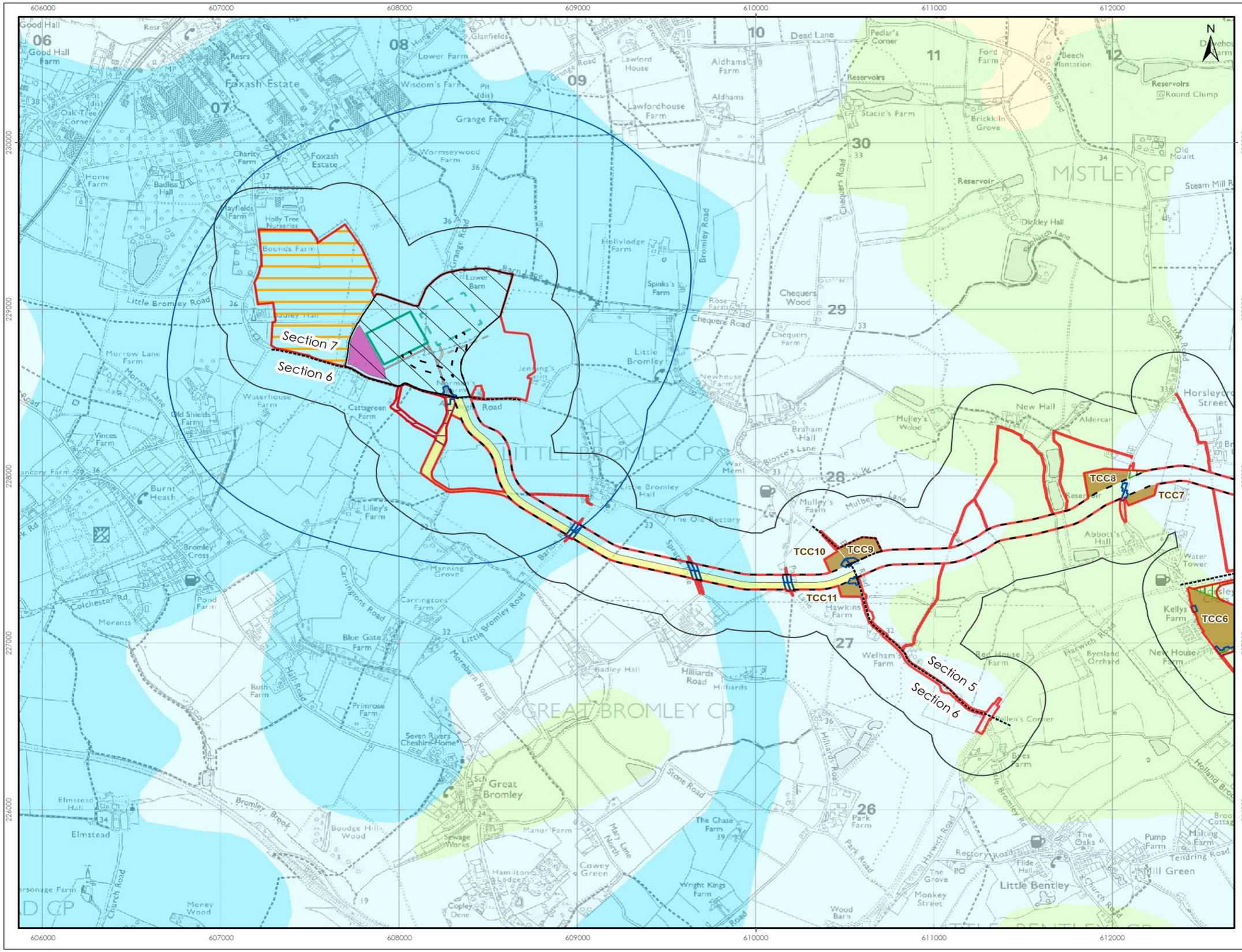
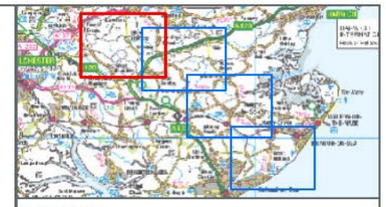
FIVE ESTUARIES OFFSHORE WINDFARM





LEGEND

- Onshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Substation Operational Boundary
- Substation Temporary Construction Compound
- Ardleigh Road Drainage Zone
- Indicative Substation Access Route
- Substation Temporary Construction Haul Road
- North Falls Indicative Substation Operational Boundary
- North Falls Indicative Substation Access Route
- Temporary Construction Compound
- National Grid EACN Substation Zone
- Off Route Haul Road
- Access and Crossing Zone
- Substation Works Area
- Substation Study Area (Substation Works Area 1 km Buffer)

Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3
- Grade 4

0 0.25 0.5 1

Kilometres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

AGRICULTURAL LAND CLASSIFICATION

VER	DATE	REMARKS	Drawn	Checked
1	20/02/2024	ES Submission	MM	JRS

DRAWING NUMBER: 5.3

Sheet No: 4 of 4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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FIVE ESTUARIES OFFSHORE WIND FARM

Table 5.8: Agricultural Land Classification

Onshore Infrastructure		Agricultural Land Quality
Route Section 1		Grade 3 – 38.45 ha, 47.96% Grade 4 – 41.72 ha, 52.04%
Route Section 2		Grade 2 – 2.01 ha, 18.04% Grade 3 – 9.12 ha, 81.96%
Route Section 3		Grade 2 – 11.03 ha, 23.28% Grade 3 – 36.34ha, 76.72%
Route Section 4	4A	Grade 2 – 1.02 ha, 5.85% Grade 3 – 16.46 ha, 94.15%
	4B	Grade 2 – 18.82 ha, 53.85% Grade 3 – 16.12 ha, 46.15%
Route Section 5		Grade 2 – 18.88 ha, 73.80% Grade 3 – 6.7ha, 26.20%
Route Section 6		Grade 1 – 15.26 ha, 61.69% Grade 2 – 9.48 ha, 38.31%
Route Section 7		Grade 1 – 3.95 ha, 100%
Onshore Substation Zone		Grade 1 – 39.82 ha, 100%
Temporary Construction Compounds		Grade 2 – 9.12 ha, 29.95% Grade 3 – 20.28 ha, 66.60% Grade 4 – 1.05 ha, 3.44%

5.7.10 The Table 5.9 below presents the ALC grades as a percentage of the total BMV grade land within Essex.

Table 5.9 Percentage of BMV Resource within Essex

ALC Grade (BMV)	Percentage of BMV grade land within the DCO Order Limits (%)	BMV grade land within the DCO Order Limits as a percentage of the total BMV grade land in Essex (%)
Grade 1	29.79	1.77
Grade 2	19.59	0.04
Grade 3 (undifferentiated)	39.47	0.08

AGRI-ENVIRONMENTAL SCHEMES

5.7.11 Landowners within the Order Limits are potentially part of four types of agri-environment scheme: Environmental Stewardship Schemes (ESS) and Countryside Stewardship Schemes (CSS), which are existing schemes, being phased out following the Agriculture Act 2020. These are being replaced by the Sustainable Farm Incentive and revised Countryside Stewardship Scheme which are both very much in their infancy, having been opened to applications from September 2023.

5.7.12 ESS provide funding and advice to farmers, tenants and other land managers to encourage effective environmental management of land.

5.7.13 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.

5.7.14 Mapping information obtained from Natural England datasets has identified CSS within the Order Limits. There are no CSS within Route Section 2. Within Route Section 1, 0.8 ha is situated on land subject to a Higher Tier CSS, there is also 41.45ha in Entry Level plus Higher Level Environmental Stewardship. In section 3, there is 28.67 ha for a Higher Tier CSS and 0.57ha for a Mid-Tier CSS, 20.38 ha within Section 4 for Higher Tier CSS and 65.85 ha. for Mid-Tier. Section 5 has 9.80 ha of Higher Tier CSS and 27.60 ha of Mid-Tier CSS.

5.7.15 These schemes are no longer open to new applications, with current agreements will running to their expiry.

5.7.16 The ESS has been replaced by the Sustainable Farming Incentive (SFI). The aim of this scheme is that it is available to all farmers and land managers to encourage sustainable management of the land.

5.7.17 The Enhanced Countryside Stewardship Scheme goes further than the SFI, with the aims of:

- increasing biodiversity
- improving habitat
- expanding woodland areas
- improving water quality
- improving air quality
- improving natural flood management

5.7.18 As applications have only just opened for these schemes, the data on land entered into agreements is not yet publicly available.

STATUTORY AND NON-STATUTORY DESIGNATED SITES

5.7.19 Mapping information obtained from the DEFRA MAGIC website identified limited designations, such as SSSI and LGS within the study area. No SAC and no RAMSAR sites are located within the study area.

5.7.20 The designations relevant to Ground Conditions and Land Use within the study area are shown on Figure 5.1, listed and described below:

- Route Section 1:
  - Holland on Sea Cliff SSSI – This is located on the coast, east of The Esplanade, Holland on Sea, approximately 250m to the south of the beach access route. Residential housing separates the SSSI from the proposed beach access route. The SSSI covers an area of 0.7ha and is cited for two stratigraphic gravel units which are exposed at the cliff at Holland-on-Sea. The units date to just before and just after the Thames River was diverted and contains important information about the evolution of the Thames and its tributaries during the Ice Age; and
  - Great Holland Pits Nature Reserve LGS – This is recorded as a 'potential' LGS to the north of Little Clacton Road. The LGS is separated from the Order Limits by Mill Lane which provides access to Great Holland Mill. At its closest point, the LGS is c.12 m to west of the Order Limits. The LGS site is recorded as a site of geological interest with potential for geological education noted for being a former gravel pit in the Cooks Green Gravel, laid down by the Thames-Medway river. The site is known to have been backfilled post gravel excavation (see Section 5.7.42), it is reported that there are no current exposures of gravel and is now an Essex Wildlife Trust nature reserve.
- Route Section 3:
  - Beaumont Red Crag Outlier LGS – This is a 'notified' LGS and situated between the settlements of Beaumont and Thorpe-le-Soken. The LGS is located c.400 m to the east of the Onshore ECC, and c.200 m north of a proposed access route. The LGS site is noted for the high ground at

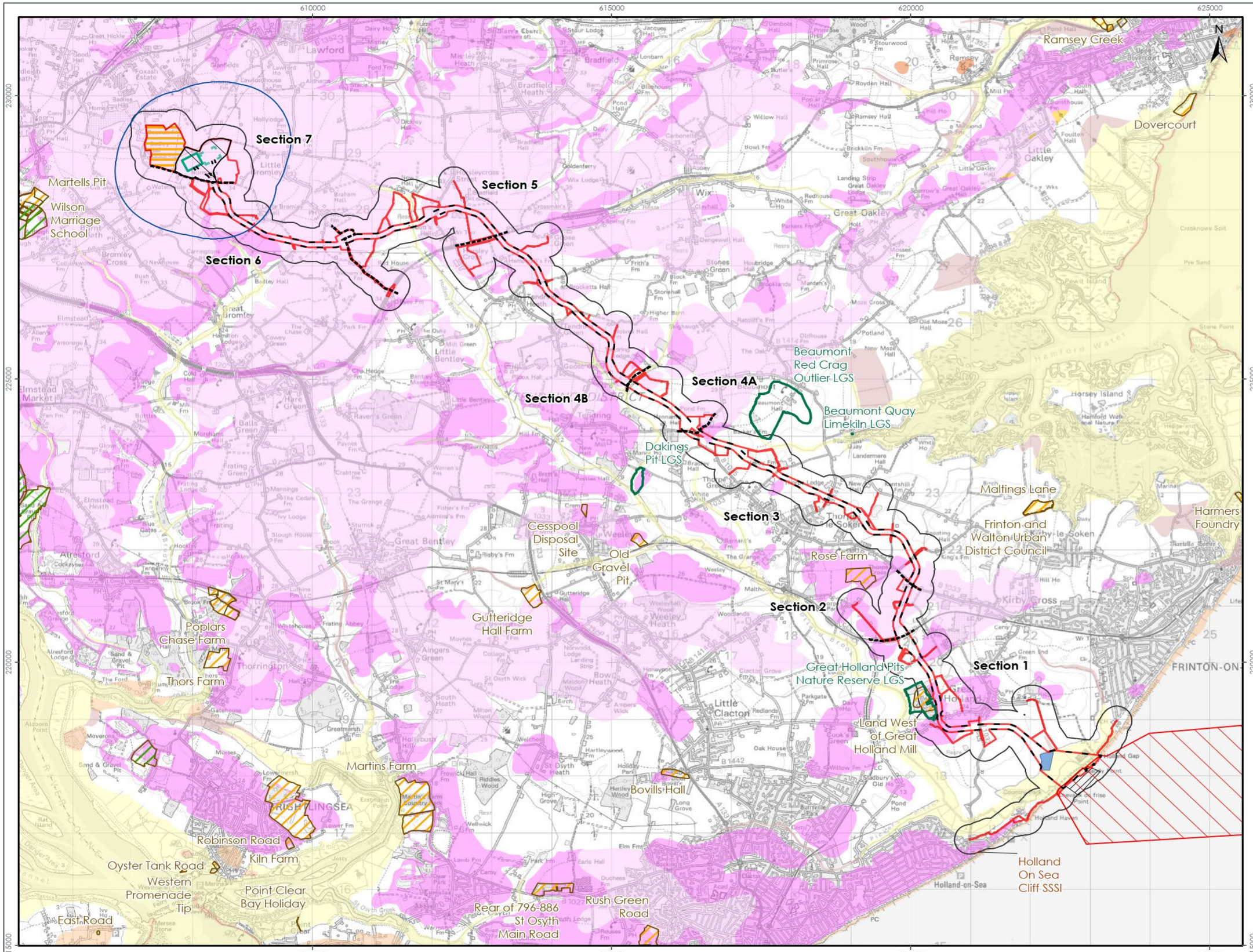
Beaumont Hall that is capped with an outlier of shelly Red Crag which is visible in rabbit burrows and on footpaths. The Reg Crag in this part of Essex contains loose sand with abundant fossil shells and fossils of marine animals. The LGS site is private land and accessible only on public footpaths.

