

Outer Dowsing Offshore Wind

Environmental Statement

Chapter 23 Geology and Ground Conditions

Volume 1 Chapters

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Acronyms & Terminology

Abbreviations / Acronyms

Abbreviation / Acronym	Description
AC	Alternating Current
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
AONB	Areas of Outstanding Natural Beauty
BGS	British Geological Survey
BMV	Best and Most Versatile
CEA	Cumulative Effect Assessment
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
DCO	Development Consent Order
DECC	Department of Energy & Climate Change (now the Department for Energy Security and Net Zero (DESNZ))
DEFRA	Department for Environment, Food & Rural Affairs
DESNZ	Department for Energy Security and Net Zero, formerly Department of Business, Energy and Industrial Strategy (BEIS), which was previously Department of Energy & Climate Change (DECC)
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
ECC	Export Cable Corridor
EEA	European Economic Area
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act 1990
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
EWG	European Waste Catalogue
GCR	Geological Conservation Review
GT R4 Ltd	The Applicant. The special project vehicle created in partnership between Corio Generation (a wholly owned Green Investment Group portfolio company), Gulf Energy Development and TotalEnergies.
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
IDB	Internal drainage Board
IEMA	Institute of Environmental Management & Assessment
LCRM	Land Contamination Risk Management
LDP	Local Development Plan
LGS	Local Geological Site
LNR	Local Nature Reserves
LoGS	Local Geological Site
LPA	Local Planning Authorities
km	Kilometre
m	Metre

Abbreviation / Acronym	Description
MAGIC	Multi-Agency Geographic Information for the Countryside
MDE	Maximum Design Envelope
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MSA	Mineral Safeguarding Area
NFU	National Farmers Union
NGESO	National Grid Electrical System Operator
NGET	National Grid Electricity Transmission
NGSS	National Grid Substation
NIA	Nature Improvement Area
NPS	National Policy Statement
NPPF	National Planning Policy Framework
NRPB	National Radiological Protection Board
NSIP	Nationally Significant Infrastructure Project
ODOW	Outer Dowsing Offshore Wind Farm (The Project)
ORCP	Offshore Reactive Compensation Platform
OnSS	Onshore Substation
OSS	Offshore Substations
PCC	Primary Construction Compound
PEIR	Preliminary Environmental Information Report
PLQRA	Preliminary Land Quality Risk Assessment
PMP	Peat Management Plan
PPE	Personal Protective Equipment
PPEIRP	Pollution Prevention and Emergency Incident Response Plan
PPG	Planning Practice Guidance
RIGS	Regionally Important Geological/Geomorphological Sites
SAC	Special Area of Conservation
SMP	Outline Soil Management Plan
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Sites of Special Scientific Interest
SWDS	Surface Water Drainage Strategy
TJB	Transition Joint Bays
UXO	Unexploded Ordnance

Terminology

Term	Definition
400kV cables	High-voltage cables linking the OnSS to the NGSS.
400kV cable corridor	The 400kV cable corridor is the area within which the 400kV cables connecting the onshore substation to the NGSS will be situated.
Baseline	The status of the environment at the time of assessment without the development in place.
Cumulative effects	The combined effect of the Project acting additively with the effects of other developments, on the same single receptor/resource.
Cumulative impact	Impacts that result from changes caused by other past, present or reasonably foreseeable actions together with the Project.

Term	Definition
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of an impact with the sensitivity of a receptor, in accordance with defined significance criteria.
EIA Directive	European Union 2011/92/EU (as amended by Directive 2014/52/EU).
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	The suite of documents that detail the processes and results of the EIA.
Evidence Plan	A voluntary process of stakeholder consultation with appropriate Expert Topic Groups (ETGs) that discusses and, where possible, agrees the detailed approach to the Environmental Impact Assessment (EIA) and information to support Habitat Regulations Assessment (HRA) for those relevant topics included in the process, undertaken during the pre-application period.
Export cables	High voltage cables which transmit power from the Offshore Substations (OSS) to the Onshore Substation (OnSS) via the Offshore Reactive Compensation Platform (ORCP) if required, which may include one or more auxiliary cables (normally fibre optic cables).
Grid connection cable	Cable which connects the project Onshore Substation (OnSS) with the National Grid Substation.
Haul Road	The track within the onshore ECC which the construction traffic would use to facilitate construction.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial.
Indicative Working Width	The indicative working width within the Onshore Export Cable Corridor (ECC), required for the construction of the onshore cable route.
Intertidal	The area between Mean High-Water Springs (MHWS) and Mean Low Water Springs (MLWS).
Joint bays	An excavation formed with a buried concrete slab at sufficient depth to enable the jointing of high voltage power cables.
Landfall	The location at the land-sea interface where the offshore export cables and fibre optic cables will come ashore.
Link boxes	Underground metal chamber placed within a plastic and/or concrete pit where the metal sheaths between adjacent export cable sections are connected and earthed.
Maximum Design Scenario	The project design parameters, or a combination of project design parameters that are likely to result in the greatest potential for change in relation to each impact assessed.
Mitigation	Mitigation measures are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of

Term	Definition
	the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
National Grid Onshore Substation (NGSS)	The National Grid substation and associated enabling works to be developed by the National Grid Electricity Transmission (NGET) into which the Project's 400kV Cables would connect.
National Policy Statement (NPS)	A document setting out national policy against which proposals for Nationally Significant Infrastructure Projects (NSIPs) will be assessed and decided upon.
Onshore Export Cable Corridor (ECC)	The Onshore Export Cable Corridor (Onshore ECC) is the area within which the export cables running from the landfall to the onshore substation will be situated.
Onshore Infrastructure	The combined name for all onshore infrastructure associated with the Project from landfall to grid connection.
Onshore substation (OnSS)	The Project's onshore HVAC substation, containing electrical equipment, control buildings, lightning protection masts, communications masts, access, fencing and other associated equipment, structures or buildings; to enable connection to the National Grid.
Outer Dowsing Offshore Wind (ODOW)	The Project
Order Limits	The area subject to the application for development consent, the limits shown on the works plans within which the Project may be carried out.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Pre-construction and post-construction	The phases of the Project before and after construction takes place.
Preliminary Environmental Information Report (PEIR)	The PEIR was written in the style of a draft Environmental Statement (ES) and provided information to support and inform the statutory consultation process during the pre-application phase.
The Project	Outer Dowsing Offshore Wind, an offshore wind generating station together with associated onshore and offshore infrastructure.
Project Design Envelope	A description of the range of possible elements that make up the Project's design options under consideration, as set out in detail in the project description. This envelope is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Statutory consultee	Organisations that are required to be consulted by the Applicant, the Local Planning Authorities and/or The Planning Inspectorate during the pre-application and/or examination phases, and who also have a statutory responsibility in some form that may be relevant to the Project and the DCO application. This includes those bodies and interests prescribed under Section 42 of the Planning Act 2008.

Term	Definition
Study Area	Area(s) within which environmental impact may occur – to be defined on a receptor-by-receptor basis by the relevant technical specialist.
Transboundary impacts	Transboundary effects arise when impacts from the development within one European Economic Area (EEA) state affects the environment of another EEA state(s)
Transition Joint Bay (TJBs)	The offshore and onshore cable circuits are jointed on the landward side of the sea defences/beach in a Transition Joint Bay (TJB). The TJB is an underground chamber constructed of reinforced concrete which provides a secure and stable environment for the cable.
Trenched technique	Trenching is a construction excavation technique that involves digging a trench in the ground for the installation, maintenance, or inspection of pipelines, conduits, or cables.
Trenchless technique	Trenchless technology is an underground construction method of installing, repairing and renewing underground pipes, ducts and cables using techniques which minimize or eliminate the need for excavation. Trenchless technologies involve methods of new pipe installation with minimum surface and environmental disruptions. These techniques may include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

Reference Documentation

Document Number	Title
6.1.3	Project Description
6.1.4	Site Selection and Alternatives
6.1.5	EIA Methodology
6.1.6	Technical Consultation
6.1.19	Onshore Air Quality
6.1.21	Onshore Ecology
6.1.24	Hydrology, Hydrogeology and Flood Risk
6.1.25	Land Use
6.3.5.3	Onshore Cumulative Effects Assessment Approach
6.3.23.1	Preliminary Land Quality Risk Assessment
8.1	Code of Construction Practice
8.1.3	Outline Soil Management Plan
8.1.4	Outline Onshore Pollution Prevention and Emergency Incident Response Plan
8.1.5	Outline Surface Water Drainage Strategy
8.1.6	Outline Site Waste Management Plan
8.1.7	Outline Organic Land Protocol

23 Geology and Ground Conditions

23.1 Introduction

1. This chapter of the Environmental Statement (ES) presents the Environmental Impact Assessment (EIA) process and results, for the potential impacts of Outer Dowsing Offshore Wind (“the Project”) on Onshore Geology and Ground Conditions. This chapter considers the potential impact of the onshore elements of the Project including the landfall, the Onshore Export Cable Corridor (ECC) and 400 kV cable corridor, and the Onshore substation (OnSS) during the construction, operation and maintenance, and decommissioning phases.
2. The Project will include both offshore and onshore infrastructure including an offshore generating station (windfarm) located approximately 54km from the Lincolnshire coastline, export cables to landfall, onshore cables, an onshore substation, connection to the electricity transmission network, and ancillary and associated development (see Volume 1, Chapter 3: Project Description for full details (document reference 6.1.3)).
3. This chapter is supported by, and summarises the information contained within:
 - Volume 3, Appendix 23.1: Preliminary Land Quality Risk Assessment (PLQRA) (document reference 6.3.23.1).
4. This chapter should be read alongside the following chapters and documents:
 - Volume 1, Chapter 24: Hydrology, Hydrogeology and Flood Risk (document reference 6.1.24);
 - Volume 1, Chapter 25: Land Use (document reference 6.1.25);
 - Outline Soil Management Plan (SMP) (document reference 8.1.3); ~~and~~
 - Outline Onshore Pollution Prevention and Emergency Incident Response Plan (PPEIRP) (document reference 8.1.4); ~~and~~
 - Outline Organic Land Protocol (OLP) (document reference 8.1.7).
 - Outline Surface Water Drainage Strategy (8.1.5)
 - Outline Site Waste Management Plan (8.1.6)

23.2 Statutory and Policy Context

5. This section identifies the legislation and policy that has informed the assessment of effects with respect to geology and ground conditions.
6. The Project will be developed in accordance with the following National legislation, National and Local Planning Policy and Strategy, and other relevant guidance.

23.2.1 National Legislation

7. The following UK legislation is relevant to the protection of the ground environment:
 - The Environment Act 1995 sets out roles and responsibilities for the Environment Agency;
 - Construction (Design & Management) Regulations 2015 (CDM Regulations);

- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 set out the key stages in the assessment process, including review and monitoring; and
 - Part 2A of the Environmental Protection Act 1990 (section 78A (2)).
8. Part 2A of the Environmental Protection Act 1990 (section 78A (2)) defines contaminated land as land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:
- Significant harm is being caused or there is the significant possibility of such harm being caused; or
 - Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.
9. Part 2A requires all local authorities to identify contaminated land in its area and secure its remediation to a condition suitable for its use. A key element of the Part 2A regime is the Source-Pathway-Receptor contaminant linkage concept. Each element is defined as follows:
- The source is the contamination in, on or under the land;
 - The pathway is the route by which the contaminated land reaches the receptor; and
 - The receptor is defined as living organisms, ecological systems or property which may be harmed.
10. Without the clear identification of all three elements of the contaminant linkage, land cannot be identified as contaminated land under the regime.

23.2.2 National Planning Policy

11. The National Policy Statements (NPS) are a series of principal decision-making documents to appropriately assess Nationally Significant Infrastructure Projects (NSIP). As the Project is a NSIP, this assessment has made explicit reference to the relevant NPS requirements. The NPS provide the main policy tests in relation to the Project. The NPS were recently revised, with updated policy statements published in November 2023 and formally adopted in January 2024. Those relevant to the proposed Project are:
- Overarching NPS for Energy (EN-1, (DESNZ 2023a));
 - NPS for Renewable Energy Infrastructure (EN-3 (DESNZ, 2023b)); and
 - NPS for Electricity Networks Infrastructure (EN-5 (DESNZ 2023c)).
12. The NPS sets out the need for, and Government's policies to deliver, development of NSIPs in England. The NPS sets out policy in relation to geology and soils for the following:
- Pollution control and other environmental protection regimes;
 - Biodiversity and ecological conservation which includes geological conservation;
 - Land stability; and
 - Land use including open space, green infrastructure and Green Belt pertaining to Agricultural Land Classification, soil quality and consideration of the risk posed by land contamination and how it is proposed to address this.

13. The National Planning Policy Framework (NPPF) prepared by the Department for Communities and Local Government was revised and published in December 2023, sets out the Government's planning policies for England and how these are expected to be applied, along with the National Planning Practice Guidance (PPG) which expands on policies contained in the NPPF.
14. Section 15 of the NPPF sets out the requirements for conserving and enhancing the natural environment. Applicants should seek to recognise benefits from natural capital and ecosystem services including the economic value and other benefits of best and most versatile (BMV) agricultural land.