5.7.21 There are no designated sites within Route Sections 2, 4, 5, 6 or 7.

5.7.22 Beyond the study area, there is also one site designated for geological interests that is present within 1 km of the onshore ECC route, which is described below:

- Route Section 3:
  - Daking Pit LGS - This is recorded as a 'potential' LGS. This site is located approximately 955 m to the east of VE, north west of the settlement of Weeley. This site is a former gravel pit in the Cooks Green Gravel. A rich assemblage of Palaeolithic artefacts has been recovered from this former pit. There is no current exposure of the gravel and the land is in private ownership.

5.7.23 It is considered that the distance between VE and the Daking Pit LGS provides geographical separation. Therefore, the designated site is beyond the zone of influence from VE and is not considered further within this assessment.



LEGEND

- Onshore Order Limits
- Offshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Substation Operational Boundary
- North Falls Indicative Substation Operational Boundary
- Landfall Compound Zone
- Landfall Exit Pit Sheet Piling Zone
- National Grid EACN Substation Zone
- Substation Works Area
- Substation Study Area (Substation Works Area 1 km Buffer)
- Local Geological Site (LGS)
- Holland on Sea Cliff Site of Special Scientific Interest (SSSI)
- Historic Landfill Site
- Authorised Landfill Site

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

0 0.5 1 2
Kilometres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
SUPERFICIAL GEOLOGY OVERVIEW

VER	DATE	REMARKS	Drawn	Checked
1	20/02/2024	ES Submission	MM	JRS

DRAWING NUMBER: 5.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:40,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

SUPERFICIAL DEPOSITS

5.7.24 British Geological Survey (BGS) mapping indicates that superficial deposit coverage varies across the area within the Order Limits. Where superficial deposits are present, the BGS data shows further variability in superficial deposit group type. The ECC crosses over Storm Beach Deposits and Alluvium at landfall. Further inland, the ECC crosses over Cover Sands which are underlain by the Kesgrave Catchment Subgroup.

5.7.25 BGS Borehole records indicate that where present, significant thicknesses of superficial deposits may be present along the proposed route.

5.7.26 Where superficial deposits are absent across some parts of the route, the bedrock is mapped as cropping out at surface.

5.7.27 From examination of the geological map 1:50,000 Series Solid and Drift Geology Map England and Wales, Sheet 224 & 242 - Colchester and Brightlingsea, the following deposits are evident (as shown on Figure 5.):

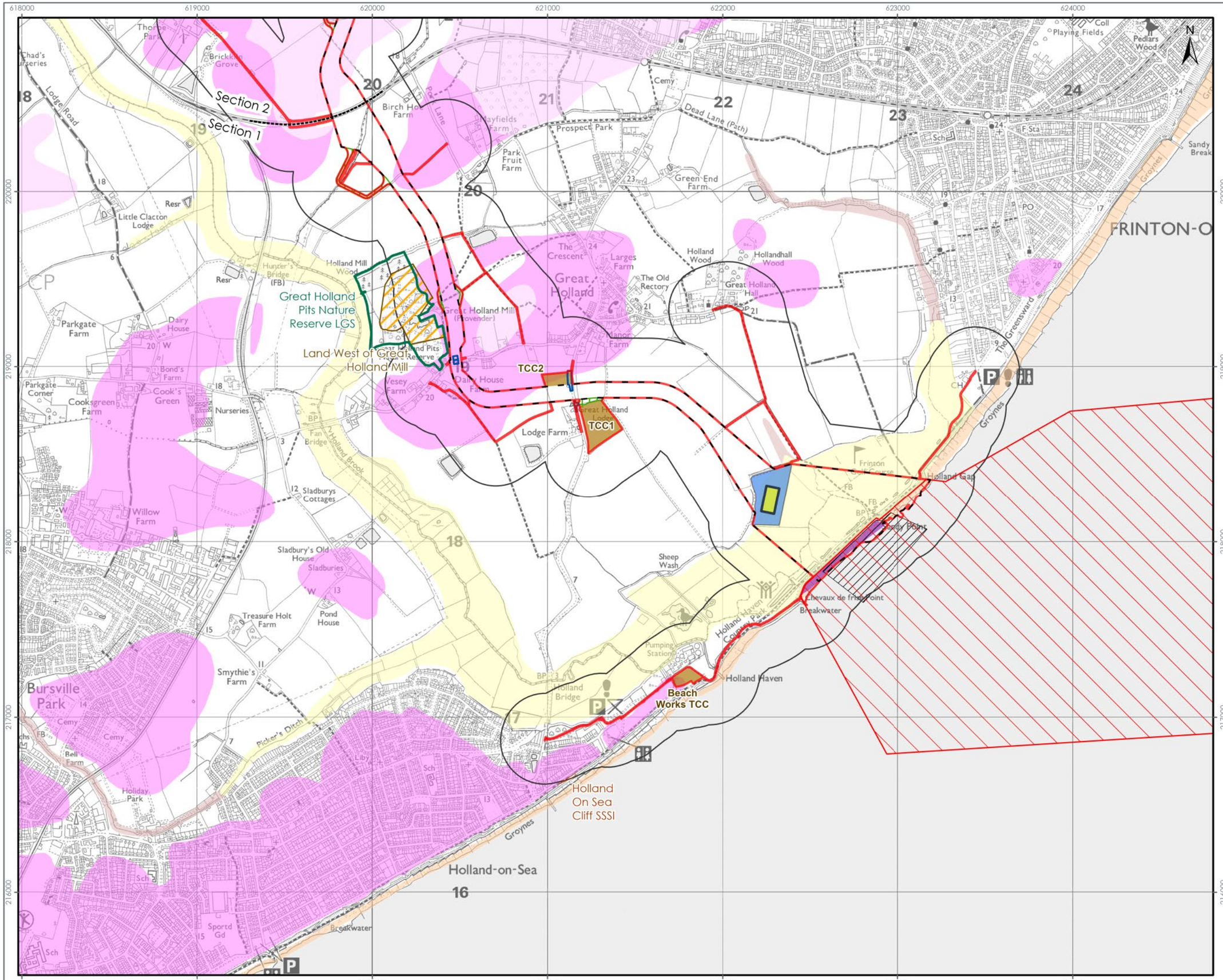
- Storm Beach Deposits - (gravels, cobbles and boulders) restricted in width to the present beach areas and extending several kilometres parallel to the coast;
- Alluvium – unconsolidated clays, silts, sand and gravels deposited by the Holland Brook and other streams;
- Cover Sand – aeolian blanket deposits of clay, silt and sands over lowland areas; and
- Kesgrave Catchment Subgroup – sands and gravels deposited by glacial meltwater.

5.7.28 The superficial geology in each of the seven route sections is detailed in Table 5.10 below and illustrated on Figure 5..

5.7.29 As discussed, there are two geological designations, the Holland on Sea Cliff SSSI and Great Holland Pits Nature Reserve, associated with the superficial geology within the study area. However, the superficial deposits within the study area and environs are widespread throughout Essex.

Table 5.10: Superficial Geology

Route Section – Onshore	Superficial Geology
Route Section 1	Storm Beach Deposits, Alluvium and Kesgrave Catchment Subgroup.
Route Section 2	Cover Sand and Kesgrave Catchment Subgroup.
Route Section 3	Cover Sand and Kesgrave Catchment Subgroup. Bedrock mapped at surface across most of the section.
Route Section 4	Alluvium, Cover Sand and Kesgrave Catchment Subgroup.
Route Section 5	
Route Section 6	Cover Sand and Kesgrave Catchment Subgroup.
Route Section 7	



LEGEND

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- Temporary Construction Compound
- Off Route Haul Road
- Access and Crossing Zone
- Local Geological Site (LGS)
- Holland on Sea Cliff Site of Special Scientific Interest (SSSI)
- Historic Landfill Site

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

0 125 250 500
Metres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY

VER	DATE	REMARKS	Drawn	Checked
1	14/02/2024	ES Submission	MM	JRS

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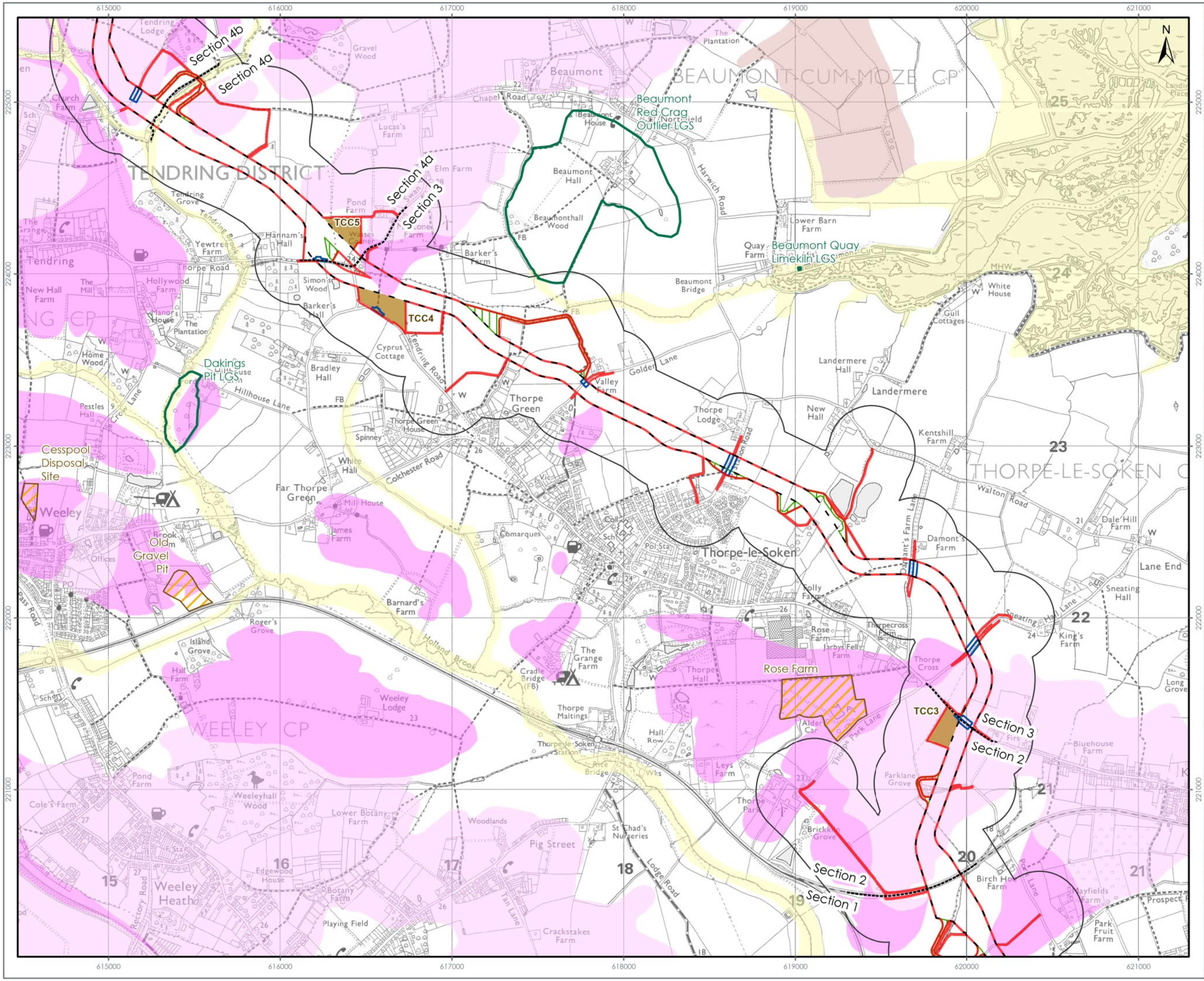
FIVE ESTUARIES OFFSHORE WIND FARM



LEGEND

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Superficial Geology

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0 125 250 500
Metres

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Sheet No: 2 of 4

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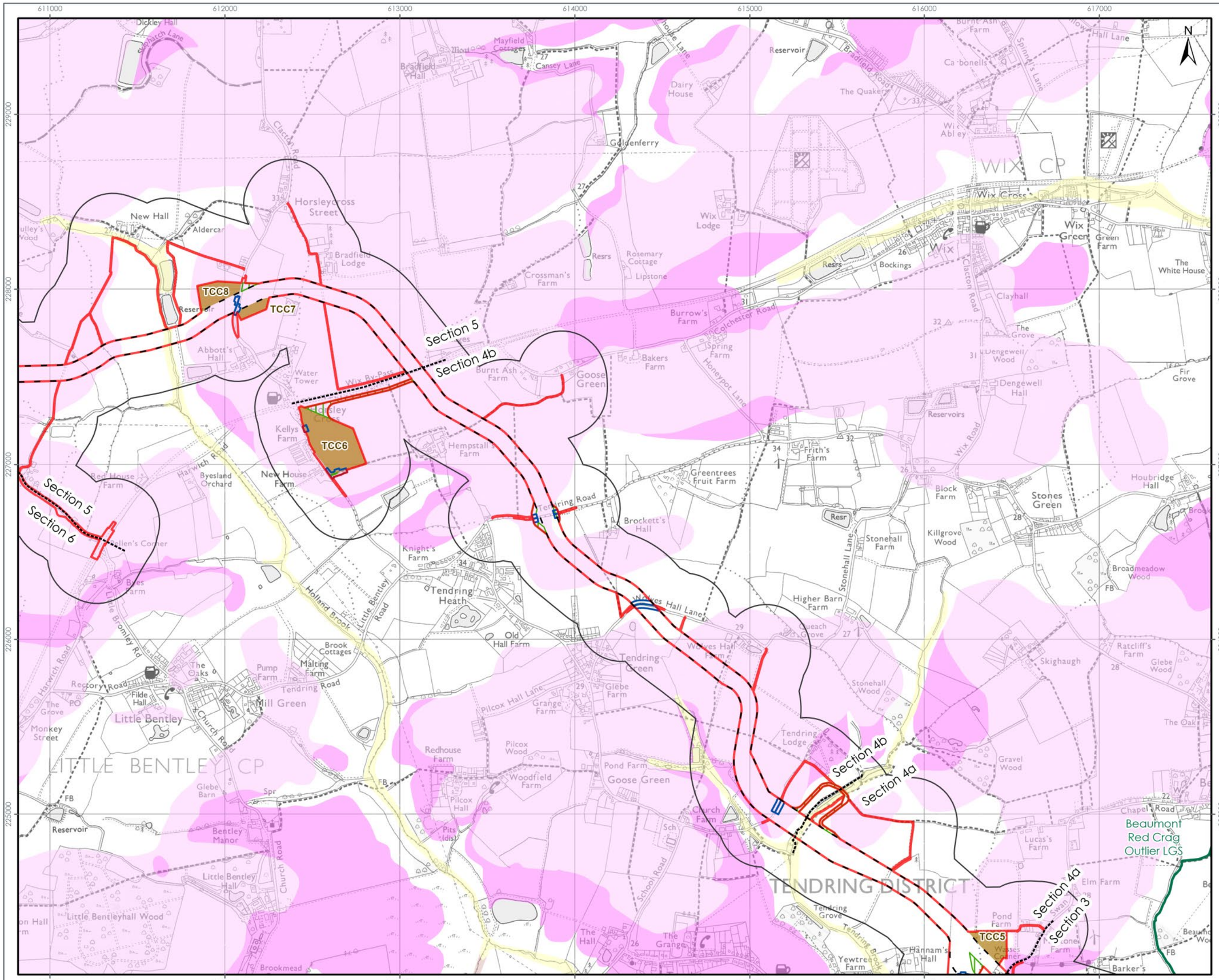
FIVE ESTUARIES OFFSHORE WIND FARM



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- Access and Crossing Zone
- Local Geological Site (LGS)

Superficial Geology

- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
- Head - Diamicton
- Head - Silt
- River Terrace Deposits 2 - Sand and Gravel
- River Terrace Deposits 3 - Sand and Gravel
- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

0 125 250 500
Metres

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SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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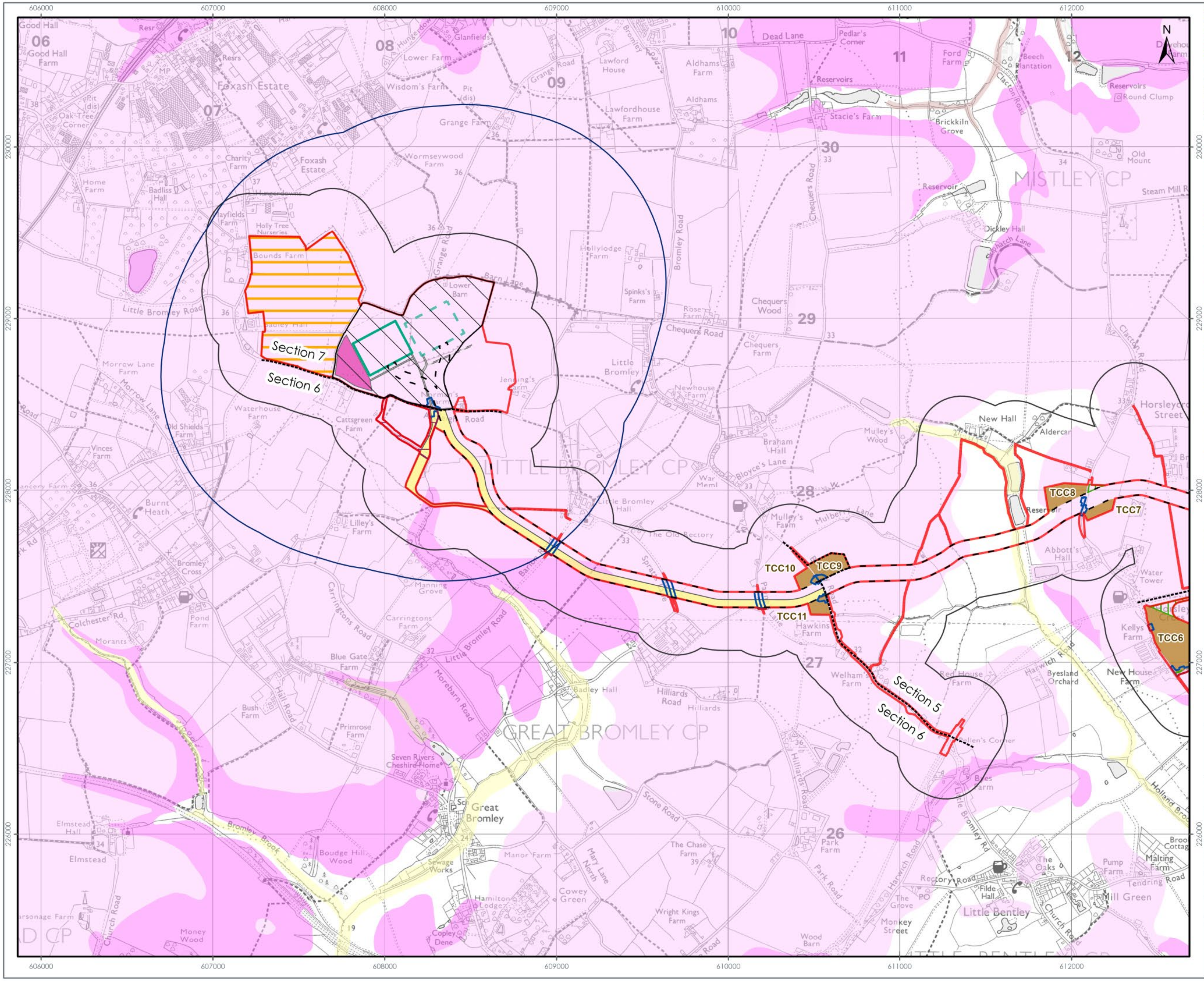
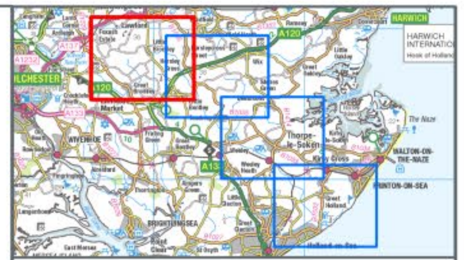
FIVE ESTUARIES
OFFSHORE WIND FARM





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- Off Route Haul Road
- Access and Crossing Zone
- Substation Works Area
- Substation Study Area (Substation Works Area 1 km Buffer)

Superficial Geology
- Alluvium - Clay and Silt
- Intertidal Deposits - Clay and Sand
- Intertidal Deposits - Clay and Silt
- Lowestoft Formation - Sand and Gravel
- Kesgrave Catchment Subgroup - Sand and Gravel
- Cover Sand - Clay Silt and Sand
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- River Terrace Deposits 2 - Sand and Gravel
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- Interglacial Deposits - Clay and Silt
- Storm Beach Deposits - Sand and Gravel
- Bedrock at or Near Surface

0 125 250 500
Metres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY

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DRAWING NUMBER: 5.5

Sheet No: 4 of 4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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FIVE ESTUARIES
OFFSHORE WIND FARM

BEDROCK GEOLOGY

5.7.30 BGS bedrock data is shown on Figure 5.8**.** and indicates the bedrock geology is consistent across the study area; the area is underlain by Thames Group (clay, silt and sands) of Palaeogene age. The unit is of Ypresian Age and formed 55.8-48.6 million years ago within the Palaeogene period. The Thames Group was deposited in environments ranging from marine shoreface ranging out to outer marine shelf. The published data indicates that the London Clay Formation is the Thames Group strata present beneath the site.

5.7.31 The Beaumont Red Crag Outlier LGS is notified for solid geology.

610000
615000
620000
625000
230000
225000
220000
215000

Section 7
Section 6
Section 5
Section 4A
Section 4B
Section 3
Section 2
Section 1

Martells Pit
Wilson Marriage School
Ramsey Creek
Dovercourt
Beaumont Red Crag Outlier LGS
Beaumont Quay Limekiln LGS
Dakings Pit LGS
Cesspool Disposal Site
Old Gravel Pit
Gutteridge Hall Farm
Poplars Chase Farm
Thors Farm
Martins Farm
Bovills Hall
Robinson Road
Kiln Farm
Western Promenade
Oyster Tank Road
Point Clear Bay Holiday Tip
East Road
Rear of 796-886 St Osyth Main Road
Rush Green Road
Maltings Lane
Frinton and Walton Urban District Council
Harmers Foundry
Rose Farm
Land West of Great Holland Mill
Great Holland Pits Nature Reserve LGS
Holland On Sea Cliff SSSI

N

LEGEND

- Onshore Order Limits
- Offshore Order Limits
- Onshore Export Cable Corridor Section Division
- Onshore Export Cable Corridor
- ECC Study Area (Onshore Order Limits 250 m Buffer)
- Substation Operational Boundary
- North Falls Indicative Substation Operational Boundary
- Landfall Compound Zone
- Landfall Exit Pit Sheet Piling Zone
- National Grid EACN Substation Zone
- Substation Works Area
- Substation Study Area (Substation Works Area 1 km Buffer)
- Local Geological Site (LGS)
- Holland on Sea Cliff Site of Special Scientific Interest (SSSI)
- Historic Landfill Site
- Authorised Landfill Site

Bedrock Geology

- Red Crag Formation – Sand (CENZOIC)
- Thames Group - Clay, Silt and Sand (PALAEOGENE)

0 0.5 1 2
Kilometres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
BEDROCK GEOLOGY OVERVIEW

VER	DATE	REMARKS	Drawn	Checked
1	20/02/2024	ES Submission	MM	JRS

DRAWING NUMBER: 5.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:60,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

AQUIFER PROPERTIES AND GROUNDWATER SOURCE PROTECTION ZONES

5.7.32 The hydrological and hydrogeological setting of the onshore study area are described in detail within Volume 6, Part 3, Chapter 6: Hydrology and Flood Risk.

5.7.33 The superficial deposits are of low sensitivity, comprising Secondary (A) and Secondary (B) aquifers and unproductive strata. The bedrock Thames Group are impermeable, deposits that have been classified as unproductive.

5.7.34 The EA has defined Source Protection Zones (SPZ) for potable groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones are determined by the time it would take for contamination or pollution to travel through the ground to reach a principal groundwater abstraction point.

5.7.35 There are no sensitive zones (i.e. SPZ1 or 2) within the study area. The Route Sections 1, 2 and 3 not located within an SPZ. The land within and surrounding Route Section 4b, Route Sections 5, 6 and 7 are located within a designated SPZ3. Please refer to Volume 6, Part 3, Chapter 6: Hydrology and Flood Risk for further details.

MINERAL SAFEGUARDING AREAS

5.7.36 'Safeguarding' is the process used in the planning system to ensure the protection of mineral resources from the risk of sterilisation from non-mineral development. Essex County Council have used a number of criteria to identify to develop MSAs that have highlight areas of geology that could constitute an economically viable resource.