23.2.3 Regional and Local Planning Policy

15. The Project is located within Lincolnshire County Council. The Lincolnshire Minerals and Waste Local Plan documents and policies have been reviewed as part of this assessment. Policy M11 of the Core Strategy and Development Policies (adopted June 2016) sets out Mineral Safeguarding Areas (MSA) and the need for safeguarding of mineral resources within the county.
16. The Project crosses several Local Planning Authorities (LPA), East Lindsey, Boston, and South Holland Districts. The core strategies and local plans within the districts set out the spatial vision for the district and set out objectives and policies to achieve that vision. The following LPA policies are of relevance to this chapter:
 - East Lindsey District Council Local Plan – Core Strategy (2018); and
 - Policy SP24 – Biodiversity and Geodiversity.
 - South East Lincolnshire Local Plan 2011 to 2036 (2019) covering Boston Borough Council and South Holland District Council:
 - Policy 2 – Development Management;
 - Policy 3 – Design of New Development;
 - Policy 28 – The Natural Environment; and
 - Policy 30 – Pollution.

23.2.4 Guidance

17. The following additional guidance documents relevant to geology and ground conditions have been considered when undertaking this assessment:
 - The Land Contamination Risk Management (LCRM)' guidance (Environment Agency, 2021) is a detailed technical framework for investigating and dealing with land affected by contamination.
 - 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;

- Environmental impact assessment guidance produced by CIRIA, Institute of Environmental Management and Assessment (IEMA);
- Design Manual for Roads and Bridges (DMRB), (2020) LA104 Environmental assessment and monitoring;
- DMRB LA 109 Geology and Soils (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 (2022);
- Ministry of Agriculture, Fisheries and Food, ALC of England and Wales - revised guidelines and criteria for grading the quality of agricultural land (1988);
- Greater Lincolnshire Nature Partnerships Geodiversity Strategy 2022-26 (2021), which aims to promote action to conserve and enhance the diverse geological heritage of Greater Lincolnshire whilst promoting and managing the sustainable use of its geodiversity resources. A key part of the geodiversity strategy is the survey and designation of Local Geological Sites.

23.2.5 Legislation and Policy Context

18. The relevant legislation and planning policy for offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to geology and ground conditions, is outlined in Table 23.1 below.

Table 23.1 Legislation and Policy Context

Legislation/policy	Key provisions	Section where legislation or policy addressed
Environmental Protection Act (EPA) (1990). Part 2A - Contaminated Land Statutory Guidance	The legislation should manage the identification 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 order limits have been selected to avoid potentially contaminative sites, such as landfills and industrial land use areas. A PLQRA has been undertaken to identify potential contamination sources, pathways and receptors and is provided within Volume 3, Appendix 23.1 (document reference 6.3.23.1). A summary of the baseline environment in relation to the identification of potential contamination is presented in Section 23.4.3.
Contaminated Land (England) Regulations 2006	These Regulations make provision for the identification and remediation of contaminated land under Part 2A EPA 1990. They identify categories of sites (“special sites”), including land which is contaminated land by radioactive substances in, on or	

Legislation/policy	Key provisions	Section where legislation or policy addressed
	under that land. In relation to such special sites the Environment Agency is to be the enforcing authority. Local authorities are the enforcing authority in relation to any other type of site. The Regulations also provide for the content and notification of "remediation notices", i.e. notices served by a local authority or the Environment Agency specifying what is to be done by way of remediation.	
Hazardous Waste (England and Wales) Regulations 2005	The Hazardous Waste Regulations set out the regime for the control and tracking of hazardous waste. Under these Regulations, a process of registration of hazardous waste producers and a new system for recording the movement of waste was introduced. A waste is defined as Hazardous if it is listed in List of Wastes Regulation, which is a copy of the European Waste Catalogue (EWC) list produced by the EC. Hazardous Waste classification is underpinned by Environment Agency Technical Guidance WM3.	The effects of onshore infrastructure associated with the Project on the management of hazardous waste are considered in Section 23.5.4 Embedded Mitigation.
The Overarching National Policy Statement for Energy (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 (including those outside England), on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity, including irreplaceable habitats. Paragraph 5.4.18 The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Secretary of State consider thoroughly the potential effects of a proposed project.	The effects of onshore infrastructure associated with the Project on designated sites of geological conservation importance are considered in Section 23.7.1.4.
	Paragraph 5.4.21: 'As set out in Section 4.7, the design process should embed opportunities for nature inclusive design. Energy infrastructure projects have the	The Project has avoided geological conservation interests where possible. The effects of onshore

Legislation/policy	Key provisions	Section where legislation or policy addressed
	<p>potential to deliver significant benefits and enhancements beyond Biodiversity Net Gain, which result in wider environmental gains (see Section 4.6 on Environmental and Biodiversity Net Gain). The scope of potential gains will be dependent on the type, scale, and location of each project.'</p> <p>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.</p>	<p>infrastructure associated with the Project on designated sites of geological conservation importance are considered in Section 23.7.1.4.</p>
	<p>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).</p> <p>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 account any mitigation measures proposed.</p> <p>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.</p> <p>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</p>	<p>The evolution of the design is set out Volume 1, Chapter 4: Site Selection and Alternatives (document reference 6.1.4) and Volume 1, Chapter 3 (document reference 6.1.3).</p> <p>The effects of onshore infrastructure associated with the Project on Best and Most Versatile (BMV) agricultural land is considered within Volume 1, Chapter 25 (document reference 6.1.25). The effects on soils and land quality are considered within Section 23.7.1.2 of this chapter.</p> <p>Although the onshore infrastructure does not utilise previously developed land, an assessment of the</p>

Legislation/policy	Key provisions	Section where legislation or policy addressed
	being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.	potential for impacts to occur from contamination is provided in Section 23.4.3.
	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 identification of potential mineral resources and safeguarded minerals is presented in Section 23.4.3.
National Policy Statement for Electricity Networks Infrastructure (EN-5)	<p>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:</p> <ul style="list-style-type: none"> 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, 	<p>The evolution of the design is set out Volume 1, Chapter 3 (document reference 6.1.3) and Volume 1, Chapter 4 (document reference 6.1.4).</p> <p>The effects of onshore infrastructure associated with the Project on geology and ground conditions are considered in Section 23.7.</p> <p>The effects of onshore infrastructure associated with the Project on BMV agricultural land is considered within Volume 1, Chapter 25 (document reference 6.1.25).</p>

Legislation/policy	Key provisions	Section where legislation or policy addressed
	backfilling, and return of the land to the baseline Agricultural Land Classification (ALC), thus ensuring no loss or degradation of agricultural land. 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 biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; e) preventing new and existing development 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating	The identification of designated sites of geological conservation, and potential contamination is presented in Section 23.4.3. The effects of onshore infrastructure associated with the Project on designated geological sites and land contamination are considered in Section 23.7. The effects of onshore infrastructure associated with the Project on BMV agricultural land is considered within Volume 1, Chapter 25 (document reference 6.1.25).

Legislation/policy	Key provisions	Section where legislation or policy addressed
	despoiled, degraded, derelict, contaminated and unstable land, where appropriate.	
	Para 189, Planning policies and decisions should ensure that: a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.	The identification of potential contamination is presented in Section 23.4.3. The effects of onshore infrastructure associated with the Project on land contamination are considered in Section 23.7.
	Para 216 Planning Policies should: ' c) safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas ⁷⁴ ; 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;	The Project does not overlie any MSAs. The identification of the baseline is presented in Section 23.4.3.
Lincolnshire Minerals and Waste Local Plan - Core Strategy and Development Policies (adopted June 2016)	Policy M11 Mineral Safeguarding Areas set out areas where potential mineral resources are considered to be of current or future economic importance that should be protected from permeant sterilisation by non-minerals developments. The policy requires that 'Applications for non-minerals development in a minerals safeguarding	

Legislation/policy	Key provisions	Section where legislation or policy addressed
	area must be accompanied by a Minerals Assessment.'	
East Lindsey District Council Local Plan - Core Strategy (2018)	Policy SP24 'Development proposals should seek to protect and enhance the biodiversity and geodiversity value of land and buildings and minimise fragmentation and maximise opportunities for connection between natural habitats. The Council will protect sites designated internationally, nationally or locally for their biodiversity and geodiversity importance, ... Development, which could adversely affect such a site, will only be permitted in exceptional circumstances...'	The effects of onshore infrastructure associated with the Project on designated sites of geological conservation importance are considered in Section 23.7.1.4.
South East Lincolnshire Local Plan 2011 to 2036 (2019)	Policy 2. 'Proposals requiring planning permission for development will be permitted provided that sustainable development considerations are met, specifically in relation to 1. ... 3. maximising the use of sustainable materials and resources; 9. ...impact on the potential loss of sand and gravel mineral resources.'	The identification of potential mineral resources is presented in Section 23.4.3.
	Policy 3. 'Development proposals will demonstrate how the following issues, where they are relevant to the proposal, will be secured: ... 13. The use of locally sourced building materials, minimising the use of water and minimising land take, to protect best and most versatile soils;'	The effects of onshore infrastructure associated with the Project on land quality is considered within Section 23.7.1.2 BMV agricultural land is considered within Volume 1, Chapter 25 (document reference 6.1.25).
	Policy 28. '3. iv. conserving or enhancing biodiversity or geodiversity conservation features that will provide new habitat and help wildlife to adapt to climate change, and if the development is within a Nature Improvement Area (NIA), contributing to the aims and objectives of the NIA.'	The effects of onshore infrastructure associated with the Project on designated sites of geological conservation importance are considered in Section 23.7.1.4.
	Policy 30. 'Development proposals will not be permitted where, taking account of any proposed mitigation measures, they would lead to unacceptable adverse impacts upon:	The effects of onshore infrastructure associated with the Project on natural environment and land quality are

Legislation/policy	Key provisions	Section where legislation or policy addressed
	...3. the natural...environment 7. land quality or condition.'	considered in Section 23.7.

23.3 Consultation

19. Consultation is a key part of the Development Consent Order (DCO) application process. Consultation regarding Onshore Air Quality has been conducted through the following processes:

- Evidence Plan Process (EPP) including Expert Topic Group (ETG) meetings;
- EIA scoping process (ODOW, 2022);
- Bilateral engagement with relevant stakeholders;
- Section 47 consultation process (all public consultation phases including phase 1 and 1a); and
- Section 42 consultation process (Phase 2 Consultation, the Autumn Consultation and the Targeted Winter Consultation).

20. An overview of the Project's consultation process with reference to technical considerations is presented within Volume 1, Chapter 6: Technical Consultation (document reference 6.1.6). Further information on the Project's consultation phases can be found in the Project's Consultation Report (document reference 5.1).

21. A summary of the key issues raised during consultation to date, specific to Geology and Ground Conditions, is outlined in Table 23.2 below, together with how these issues have been considered in the production of this ES.

Table 23.2: Summary of consultation relating to Geology and Ground Conditions

Date and consultation phase/ type	Comments	Section where comment addressed
Scoping Opinion		
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.1, Table 8.4.7	Operational impacts on geology/ground conditions and associated longer term risks to human and environmental receptors – O&M: The ES should include an assessment of operational impacts on geology/ground conditions and associated longer term risks to human and environmental receptors, where likely significant effects could occur.	It is not considered that there will be significant ground disturbance during the operational phase. Contractors will be appointed to carry out repair and/or maintenance activities using existing access infrastructure. This is addressed within Section 23.7.2.
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.2, Table 8.4.7	Loss of agricultural land from operation of underground cables – O&M: The ES should include consideration of such effects during construction. Where this has been appropriately considered and mitigated (where applicable), the Inspectorate agrees that long-term effects on agricultural land can be scoped out of the assessment. Although see also point 3.16.9 below.	The onshore ECC routes through areas of predominantly agricultural land. Whilst there is predicted to be a temporary impact upon agricultural land during the construction phase, the reinstatement of this land will allow agricultural cultivation to re-commence once the cables have been installed. This is addressed within Section 23.7.2 and further addressed Volume 1, Chapter 25 (document reference 6.1.25).
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.3, Table 8.4.7	Routine maintenance effects on sterilisation of minerals and loss of agricultural land – O&M: Given the small-scale of likely O&M activities, the Inspectorate agrees that this matter can be scoped out of the assessment as significant effects are unlikely to occur.	This was scoped out of the assessment.
Scoping Opinion (the Planning Inspectorate, 9 September 2022)	Transboundary effects on geology, ground conditions and land quality: The Inspectorate agrees that given the localised nature of the Proposed Development, significant transboundary effects are unlikely to occur and can be scoped out of the assessment.	This was scoped out of the assessment.

Date and consultation phase/ type	Comments	Section where comment addressed
Comment ID: 3.16.4, Paragraph 8.4.43		
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.5, Table 8.4.1	Local geological sites: The ES should assess effects on local geological sites, where significant effects are likely to occur.	The Lincolnshire Coast Submerged Forest Local Geological Site (LGS) has been identified as within the study area and is described in more detail within the existing environment Section 23.4.3. The potential effects of the project on the Lincolnshire Coast Submerged Forest LGS are addressed within Section 23.7.1.4.
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.6, Paragraph 8.4.3	Reference to other aspect chapters and assessment: The geology, ground conditions and land quality assessment should also refer to the Land Use aspect chapter (for information on soil and agricultural land quality) and Onshore Ecology (for information in relation to Sites of Special Scientific Interest (SSSI) that have both ecological and geological interest features) to ensure there is complete consideration of potential effects on receptors.	Where relevant this chapter refers to the Land Use, Hydrogeology, Hydrology and Flood Risk and Onshore Ecology Chapter. The baseline data is identified within Section 23.4.3, and the effects of the Project addressed within Section 23.7.
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.7, Paragraphs 8.4.25 to 8.4.34	Assessment methodology: The ES should explain what aspect-specific criteria are used to define receptor value/sensitivity and magnitude of change for the geology, ground conditions and land quality assessment.	The assessment methodology is described within Section 23.6.
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.8, Paragraph 8.6.12	Guidance documents: The Inspectorate also suggests consideration of the IEMA Guidance – Land and Soil in EIA (2022).	This guidance has been considered within this assessment and within the Volume 1, Chapter 25 (document reference 6.1.25).