5.7.37 The study area overlies several areas defined as being safeguarded for '*Sand and Gravel (Including Silica Sand)'* and is therefore subject to Policy S8 of the Essex MLP.

5.7.38 The MLP states that the definition of the safeguarded sand and gravel extent is "*All glacial sand and gravel resources, glaciofluvial sand and gravel resources and river terrace deposits as identified from BGS mapping and other supplementary sources of evidence*". These mineral safeguarded areas (MSA) therefore do not necessarily extend to the same extent as the mapped superficial deposits shown on the BGS mapping data.

5.7.39 Within the Order Limits a total area of approximately 178.96 ha is designated as a MSA. Overall, this equates to approximately 43.35% of the Order Limits designated as an MSA.

5.7.40 Table 5.11 shows the MSA coverage for VE within the Order Limits.

Table 5.11 Mineral Safeguarding Areas within the VE Order Limits

Route Section – Onshore	Approximate Area (ha)
Route Section 1	25
Route Section 2	2
Route Section 3	None
Route Section 4A	<0.2
Route Section 4B	11
Route Section 5	12
Route Section 6	27
Route Section 7	108

HISTORICAL MINING

5.7.41 The study area, according to the Coal Authority website interactive mapping, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.

5.7.42 BGS recorded mineral sites data indicates that no active quarry workings are present within the study area. There are no ceased workings within the study area for Route Sections 2, 3 4, 5, 6 or 7. There are however historical ceased gravel pits recorded within the study area for:

- Route Section 1:
  - Holland Gravel Pit;
  - Great Holland Mill Gravel Pit; and
  - Hodgnells Farm Gravel Pit;

5.7.43 The historical quarry workings are small scale gravel pits with a limited extent. On this basis, potential impacts on the proposed development arising from historical mining is scoped out of the subsequent construction or operational assessment as there is no pathway between the mining and the development.

HISTORICAL PAST USE AND CONTAMINATED LAND

5.7.44 The 1:10,000 scale historical maps for the study area have been reviewed. In general, these show that the study area has been predominantly under agricultural use, with scattered settlements, from the 1800s to the present day.

5.7.45 Contamination from agricultural land use may have resulted from a number of activities including the use of pesticides and fertilizers. Localised contamination may have also arisen from small spillages / leakages of fuel or oil from machinery and from the deposition of waste materials. The majority of the study area is located away from farm infrastructure and the risk from contamination associated with the agricultural land use is considered low.

5.7.46 The historic maps show little change to the road network and railway lines and associated cutting / embankment features in and around the study area between the late 1800s and present day. Made Ground associated with their development is therefore likely to be present. However, this will be to limited lateral and vertical extent within the study area.

5.7.47 There are no active petrol stations or garages within the ES study area. Satellite imagery of the study area, in particular urban sections from the last 25 years, indicate no presence of potentially contaminative activities such as heavy industry, petrol stations or garages.

5.7.48 The Envirocheck reports indicate no historical pollution incidents relevant to this ground conditions and land use chapter.

5.7.49 The EA and Essex County Council websites, together with Envirocheck reports, were consulted for Waste Management Sites (authorised and historical) and waste related activities. The search identified no waste sites within the study area.

5.7.50 The EA website was consulted for the presence of landfills (authorised and historical). There are no active landfill sites within the study area. However, the search identified two historical landfills within the study area, these are discussed below and shown on Figure 5.9 and Figure 5.10.

- Route Section 1:
  - Adjacent to the west of the Order Limits is the Great Holland Mill gravel pit which is also recorded as a historical landfill. There is little additional information on the historical landfill, except that it was dated 1952. This site is now Great Holland Pits Nature Reserve owned by Essex Wildlife Trust.
- Route Section 2:
  - The historical landfill within the Thorpe-le-Soken gravel pit is on land at Rose Farm. The southern part of the historical landfill lies within the 250 m buffer zone of the Order Limits. This was a licensed industrial landfill between 1978 to 1991 for inert material.

5.7.51 The historical landfills and are considered to present a very low risk given the nature of the fill material (inert).

UNEXPLODED ORDNANCE

5.7.52 The Envirocheck data indicates the red/ amber /green (RAG) status for Unexploded Ordnance (UXO) within the study area.

5.7.53 The description of the RAG status categories is as follows:

- Red: An obvious UXO Threat is present and a Detailed UXO Threat & Risk Assessment should be commissioned;
- Amber: Further research is required to establish the threat level and a Preliminary UXO Threat Assessment should be commissioned; and
- Green: No further action is required

5.7.54 The RAG status of the study area as a result of World War Two (WWII) bombing:

- Route Section 1:
  - The coastal area to approximately 150 m inland including Holland Haven Country park are recorded as red, while the remainder of Route Section 1 is generally recorded as green status.
- Route Section 2, 3, and 4:
  - These sections are indicated as green.
- Route Section 5:
  - The eastern part of this section has a green status. The western part of this section has an amber status.
- Section 6:
  - This section has red and amber status.
  - In addition the online Zetica UXO mapping also has two records of 'Strategic Target - Luftwaffe Target' noted to the southeast of Little Bromley in the vicinity of Bentley Road and within the study area. There are a number of other recorded targets in between Little Bentley and Great Bromley, however these are outside of the study area.
- Section 7:
  - This section includes areas that have red, amber and green statuses.

5.7.55 A Preliminary UXO Threat Assessment report was undertaken for the PEIR stage substation search area which overlapped with Route Section 5. This report indicates that RAF Great Bromley was located 725 m to the south west as well as several other defence features or bombing targets within 1 km of the current substation zone selected for ES.

5.7.56 A Preliminary UXO Threat Assessment report was also undertaken for the PEIR stage substation search areas within the current Route Sections 6 and 7 as part of the geotechnical and geoenvironmental desk study reporting. This report indicates that there are written records that Little Bromley and the surrounding fields were subject to bombing in WWII.

5.7.57 It is considered in both reports that the land within the study area has remained undeveloped pre and post WWII and the proposed development is likely to extend into previously undisturbed land, therefore there is potential for an unplanned encounter with UXO to occur.

RADON GAS

5.7.58 The UK Radon Map indicates that the majority of the study area does not lie within a Radon Affected Area, as less than 1% of properties are at or above the above the National Radiological Protection Board (NRPB) action level.

5.7.59 Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576[1]. Current advice confirms that protection measures would not be required for any permanently enclosed structure. This is therefore not considered further in this assessment of the Proposed Development.

5.8 FUTURE BASELINE

5.8.1 This section discusses the likely future evolution of the existing baseline environment according to known trends in the base condition without implementation of VE.

5.8.2 In the absence of VE, it is likely that current management and land use (predominantly agricultural) will remain unchanged and therefore baseline conditions are likely to remain similar in the future.

5.8.3 With regards to the geological and soil environment, the main changes from the current baseline scenario would relate to climate change. It is predicted that more frequent extreme weather events are likely to occur and it is widely accepted that the UK climate is likely to become more variable with projected increases in peak rainfall allowances, wind speed, temperatures, and sea level rise which could lead to milder wetter winters and hotter drier summers.

5.8.4 The expected result of wetter winters and drier summers, has the potential to mobilise pre-existing sources of contamination either through increased rates of infiltration due to heavier rainfalls or dust generation through drier summers. These changes have the potential to increase the exposure risks of receptors to pre-existing sources. However, the natural degradation of contaminants over time may result in a general improvement in ground conditions.

5.8.5 No major changes to the geology underlying the study area in relation to climate change and natural trends are anticipated to occur over the lifetime of VE.

5.8.6 Climate change and natural trends are not anticipated to impact MSA's present within the study area.

5.8.7 The erosion of soil is a natural process that is expected to occur over time and is primarily controlled by the weather conditions and farming practices. Climate change and the changing seasonal weather conditions could lead to increased rates of soil erosion, waterlogging, or drying, affecting soil quality and health.

[1] BSI Standards Publication 2013, BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)

5.8.8 However, the majority of the land within the study area and surrounding areas is agricultural land. This type of land is highly managed by farming processes, such as fertilisation, irrigation, ploughing and tilling. Therefore, it is considered that there are likely to be no significant effects due to very managed landscape moderating climate impacts such as soil quality and resource.

5.8.9 The adoption of sustainable farming practices and government led land stewardship schemes may also have associated benefits on soils and land.

5.9 KEY PARAMETERS FOR ASSESSMENT

5.9.1 For the basis of the assessment presented within this chapter Scenario 1 is assumed as the MDS for VE, the three scenarios for delivery are explained within Volume 6, Part 3, Chapter 1: Onshore Project Description. The MDS criteria identified in Table 5.12 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These criteria have been selected from the details provided in the onshore project description (Volume 6, Part 3, Chapter 1: Onshore Project Description).

5.9.2 Effects of greater significance are not predicted to arise should any other development scenario be taken forward, based on details within the project design envelope. The MDS takes into consideration designed-in mitigation as described in Table 5.12.

Table 5.12: Maximum design scenario for the project alone

Potential effect	Maximum adverse scenario assessed	Justification
Construction		
Impact 1: Short term risks to construction workers during development of landfall, OnSS and onshore cable routes	The Onshore ECC is up to 22 km in length with installed cable lengths of up to 24.5 km from landfall to the National Grid EACN substation have been considered in the assessment to allow for micro-routing.	The MDS includes the maximum development footprint and therefore the largest possible area of disturbance to ground that may have potential contamination.
Impact 2: risks to offsite human receptors, such as occupants of residential properties bordering landfall, OnSS and onshore cable routes	For the assessment presented in this chapter, the MDS for the onshore ECC is approximately 60 m wide where open trenching will be used (38 m for scenario 2 and 3). In general, a 90 m wide ECC has been defined which for the open trench sections gives some flexibility for micro-routing for archaeology or other ecological features found during pre-construction surveys.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance impact on offsite human receptors
Impact 3: construction phase		The MDS includes the maximum development

Potential effect	Maximum adverse scenario assessed	Justification
impacts upon soil/land quality	Where trenchless techniques such as HDD are used along the ECC, the width will need to increase to approximately 90 m (45 m for scenario 2 and 3), but slightly wider widths are required at the major crossings such as the railway and Tendring Brook. HDD crossings required for landfall; larger surface watercourses; key roads; ecological features and some utility crossings. There could be up to 12 HDD bores per crossing. The maximum HDD depth will be up to 20 m. Cables will be installed in ducts, with installation undertaken in sections. The cables will be installed as one trench per circuit (maximum of 4 trenches, 2 circuits with ducting for an additional 2 circuits), with each trench up to 3.5 m wide and up to 2 m deep. Up to 12 TCC locations along the onshore ECC. There may be up to 2 TJBs, the indicative area per TJB is 100m^2. Construction period up to 24 months. The Section 7 includes the construction footprint of the substation infrastructure and development platform (including landscaping). The OnSS operational footprint assumes an Air Insulated Switchgear (AIS) substation which has the greater indicative footprint of 58,800 m². OnSS TCC maximum size 37,500 m^2.	footprint (temporary and permanent) and therefore the largest possible area of disturbance to soil and/or land quality.
Impact 4: Sterilisation of mineral deposits	The Section 7 includes the construction footprint of the substation infrastructure and development platform (including landscaping). The OnSS operational footprint assumes an Air Insulated Switchgear (AIS) substation which has	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of

Potential effect	Maximum adverse scenario assessed	Justification
	the greater indicative footprint of 58,800 m².	disturbance/ sterilisation of safeguarded minerals.
Impact 5: Risk from unexploded ordnance to construction workers and nearby residents	Potential identification of UXO within the Route Section 5, 6 and 7.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to UXO.
Impact 6: Risk to environmental designations	As above for Impact 2.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to environmental designations.
Operation		
Impact 7: Loss of agricultural land during operation of underground cables	Permanent onshore cables will be buried (apart from link boxes).	The MDS includes the permanent link boxes and therefore the largest possible area of loss to agricultural land during operation.
Impact 8: Loss of agricultural land during operation of OnSS	Permanent area of the OnSS footprint assumes an AIS substation which has the greater footprint of 58,800 m², plus an operational access road.	The MDS includes the maximum development footprint (permanent) and therefore the largest possible area of loss to agricultural land.
Impact 9: Ingress and accumulation of hazardous ground gases	Interaction with unexpected, contaminated land through cable positioning or HDD (or alternative trenchless crossing technique) crossings.	The MDS includes the maximum development footprint (permanent) and therefore the largest possible area of disturbance to agricultural land.
Impact 10: Structures and services laid in	Routine maintenance of the OnSS. Permanent onshore cables will be buried (apart from joint bay access	The onshore ECC provides potential preferential lateral

Potential effect	Maximum adverse scenario assessed	Justification
direct contact with contaminated soils and groundwater	points). Potential contaminants affecting the integrity of subsurface materials such as buried concrete and plastic ducting.	pathways for contamination which could indirectly affect soils and land quality.
Decommissioning		
Impact 11: Short term risks to construction workers during decommissioning of Onshore ECC and associated Infrastructure.	Removal of the OnSS including any areas of hardstanding. Buried cables would be de-energized with the ends sealed and left in place to avoid ground disturbance. Any final decommissioning methodology will adhere to industry best practice, rules and regulations at the time of decommissioning.	Removal of infrastructure represents greatest disturbance and disruption to receptors.
Impact 12: Risks to offsite human receptors, such as occupants of residential properties bordering the associated infrastructure with the project	Removal of the OnSS including areas of hardstanding and the removal of TJB at landfall.	Removal of all infrastructure represents greatest disturbance and disruption to receptors.