Date and consultation phase/ type	Comments	Section where comment addressed
Scoping Opinion (the Planning Inspectorate, 9 September 2022) Comment ID: 3.16.9	Effects on agricultural land quality and soil conditions: The ES should ensure it is possible to easily locate information in relation to significant effects and to ensure that effects are not under-represented, or indeed unnecessarily duplicated, as a result of inclusion in two aspect chapters.	Where necessary this chapter refers to the Land Use chapter. The identification and assessment of agricultural production is addressed Volume 1, Chapter 25 (document reference 6.1.25).
Expert Topic Group (ETG) Meetings		
ETG Meeting (online) 12 th October 2022	Scoping opinion comments discussed. Methodology and baseline study area and next steps set out. No comments from stakeholders.	The assessment methodology is described within Section 23.6.
ETG Meeting (online) 26 th January 2023	Provided an update on the scope of assessment, study area and key receptors and embedded mitigation set out. Proposed that the risks posed to sensitive surface water and groundwater resources will be assessed as part of the Hydrology Chapter. No comments from stakeholders.	The assessment methodology is described within Section 23.6. The impacts to be assessed within this chapter are set out within Section 23.7. The baseline data and receptors are described within Section 23.4.3. Embedded mitigation is set out within Table 23.19.
ETG Meeting (online) 16 th March 2023	Agreement log discussed. No areas of disagreement and no objections raised during the meeting or minutes.	n/a
ETG Meeting (online) 2 nd August 2023	Ongoing preparation for ES set out together with detailed S42 consultee responses and project responses. No areas of disagreement and no objections raised during the meeting or minutes.	n/a
ETG Meeting (online) 18 th September 2023	Ongoing preparation for ES set out together with refined project parameters. Summary of S42 consultee responses and project response. No areas of disagreement and no objections raised during the meeting or minutes.	n/a

Date and consultation phase/ type	Comments	Section where comment addressed
Section 42 Phase 2 Consultation		
Natural England – Annex F – Onshore Ecology	<p>Comment – Chapel Point to Wolla Bank SSSI – The Chapel Point to Wolla Bank SSSI is a site designated for its glacial sedimentary geological features and is located within the Red Line Boundary for the Project.</p> <p>Recommendation – Natural England advise that further clarification is required from the project on whether they will avoid impacting on this site. As per our advice for the Sea Bank Clay Pits SSSI, our advice is that the use of HDD would not be considered as avoidance given the site’s designation. We advise that any potential impacts (including the use of trenchless drilling techniques) will require a management plan to ensure that features are not impacted.</p>	<p>Following refinement of the Project boundary, Chapel Point to Wolla Bank SSSI outside of the revised Project boundary. Where the project makes landfall, it will not cross under the SSSI. The SSSI has therefore been mitigated against by avoidance.</p> <p>The baseline data and receptors are described within Section 23.4.</p> <p>The impacts to be assessed within this chapter are set out within Section 23.7.</p>
Environment Agency	<p>PEIR Document Reference 6.1.23</p> <p>We have reviewed this chapter in so far as it relates to the risk posed to groundwater and we are satisfied that the risk assessments undertaken to date are appropriate.</p>	<p>The baseline data and receptors are described within Section 23.4.3.</p> <p>Further detail on water resources are set out within Chapter 24 (document reference 6.1.24).</p>
National Farmers Union (NFU)	<p>PEIR Document 8.1.3 Outline Soil Management Plan</p> <p>The NFU would welcome greater detail on how Outer Dowsing proposes to deal with drainage to minimise impact on agricultural businesses. It is essential and a preference that you appoint a local drainage consultant as the Agricultural Liaison Officer will only be able to coordinate works with the consultant, contractor and the farmer.</p>	<p>A local drainage consultant has been appointed to the project to ensure our pre and post construction drainage schemes are designed in a harmonic way with the current drainage systems.</p> <p>The impacts to be assessed within this chapter are set out within Section 23.7.</p>

Date and consultation phase/ type	Comments	Section where comment addressed
NFU	<p>While there are multiple options within the PEIR for the Onshore Export Cable corridor, some of the outlined routes are located within a significant amount of Grade 1 agricultural land, as outlined in Figure 25.1 in 6.1.25 of the 'Land Use' section. In particular, 90% of the route to Weston Marsh via South of the A52, between Low Road and Church End Lane pass through Grade 1 agricultural land, with the alternative route North of the A52 consisting of 24% Grade 1 agricultural land.</p> <p>The Lincolnshire Node onshore substation zone is also located within 100% Grade 3 agricultural, land, while the two Weston Marsh substation options are located within 100% Grade 1 agricultural land. This area of land will be acquired permanently and removed from agricultural production.</p> <p>While the NFU understands the difficulties in the case of linear schemes (where there is a fixed end point), we would still want to see infrastructure schemes avoiding best and most versatile (BMV) land.</p> <p>Due to the amount of BMV agricultural land being impacted (especially Grade 1 land on both the Weston Marsh routes, but particularly the southern route), the reinstatement and aftercare of the soils must be carried out to a high specification and at the right time to achieve favourable results. Also, during construction, the impact of dust on the high value vegetable crops could be significant. The control of dust, especially from the haul road, must be identified in detail in the outline code of construction.</p>	<p>The evolution of the design is set out Volume 1, Chapter 3 (document reference 6.1.3) and Volume 1, Chapter 4 (6.1.4).</p> <p>The effects of onshore infrastructure associated with the Project on Best and Most Versatile (BMV) agricultural land and the potential impact and subsequent reinstatement and aftercare of soils has been considered in the Volume 1 Chapter 24 (document reference 6.1.24) and Volume 1, Chapter 25 (document reference 6.1.25) Section 23.7.1.2.</p> <p>Handling and protection of soils, including measures such as the separate storage of topsoil and subsoil, and ceasing work during wet weather, will be managed through the Outline Soil Management Plan (document reference 8.1.3), which has been produced and submitted alongside the DCO application.</p> <p>The control of dust and air quality is considered within Volume 1, Chapter 19: Onshore Air Quality (6.1.19).</p>
NFU	<p>PEIR Document 8.1.3 Outline Soil Management Plan</p> <p>We note that the pre-construction survey will include information on pre-existing soil conditions, and that Section 3</p>	<p>The potential impact and subsequent reinstatement and aftercare of soils has been</p>

Date and consultation phase/ type	Comments	Section where comment addressed
	<p>includes information on soil monitoring during the process and reinstatement. The NFU is pleased to see that this section has been included but the detail is lacking on what will be needed in a pre-soil statement. This work is essential, and the NFU has specific wording that it would like to see agreed, which covers practical matters and forms an interface document. Due to the routes of the proposed cable route corridors crossing very high-grade land it is essential that Outer Dowsing cover within the Outline Code of Construction how the impact of dust on high value crops will be dealt with.</p> <p>The NFU would welcome the opportunity to engage with Outer Dowsing on this and for the wording to be included within the Outline Code of Construction, so that it is taken forward and becomes binding on contractors under the Code of Construction. The NFU wording covers the following:</p> <ul style="list-style-type: none"> ▪ a) Role of an Agricultural Liaison Officer ▪ b) Records of Condition ▪ c) Biosecurity ▪ d) Irrigation ▪ e) Agricultural Land Drainage ▪ f) Treatment of Soils ▪ g) Agricultural Water Supplies 	<p>considered in the Volume 1, Chapter 19 and Chapter 25, section 23.7.1.2.</p> <p>Handling and protection of soils, including measures such as the separate storage of topsoil and subsoil, and ceasing work during wet weather, will be managed through the Outline SMP (document reference 8.1.3), which has been produced and submitted alongside the DCO application.</p>
Lincolnshire County Council	The 'Review of Soils and Agricultural Land Classification Outer Dowsing Cable Route' Section 9 sets out a basic Soil Management Plan that should be established as part of the Construction Phase, to minimise the impact on soil resources.	The potential impact and subsequent reinstatement and aftercare of soils has been considered in Volume 1, Chapter 19 and Chapter 25, section 23.7.1.2.

Date and consultation phase/ type	Comments	Section where comment addressed
		<p>Handling and protection of soils, including measures such as the separate storage of topsoil and subsoil, and ceasing work during wet weather, will be managed through the Outline SMP (document reference 8.1.3), which has been produced and submitted alongside the DCO application.</p>
<p>Boston Borough Council</p>	<p>PEIR Document Reference 6.1.23</p> <p>Boston Council do not have an in-house geologist and the Coal Authority may have chosen to comment directly on the content of the consultation at phase 2, however having reviewed the information put forward within the PEIR, the approach taken appears reasonable in the methodology and we have the following specific comments to offer:</p> <p>Specific comments from a member of Freiston Parish Council have been received and officers share these concerns. In relation to this topic the following has been raised:</p> <p>Soil management practices may need further evidence and investigation with relation to marine silts. Methodologies to prevent silt slurries should be presented as these pose a dangerous environmental risk.</p>	<p>The concern from the member of Freiston Parish Council regarding route option south of the A52 close to the Wash sea defence banks through the parish of Freiston at PEIR is no longer in consideration. It is confirmed that the route north of the A52 will be taken forward to Application.</p> <p>The potential impact and subsequent reinstatement and aftercare of soils has been considered in Volume 1, Chapter 19 and Chapter 25, section 23.7.1.2.</p> <p>It is noted that the soils in the region are high quality and complex soils. The Soil Management Plan includes further management practices and mitigation to address the potential risk. Handling and protection of soils, including management practices and mitigation measures for working in marine silts, and ceasing work during wet weather, will be managed through the Outline SMP (document reference 8.1.3), which has</p>

Date and consultation phase/ type	Comments	Section where comment addressed
		been produced and submitted alongside the DCO application.
East Lindsey District	East Lindsey Council do not have an in-house geologist and the Coal Authority may have chosen to comment directly on the content of the consultation at phase 2, however having reviewed the information put forward within the PEIR, the approach taken appears reasonable in the methodology and we have no specific comments to offer.	Noted.
South Holland District	South Holland District Council do not have an in-house geologist and the Coal Authority may have chosen to comment directly on the content of the consultation at phase 2, however, having reviewed the information put forward within the PEIR, the approach taken appears reasonable in the methodology and we have the below specific comments to offer: <ul style="list-style-type: none"> - Soil management practices may need further evidence and investigation with relation to marine silts. - Methodologies to prevent silt slurries should be presented as these pose a dangerous environmental risk. 	The potential impact and subsequent reinstatement and aftercare of soils has been considered in Volume 1, Chapter 19 and Chapter 25, section 23.7.1.2. It is noted that the soils in the region are high quality and complex soils. The SMP includes further management practices and mitigation to address the potential risk. Handling and protection of soils, including management practices and mitigation measures for working in marine silts, and ceasing work during wet weather, will be managed through the Outline SMP (document reference 8.1.3), which has been produced and submitted alongside the DCO application.
	PEIR Document reference 8.1.3 Outline Soil management plan Soil stockpiles should be sealed to reduced fugitive dust emissions.	The Outline SMP (document reference 8.1.3), which has been produced and submitted alongside the DCO application includes guidance for construction and maintenance of stockpiles.

22. As identified in Volume 1, Chapter 3 (document reference 6.1.3) and Chapter 4 (document reference 6.1.4), the Project design envelope has been refined throughout the stages of the Project prior to DCO submission. This process has been reliant on stakeholder consultation feedback.

23.4 Baseline Environment

23.4.1 Study Area

23. The study area for the baseline data collection for geology and ground conditions is defined by the Order Limits as shown on Figure 23.1 to Figure 23.4 and comprises the onshore elements of the Project from Landfall to the Connection Area, plus a buffer of 1km around the OnSS, and a 250m buffer around the landfall, the onshore ECC and 400kV cable corridor (including haul roads and temporary construction compounds).

24. The 250m buffer is attributed to the relatively shallow excavations or trenchless techniques associated with the landfall, onshore ECC and 400kV cable corridor, noting there will be no disturbance outside of the Order Limits and reinstatement of the current land use following construction. The wider 1km buffer has been attributed to the OnSS to reflect the permanent nature of this development.

25. The study area and available data have been discussed and agreed with stakeholders. It is considered that beyond the study area there is geographic separation between development and any potential receptors. This results in the absence of an effect to geology and ground conditions receptors beyond the study area.

23.4.2 Data Sources

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

27. A desk-based review of soil and geological maps, Ordnance Survey mapping and Digital Terrain Model mapping has been undertaken.