5.10 MITIGATION

5.10.1 The mitigation contained in Table 5.13 are mitigation measures or commitments that have been identified and adopted as part of the evolution of the project design of relevance to the topic, these include project design measures, compliance with elements of good practice and use of standard protocols. Where the assessment determined significant effects accounting for mitigation, further measures may be required, which are presented as additional mitigation. Table 5.17 presents additional mitigation measures. These have typically been put forward where:

- An effect is significant in EIA terms, even with mitigation, but additional mitigation measures are available to reduce the level of effect; or
- Mitigation has been proposed but has not yet been agreed with regulators, stakeholders, etc. or it is unproven.

Table 5.13: Mitigation measures relating to Ground Conditions and Land Use

Parameter	Mitigation measures
General	
Site Selection	The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Land take will be reduced as far as practicable. Reinstatement of land to its original use will be undertaken as far as practical following the completion of the construction works.
Project Design	Careful routing of the onshore ECC to avoid features such as, but not limited to geological designations, areas of potential contamination and design of key crossing points, including use of trenchless crossings to avoid key areas of sensitivity.
Environmental Permit	Consent may be required for the works (e.g. drilling, crossing, culverting, passing under or through) affecting the sea defence structures or other infrastructure, in accordance with Environmental Permitting (England and Wales) Regulations 2016. The conditions of the consents would be specified to ensure that construction does not result in significant alteration to the ground conditions and land use.
Construction	
Code of Construction Practice (CoCP)	A CoCP is provided as part of the DCO application (Volume 9, Report 21). The CoCP will include measures to control the potential impacts to ground conditions and land use.
Pollution Prevention	The CoCP incorporates measures to prevent pollution. Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils, drilling fluids and chemicals) will be bunded and carefully sited to minimise the risk of hazardous substances entering drainage systems or local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. will have a 110% capacity. To minimise ground contamination and contaminated runoff to surface water or groundwater. A Pollution Prevention and Emergency Incident Response Plan (PPEIRP) will be prepared and held on all construction sites to follow in the event of an environmental emergency.
Soil Management	The CoCP incorporates the outline principles of soil management and mitigation measures to ensure protection of soils. A Soil Management Plan (SMP) will be developed and will be produced in advance of construction. The SMP will provide further details of mitigation

Parameter	Mitigation measures
	measures and best practice handling techniques during stripping, handling and reinstatement to safeguard soil resources by ensuring their protection, conservation and appropriate reinstatement following the construction of the onshore works.
Agricultural Operations	Where required, crossing points will be used so that livestock and vehicles can cross the working width. General disruption impacts will be mitigated by keeping landowners updated with project progress. The Project will seek to liaise with landowners to agree terms with affected parties including any loss of ongoing payments or penalties relating to agri-environmental stewardship schemes.
Best Practice	All construction work will be undertaken in accordance with the CoCP, (Volume 9, Document 9.21) and good practice guidance including, but not limited to: > Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA 2001); > CIRIA – SuDS Manual (C753) (CIRIA, 2015b): > No discharge to main river watercourses will occur without permission from EA (SuDS Manual); > Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); and > Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual). > DEFRA Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009); and > Good Practice Guide for Handling Soils (Institute of Quarrying, 2021).
Contaminative Material	The desk-based assessment has not identified any significant potential source of contamination resulting from historic or current land use. In order to mitigate the potential impacts associated with excavation of unexpected potentially contaminative material: > The CoCP (Volume 9, Report 21: CoCP) identifies the procedures to be followed should an area of contamination be encountered. > Where necessary, works on site at that location will cease until any identified contamination has been assessed by a suitably qualified Environmental Consultant in accordance with The Contaminated Land (England) Regulations 2006; > Areas where these materials are found will be photographed and annotated on a site drawing;

Parameter	Mitigation measures
	> Construction workers will follow good site practice and hygiene rules; > Personal Protective Equipment (PPE), including nitrile gloves, protective overalls, safety goggles and face mask will be worn where appropriate, especially by those workers who are likely to be coming into contact with contaminated soil or water, such as those carrying out hand digging activities; > All works will be carried out in accordance with BS5930: 2015 +A1:2020 (The Code of Practice for Site Investigations) and BS10175: 2011+A2:2017 (Investigation of Potentially Contaminated Sites); > Use of the waste hierarchy to determine the most sustainable option for all surplus soils that are generated on site; > Re-instatement of topsoil; > Inclusion of excavated subsoil that is suitable for use within the design as landscaping material at the OnSS to minimise offsite movements; > Segregation of waste subsoil for offsite management from subsoil suitable for reinstatement on site; > Identification of suitable local schemes that are suitable for offsite reuse or recycling of surplus subsoil; and > Any wastes found to be hazardous, will be stockpiled or stored separately from any non- hazardous stockpiles. Appropriate action will be taken in accordance with The Waste Enforcement (England and Wales) Regulations 2018, the Environmental Protection Act (1990) and the Environment Act (1995).
Operation	
General	The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would follow good practice in line with the prevailing future guidance and legislation with regard to measures such as the storage and management of potentially polluting substances, emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff and routine inspection to prevent or contain leaks of any pollutants. Where required good practice will be undertaken to excavate and replace without impacting soil quality significantly during any cable replacement.

Parameter	Mitigation measures
Agricultural Operations	Any permanent restriction of non-standard agricultural activities will be discussed with affected landowners to minimise impacts.
Decommissioning	
General	Decommissioning practices would incorporate measures like the construction phase, to prevent pollution. These measures should include emergency spill response procedures, control of surface water and clean up and remediation of any contaminated soils. Exposed cables ducts will be sealed with an appropriate water proofing material to mitigate flood risk or creation of preferential flow pathways.
General	No decision has yet been made regarding the final approach to decommissioning for the Project as it is recognised that industry best practice, rules and legislation change over time. The detail and scope of decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator with a decommissioning plan provided.

5.11 ENVIRONMENTAL ASSESSMENT

5.11.1 The impacts of the onshore construction of VE have been assessed on Ground Conditions and Land Use in the onshore study area, as shown in Figure 5.1. The following sections describe the potential impacts during the construction, operational and decommissioning phases of the Project.

5.11.2 The ECC and OnSS will be designed to avoid where possible, known areas of potential concern to minimise excavation of potentially contaminated material.

5.11.3 A description of the potential effect on Ground Conditions and Land Use receptors caused by each identified impact is given below.

5.12 ENVIRONMENTAL ASSESSMENT: CONSTRUCTION PHASE

IMPACT 1: SHORT TERM RISKS TO CONSTRUCTION WORKERS DURING DEVELOPMENT OF LANDFALL, ONSS AND ONSHORE CABLE ROUTES

5.12.1 The impacts to human health from the construction stages of the VE were considered in the context of existing potential sources of contamination and the significance of pollutant linkages between source and receptor.

5.12.2 The excavation of cable trenches, earthworks and the movement and stockpiling of soils have the potential to mobilise existing ground contamination (where present). This could result in impacts to human health through dermal contact, inhalation and ingestion of contaminants.

5.12.3 As set out in Section 5.7 no significant sources of contamination were identified within the study area. The potential for contaminants contained within excavated ground and therefore within stockpiled materials during construction is unlikely. Aerial photography and preliminary site walkover have not indicated any visible impact suggesting the likely magnitude of contamination, if present, is low.

5.12.4 Contamination from agricultural land use may have resulted from farming practices such as use of pesticides and fertilizers, localised hydrocarbon contamination may be present as a result of small spillages and leakages of fuel or oil and deposition of waste materials. However, as discussed in Section 5.7 the risk of contamination is considered low. Should such contamination (if present) be disturbed during construction works, there is a possibility that sources of contamination could be mobilised causing potential harm on construction workers and/or human receptors.

5.12.5 The mitigation for potentially contaminative materials and the CoCP (Table 5.13) set out procedures to be followed should sources of contamination (e.g. asbestos containing materials) are discovered during construction phase works. As a part of the construction and operation of the site workers will adhere to site-specific risk assessment and method statement.

5.12.6 If unexpected contamination is encountered or suspected, the works would cease in that area and assessment by a suitably qualified land contamination specialist would be made to determine appropriate actions. Samples of the contaminated material and surrounding soil (or where appropriate groundwater) would be collected and analysed. If the contaminant of concern was hydrocarbon soil headspace readings (i.e., soil vapour) would be taken in situ in addition to samples for laboratory analysis. The risks associated with contamination would then be assessed. If required, a remediation strategy would be designed and agreed with EA and Relevant Planning Authority before implementation.

5.12.7 The impact of short term risks to construction workers is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for VE construction workers, as set out in Table 5.4. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 2: RISKS TO OFFSITE HUMAN RECEPTORS, SUCH AS OCCUPANTS OF RESIDENTIAL PROPERTIES BORDERING LANDFALL, ONSS AND ONSHORE ECC.

5.12.8 The excavation of cable trenches, earthworks and the movement and stockpiling of soils have the potential to mobilise existing ground contamination (if present). This could result in impacts to human health through, inhalation and ingestion of contaminants.

5.12.9 As set out in Section 5.7 no significant sources of contamination were identified within the study area. The potential for contaminants contained within excavated ground and therefore within stockpiled materials during construction is unlikely. Aerial photography and preliminary site walkover have not indicated any visible impact suggesting the likely magnitude of contamination, if present is low.

5.12.10 The potential impacts and mitigation are as set out in Paragraphs 5.12.1 to 5.12.6.

5.12.11 The impact of the construction of the OnSS and Onshore ECC is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **medium** for offsite human receptors. The significance of the residual effect is therefore concluded to be **negligible adverse**, which is not significant in EIA terms.

IMPACT 3: CONSTRUCTION PHASE IMPACTS UPON SOIL/LAND QUALITY

ONSHORE CABLE ROUTE INFRASTRUCTURE

5.12.12 The Agricultural Classification of the soil within the Order Limits for the Route Sections is predominantly by Grade 3 (67%) and is therefore considered to be of moderate to good quality. Overall, 89% of the onshore Order Limits are mapped as ALC Grade 1, 2 or 3. The Order Limits have been refined since the preliminary assessment within the PEIR and temporary and permanent land take area reduced as far as practicable.

5.12.13 The onshore cable route sections do interact with areas of Grade 1 and Grade 2 land where available space is limited and there are a number of other constraints including watercourses, residential properties, ancient woodland and roads.

5.12.14 It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b where Grade 3 is mapped as present. Where Grade 3 is present, a worst case scenario will be assumed that it is entirely or comprises a majority of ALC Grade 3a. As outlined in Table 5.4, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity. Therefore, based on the criteria in Table 5.4, sensitivity of the land within the Order Limits is assessed as **high** sensitivity.

5.12.15 The construction corridor of the onshore export cables will be contained within the Route Sections and will cover a corridor of land, up to 22 km length and approximately 60 m wide within the Open Trench section of the ECC, there will however be some exceptions where the ducts are installed using trenchless techniques which may require widths up to 90 m for standard trenchless crossings and up to 120 m for more complex/deeper trenchless crossings, such as at the railway and Tendring brook.

5.12.16 Site clearance and preparation works for installation of the onshore ECC and the preparation of haul roads have the potential to impact the soil quality and resource. Potential impacts identified include:

- Over compaction of agricultural and amenity soils caused by the use of heavy machinery onsite;
- Over compaction of agricultural and amenity soils caused by storage of construction equipment at the site;
- Structural deterioration of soil materials during excavation, soil handling, storage and replacement;
- Erosion and loss of soils during soil handling, storage and replacement; and
- Homogenisation and loss of characteristic horizons during excavation, storage and replacement.

5.12.17 These direct impacts on soil quality can also have potential indirect impacts on soil fertility and drainage.

5.12.18 The construction methodology (as set out in Volume 6, Part 3: Chapter 1 Onshore Project Description) will ensure that the direct impacts on soil resulting from excavation will be limited spatially to the onshore ECC and temporally to a one off process of excavation, storage and replacement.

5.12.19 The onshore ECC does route through areas of predominantly agricultural land. Whilst there will be a temporary impact upon agricultural land during the construction phase, the onshore ECC will be constructed in sections therefore, in most cases the land will not be taken out of existing use for the full construction duration.

5.12.20 The reinstatement of land above the buried cable will allow agricultural cultivation to re-commence once the ducting has been installed. Field drainage will be reinstated and the indicative minimum burial depth (from ground surface to the top of the cable ducting), will allow cultivation of land. Measures to reduce the impact of construction works on agricultural soils are included as part of the CoCP.

5.12.21 The potential for long-term impacts resulting from the construction works is assessed as negligible, although careful soil handling will be required in order to preserve soil, structure, texture and avoid compaction within sensitive locations such as productive arable fields or high quality pasture.

5.12.22 Mitigation to ensure soils are protected during the development process will be undertaken and will be managed through planning and operation of best practice site management techniques (Table 5.13). The principles that will be adopted to manage potential impacts upon soil during construction within the onshore ECC will be set out as part of the SMP produced in advance of construction. The SMP will provide details of mitigation measures and best practice handling techniques to safeguard soil resources by ensuring their protection, conservation and appropriate reinstatement during the construction of the onshore works.

5.12.23 Given the features affected, i.e. agricultural soils, roadsides and amenity land; plus the limited and short term nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils. The impact of the onshore ECC construction on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

ONSS

5.12.24 The agricultural classification of the soil within the substation zone is entirely Grade 1 (39.82 ha) and is therefore considered to be of excellent or good quality. Therefore, based on the criteria in Table 5.4, sensitivity of the substation zone which will be subject to construction works is assessed as **high**.

5.12.25 The clearance and preparation of the OnSS and associated construction zone, will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar potential impacts are anticipated in terms of the physical parameters of soil quality within the OnSS and associated construction zone and access zones (compaction, structural deterioration during excavation and storage, homogenization and loss of characteristic horizons as set out in Paragraph 5.12.16).

5.12.26 Soils stripped during construction that are suitable for reuse as part of wider mitigation associated with the OnSS (e.g. planting areas) will be reused in a broadly similar location to their origin, and stored for the shortest amount of time permissible; Any surplus soils from the OnSS works to be re-used for landscaping, offered to landowners or disposed of in an appropriate manner off-site, this commitment will be secured as part of the CoCP. Any materials reused on site or disposed of offsite will follow the appropriate guidance on the waste hierarchy.

5.12.27 Given the features affected, i.e. agricultural soils, roadsides and amenity land; plus the limited and short term nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils. The impact of the construction phase of the onshore OnSS on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

5.12.28 There is potential for mobilisation of bulk materials such as concrete or entrainment of stockpiled material from excavations during OnSS construction to result in watercourses or drainage ditches becoming restricted or blocked. This could impact flow regimes and could result in an increase in localised land contamination. However, through controls set out in within the best practice mitigation measures (Table 5.13) the potential impact would be mitigated, and the magnitude of the impact is assessed as **low** resulting in an effect of **minor adverse** and therefore not significant.

TJB CONSTRUCTION

5.12.29 Route Section 1 shown on Figure 5.3 encompasses the landfall between Frinton-on-sea and Holland-on-sea.

5.12.30 The TJBs will be used to join the onshore and offshore cables at Landfall. The land within the landfall area has been identified on the available mapping as ALC Grade 4. Grade 4 is mapped the length of the coast between Frinton-on-Sea and Holland-on Sea and approximately 700 m inland. To the north of the indicative HDD landfall location the ALC grade is mapped as Grade 3.

5.12.31 The soil within the landfall area is described as loamy and clayey soils of coastal flats. These soils have formed on an area of the clay bedrock which is mapped as absent of superficial deposits. The sensitivity of the soils has been assessed as **low.**

5.12.32 The clearance and preparation of the TJB site will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar impacts to those described in Paragraph 5.12.16, are anticipated for the TJB construction. Once the joint is completed the TJBs are covered and the land above reinstated. The construction of the TJBs is expected to involve a small area of permanent land take area where link boxes and access manholes will be located, the MDS is set out in Table 5.12. This permanent land take will lead to a localised and minor permanent loss of soils.

5.12.33 Based on the proposed construction methodology (as set out in Volume 3, Chapter 1) and the mitigation (Table 5.13), the impacts are likely to be associated with localised excavation and the permanent loss of soils is expected to be significantly less than 5 ha, therefore the magnitude of the impact is assessed as **low**.

5.12.34 The impact of the TJBs construction phase on soil/land quality is considered to be of **low** adverse magnitude, and the sensitivity of receptors affected is considered to be **low** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

TRENCHLESS CROSSING WORKS

5.12.35 The agricultural classification of the soil within the Order Limits for the route sections is dominated by Grade 3 (67%) and is therefore considered to be of moderate to good quality. Overall, c.89% of the onshore Order Limits route sections are mapped as ALC Grade 1, 2 or 3. Therefore, based on the criteria in Table 5.4, sensitivity of the Route Sections 1 to 7 are assessed as **high**.

5.12.36 The subsurface geology is mapped as the London Clay formation. The London Clay formation is a clay with an impermeable nature and has the potential to contain selenite crystals and disseminated pyrite. Pyrite is a major sulphur bearing mineral and there is the potential it could present aggressive ground conditions. The sensitivity of the subsurface geology is assessed as **medium**.

5.12.37 As set out for the onshore ECC works above, implementation of the mitigation measures discussed in Table 5.13 and the measures proposed within the CoCP would ensure that the potential for incidents detrimental to soil and land quality occurring is minimised and would reduce the magnitude of the impact of any such incidents.

5.12.38 The potential direct impact would arise from the drilling activity and could lead to bentonite and or drilling fluids/ hydraulic fluids being released into the soils and or ground water. In consideration of pollution prevention measures, these techniques would be managed effectively with a negligible magnitude of impact.

5.12.39 The impact on ground conditions and land quality from the trenchless techniques are predicted to be of local spatial extend and of an intermittent nature and of short duration.

5.12.40 The impact of the trenchless techniques during construction phase on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors and medium for subsurface geology. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 4: STERILISATION OF MINERAL DEPOSITS

5.12.41 A principle of the site selection process was to avoid MSAs where possible. The Project avoids areas safeguarded for Chalk, Brickearth and Clay. As described in the baseline characterisation (Section 5.7) mapped safeguarded mineral deposits occur within the Order Limits for Route Sections 1, 2, 4, 5, 6 and 7. The safeguarded minerals are the sands and gravels recorded on BGS maps.

5.12.42 The OnSS within Route Section 7 is located in proximity to the existing Lawford Substation and the proposed National Grid EACN substation zone. The existing substation, the land surrounding and over 3 km is designated as a sand and gravel MSA. Consequently, given the large area of mapped potential resources, while taking into account the unknown nature and quantity of any potential resource, and the limited amount that would be potentially sterilised within the substation zone, other site selection factors were given more weight.

5.12.43 Sands and gravels are mapped as abundant in extent across Tendring District and Essex. Essex County Council have designated MSAs for sand and gravel within the Essex County Council MLP.

5.12.44 Policy S8 of the Essex County Council MLP requires that a non-mineral proposal located within an MSA which exceeds defined thresholds (more than 5 ha for sand and gravel) must be supported by a Minerals Resource Assessment to establish the existence, or otherwise, of a mineral resource capable of having economic importance.

5.12.45 These deposits are safeguarded under national and local planning policies, with the aim that mineral deposits are not needlessly sterilised by incompatible development. The Essex County Council Landbank requires a continual supply of mineral, which is provided through site allocations and planning permissions. No land within the DCO Limit is currently allocated or permitted for mineral extraction.

5.12.46 A Mineral Resource Assessment (Annex 6.5.2) has been produced to present the information currently available on the likely presence, quality and extent of the potential mineral resource. Together with the practicality and viability of extraction of the potential mineral resource and environmental receptors to enable a quantification of the amount of mineral that may be sterilised.

5.12.47 The MRA indicates that there may be the potential presence of mineral deposits within Route Section 1, 6 and 7. The presence of minerals within Section 4 and 5 could not be confirmed due to lack of published or available geological data. There is considered to be no potential mineral within Section 2, 3.

5.12.48 There is however little published information about the presence and nature of these potential mineral deposits. Therefore, their quality and potential use as an aggregate or industrial mineral resource is currently unconfirmed.

5.12.49 The permanent easement of the ECC is 20 m wide for VE, therefore the areas impacted along the onshore ECC are spread along a narrow linear route rather than a single large area.

5.12.50 The construction and operation of the OnSS has the potential to sterilise mineral resource across a single area, which would prevent extraction of resources within the permanent footprint of VE during construction and for the duration of operation (up to 40 years). The MRA (Annex 6.5.2) has indicated that potential mineral within land surrounding the OnSS may be sterilised during operation. This is due to the restricted size and area of land parcels adjacent to the OnSS which would not be practical or viable for extraction once the OnSS is operational.

5.12.51 Overall, the project is long lived but temporary in nature, with the potential to sterilise mineral for the life of the Project only (up to 40 years). Therefore, the proposed development will not permanently sterilise the potential mineral resources, which will be available for exploitation following decommissioning of the proposed development.

5.12.52 Mineral Safeguarding Areas and safeguarded sand and gravel deposits are considered to be of regional importance and therefore the sensitivity of the receptor is considered to be **medium**.

5.12.53 The impacts of sterilisation across the wider construction areas are considered to be long lived, but temporary, as such the magnitude of effect is considered to be low. The proportion of the total Mineral Safeguarding Areas that would effectively be temporarily sterilised within the Project is considered to be small in respect to the overall county mineral resources.

5.12.54 The impact of the construction of the Onshore ECC on mineral resource is considered to be of **low** magnitude, and the sensitivity of receptors affected is considered to be **medium** for soil receptors and medium for subsurface geology. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 5: RISK FROM UNEXPLODED ORDNANCE TO CONSTRUCTION WORKERS AND NEARBY RESIDENTS

5.12.55 As set out in Section 5.7 the potential for UXO within the onshore ECC Route Sections 2, 3 and 4 of the onshore ECC is low risk. The impact from UXO within Route Sections 2, 3 and 4 is considered to be of **negligible** magnitude, and the sensitivity receptors (construction worker and nearby residents) to UXO affected is considered to be **high**. The significance of the effect is therefore concluded to be **negligible adverse**, which is not significant in EIA terms.

5.12.56 The UXO risk level for Route Section 1 (the coastal areas and approximately 200 m inland is recorded as medium risk level. Within the study area for Route Section 5, 6 and 7 the detailed UXO assessment undertaken as part of a Geotechnical and Geo-environmental Desk study of the PEIR substations search area indicated the potential for UXO given the military activity in the vicinity as described in Section 5.7. The sensitivity of the receptors within Route Section 1, Route Section 5, 6 and 7 has been determined as **medium.**

5.12.57 Mitigation measures have been recommended for the OnSS area within Route Section 7 as part of the Preliminary UXO Threat Assessment. The mitigation includes an Operational UXO Emergency Response Plan should be held within the site management documentation and safety and awareness briefings are provided to construction workers. In advance of any ground breaking works the risk assessment will be refined to take account of any work area changes from the initial assessment to confirm the additional mitigation measures remain relevant.

5.12.58 It is assessed that with the mitigation measures in place, the impact of unplanned UXO within Section 1, Section 6 and the OnSS within Section 7 is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for construction workers and nearby residents. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 6: RISK TO ENVIRONMENTAL DESIGNATIONS

5.12.59 There are two designated sites Holland on Sea Cliff SSSI and Great Holland Pits Nature Reserve potential LGS associated with the superficial geology within the study area. The presence of VE in the vicinity of a designated geological site has the potential to damage or have an adverse impact to the features of the designated site.

5.12.60 Holland on Sea Cliff SSSI is located about 250 m to the south of the beach access route, on the coast east of The Esplanade, Holland on Sea. There is no infrastructure associated with the Order Limits within the SSSI and the housing east of the B1032 separates the SSSI from the Order Limits. The Holland on Sea Cliff SSSI is considered geographically separated from VE by housing within the settlement of Holland on Sea. Therefore, the sensitivity level is determined to be **low**.

5.12.61 Great Holland Pits Nature Reserve and potential LGS is located near the western boundary of VE, north of Little Clacton Road, the project does not overlap with the boundary of the LGS. The site is now an Essex Wildlife Trust nature reserve. The site is known to have been backfilled post gravel excavation, it is reported that there are no current exposures of gravel. The sensitivity of the Great Holland Pits Nature Reserve LGS is determined to be **low**.

5.12.62 Where the boundary of VE is in very close proximity to the LGS control of working areas marking out of the boundary of the Order Limits would be employed to avoid disturbance outside of the area from construction plant and activities. The controls which would be adopted at site in accordance and standard construction practice (Table 5.13) would ensure that the potential magnitude of impact on the designated SSSI and LGS is negligible.

5.12.63 The impact of the construction phase on designated sites is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **low** for the designated sites. The significance of the residual effect is therefore concluded to be **negligible adverse**, which is not significant in EIA terms.

5.13 ENVIRONMENTAL ASSESSMENT: OPERATIONAL PHASE

5.13.1 The impacts of the operation and maintenance of VE have been assessed on Ground Conditions and Land Use in the onshore study area.

5.13.2 A description of the potential changes on Ground Conditions and Land Use receptors caused by each identified impact is given below.

IMPACT 7: LOSS OF AGRICULTURAL LAND DURING OPERATION OF UNDERGROUND CABLES

5.13.3 The following section considers the potential impact of a reduction in available soil resource through the presence of the onshore ECC during the operation of VE.

5.13.4 There will be no permanent land take associated with the operational onshore export cable with the exception of the man-hole covers associated with the TJBs and the link boxes associated with the joint bays, where access is needed .