28. Third party data from bodies such as the Environment Agency (EA) and DEFRA's MAGIC website has been used to characterise the geological features and identify any geological designated areas. The data review those sources shown in Table 23.3.

Table 23.3 Data Sources

Data	Reference/Source
Various datasets	Find open data - data.gov.uk Envirocheck Report (Digital GIS layers)
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 Soilscales map viewer
Geology	British Geological Survey (BGS) Onshore Geoindex; https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

Data	Reference/Source
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	Environment Agency and Lincolnshire 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	Greater Lincolnshire Nature Partnership ecology records relating to Local Geological Sites (LoGs) and Regionally Important Geological/Geomorphological Sites (RIGS).
Radon	Public Health England: UK Radon Map
Unexploded Ordnance (UXO)	Zetica UXO: Risk Maps
Land use	Google Earth aerial photography
Historical Maps	Envirocheck Data

29. A site walkover survey of the Study Area was undertaken in March 2023. This survey was undertaken by SLR Consulting Ltd, access to the OnSS location and ECC was obtained on foot.
30. To provide site specific information on which to base the impact assessment, a study was conducted which consisted of reviewing available desk-based information related to ground conditions and contamination. The assessment is provided in the desk based PLQRA (Technical Appendix 23.1). The PLQRA provides an assessment of ground conditions for the Project and follows a risk-based approach including consideration of potential sources, pathways and receptors to identify potential pollutant linkages that may result in unacceptable risks to receptors from ground contamination.
31. The majority of the onshore ECC crosses agricultural land. The ECC has been assessed using ALC which provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. It is the only approved system for grading agricultural land quality in England and Wales.
32. The Natural England Provisional ALC maps have been used to classify the soils across the study area. The agricultural land has been categorised within this section 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; and
- Urban.

23.4.3 Existing Environment

33. This section describes the present conditions which constitute the existing baseline environment for geology and ground conditions within the onshore study area.
34. The Project will make landfall at Wolla Bank where the onshore ECC will head south to the OnSS at Surfleet Marsh, a 400kV cable corridor will then connect the OnSS to the Project's Connection Area¹. A description of the proposed works is detailed in Chapter 3 (document reference 6.1.3).
35. Due to the linear footprint of the Project, the Study Area for some receptors is relatively large-scale, therefore to assist with the interpretation and explanation of associated data, the Order Limits have been split into segments. The extent of these segments has been aligned with key geographical features such as roads or rivers which cross the Order Limits. The segment names are as outlined below:
- ECC 1: Landfall to A52 - Hogsthorpe;
 - ECC 2: A52 - Hogsthorpe to Marsh Lane;
 - ECC 3: Marsh Lane to A158 - Skegness Road;
 - ECC 4: A158 - Skegness Road to Low Road;
 - ECC 5: Low Road to Steeping River;
 - ECC 6: Steeping River to Fodder Dike Bank/Fen Bank;
 - ECC 7: Fodder Dike Bank/Fen Bank to Broadgate;
 - ECC 8: Broadgate to Ings Drove;
 - ECC 9: Ings Drove to Church End Lane;
 - ECC 10: Church End Lane to The Haven;
 - ECC 11: The Haven to Marsh Road;
 - ECC 12: Marsh Road to Fosdyke Bridge;
 - ECC 13: Fosdyke Bridge to Surfleet Marsh OnSS/Marsh Drove; and
 - ECC 14: Surfleet Marsh OnSS/Marsh Drove to the Connection Area.
36. The present ground conditions are described per segment in the following sections.

¹ The Connection Area is an Indicative search area for the National Grid substation (NGSS).

23.4.3.1 ECC 1: Landfall to A52 - Hogsthorpe

Designated Sites

37. Within the ECC 1 study area, the Chapel Point – Wolla Bank Site of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) area is present. This SSSI and GCR is a 1.5km length of coastline comprising the foreshore section of intertidal deposits stretching from the Coastguard lookout at Chapel Point to the car park at Wolla Bank. The site covers an area of 39.57ha and is located at British National Grid reference TF 560 471. The SSSI lies beyond the southernmost part of the of the Order limits, within the 250m buffer zone.
38. The site is notified for intertidal deposits which represent the global sea level rise during the Holocene (flandrian) Stage. These deposits comprise interbedded peats, saltmarsh deposits and shelly clays, incorporated within these deposits are the flora and fauna present at the time of deposition. These deposits are noted to be of national importance for the representation of the Holocene stratigraphy and environment.
39. To the north of the Chapel Point - Wolla Bank SSSI site, situated along the beach and coast for approximately 9.4km is the Lincolnshire Coast Submerged Forest non-statutory selected Local Geological Site (LoGS).
40. A document prepared by the University of York (Derret and Selby, 2020) described the extent and condition of the 'Lincolnshire Coast Submerged Landscape'. It concludes that the submerged landscape has reduced in extent and is rarely exposed compared to what was once visible for many miles. The deposits are subject to natural shore erosion and are buried below the annual beach replenishment scheme imported sand coverage. It does however note that an in-situ section on the foreshore between Anderby Creek and Wolla Bank is exposed despite beach replenishment, and it is thought to be a long-term exposure.
41. The SSSI, GCR and LGS are located within the study area and therefore are of major sensitivity.

Soils

42. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:
 - Loamy and clayey soils of coastal flats with naturally high groundwater.
43. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.4 Landfall to A52 – Hogsthorpe ECC 1 ALC Grades

Agricultural Land Classification	Total Area (ha)	% of the ECC Section
Grade 3	65.36 65.36	83.6% 82.26
Not Graded (coastal area)	12.79 14.09	16.4% 17.74
Total	78.15	100

Agricultural grade	Land Classification	Total Area (ha)	% of the ECC Section
		79.45	

44. ALC mapping does not extend to the mean low water spring (MLWS) mark. Therefore, the coastal areas around landfall have not been graded as part of the ALC classification.
45. The ALC maps indicate that the study area related to this onshore ECC segment is mapped as Grade 3 and is therefore considered to be of moderate to good quality. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b, noting the mapping refers only to 'Grade 3'. As outlined in Table 23.21, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity.
46. As the majority of the study area is mapped as Grade 3 and may be Grade 3a and therefore Best and Most Versatile (BMV) agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

47. The BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 104 – Mablethorpe and 116 - Skegness, indicates the superficial geology within the study area comprise Quaternary deposits of blown sand, Terrington Beds (salt marsh and tidal deposits), glaciofluvial sand and gravel and till (boulder clay). The published superficial geology is illustrated in Figure 20.4.
48. Published borehole records indicate that in general the superficial geology comprises varying thicknesses of soils and silty sand, overlying a stiff brown or blue clay that becomes chalky with depth.
49. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

50. The BGS mapping indicates that the bedrock geology within the study area comprises the Burnham Chalk Formation and the Welton Chalk Formation of Cretaceous age. The Burnham Chalk is described by the BGS Lexicon as '*white, thinly bedded chalk with common tabular discontinuous flint bands; sporadic marl seams*', and the Welton Chalk is described as '*white, massive or thickly bedded chalk with common flint nodules...*'. The published bedrock geology is illustrated in Figure 20.5.
51. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

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

53. There is one BGS record of a closed brickworks in Anderby Creek. The brickworks are estimated to have been worked until the early 1940s, the brick pit is now a large water feature in the settlement. There were a small number of clay pits along the coast to the south of Anderby Creek that may have been associated with the brickworks. These clay pits are now designated as the Sea Bank Clay Pits SSSI for ecological aspects.
54. The BGS mapping has no records of active quarries or evidence of modern brickworks within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
55. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

56. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

57. The 1:10,000, 1:2,500 and 1:1,250 scale historical maps for the ECC 1 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.
58. Whilst the historical maps do not show evidence of potentially significant contaminative land use within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is very low.
59. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
- Landfills (authorised and historic) - the search identified two historic landfills within the study area; Lowgate Farm and Lowgate Road (NGR TF 5340 7330), which accepted unknown and household waste respectively (see Appendix 23.1).
 - Pollution incidents - no pollution incidents have been noted within the study area; and
 - Past contaminative uses – available information indicates that there was a heap of unknown constituents.
60. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a minor sensitivity.

Radon Gas

61. 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 therefore the risk of significant ingress of radon into structures on-site is considered negligible.
62. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576: Guidance on investigations for ground gas. Permanent gases and volatile organic compounds. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

63. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.2 ECC 2: A52 - Hogsthorpe to Marsh Lane

Designated Sites

64. There are no designated sites for geological interests within the ECC2 study area.

Soils

65. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscape) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:
- Loamy and clayey soils of coastal flats with naturally high groundwater.
66. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.5: A52 Hogsthorpe to Marsh Lane ECC 2 ALC Grades

Agricultural Land grade	Classification	Total Area (ha)	% of the ECC Section
Grade 3		45.66	100
Total		45.66	100

67. The ALC maps indicate that the study area is mapped as Grade 3 and is therefore considered to be of moderate to good quality and potentially BMV agricultural land. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b, noting the mapping refers only to 'Grade 3'. As outlined in Table 23.21, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity.
68. As all of the study area is mapped as Grade 3 and may be Grade 3a and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

69. The BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within study area comprise Quaternary deposits of Terrington Beds (salt marsh and tidal deposits) and Till (boulder clay). The published superficial geology is illustrated in Figure 23.4. There are no known published boreholes within this section.
70. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

71. The BGS mapping indicates that the bedrock geology within the study area comprises the Welton Chalk Formation and Ferriby Chalk Formation of Cretaceous age. The Welton Chalk is described as '*white, massive or thickly bedded chalk with common flint nodules...*', and the Ferriby Chalk is described as '*Grey, soft, marly, flint-free chalk, typically weathering buff in exposures; locally includes pinkish bands*'. The published bedrock geology is illustrated in Figure 23.3.
72. The geological features within the onshore study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

73. The study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
74. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
75. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

76. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

77. The 1:10,000, 1:2,500 and 1:1,250 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.
78. Whilst the historical maps do not show evidence of potentially contaminative land use within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities

and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is very low.

79. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
- Landfills (authorised and historic) - the search identified one historic landfill within the study area at Field Farm (NGR TF 5280 7220), which accepted commercial household between 1984 and 1994.
 - Pollution incidents - no pollution incidents have been noted within the study area; and
 - Past contaminative uses – no uses have been noted within the study area.
80. The historic landfill within ECC2 at Field Farm poses a localised area of higher potential risk, however measures will be implemented to ensure that it can be mitigated. This will include targeted ground investigation, and should contamination be identified it will be dealt with through implementation of a Remediation Scheme. Alternatively, it may be possible that the route could be adapted around the area of landfill if it is found to be localised such that it avoids any potential area of impact. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having an overall minor sensitivity, with the exception of the area of localised landfill which would increase to a moderate/high sensitivity.

Radon Gas

81. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
82. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

83. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.3 ECC 3: Marsh Lane to A158 - Skegness Road

Designated Sites

84. There are no designated sites for geological interests within the ECC 3 study area.

Soils

85. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscape) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:
- Loamy and clayey soils of coastal flats with naturally high groundwater.

86. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.6 Marsh Lane to A158 Skegness Road ECC 3 ALC Grades

Agricultural Land grade	Classification	Total Area (ha)	% of the ECC Section
Grade 3		37.33	100
Total		37.33	100

87. The ALC maps indicate that the study area is mapped as Grade 3 and is therefore considered to be of moderate to good quality. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b, noting the mapping refers only to 'Grade 3'. As outlined in Table 23.21, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity.

88. As all of the study area is mapped as Grade 3 and may be Grade 3a and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

89. The BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within study area comprise Quaternary deposits of Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. There are no known published boreholes within this section.

90. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

91. The BGS mapping indicates that the bedrock geology within study area comprises the Ferriby Chalk Formation and the Carstone Formation of Cretaceous age. The Ferriby Chalk is described as *'Grey, soft, marly, flint-free chalk, typically weathering buff in exposures; locally includes pinkish bands'* and the Carstone Formation is described as *'greenish-brown (rusty when weathered), thick-bedded, cross-bedded, oolitic ferruginous sandstone. The formation is medium- to coarse-grained and pebbly in part, especially at the base where it becomes a conglomerate'*. The published bedrock geology is illustrated in Figure 23.5.

92. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

93. The study area, according to the Coal Authority, does not lie within a coal mining reporting area

and there are no significant coal bearing bedrock units present.

94. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
95. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

96. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

97. The 1:10,000, 1:2,500 and 1:1,250 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.
98. Whilst the historical maps do not show evidence of potentially contaminative land use within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is very low.
99. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
 - Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;
 - Pollution incidents - no pollution incidents have been noted within the study area; and
 - Past contaminative uses— no records of potentially contaminated land within the study area.
100. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a negligible sensitivity.

Radon Gas

101. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
102. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures

would not be required for any permanently enclosed structure.

UXO

103. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.4 ECC 4: A158 - Skegness Road to Low Road

Designated Sites

104. There are no designated sites for geological interests within the ECC 4 study area.

Soils

105. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study areas as loamy clayey soil, further defining it as the soilscape:

- Loamy and clayey soils of coastal flats with naturally high groundwater.

106. The Natural England provisional ALC maps have been used to classify the soils across the study areas. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.7 A158 - Skegness Road to Low Road ECC 4 ALC Grades

Agricultural Land Classification	Total Area (ha)	% of the ECC Section
Grade 2	4.01	17.10
Grade 3	19.45	82.90
Total	23.46	100

107. The ALC maps indicate that the study area is mapped as Grade 2 to Grade 3 and is therefore considered to be of good quality BMV agricultural land. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b, noting the mapping refers only to 'Grade 3'.
108. As the majority of the study area is mapped as Grade 2 to 3 and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

109. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within the study areas comprise Quaternary deposits of the Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4.
110. There are no known published boreholes within these study areas.
111. The geological features within the study areas and environs are widespread throughout

Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

112. The BGS mapping indicates that the bedrock geology within the study areas comprises and the Claxby Ironstone Formation, Tealby Formation and Roach Formation (Undifferentiated). The published bedrock geology is illustrated in Figure 23.5.
113. The Claxby Ironstone Formation is described by the BGS as '*Pale grey to dark brown, ferruginous oolitic, silty clay with varying concentrations of oolitic ironstone and pink or cream, calcareous, siltstone bands*'. The Tealby Formation is described as '*Brown and grey clays, ooidal and glauconitic in part, with a sandy limestone in the middle part of the formation*', and the Roach Formation described as '*Sandy, bioturbated, ooidal-mudstones and very fine-grained, very clayey, bioturbated, partly ooidal sands*'.
114. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

115. The study areas, according to the Coal Authority, do not lie within a coal mining reporting areas and there are no significant coal bearing bedrock units present.
116. There is one BGS record of a closed brickworks to the southeast of Burgh le Marsh, south of the A158 Sycamore Lakes roundabout. The brick pits are now a series of lakes within a holiday and caravan park.
117. The BGS mapping has no records of active quarries or evidence of modern brickworks within the study areas or surrounding area. The geological units within the study areas and environs are widespread throughout Lincolnshire.
118. The study areas do not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

119. The hydrological and hydrogeological setting of the study areas are described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

120. The 1:10,000, 1:2,500 and 1:1,250 scale historical maps for the study areas have been reviewed. In general, these show that the study areas have been predominantly under agricultural use, with scattered settlements, from the 1800s to the present day.
121. Whilst the historical maps do not show evidence of potentially contaminative land use within the study areas it has been noted that agricultural land use may result in some very

limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study areas are located away from farm infrastructure so risk from contamination is very low.

122. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study areas comprising:
- Landfills (authorised and historic) - the search identified no historic or active landfills within the study areas;
 - Pollution incidents - no pollution incidents have been noted within the study areas; and
 - Past contaminative uses— no records of potentially contaminated land within the study areas.

Radon Gas

123. The UK Radon Map indicates that the majority of the study areas do not lie within a Radon Affected Area, as less than 1% of properties are at or above the above the NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
124. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

125. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study areas are identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.5 ECC 5: Low Road to Steeping River

Designated Sites

126. There are no designated sites for geological interests within the ECC 5 study area.

Soils

127. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study areas as loamy clayey soil, further defining it as the soilscape:
- Loamy and clayey soils of coastal flats with naturally high groundwater.
128. The Natural England provisional ALC maps have been used to classify the soils across the study areas. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.8 Low Road to Steeping River ECC 5 ALC Grades

Agricultural Land Classification grade	Total Area (ha)	% of the ECC Section
Grade 2	40.90	75.28
Grade 3	13.43	24.72
Total	54.34	100

129. The ALC maps indicate that over 40% of the study area is mapped as Grade 2 and is therefore considered to be of good quality and BMV land. Some of the study area is also mapped as Grade 3. It is not possible with the published ALC mapping to differentiate between Grade 3a and 3b, noting the mapping refers only to 'Grade 3'. As outlined in Table 23.21, Grade 3a would be determined as high sensitivity, whereas Grade 3b as medium sensitivity.

130. As all of the study area is mapped as Grade 2 or 3, a worst-case scenario will be assumed that all the land is BMV agricultural land, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

131. British Geological Survey (BGS) map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within the study area comprises Quaternary deposits of clay and silt, Terrington Beds (salt marsh and tidal deposits), glaciofluvial sand and gravel and Till (boulder clay). The published superficial geology is illustrated in Figure 23.4. More isolated regions of the ECC (south of Croft village) comprise deposits of glacial till (boulder clay). Published boreholes records indicate that in general the superficial geology comprises soils and up to 3m of clayey sand and gravels, overlying a soft to stiff clay with a proven thickness of 10m.

132. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

133. The BGS mapping indicates that the bedrock geology within the study areas comprises the Claxby Ironstone Formation, Tealby Formation and Roach Formation (Undifferentiated). The published bedrock geology is illustrated in Figure 23.5.

134. The Claxby Ironstone Formation is described by the BGS as '*Pale grey to dark brown, ferruginous oolitic, silty clay with varying concentrations of oolitic ironstone and pink or cream, calcareous, siltstone bands*'. The Tealby Formation is described as '*Brown and grey clays, ooidal and glauconitic in part, with a sandy limestone in the middle part of the formation*', and the Roach Formation described as '*Sandy, bioturbated, ooidal-mudstones and very fine-grained, very clayey, bioturbated, partly ooidal sands*'.

135. The Spilsby Formation comprises two members, the Upper Spilsby Sandstone and Lower Spilsby Sandstone. These members are further divided into units of differing composition. In

general, the formation is described as greenish-yellow to brown soft coarse grained sandstone with phosphate nodules and large calcareous concretions.

136. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

137. The ECC 5 study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
138. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
139. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

140. The hydrological and hydrogeological setting of the study areas are described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

141. The 1:10,000, 1:2,500 and 1:1,250 scale historical maps for the study areas have been reviewed. In general, these show that the study areas have been predominantly under agricultural use, with scattered settlements, from the 1800s to the present day.
142. Whilst the historical maps do not show evidence of potentially contaminative land use within the study areas it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study areas are located away from farm infrastructure so risk from contamination is very low.
143. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study areas comprising:
- Landfills (authorised and historic) - the search identified no historic or active landfills within the study areas;
 - Pollution incidents - no pollution incidents have been noted within the study areas; and
 - Past contaminative uses— no records of potentially contaminated land within the study areas.
144. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a minor sensitivity.

Radon Gas

145. The UK Radon Map indicates that the majority of the study areas do not lie within a Radon Affected Area, as less than 1% of properties are at or above the above the NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
146. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

147. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study areas are identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.6 ECC 6: Steeping River to Fodder Dike Bank/Fen Bank; Designated Sites

148. There are no designated sites for geological interests within the ECC 6 study area.

Soils

149. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as two soilscales:
- Loamy and clayey soils of coastal flats with naturally high groundwater; and
 - Loamy and sandy soils with naturally high groundwater and a peaty surface.
150. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.9 Steeping River to Fodder Dike Bank/Fen Bank ECC 6 ALC Grades

Agricultural Land Classification grade	Total Area (ha)	% of the ECC Section
Grade 2	30.71	100
Total	30.71	100

151. ALC maps indicate that the study area is entirely Grade 2 and is therefore considered to be of good quality and BMV land.
152. As all of the study area is mapped as Grade 2 and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

153. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within the study area comprises Quaternary deposits of clay

and silt, Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. Published boreholes records indicate that in general the superficial geology comprises soils and up to 5m of clayey sand and silts, overlying a soft to stiff clay with a proven thickness of 12m.

154. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

155. The BGS mapping indicates that the bedrock geology within the study area comprises the Spilsby Formation and Kimmeridge Clay Formation.
156. The Spilsby Formation comprises two members, the Upper Spilsby Sandstone and Lower Spilsby Sandstone. These members are further divided into units of differing composition. In general, the Spilsby Formation is described as greenish-yellow to brown soft coarse grained sandstone with phosphate nodules and large calcareous concretions. Onshore the Kimmeridge Clay Formation is described by the BGS Lexicon as '*Mudstones (calcareous or kerogen-rich or silty or sandy); thin siltstone and cementstone beds; locally sands and silts*'.
157. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

158. The study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
159. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
160. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

161. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

162. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:

- Landfills (authorised and historic) - the search identified one historic landfill within the study area at Scaldgate (TF 47436 58031 and TF 47435 57924), the site has no registered date, accepting inert type waste;
- Pollution incidents - no pollution incidents have been noted within the study area; and
- Past contaminative uses – no records of potentially contaminated land within the study area.

Radon Gas

163. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
164. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

165. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.7 ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

Designated Sites

166. There are no designated sites for geological interests within the ECC 7 study area.

Soils

167. The UK Soil UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as two soilscales:
- Loamy and clayey soils of coastal flats with naturally high groundwater; and
 - Loamy and sandy soils with naturally high groundwater and a peaty surface.
168. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.10 Fodder Dike Bank/Fen Bank to Broadgate ECC 7 ALC Grades

Agricultural Land Classification grade	Total Area (ha)	% of the ECC Section
Grade 1	0.01	0.02
Grade 2	50.15	99.98
Total	50.16	100

169. The ALC maps indicate that the ECC 7 study area is mapped as Grade 1 and Grade 2 and is therefore considered to be of excellent to good quality and BMV land.
170. As most of the study area is mapped as Grade 1 or Grade 2 and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

171. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within the study area comprises Quaternary deposits of clay and silt, Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. Published boreholes records indicate that in general the superficial geology comprises soils up to 0.5m and clayey sand and silts, overlying a soft to stiff clay with a proven thickness of 5m.
172. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

173. The BGS mapping indicates that the bedrock geology within the study area comprises the Kimmeridge Clay Formation.
174. Onshore the Kimmeridge Clay Formation is described by the BGS Lexicon as '*Mudstones (calcareous or kerogen-rich or silty or sandy); thin siltstone and cementstone beds; locally sands and silts*'.
175. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

176. The ECC 7 study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
177. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.

Hydrogeological Setting

178. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

179. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:

- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;
- Pollution incidents - no pollution incidents have been noted within the study area; and
- Past contaminative uses – no records of potentially contaminated land within the study area.

Radon Gas

180. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.

181. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

182. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.8 ECC 8: Broadgate to Ings Drove

Designated Sites

183. There are no designated sites for geological interests within the ECC 8 study area.

Soils

184. The UK Soil UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:

- Loamy and clayey soils of coastal flats with naturally high groundwater.

185. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

186. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Table 23.11 Broadgate to Ings Drove ECC 8 ALC Grades

Agricultural Land Classification grade	Total Area (ha)	% of the ECC Section
Grade 1	25.59	49.98
Grade 2	25.61	50.02

Agricultural Land Classification grade	Total Area (ha)	% of the ECC Section
Total	21.19 51.19	100

187. The ALC maps indicate that the study area is mapped as Grade 1 and Grade 2 land and is therefore considered to be of excellent/good quality and BMV land.

As all of the study area is mapped as Grade 1 or 2 and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

188. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 - Skegness, indicates the superficial geology within the study area comprises Quaternary deposits of clay and silt, Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. Published boreholes records indicate that in general the superficial geology comprises soils up to 0.3m and clayey sand and silts, overlying a soft to stiff clay with a proven thickness of 3.5m.

189. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

190. The BGS mapping indicates that the bedrock geology within the study area comprises the Kimmeridge Clay Formation.

191. Onshore the Kimmeridge Clay Formation is described by the BGS Lexicon as '*Mudstones (calcareous or kerogen-rich or silty or sandy); thin siltstone and cementstone beds; locally sands and silts*'.

192. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

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

194. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the onshore study area and environs are widespread throughout Lincolnshire.

195. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

196. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

197. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;
 - Pollution incidents - no pollution incidents have been noted within the study area; and
 - Past contaminative uses – no records of potentially contaminated land within the study area.

Radon Gas

198. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
199. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

200. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.9 ECC 9: Ings Drove to Church End Lane

Designated Sites

201. There are no designated sites for geological interests within the ECC 9 study area.

Soils

202. The UK Soil UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscape) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:
- Loamy and clayey soils of coastal flats with naturally high groundwater.
203. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.12 Ings Drove to Church End Lane ECC 9 ALC Grades

Agricultural Land Classification grade	Total Area (ha)	% of the ECC Section
Grade 1	34. 70 ⁶⁹	51.47
Grade 2	32.72	48.53
Total	67.42¹	100

204. The ALC maps indicate that the study area is mapped as Grade 1 and Grade 2 land and is therefore considered to be of excellent/good quality and BMV land.

205. As all of the study area is mapped as Grade 1 or 2 and therefore BMV agricultural land, a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

Superficial Geology

206. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 116 – Skegness and the BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 128 - Boston, and 129 – The Wash, indicates the superficial geology within study area comprises Quaternary deposits of clay and silt, Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. There are no known published boreholes within this section.

207. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

208. The BGS mapping indicates that the bedrock geology within the study area comprises the Kimmeridge Clay Formation and the Amphill Clay Formation.

209. Onshore the Kimmeridge Clay Formation is described by the BGS Lexicon as '*Mudstones (calcareous or kerogen-rich or silty or sandy); thin siltstone and cementstone beds; locally sands and silts*'. The Amphill Clay is described as smooth or slightly silty mudstone '*pale to medium grey with argillaceous limestone (cementstone) nodules*'. The published bedrock geology is illustrated in Figure 23.5.

210. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

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

212. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the onshore study area and environs are

widespread throughout Lincolnshire.

213. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

214. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

215. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;
 - Pollution incidents - no pollution incidents have been noted within the study area; and
 - Past contaminative uses – no records of potentially contaminated land within the study area.