5.13.5 The onshore export cable would be buried underground. The construction phase would include restoration of the land above the cable to its former land use. Best practice and soil handling principles for reinstatement will be set out within the CoCP (Volume 9, Report 21: CoCP). In addition, as stated in Paragraph 5.12.20 field drainage will be reinstated and the indicative minimum soil cover of 0.9m will allow cultivation of land.

5.13.6 As noted in Volume 6, Part 3: Chapter 1 Onshore Project Description, activity during operation will be limited to periodic inspection and maintenance activity of infrastructure within the onshore ECC. Any repair activity would be of a similar nature to the construction phase (albeit at a much reduced scale).

5.13.7 The impact of the underground cable operational phase on agricultural land is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high**. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 8: LOSS OF AGRICULTURAL LAND DURING OPERATION OF THE ONSS

5.13.8 A principle of the site selection process was to avoid BMV land where possible. This approach is aligned with NPS EN-1 para 5.10.8, which advises that BMV land should be avoided where possible except where it would be inconsistent with other sustainability considerations and sensitive receptors (including but not limited to infrastructure, residential and archaeology). The substation zone is unavoidably located in close proximity to the National Grid EACN substation. The land surrounding and over 3 km beyond is mapped as BMV land. Due to the need to locate the OnSS in close proximity to the National Grid EACN substation and taking into account other environmental constraints, it has therefore not been possible to avoid BMV land.

5.13.9 The agricultural classification of the soil within the substation zone is entirely Grade 1 (23.21 ha) and is therefore considered to be of excellent or good quality. Therefore, based on the criteria in Table 5.4, sensitivity of the soil within the substation zone is assessed as **high**.

5.13.10 Soil will also be removed and used for landscaping or sterilised under the foundation footprint of the OnSS and therefore the soils will be subject to an irreversible change over the whole feature. The OnSS will not cover the whole of the substation zone, the permanent footprint of the OnSS is proposed to be about 6 ha in size. Additional land is also required for planting/ screening.

5.13.11 The total area of farmed land within Essex is 210,328 ha and represents 59% of the county (Essex County Council, 2019). The footprint of the Order Limits constitutes approximately 0.18% of the county resource and the OnSS permanent footprint represents approximately 0.003% of this resource area.

5.13.12 Whilst the permanent loss of agricultural land at the OnSS at a local level is of medium magnitude, in the context of the county resource the loss of agricultural land is of negligible magnitude at less than 1% of the total Essex resource.

5.13.13 Furthermore, the IEMA guidance (2022) acknowledges that whilst it may not be possible to entirely mitigate the loss of agricultural land, it may be possible to mitigate the displacement of the soils.

5.13.14 The guidance also acknowledges that intensive agriculture can lead to losses of soil function. Soil functions could be improved through enhancement and an increase in biodiversity. The land beneath the OnSS may be lost to agriculture, but the soils will be conserved for sustainably re-use within the Project. The surplus soil and excavation material and this will be used in the creation of low bunding and sensitive reprofiling within those parts of the site area where woodland or grassland planting is proposed. The combination of raised ground levels and woodland planting will contribute to the landscape mitigation (Volume 6, Part 3, Landscape and Visual Impact Assessment). This is included within the landscaping proposals, indicative plans are included within Volume 9, Report 22: Outline Landscape and Ecological Management Plan.

5.13.15 Due to the small area of the permanent operational infrastructure in the context of the regional resource and the additional landscaping footprint which may have the potential to mitigate the loss in soil functions, the impact of the OnSS operation on soil/land quality is considered to be of **negligible** magnitude, and the sensitivity of receptors affected is considered to be **high** for soil receptors. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 9: INGRESS AND ACCUMULATION OF HAZARDOUS GROUND GASES

5.13.16 Significant sources of ground gas have not been identified during the desk study in relation to contamination. Should an unknown source of contamination be present ground gas could feasibly be generated by mobilisation of existing contaminant deposits of fill could accumulate in confined spaces, such as structures and deep excavations, resulting in the accumulation of poor air quality and a risk of asphyxiation and explosion.

5.13.17 The design of the route has considered contaminated land, and the route has been designed to avoid any areas of potential contamination. The distance from potentially contaminated sources and the impermeable nature of the clay bedrock geology across the route minimises the risk of potential pollutant pathways and precludes the need for gas mitigation or control measures.

5.13.18 The bedrock geology, the London Clay Formation has the potential to create aggressive ground conditions if sulphur bearing minerals within the geology attack the concrete structures laid down as part of VE. Any ground investigations as part of the design and construction will determine the exact nature and properties of the ground conditions and bedrock. This information will be used to inform the requirements of detailed design.

5.13.19 The impact of the ingress and accumulation of ground gases is considered to be of **negligible** magnitude, and the sensitivity of receptors (construction workers) affected is considered to be **high**. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

IMPACT 10: STRUCTURES AND SERVICES LAID IN DIRECT CONTACT WITH CONTAMINATED SOILS AND GROUNDWATER

5.13.20 Certain contaminants can have a long-term impact on the integrity of subsurface materials such as buried concrete and plastic service pipes.

5.13.21 The onshore project infrastructure has been designed to avoid any areas of potential contamination. Although no potential sources for contamination have been identified, as part of the project design phase appropriate materials will be selected that provide adequate protection from any unexpected contaminated soils and/or groundwater.

5.13.22 During operation and maintenance of the OnSS the workforce is unlikely to come into contact with soils or groundwater as the hard standing at ground level will provide a barrier between any potential contaminants.

5.13.23 The impact of the structures laid in contact with contaminated soils or groundwater is considered to be of **negligible** magnitude, and the sensitivity of soil and land receptors affected is considered to be **low**. The significance of the residual effect is therefore concluded to be **negligible adverse**, which is not significant in EIA terms.

5.14 ENVIRONMENTAL ASSESSMENT: DECOMMISSIONING PHASE

5.14.1 The impacts of the decommissioning of VE have been assessed on Ground Conditions and Land Use in the onshore study area.

5.14.2 No decision has yet been made regarding the final decommissioning policies for the Project as it is recognised that industry best practice, rules and legislation change over time. The detail and scope of decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator.

5.14.3 However, it is considered likely that the proposed OnSS would be removed and will be reused or recycled and that the onshore cables would also be removed and recycled, with the transition bays and cable ducts (where used) left in situ. For the purposes of a worst-case scenario, it is considered that magnitude of impact and effects associated with decommissioning would be no greater than those identified for the construction phase.

IMPACT 11: SHORT TERM RISKS TO CONSTRUCTION WORKERS DURING DECOMMISSIONING OF THE ONSHORE ECC AND ASSOCIATED INFRASTRUCTURE AND IMPACT 12: RISKS TO OFFSITE HUMAN RECEPTORS, SUCH AS OCCUPANTS OF RESIDENTIAL PROPERTIES BORDERING THE ASSOCIATED INFRASTRUCTURE WITH THE PROJECT

ONSHORE CABLE ROUTE INFRASTRUCTURE

5.14.4 With respect to the buried onshore cables, these are likely to be pulled through the ducts and removed, with the ducts themselves left in situ after decommissioning. At the present time, allowing the ducts to remain in place is considered an acceptable option with minimal environmental impact.

5.14.5 The impact of the decommissioning of the Onshore ECC is considered to be of **negligible** magnitude, and the sensitivity of construction worker receptors affected is considered to be **high**, off-site human receptors are considered medium sensitivity. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

ONSS AND TJB

5.14.6 It is anticipated that the OnSS and TJB would be gradually dismantled on site with certain infrastructure removed for recycling or re-use. The decommissioning works may involve removal of some or all of the impermeable hard-standing surfacing and structures. A decommissioning plan that will be secured through the DCO would be agreed with statutory authorities at the time of decommissioning.

5.14.7 During decommissioning phase, in relation to the OnSS and TJBs the impacts on construction workers will be similar to those assessed for the construction phase (Paragraph 5.12.1) and expected to be of a similar duration. Good practice measures (similar to those identified within the outline CoCP) would be employed during decommissioning.

5.14.8 The impact of the decommissioning of the OnSS and TJB is considered to be of **negligible** magnitude, and the sensitivity of construction worker receptors affected is considered to be **high,** off-site human receptors are considered medium sensitivity. The significance of the residual effect is therefore concluded to be **minor adverse**, which is not significant in EIA terms.

5.15 ENVIRONMENTAL ASSESSMENT: CUMULATIVE EFFECTS

5.15.1 This cumulative impact assessment for ground conditions and land use has been undertaken in accordance with the methodology provided in Volume 6, Chapter 3, Annex 3.1: Cumulative Effects Assessment Methodology. A list of other major developments has been compiled for the onshore assessment of cumulative effects, which includes other projects that are considered likely to be present in the area of the onshore works once VE is operational, or where there may be some overlap in respective construction phases and in decommissioning if appropriate.

5.15.2 In assessing the potential cumulative impacts for VE, it is important to consider that other projects that are currently proposed may or may not be taken forward for development. To build in some consideration of certainty (or uncertainty) the projects and plans discussed above have been allocated into 'Tiers' reflecting their current status within the planning and development process. These Tiers are included in Table 5.14.

Table 5.14: Description of Tiers of other developments considered for cumulative effect assessment.

Tiers	Development Stage
Tier 1	Projects under construction.
	Permitted applications, whether under the Planning Act 2008 or other regimes, but not yet implemented.
	Submitted applications, whether under the Planning Act 2008 or other regimes, but not yet determined.

Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
	Projects under the Planning Act 2008 where a PEIR has been submitted for consultation.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted.
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/ approvals, where such development is reasonably likely to come forward.

5.15.3 Each project, plan or activity has been considered and scoped in or out on the basis of effect–receptor pathway, data confidence and the temporal and spatial scales involved. For the purposes of assessing the impact of VE on Ground Conditions and Land Use in the region, the cumulative effect assessment technical note submitted through the EIA Evidence Plan and forming Technical Annex 1.3.1 of this ES screened in a number of projects and plans as presented in Table 5.15.

5.15.4 The greatest potential for cumulative effects arises when the construction phase of another development overlaps with the construction phase of the VE. Cumulative effects are considered to have the potential to be significant only where such an overlap may exist, as activities that could be potentially detrimental to the ground conditions and land use environment are greatly reduced during the operational phase of developments.

5.15.5 It is considered that geographic separation between developments, results in the absence of a cumulative effect to geology and the soils environment. Based on geographic separation between VE and other proposed or consented developments located within a 500 m radius, the majority of other projects have been scoped out of the cumulative assessment.

Table 5.15: Projects considered within the Ground Conditions and Land Use cumulative effect assessment.

Development type	Project	Status	Data confidence assessment/ phase	Tier
Energy – Proposed modification to part of the 132kV OHL line network	18/00832/OHL	Permitted development. 10 Jul 2018	Medium data confidence - sourced from Tendring District Council The modifications are proposed to line networks stretching from Lawford Grid Substation to the north and northeast.	Tier 1
Energy – North Falls Offshore Wind Farm (OWF)	EN010119	Scoping Opinion. 16 July 2021. Application is expected to be submitted to the Planning Inspectorate in 2024	High – PEIR application submitted and S42 responses issued. Source PINS The Order Limits of the project overlap with VE and the substations for VE and North Falls lie adjacent.	Tier 2
Electricity Transmission - National Grid Norwich to Tilbury Reinforcement Project and the associated East Anglia Connection Node Substation (EACN Substation)		Scoping Opinion. 14 December 2022. Application is expected to be submitted to the Planning Inspectorate Q4 2024	High – Scoping Opinion. Source PINS Second non-statutory consultation held in August 2023. The Order Limits of this project overlaps with VE.	Tier 2

5.15.6 Table 5.16 presents the scenarios whereby VE and the other projects listed in Table 5.15 could potentially result in cumulative direct effects.

5.15.7 In order for VE to connect to the National Grid, the proposed National Grid Norwich to Tilbury Reinforcement Project and the associated EACN substation must be operational. National Grid has defined a construction and operational zone within which their EACN substation will be situated. This is adjacent to the VE OnSS zone.

5.15.8 Despite its stage in the planning process, due to VE's reliance on this project for its connection to the National Grid, it has been given detailed consideration and treated with more certainty than other projects at similar stage in the planning process in the CEA. To assist with the assessment, it has been necessary to make assumptions as to the siting, scale, form and construction of the project, particularly the EACN substation. These assumptions have been checked and agreed to be appropriate and reasonable by National Grid. For the purposes of the cumulative assessment of VE and National Grid Norwich to Tilbury Project, the worst case delivery scenario, with limited co-ordination has been assessed for the direct and indirect impacts.

Table 5.16: Cumulative MDS.