Radon Gas

216. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
217. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

218. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.10 ECC 10: Church End Lane to The Haven

Designated Sites

219. There are no designated sites for geological interests within the ECC 10 study area.

Soils

220. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:

- Loamy and clayey soils of coastal flats with naturally high groundwater.

221. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.13 Church End Lane to The Haven ECC 10 ALC Grades

Agricultural Land grade	Classification	Total Area (ha)	% of the ECC Section
Grade 1		39.20	100
Total		39.20	100

222. The ALC maps indicate that the study area is entirely Grade 1 and is therefore considered to be of excellent quality and BMV agricultural land.

The sensitivity of the soil resource and function is determined as major.

Superficial Geology

223. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 128 – Boston indicates the superficial geology within the study area comprise Quaternary deposits of the Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. There are no known published boreholes within this section.

224. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

225. The BGS mapping indicates that the bedrock geology within the study area comprises the Ampthill Clay Formation. The Ampthill Clay is described as smooth or slightly silty mudstone ‘pale to medium grey with argillaceous limestone (cementstone) nodules’. The published bedrock geology is illustrated in Figure 23.5.

226. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

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

228. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.

229. The study area does not fall within the Lincolnshire MSA and published borehole where

available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

230. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

231. The 1:10,000, 1:2,500 and 1:1,250 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.

232. Whilst the historical maps do not show evidence of potentially contaminative land use within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is very low.

233. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:

- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;
- Pollution incidents - no pollution incidents have been noted within the study area; and
- Past contaminative uses— no records of potentially contaminated land within the study area.
- No potential sources of ground gases within natural soils have been identified.

234. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a negligible sensitivity.

Radon Gas

235. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.

236. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

237. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII

bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.11 ECC 11: The Haven to Marsh Road

Designated Sites

238. There are no designated sites for geological interests within the ECC 11 study area.

Soils

239. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soil, further defining it as the soilscape:

- Loamy and clayey soils of coastal flats with naturally high groundwater.

240. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.14 The Haven to Marsh Road ECC 11 ALC Grades

Agricultural Land Classification	Total Area (ha)	% of the ECC Section
Grade 1	54.5221	100
Total	54.5221	100

241. The ALC maps indicate that the study area is entirely Grade 1 and is therefore considered to be of excellent quality and BMV agricultural land.

242. The sensitivity of the soil resource and function is determined as major.

Superficial Geology

243. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 128 – Boston indicates the superficial geology within the study area comprise Quaternary deposits of the Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. There is one published borehole within the study area which recorded brown silt and grey sand and silt to 5.79m bgl overlying an unproven thickness of brown clay.

244. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

245. The BGS mapping indicates that the bedrock geology within the study area comprises the Amphill Clay Formation and the West Walton Formation. The Amphill Clay is described as smooth or slightly silty mudstone '*pale to medium grey with argillaceous limestone (cementstone) nodules*', and the West Walton is described as '*Calcareous mudstone, silty mudstone and siltstone, with subordinate fine-grained sandstones and argillaceous limestone*'

(cementstone) or siltstone nodules'. The published bedrock geology is illustrated in Figure 23.5.

246. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

247. The study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
248. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
249. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

250. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

251. The 1:10,000, 1:2,500 and 1:1,250 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.
252. Whilst the historical maps do not show evidence of potentially contaminative land use within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is very low.
253. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;
 - Pollution incidents - no pollution incidents have been noted within the study area; and
 - Past contaminative uses— there is one record of transport support and cargo handling within the study area.
254. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a negligible sensitivity.

Radon Gas

255. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.
256. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

257. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.12 ECC 12: Marsh Road to Fosdyke Bridge

Designated Sites

258. There are no designated sites for geological interests within the ECC 12 study area.

Soils

259. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soils across the study area as loamy clayey soils, further defining it as two soilscales:
- Loamy and clayey soils of coastal flats with naturally high groundwater; and
 - Loamy, saltmarsh soils.
260. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.15 Marsh Road to Fosdyke Bridge ECC 12 ALC Grades

Agricultural Land	Classification	Total Area (ha)	% of the ECC Section
Grade 1		43.745	100
Total		43.745	100

261. The ALC maps indicate that the study area is entirely Grade 1 and is therefore considered to be of excellent quality and BMV agricultural land.
262. The sensitivity of the soil resource and function is determined as major.

Superficial Geology

263. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 128 – Boston and 144 – Spalding indicates the superficial geology within the study area comprise Quaternary

deposits of the Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. There is one published borehole within the study area which records 24m of sand and gravel overlying 26m of gravel and boulder clay.

264. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

265. The BGS mapping indicates that the bedrock geology within the study area comprises the West Walton Formation and Oxford Clay Formation. The West Walton is described by the BGS Lexicon as '*Calcareous mudstone, silty mudstone and siltstone, with subordinate fine-grained sandstones and argillaceous limestone (cementstone) or siltstone nodules*'. The Oxford Clay is described as '*Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules*'. The published bedrock geology is illustrated in Figure 23.5.
266. The published borehole record indicates that 49m of bedrock clay was proven during drilling.
267. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of bedrock geology throughout the study area is considered to be negligible.

Mineral Resources

268. The study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
269. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
270. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

271. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

272. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;

- Pollution incidents - no pollution incidents have been noted within the study area; and
- Past contaminative uses— no records of potentially contaminated land within the study area.

273. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a negligible sensitivity.

Radon Gas

274. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.

275. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

276. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.13 ECC 13: Fosdyke Bridge to Surfleet Marsh OnSS/Marsh Drove

Designated Sites

277. There are no designated sites for geological interests within the ECC 13 study area.

Soils

278. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscape) online mapping identifies the soil across the study area as loamy clayey soil, further defining it as soilscape:

- Loamy and clayey soils of coastal flats with naturally high groundwater.

279. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.16 Fosdyke Bridge to Surfleet Marsh OnSS/Marsh Drove ECC 13 ALC Grades

Agricultural Land	Classification	Total Area (ha)	% of the ECC Section
Grade 1		102.17 32	100
Total		102.3217	100

280. The ALC maps indicate that the study area is entirely Grade 1 and is therefore considered to be of excellent quality and BMV agricultural land.

281. The sensitivity of the soil resource and function is determined as major.

Superficial Geology

282. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 144 – Spalding indicates the superficial geology within the study area comprise Quaternary deposits of the Terrington Beds (salt marsh and tidal deposits). The published superficial geology is illustrated in Figure 23.4. There are several published boreholes within the study area that generally record significant thicknesses of clayey or silty sand over clay.
283. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

284. The BGS mapping indicates that the bedrock geology within the study area comprises the Oxford Clay Formation. The Oxford Clay is described as *‘Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules’*. The published bedrock geology is illustrated in Figure 23.5.
285. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Mineral Resources

286. The study area, according to the Coal Authority, does not lie within a coal mining reporting area and there are no significant coal bearing bedrock units present.
287. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.
288. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of modern economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

289. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

290. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:
291. Landfills (authorised and historic) - the search identified one historic landfill within the study area at Surfleet Bank (TF 2740 3305), the site was registered between 1993 and 2006, accepting inert materials. The site is 750m southwest of the OnSS area;

- Pollution incidents - no pollution incidents have been noted within the study area; and
- Past contaminative uses - no records of potentially contaminated land within the study area.

292. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a negligible sensitivity.

Radon Gas

293. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.

294. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

295. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.3.14 ECC 14: Surfleet Marsh OnSS/Marsh Drove to Weston Marsh NGSS Connection Area Designated Sites

296. There are no designated sites for geological interests within the ECC 14 study area.

Soils

297. The UK Soil Observatory (and Cranfield Soil and Agrifood Institute Soilscales) online mapping identifies the soil across the study area as loamy clayey soil, further defining it as soilscape:

- Loamy and clayey soils of coastal flats with naturally high groundwater.

298. The Natural England provisional ALC maps have been used to classify the soils across the study area. The majority of the ECC crosses agricultural land, and the land has been categorised within this study area into one of the grades described in paragraph 32.

Table 23.17 Surfleet Marsh OnSS/Marsh Drove to the Connection Area ECC 14 ALC Grades

Agricultural Land	Classification	Total Area (ha)	% of the ECC Section
Grade 1		177.68	100
Total		177.68	100

299. The ALC maps indicate that the study area is entirely Grade 1 and is therefore considered to be of excellent quality and BMV agricultural land. A large proportion of the ECC 14 study area is covered by the National Grid Substation Search Area.

300. The sensitivity of the soil resource and function is determined as major.

Superficial Geology

301. BGS map 1:50,000 Series Solid and Drift Geology Map England and Wales, 144 – Spalding indicates the superficial geology within the study area comprise Quaternary salt marsh and tidal deposits. The published superficial geology is illustrated in Figure 23.4. There are several published boreholes within the study area that generally record significant thicknesses of clayey or silty sand over clay.

302. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Bedrock Geology

303. The BGS mapping indicates that the bedrock geology within the study area comprises the Oxford Clay Formation. The Oxford Clay is described as '*Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules*'. The published bedrock geology is illustrated in Figure 23.5.

304. The geological features within the study area and environs are widespread throughout Lincolnshire and of limited use for knowledge, the sensitivity of superficial geology throughout the study area is considered to be negligible.

Mineral Resources

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

306. The BGS mapping has no records of historic or active quarries within the study area or surrounding area. The geological units within the study area and environs are widespread throughout Lincolnshire.

307. The study area does not fall within the Lincolnshire MSA and published borehole where available records indicate that the superficial and bedrock geology are unlikely to be of modern economic value. The sensitivity of mineral resource throughout the study area is considered to be negligible.

Hydrogeological Setting

308. The hydrological and hydrogeological setting of the study area is described in detail, together with the determination of receptor sensitivity and assessment of impact within Chapter 24 (document reference 6.1.24).

Contaminated Land

309. A number of sources including the Environment Agency, Lincolnshire County Council, and the Envirocheck report were consulted for evidence of other potentially polluting activities in the study area comprising:

- Landfills (authorised and historic) - the search identified no historic or active landfills within the study area;

- Pollution incidents - no pollution incidents have been noted within the study area; and
- Past contaminative uses – there is one record of potentially contaminative industrial land use within the ECC 14 study area.

310. As a consequence, assessment of the baseline data in relation to contaminated land has been determined as having a negligible sensitivity.

Radon Gas

311. 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 NRPB action level therefore the risk of significant ingress of radon into structures on-site is considered negligible.

312. Given the anticipated ground conditions, the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure.

UXO

313. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WWII bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.4 Future Baseline

314. The future baseline in relation to geology and ground conditions is unlikely to change significantly in the short, medium, or long term unless there is a significant change in land use within the vicinity of the site.

23.5 Basis of Assessment

23.5.1 Scope of the Assessment

315. The following impacts have been scoped into this assessment.

- Construction
 - Impact 1: Short term risks to construction workers during development of onshore ECC and associated infrastructure, including the OnSS;
 - Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering the onshore ECC;
 - Impact 3: Construction phase impacts upon soil/land quality;
 - Impact 4: Sterilisation of mineral deposits;
 - Impact 5: Risk to designated sites; and
 - Impact 6: Agricultural Drainage.
- Operation and Maintenance:
 - Impact 1: Ingress and accumulation of hazardous ground gases;

- Impact 2: Structures and services laid in direct contact with contaminated soils and groundwater;
- Impact 3: Operational impacts on geology/ground conditions and associated longer term risks to human and environmental receptors; and
- Impact 4: Agricultural Drainage.
- Decommissioning:
 - Impact 1: Short term risks to construction workers during decommissioning of onshore ECC and associated infrastructure; and
 - Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering the onshore ECC; and
- Cumulative:
 - Impact 1: Short term risks to construction workers during development of onshore ECC and associated infrastructure, including the OnSS;
 - Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering the onshore ECC;
 - Impact 3: Construction phase impacts upon soil/land quality;
 - Impact 4: Sterilisation of mineral deposits;
 - Impact 5: Risk to designated sites; and
 - Impact 6: Agricultural Drainage.

23.5.2 Impacts Scoped out of Assessment

316. In line with the Scoping Opinion (The Inspectorate, 2022), and based on the receiving environment, expected parameters of the Project (see Volume 1, Chapter 3 (document reference 6.1.3)), and expected scale of impact/potential for a pathway for effect on the environment, the following impacts have been scoped out of the assessment:

- Construction:
 - Impact 1: Risks posed to sensitive surface water and groundwater resources will be addressed as part of Volume 1, Chapter 24 (document reference 6.1.24);
- Operation and maintenance:
 - Impact 1: Loss of agricultural land from operation of underground cables has been scoped out on the basis that that this impact has been appropriately considered and mitigated (where applicable);
 - Impact 2: Routine maintenance effects on sterilisation of minerals and loss of agricultural land; and
 - Impact 3: Transboundary effects on geology, ground conditions and land quality.
- Decommissioning:

- Impact 1: Risks posed to sensitive surface water and groundwater resources will be addressed as part of Volume 1, Chapter 24 (document reference 6.1.24); and
- Cumulative:
 - Impact 1: Risks posed to sensitive surface water and groundwater resources will be addressed as part of Volume 1, Chapter 24 (document reference 6.1.24).