Impact	Scenario	Justification
Cumulative risk to construction workers and offsite human receptors during development of landfall, OnSS and onshore cable routes.	Other developments being constructed at the same time in the same area as VE.	The impacts to construction workers will be confined to the work area for all scenarios. Impacts to offsite human receptors such as, landowners, land users and neighbouring land users has the potential to be exacerbated by other projects undergoing construction at the same time increasing potential disturbance to land.
Cumulative impacts upon soil/land quality.	Other developments being constructed at the same time in the same area as VE.	This scenario increases ground disturbance to agricultural land and any potentially contaminated land.
Cumulative loss of agricultural land	Other developments being constructed and then subsequently operated at the same time in the same area as VE.	This scenario increases the overall permanent loss of agricultural land within the immediate area of the OnSS.
Cumulative impact of sterilisation of mineral deposits.	Other developments being constructed at the same time in the same area as VE.	Impacts to Mineral Safeguarding Areas may be exacerbated by other projects if

Impact	Scenario	Justification
		within the same safeguarding area.
Cumulative risks to environmental designations.	Other developments being constructed at the same time in the same area as VE.	Impacts to environmental designations may be exacerbated by other projects.

5.15.9 The various scenarios for the impacts outlined above may lead to potential cumulative effects on ground conditions and land use.

5.15.10 The proposed modification to part of the 132 kV OHL line network (18/00832/OHL) does not overlap spatially with VE. It is anticipated that this project would have undergone construction and have been completed before the commencement of construction of VE. Therefore, there would be no cumulative impacts associated with this development.

5.15.11 In accordance with the provisions of NPS EN-5 to seek to develop co-ordination solutions for onshore grid connections, VE has been working with North Falls on a co-ordinated solution to reduce the overall environmental and community impacts of the proposals. The project includes almost fully overlapping, or combined Onshore ECCs and a co-located site for the OnSS to the west of Little Bromley. It is proposed the two projects' ducts will be installed adjacent to each other within the corridor. The level of co-ordination between the two projects has led to a higher degree of understanding and interactions with the North Falls proposals that can be used within the CEA than would be normal for other developments at a similar stage in the planning process. Construction impacts on ground conditions and land use via increased disturbance would potentially be increased should the projects overlap spatially and temporally.

5.15.12 Due to the independent timescales for each project, three delivery scenarios have been developed (details of each scenario can be found within Volume 3, Chapter 1: Onshore Project Description). For the purposes of the cumulative assessment of VE and North Falls, the worst case delivery scenario, with limited co-ordination has been assessed for the direct and indirect impacts

5.15.13 For the basis of the assessment presented within Section 5.12 Scenario 1 is assumed as the MDS for VE, the three scenarios for delivery are explained within Volume 6, Part 3, Chapter 1: Onshore Project Description. When considering the cumulative assessment, it is considered that different project delivery scenarios would be the MDS for different receptors.

5.15.14 The Scenario 1 MDS foresees that VE and NF proceed with a co-ordinated construction approach delivering the two projects at the same time utilising some infrastructure such as access and TCC's. Using Scenario 1 as the MDS for the basis of the assessment within this chapter it is considered that the construction of NF and VE concurrently, it is assessing the potential cumulative impacts of some receptors. For receptors such as construction workers, human offsite receptors, environmental designations and agricultural land Scenario 1 is the worst case for cumulative impacts, where the largest amount of land is disturbed and taken out of current land use at the same time, for the same time period. This has been addressed within the impact assessment (Section 5.12) and consequently no cumulative impacts are identified for these receptors.

5.15.15 For soil/land quality and mineral resources under Scenario 2 the two projects, VE and NF reach FID between 1 and 3 years apart. This would result in an overlap spatially and temporally, with opportunities for re-use or handover of haul roads and TCC's from one project to the other. Under this scenario it is anticipated that the overall duration of construction would be extended resulting in longer time periods where minerals are sterilised by construction, soils are disturbed, subject to compaction by construction equipment and stripped soils retained in soil stores. The longer that soils are kept in store the more potential there is for erosion and degradation of the structure and quality.

5.15.16 For soil/land quality and mineral resources under Scenario 3 the two projects, VE and NF are constructed sequentially. This would result in an overlap spatially but not temporally. A new haul road alignment for the second project slightly different to the first project would be likely to be used and the TCCs would need to be re-established. Under this scenario it is anticipated that the overall duration of construction would be extended resulting in longer time periods where minerals are sterilised by construction. The sequential construction of the two projects would involve the replacement of soils and reinstatement of land in between construction phases. Therefore, the soil/land quality would undergo two separate phases of stripping, storage and reinstatement resulting in more disturbance. This has the potential to degrade the quality and structure of the soils/land quality.

5.15.17 The EACN Substation, is part of the Norwich to Tilbury Reinforcement project, which is submit to its own DCO application. The project is currently in the process of preparing its PEIR following the PINS scoping opinion. Therefore, there are no definitive layouts or construction programme available to assess fully how the projects overlap and interact with VE. A worst-case scenario is assumed for this assessment whereby the project overlaps with VE temporally during construction. Whilst the EACN substation is within the VE Order Limits no spatial overlap is considered for the impact to soils/land quality, as this would be assessed within that application. .

5.15.18 There is the potential for NF to utilise the VE haul road from Bentley Road to the substation. There may also be the potential for EACN to utilise the haul road during their construction works. The haul road is a temporary construction feature, however, in the event that either of these projects use this section of the VE haul road as the haul road will be in-situ a longer duration of time than when considering the VE project alone. This has the potential for cumulative effects on agricultural land along the route of the haul road.

5.15.19 The scale of developments, require the projects to include measures to control potential detrimental effects of the construction of the developments on ground conditions and land use. Both VE and NF have proposed mitigation measures as part of the design and have committed to measures to mitigate the potential impacts on ground conditions and land use as part of their respective CoCPs. These include the sustainable storage and re-use of soils removed during the construction phases in a coordinated manner to mitigate the potential detrimental impacts on ground conditions.

5.15.20 It is therefore considered unlikely that there would be any cumulative effects during construction on ground conditions and land use associated with the NF project or EACN as any potential impacts will be minimised and managed by adoption of mitigation measures.

5.15.21 The potential cumulative construction impacts of VE in combination with NF and EACN are not likely to result in significant adverse effects on the ground conditions and land use.

5.15.22 During the operational phase of VE, NF and EACN, the permanent land take associated with the substations is expected to be situated in the vicinity of one another. This has the potential to lead to an effect on a similar area of agricultural land resulting in a cumulative permanent loss of agricultural land during operation.

5.15.23 Whilst the permanent loss of agricultural land at the three substation locations at a local level has the potential to be medium or high magnitude, in the context of the available county resource of BMV the loss of agricultural land is likely to be of negligible to low magnitude.

5.15.24 The potential cumulative impact of VE, NF and EACN on mineral resources within the MSA will be mitigated by the Mineral Assessment and consultation with the Mineral Planning Authority in accordance with Policy S8 of the Essex County Council Mineral Local Plan.

5.15.25 The ECC and TCCs for VE and NF intersect with the MSA in various places between the landfall and substation areas. The narrow footprint of the ECC and temporary nature of the TCCs in all scenarios is such that there will likely be negligible impact on mineral resources beyond the construction phases.

5.15.26 Completion of the Minerals Assessment and compliance with the Mineral Local Plan Policy is likely to result in a low magnitude to negligible impact on mineral resources.

5.15.27 The potential cumulative operational impacts of the above listed developments are not likely to result in significant adverse effects on the ground conditions and land use.

5.16 CLIMATE CHANGE

5.16.1 Climate change is generally predicted to result in warmer and wetter winters and hotter and drier summers but also with increased occurrence of extreme weather events. This section assesses the following aspects:

- The effect of climate change on the local area in which the proposed development will take place; and
- The likely impacts of climate change and the project in-combination on the receiving environment.

5.16.2 The information provided in this section will be drawn upon and summarised in Volume 6, Part 4, Chapter 1: Climate Change. As outlined in Volume 6, Part 4, Chapter 1: Climate Change, the operational phase of VE would enable the use of renewable electricity which would result in a positive greenhouse gas impact, resulting in a significant beneficial effect.

EFFECT OF CLIMATE CHANGE ON THE LOCAL ENVIRONMENT

5.16.3 With regards to the geological and soil environment the climate is likely to become more variable with projected increases in peak rainfall allowances and wind speed among other factors, which has the potential to mobilise pre-existing sources of contamination either through increased rates of infiltration due to heavier rainfalls or dust generation through drier summers. These changes have the potential to increase the exposure risks of receptors to pre-existing sources. Natural degradation of contaminants over time may result in a general improvement in ground conditions.

5.16.4 Climate change also has the potential to lead to increased threat of soil erosion and change in soil fertility, as well as a loss of high-quality agricultural land from sea level rise. Changes in the climate and resulting changes in vegetation cover has the potential to result in a reduction in the amount of carbon stored within the soils.

5.16.5 No major changes to the geology underlying the study area in relation to climate change and natural trends are anticipated to occur over the lifetime of the onshore scheme.

EFFECT OF CLIMATE CHANGE AND THE PROJECT ON THE LOCAL ENVIRONMENT

5.16.6 To mitigate against the potential risks, the measures described below have been designed into the project. The project construction approach will ensure that areas and duration of soil exposure and disturbance are minimised as far as practicable and timely reinstatement of vegetation or hard standing will reduce soil exposure/ erosion and increase resilience to climate change.

5.16.7 The project has committed to including a Soil Management Plan as part of Volume 9, Report 21: CoCP, which provides details of how soils should be managed on-site during construction and the reinstatement, to ensure best practice soil stripping, handling, stockpile management, as well as best practice general site management (including cessation of earthworks operations under wet conditions) to limit risk of soil erosion and degradation.

5.16.8 Taking these measures into account, the effects of climate change will not alter the conclusions of the Ground Conditions and Land Use assessment.

5.17 INTER-RELATIONSHIPS

5.17.1 This chapter has considered the effect of the onshore elements of VE on ground conditions and land use in relation to the proposed onshore infrastructure. Effects on hydrology and flood risk are considered in Volume 6, Part 3, Chapter 6. Effects on marine geology, oceanography and physical processes are considered in Volume 6, Part 2, Chapter 2 and Volume 6, Part 3: Chapter Onshore landscape and visual impact assessment.

5.17.2 The potential for effects of VE to result in consequential effects on other receptors would be controlled by the measures set out in this chapter. The effects identified within this chapter are predicted to be minor or negligible adverse. None of these effects would be significant in EIA terms. Given the localised nature of the effects, there is not considered to be potential for significant inter-related effects on any offshore receptors.

5.17.3 There are not considered to be any significant inter-related effects between offshore and onshore parts of VE in terms of ground conditions and land use.

5.18 TRANSBOUNDARY EFFECTS

5.18.1 Based upon the nature of the site, and the baseline ground conditions as identified by this initial assessment, it is considered that any impacts, if present, will be localised. It is therefore judged that there will not be any transboundary impacts relating to ground conditions and land use.

5.18.2 Transboundary effects were agreed by PINS to be scoped out of the assessment. Therefore, this impact will be scoped out from further consideration within the EIA.

5.19 SUMMARY OF EFFECTS

5.19.1 The potential ground conditions and land use receptors in the study area comprise soils, geology and construction workers who may be exposed to ground contamination and minerals safeguarding areas and UXO. These receptors vary in their environmental sensitivity from low to high.

5.19.2 The assessed magnitude of the various identified impacts of VE on ground conditions and land use, primarily soils vary from high to negligible. Overall, through the implementation of mitigation measures, including those specified in Volume 9, Report 21: CoCP, it is considered that the likely overall effect of VE on ground conditions and land use throughout the construction, operation and decommissioning of VE is not significant in EIA terms.

5.19.3 Table 5.17: Summary of effects for ground conditions and land use below provides the effects and mitigation measures for summary of effects.

Table 5.17: Summary of effects for ground conditions and land use

Description of effect	Effect	Additional mitigation measures	Residual impact
Construction			
Impact 1: short term risks to construction workers during construction of landfall, OnSS and onshore cable routes	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 2: risks to offsite human receptors, such as occupants of residential properties bordering landfall, OnSS and onshore cable routes	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 3: construction phase impacts upon soil/land quality	Onshore ECC – Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
	OnSS –Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
	TJB – minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
	Trenchless crossing – minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 4: sterilisation of mineral deposits	Minor adverse	Not Applicable – no additional mitigation identified	Minor adverse
Impact 5: risk from unexploded ordnance to construction workers and nearby residents	Minor adverse	Mitigation recommended by UXO risk assessment: > An Operational UXO Emergency Response Plan should be held within the site management	No significant adverse residual effects

Description of effect	Effect	Additional mitigation measures	Residual impact
		documentation; and > Safety and awareness briefings are provided to construction workers.	
Impact 6: risk to environmental designations	Negligible	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Operation			
Impact 7: loss of agricultural land during operation of underground cables	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 8: loss of agricultural land during operation of OnSS	Minor adverse	Not Applicable	No significant adverse residual effects
Impact 9: ingress and accumulation of hazardous ground gases	Negligible	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 10: structures and services laid in direct contact with contaminated soils and groundwater	Negligible	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Decommissioning			
Impact 11: Short Term Risks To Construction Workers During Decommissioning Of ECC And Associated Infrastructure	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 12: Risks To Offsite Human Receptors, Such As Occupants Of Residential Properties Bordering The	Minor adverse	Not Applicable – no additional mitigation identified	No significant adverse residual effects

Description of effect	Effect	Additional mitigation measures	Residual impact
Associated Infrastructure With The Project			

5.20 REFERENCES

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