23.5.3 Realistic Worse-Case Scenario

317. The final design of the Project will be confirmed through detailed engineering design studies that will be undertaken post-consent to enable the commencement of construction. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst-case scenarios have been defined in terms of the potential effects that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in the Planning Inspectorate (The Inspectorate) Advice Note Nine (2018). The Rochdale Envelope for a project outlines the realistic worst-case scenario for each individual impact, so that it can be safely assumed that all lesser options will have less impact. Further details are provided in Volume 1, Chapter 5: EIA Methodology (document reference 6.1.5).

318. The Maximum Design Scenario (MDS) is outlined in Volume 1, Chapter 3 (document reference 6.1.3) and the following parameters are supported by the following figure that can be found in ES Volume 2:

- Figure 3.4 Indicative Onshore Infrastructure (document reference 6.2.3.4)
 - *This figure outlines the indicative infrastructure layers as well as associated IDs that have been assigned to each infrastructure element for reference throughout this chapter and the ES. Where an ID is relevant to this figure it is presented in square brackets e.g. [PCC-1].*

Table 23.18: MDS for Geology and Ground Conditions for the Project

Potential effect	MDS assessed	Justification
Construction		

Potential effect	MDS assessed	Justification
Landfall Impact to soil quality, resource and function; impact to potential mineral resource; potential to excavate through contaminated sites (yet unidentified sources)	<p>Horizontal Directional Drilling (HDD) maximum length 2,000m seaward of Mean Low Water Springs (MLWS) will be used from landfall to cross the coastal flood defence line. Maximum HDD depth of 25m, minimum depth of 5m.</p> <p>A Landfall Compound [PCC-1] with a footprint of 70,000m² located to the west of Roman Bank and comprising up to 6 Transition Joint Bays (TJBs) each with a maximum area of 207m² and total area of 1,242m².</p> <p>A temporary Duct Storage Compound [SCC-2] (27,000m²), where in the event of a pushdown installation (Chapter 3 Project Description), the ducts for the landfall installation will be assembled and stored.</p> <p>Construction duration 51 months.</p>	<p>The MDS represents the maximum number of cables and area of land disturbance anticipated at landfall.</p>
Onshore ECC & 400kV Cable Corridor Impact to soil quality, resource and function; impact to potential mineral resource; potential to excavate through contaminated sites (yet unidentified sources)	<p>For the assessment presented in this chapter, the onshore ECC represents a temporary construction corridor width of approximately 80m and 70km in length.</p> <p>Cables will be installed within ducts, with installation undertaken in sections. The cables will be installed in one trench per circuit (typically, a maximum of 4 trenches for up to 4 circuits²), with each trench up to 5m wide at the surface and up to 3m deep.</p> <p>The indicative length of the 400kV cable corridor is approximately 4km in length, with a typical working width of 60m.</p> <p>The haul road will be typically 6.8m wide (and up to 9m at passing places) including</p>	<p>The MDS includes the maximum corridor width, within which the final cable route will be located and so represents the greatest area of land disturbance.</p> <p>The maximum number of cable trenches and cable depth has been used.</p> <p>The maximum construction footprint area has been used.</p> <p>Trenchless techniques present a risk of</p>

² At major trenchless crossings, more ducts may be required, and the cable circuits would be bundled accordingly (i.e. reducing the number of export cables per circuit)

Potential effect	MDS assessed	Justification
	<p>verges and drainage channels (where required) and will extend the majority of the Project onshore ECC and 400kV cable corridor (except where the Project has committed to not construct a haul road, such as in locations where trenchless techniques will be adopted).</p> <p>One A52 (Hogsthorpe) Primary Construction Compound (PCC) [PCC-3] with a maximum footprint of 7,500 m² will be retained up to 51 months.</p> <p>7 PCCs along the onshore ECC a 400kV cable corridor with a total footprint of 110,00m².</p> <p>Major crossings, such as rivers, flood defences, IDB owned or maintained drains, railway lines, and major roads, will be undertaken using trenchless techniques. Cable Installation Compounds (CICs) will be required to facilitate the trenchless crossing works and joint bays installation works. 324 CICs are included in the design basis with a total footprint of 1,742,000m².</p> <p>680 Joint bays buried below ground with a combined total area of 163,800m² and 680 link boxes with a combined total area of 12,600m².</p> <p>Construction duration up to 51 months.</p>	indirectly contaminating surface soils from drilling fluids and the movement of excavated earth/sediments.
OnSS Impact to soil quality, resource and function; impact to potential mineral resource; potential to excavate through contaminated sites (yet unidentified sources)	The OnSS includes the footprint of the substation infrastructure and development platform (including on site landscaping ³). The maximum footprint of the OnSS (AIS) is 144,000m ² . The OnSS PCC [PCC-29] is 45,000m ² .	Disturbance to existing ground conditions will result from the OnSS construction and so a maximum construction footprint has been assumed.

³ Offsite planting has been excluded as no stripping of soils is anticipated therefore no impacts are expected.

Potential effect	MDS assessed	Justification
	An OnSS security compound [PCC-30] is required for the construction period of the OnSS and is 2400m ² . Construction duration 36 months. Retainment of a temporary commissioning compound area of an indicative 5,400m ² for an additional 15 months for commissioning.	
Operation and Maintenance		
Onshore substation Increase in contamination risk	Routine maintenance of the OnSS.	The MDS for contamination risk at the OnSS.
Decommissioning		
Onshore Impacts on soil quality, resource and function	Buried cables would be de-energized with the ends sealed and left in place to avoid ground disturbance. Removal of the OnSS including areas of hardstanding and the removal of TJBs. Any final decommissioning methodology will adhere to industry best practice, rules and regulations at the time of decommissioning.	The onshore export cable remaining in situ provides potential lateral pathways for contamination which could indirectly affect soil and ground conditions. Removal of all OnSS infrastructure represents greatest disturbance.

23.5.4 Embedded Mitigation

319. Mitigation measures that were identified and adopted as part of the evolution of the Project design (embedded into the project design) and that are relevant to geology and ground conditions are listed in Table 23.19. General mitigation measures, which would apply to all parts of the Project, are set out first. Mitigation measures that would apply specifically to geology and ground conditions issues associated with the landfall, onshore ECC, 400kV cable corridor and OnSS, would be secured through the relevant management plans and DCO requirements.

Table 23.19: Embedded mitigation relating to geology and ground conditions

Project phase	Mitigation measures embedded into the project design
General	
Site Selection	The Project has undergone a 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 and design of key crossing points to avoid key areas of sensitivity.

Project phase	Mitigation measures embedded into the project design
Agricultural Drainage	The Project has appointed local drainage contractor to ensure the pre and post construction drainage schemes are designed in a harmonic way with the current drainage systems.
Construction	
Code of Construction Practice (CoCP)	An Outline CoCP will be submitted as part of the DCO application (document reference 8.1). The final CoCP will be a requirement of the DCO and will be drafted in accordance with the Outline CoCP. This will include measures to control the potential impacts to ground conditions and land use.
Soil Management Plan	An Outline Soil Management Plan (SMP) is submitted as part of the DCO Application Outline CoCP (document reference 8.1.3). The SMP will provide further details of mitigation 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. The SMP includes the commitment to a Soil Clerk of Works and soil testing across the Project route.
Organic Land Protocol	An Outline Organic Land Protocol (OLP) is submitted as part of the Outline CoCP (document reference 8.1). The OLP sets out the principles and procedures to be considered and followed (by the Applicant and their contractors) for access to and management of, and restoration of land certified as organic by an approved UK organic control body.
Peat Management Plan	A commitment is secured within the CoCP that should deep peat be identified during pre-construction surveys a Peat Management Plan will be prepared. The Peat Management Plan would include good practice guidance on excavation, reuse, storage, handling, reinstatement and monitoring and inspection.
Pollution Prevention	<p>An Outline Pollution Prevention and Emergency Incident Response Plan (PPEIRP) is submitted as part of the Outline CoCP. (document reference 8.1.4). Construction practices will incorporate 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.</p> <p>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.</p> <p>The PPEIRP will be updated post consent in accordance with the Outline PPEIRP and held on all construction sites to follow in the event of an environmental emergency.</p>
Best Practice	All construction work will be undertaken in accordance with the CoCP, and good practice guidance including, but not limited to:

Project phase	Mitigation measures embedded into the project design
	<ul style="list-style-type: none"> ■ Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA 2001); ■ CIRIA – SuDS Manual (C753) (CIRIA, 2015b); <ul style="list-style-type: none"> ■ No discharge to main river watercourses will occur without permission from the Environment Agency (SuDS Manual); ■ Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); ■ 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).
Contaminated land	<ul style="list-style-type: none"> ■ In order to mitigate the potential impacts associated with excavation of potentially contaminative material: <ul style="list-style-type: none"> ■ Should areas of potential concern occur in close proximity to the Project, the onshore ECC and 400kV cable corridor will be micro-sited where possible to maintain a 25m buffer; ■ The Contaminated Land and Groundwater Management Plan will identify the procedures to be followed should an area of contamination be encountered. Areas where these materials are found will be photographed and annotated on a site drawing. Where necessary, works on site at that location will cease until any identified contamination has been assessed in accordance with the Part IIA of the EPA and the Contaminated Land (England) Regulations 2006. This assessment will be undertaken by a competent person in accordance with the LCRM guidance (Environment Agency 2021). ■ 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 soil or water, such as those carrying out hand digging activities; and

Project phase	Mitigation measures embedded into the project design
	<ul style="list-style-type: none"> ■ Adopt appropriate safe working practices that consider the potential for hazardous ground gases ingress and accumulation in confined spaces. The use of gas protection measures, such as impermeable membranes and ventilation, may be required if any permanent structures are to be in proximity to identified sources of ground gases such as a landfill site. ■ All works will be carried out in accordance with BS5930: 1999 (The Code of Practice for Site Investigations) and BS10175:2001 (Investigation of Potentially Contaminated Sites): <ul style="list-style-type: none"> ■ 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 converter substation 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; ■ 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 Hazardous Waste (England and Wales) Regulations 2005; and ■ An Outline Site Waste Management Plan is submitted as part of the CoCP (document reference 8.1.6). Use of a Site Waste Management Plan to monitor wastes arisings and ensure adherence to duty of care and wastes legislation on site and also the anticipation of sustainable waste management practices by maximising waste prevention, reuse and recycling for material destined for offsite waste management. This will actively discourage sending waste to landfill.
Operation and Maintenance	
General	<p>Operational practices will incorporate measures to prevent pollution and should contamination be encountered to deal with it, including emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff.</p> <p>Best practice will be undertaken to excavate, handle and replace without impacting soil quality significantly.</p>
Decommissioning	

Project phase	Mitigation measures embedded into the project design
General	Decommissioning practices will incorporate measures like the construction phase, to prevent pollution. These measures will include emergency spill response procedures, control of surface water and clean up and remediation of any contaminated soils. Exposed cable ducts will be sealed with an appropriate water proofing material to mitigate flood risk or creation of preferential flow pathways.
	A decommissioning plan will be required, to include protection of the soils and ground conditions, based on guidance that will be appropriate at the time of decommissioning.

23.6 Assessment Methodology

320. This section sets out the scope and methodology for the geology and ground conditions assessment of the Project.
321. 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 assessment is based on a methodology derived from the (IEMA Guidance, Design Manual for Roads and Bridges (2019) and the LCRM.
322. 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 degree of impact and sensitivity has been assessed these are then combined to determine the likelihood of each potential overall effect occurring.
323. This approach provides a mechanism for identifying the areas where site specific mitigation measures will be required, in addition to embedded 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.
324. Volume 1, Chapter 6 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 geology and ground conditions.

23.6.1 Assessment Criteria and Assignment of Significance

325. 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.
326. 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 23.21. Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

327. 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.
328. 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 the Project are also determining factors. The criteria that have been used to assess the magnitude of impact are defined in Table 23.20.
329. This approach uses the term “beneficial” for an advantageous or positive effect on an environmental resource or receptor or “adverse”, for a detrimental or negative effect on an environmental resource or receptor.

Table 23.20: Impact magnitude definitions

Magnitude	Description/reason
Major	Fundamental loss (long term or permanent loss of geological feature and/or, over an area of more than 20ha or loss of soil-related features) of resource and/or quality and integrity of resource; 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).
Moderate	Loss of resource (partial loss of geological feature and/or over an area of between 5 and 20ha or loss of soil-related features) 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).
Minor	Permanent, irreversible loss over less than 5ha or a temporary, reversible loss of one or more soil functions or soil volumes and/or some measurable change in 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).

Magnitude	Description/reason
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).

330. The sensitivity/importance of the receptor is defined in Table 23.21.

Table 23.21: Sensitivity/importance of the environment

Receptor sensitivity/ importance	Definition
Major	<p>Geology</p> <ul style="list-style-type: none"> UNESCO Geoparks, (SSSI or GCR sites with internationally important geomorphological or geological features; Special Area of Conservation (SAC), SSSI or GCR with nationally important geomorphological or geological features. <p>Soils</p> <ul style="list-style-type: none"> 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); ALC Classes 1, 2 and 3a- Excellent to Good Quality agricultural land; and/ or Important surface mineral reserves that would be sterilised (i.e. without future access). <p>Contamination</p> <ul style="list-style-type: none"> Presence of regulatory determined contaminated land (Part 2A EPA designated); VE construction workers.
Moderate	<p>Geology</p> <ul style="list-style-type: none"> Regionally Important Geological Site (RIGS) or Local Geological Sites (LoGS). <p>Soils</p> <ul style="list-style-type: none"> Soils supporting protected or valued non-statutory designated sites (e.g., Local Nature Reserves (LNR), Local Geological Sites, Sites of Nature Conservation Importance); and/or ALC Classes 3b Moderate Land capable of producing a moderate range of crops; Surface mineral reserves that would remain accessible for extraction.

Receptor sensitivity/ importance	Definition
	<ul style="list-style-type: none"> Contamination Areas of potential concern identified by Local Authority under their statutory investigation of contaminated land (under Part 2A; EPA 1990).
Minor	<p>Geology</p> <ul style="list-style-type: none"> Locally important sites (e.g., non-designated geological exposures, former quarries/mining sites). <p>Soils</p> <ul style="list-style-type: none"> Soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils; ALC Classes 4 and 5 Poor to Very Poor Quality– Improved grassland and rough grazing or Urban soils; Surface mineral reserves that would remain accessible for extraction. Contamination Areas of previously developed land with no areas of potential concern relating to contaminated land identified.
Negligible	<p>Geology</p> <ul style="list-style-type: none"> Common geological features of limited use for knowledge/study; <p>Soils</p> <ul style="list-style-type: none"> As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions; <p>Contamination</p> <ul style="list-style-type: none"> No areas of previously developed land with no areas of potential concern relating to contaminated land identified.

331. 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 23.22.

332. The table 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.

333. Effects of ‘major’ and ‘moderate’ significance are considered to be ‘significant’ in terms of the EIA Regulations. The broad definitions of the terms used are set out in Volume 1, Chapter 5: EIA Methodology. A statement of residual effects, following consideration of any further specific mitigation measures where identified, is then given.

Table 23.22: Matrix to determine effect significance

		Magnitude of impact			
		<i>Negligible</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>
Sensitivity of receptor	<i>Negligible</i>	Negligible (Not significant)	Negligible (Not significant)	Minor (Not significant)	Minor (Not significant)
	<i>Minor</i>	Negligible (Not significant)	Minor (Not significant)	Minor (Not significant)	Moderate (Significant)
	<i>Moderate</i>	Minor (Not significant)	Minor (Not significant)	Moderate (Significant)	Major (Significant)
	<i>Major</i>	Minor (Not significant)	Moderate (Significant)	Major (Significant)	Major (Significant)

23.6.1.1 Assumptions and Limitations

334. This assessment is based on design information and publicly available data obtained from the Environment Agency, Natural England and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.
335. Overall, a moderate to high 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 within the Project onshore geology and ground conditions study area, therefore, there are no data limitations that would affect the conclusions of this assessment.
336. The MDS identified in Section 23.5.3 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the Project Description (Volume 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.

23.7 Impact Assessment

23.7.1 Construction

337. This section presents the assessment of impacts arising from the construction phase of the

Project.

23.7.1.1 Impact 1 and 2: Short term risks to construction workers and offsite human receptors during development of onshore ECC, 400kV cable corridor and associated infrastructure, including the OnSS

338. The impacts to human health from the construction stages of the Project were considered in the context of existing identified contaminated sources and how the Project is likely to interact with these, based on significant pollution linkages.
339. 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.
340. An assessment has been undertaken for the study area to identify potential presence of contaminants within soils and geology. The study has identified that the majority of the land within the study area is agricultural land and unacceptable risks from current contamination are not anticipated.
341. The baseline data as set out in section 23.4.3 has indicated that localised areas within the study area with a potentially contaminative past use may be present. This includes the historic landfill areas mapped within the study area for five segments; ECC1, ECC2, ECC6 and ECC13. These historic landfills comprise inert, household, commercial and unknown waste. It has been identified that a historic landfill containing commercial and household waste is located within the route at ECC2.
342. The historic landfill within ECC2 at Field Farm poses a localised area of higher potential risk, however measures will be implemented to ensure that it can be mitigated. This will include targeted ground investigation, and should contamination be identified it will be dealt with through implementation of a Remediation Scheme. Alternatively, it may be possible that the route could be adapted around the area of landfill if it is found to be localised such that it avoids any potential area of impact.
343. Micro-siting as part of the design and embedded mitigation will avoid, where possible positioning the Onshore ECC and construction haul roads within the mapped landfills and will employ an appropriate buffer zone. The incurrence of contaminated land is predicted to be minor but where areas of potential contamination cannot be avoided, targeted ground investigations would be undertaken.
344. If contamination does occur, it is likely to be associated with previous farming practices such as usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. If disturbed during construction works, there is a possibility that sources of contamination could be mobilised causing potential harm to construction workers and/or human receptors.
345. The [Contaminated Land and Groundwater Plan, secured by a DCO Requirement](#), ~~construction environmental management plan (CEMP)~~ will set out procedures to be followed should sources of contamination (e.g., buried asbestos) be discovered during construction phase works. 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. Soil (soil vapour/ groundwater) samples would be collected and analysed. The risks associated with contamination would be assessed. When required, a remediation strategy would be designed and agreed with the Environment Agency and Lincolnshire County Council before implementation.

346. The management of all site waste will comply with the Site Waste Management Plan (SWMP) under the final Code of Construction Practice (CoCP).

~~345.~~347. Potential impacts to construction workers can be managed directly via appropriate controls and construction management practices. Embedded mitigation, as described in Table 23.19, will control the impacts associated with any potential ground contamination.

~~346.~~348. The sensitivity of construction workers is considered to be major, the magnitude of impact is assessed as negligible, and the resulting significance of the effect is **minor adverse**. This is not significant in EIA terms.

23.7.1.2 Impact 3: Construction phase impacts upon soil/land quality *Onshore ECC infrastructure and 400kV cable corridor*

~~347.~~349. The soils within the onshore ECC infrastructure, are generally loamy and clayey soils that are not considered to generally exhibit characteristics which indicate they have a high susceptibility to damage or degradation. The soils in the study area are mapped as ALC Grade 1, 2 or 3 (excellent to good quality soils), and therefore BMV agricultural land, thus a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

~~348.~~350. Site clearance and preparation works for installation of the onshore export cables, cable joint bays and the preparation of access routes have the potential to impact the soil and land quality within the onshore ECC and 400kV cable corridor. 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.

~~349.~~351. These direct impacts on soil quality can also have potential indirect impacts on soil fertility and drainage. If soils are not stored or reinstated correctly, or are compacted, there is potential to lose the definition of soil profiles, which can lead to homogenisation of the soil.

352. The onshore ECC and 400kV cable corridor routes through areas of predominantly

agricultural land. Prior to and post construction, a competent person will be employed to ensure that information on existing agricultural management and soil/land conditions is obtained, recorded and verified by way of a detailed pre and post construction condition survey. Construction will involve the temporary stripping and storage of topsoil, ~~and upper~~ subsoil, and lower subsoil to excavate trenches to the required width and depth to install cable circuits. Whilst there will be a short term, 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.

~~350.~~353. Land drainage systems will be maintained during construction and reinstated on completion. All existing land drainage records collated will form part of a full pre and post construction land drainage design, as set out within the Outline SMP. Post construction ~~F~~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.

354. The construction methodology adopted will ensure that the direct impacts on soil resulting from excavation will be limited spatially to the onshore ECC and 400kV cable corridor and temporally to a one-off process of excavation, storage and replacement. Material used to backfill infrastructure will be carried out in accordance with a Soil Management Plan (SMP) and relevant sections of the CoCP relating to materials handling. Soils reinstated at ground surface will be demonstrated that they are suitable for their proposed use in accordance with a SMP. The Outline Soil Management Plan is ES document 8.1.3.

~~351.~~355. The potential for long-term impacts on soil 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.

356. Mitigation to ensure soils are protected during the development process will be undertaken and will be managed through implementation of best practice site management techniques. The principles that will be adopted to manage potential impacts upon soil during construction within the onshore ECC and 400kV cable corridor are set out in the Outline SMP (document reference 8.1.3). The SMP provides 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.

357. The Project has committed to undertaking preconstruction soil testing on topsoil and where required, subsoil, which will be used to inform the detail of the final SMP. These surveys will take place post consent, pre-construction. The commitment to testing is contained within the Outline SMP.

358. The construction phase of the Project will require access to, management of, and restoration of land certified as organic by an approved UK organic control body. Additional measures are required to protect the organic integrity of the land over and above those set out within the Outline SMP. An Outline Organic Land Protocol (OLP) has therefore been submitted

as part of the Outline CoCP (document reference 8.1.7) which sets out controls and management measures and will apply to all land certified as organic within the Order Limits.

359. Should deep peat be identified during pre-construction surveys, a Peat Management Plan (PMP) will be prepared as set out within the Outline CoCP. The PMP would include good practice guidance on excavation, re-use, storage, handling, reinstatement and monitoring and inspection.

~~352.~~360. Given the features affected, i.e., agricultural soils, roadsides, and amenity land, plus the limited and temporary nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils. It is therefore assessed as a negligible magnitude of impact across the study area.

~~353.~~361. Given the major sensitivity and the negligible magnitude of impact for soil grades within all sections, the overall significance of the impacts on physical parameters of soil quality is **minor adverse** and therefore not significant in EIA terms.

OnSS

~~354.~~362. The soils within the -OnSS site are generally loamy and clayey soils that are not considered to generally exhibit characteristics which indicate they have a high susceptibility to damage or degradation. The soils are mapped as ALC Grade 1 or 3 (excellent to good quality soils), and therefore BMV agricultural land, thus a worst-case scenario will be assumed, and the sensitivity of the soil resource and function is determined as major.

~~355.~~363. The clearance and preparation of the OnSS, will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar impacts are anticipated in terms of the physical parameters of soil quality within the OnSS.

364. The principles that will be adopted to manage potential impacts upon soil during construction within the OnSS are set out in the Outline SMP (document reference 8.1.3), provided as part of the outline CoCP. The SMP provides 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.

365. The construction phase of the Project will require access to, management of, and restoration of land certified as organic by an approved UK organic control body. Additional measures are required to protect the organic integrity of the land over and above those set out within the Outline SMP. An Outline OLP has therefore been submitted as part of the CoCP (document reference 8.1.7) which sets out controls and management measures and will apply to all land certified as organic within the Order Limits.

~~356.~~ —

~~357.~~366. Given the features affected, i.e., agricultural soils, roadsides and amenity land; plus the limited and temporary nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils. It is therefore assessed as a negligible magnitude of impact across the study area.

~~358-367.~~ Given the major sensitivity and the negligible magnitude of impact for soil grades within the OnSS -areas, the overall significance of the impacts on physical parameters of soil quality is **minor adverse** and therefore not significant in EIA terms.

Trenchless Crossings and TJBs

~~359-368.~~ The clearance and preparation of the trenchless crossing construction compounds and TJB sites will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar impacts to those described in paragraph 350, are anticipated as for the onshore ECC and 400kV cable corridor works.

369. HDD (horizontal directional drilling) or other trenchless techniques will be undertaken for all major crossings including main rivers, flood defences and IDB owned and managed ordinary watercourses, most roads, remains of national importance and all railway lines.

~~360-370.~~ Some trenchless crossings locations such as at large watercourse or archaeological sites will not involve any impact on the soils or surface of the land. Disruption will be limited to the subsurface environment associated with the installation of the cables.

~~361-371.~~ Procedures followed for cable installation by trenching and HDD will be in line with best practice and the final CoCP. Furthermore, implementation of the embedded mitigation measures and the measures proposed within the Outline SMP (document reference 8.1.3) and Outline OLP (document reference 8.1.7) would ensure that the potential for incidents detrimental to land quality occurring is localised and would reduce the magnitude of the impact of any such incidents.

~~362-372.~~ The impact on geology and ground conditions from the trenchless techniques would be direct (shore works only) or indirect (via onshore watercourses discharging to the coast) and of an intermittent nature and of short duration.

~~363-373.~~ The potential 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 groundwater. In consideration of pollution prevention measures and the bentonite breakout management measures included as part of the outline- Pollution Prevention and Emergency Incident Response Plan (PPEIRP document 8.1.4), CoCP these techniques would be managed effectively with a negligible magnitude of impact and located away from sensitive receptors.

~~364-374.~~ Based on the proposed construction methodology (as set out in Volume 1, Chapter 3 (document reference 6.1.3)), impacts are likely to be associated with localised excavation and therefore the magnitude has been assessed as negligible. The sensitivity of the receptors, the soils are considered to have a major sensitivity. The effect would therefore be **minor adverse**, which is not significant in EIA terms.

23.7.1.3 Impact 4: Sterilisation of Mineral Deposits

~~365-375.~~ As noted in the baseline environment, the study area does not overlie areas of minerals safeguarded by Lincolnshire County Council. A search of the Lincolnshire County Council planning website has not shown any extant planning permissions for mineral extraction in these areas.

~~366~~376. The published information indicates that in this region the deposits are widespread. Deposits further north within similar geologies have been quarried, however within the study area deposits have not been quarried or mined on any significant scale are unlikely to be of economic value. It is considered that the construction of the onshore ECC, 400kV cable corridor and proposed OnSS location will not lead to sterilisation of mineral resources.

~~367~~377. The sensitivity of mineral resources has been assessed as negligible and the magnitude deemed to be negligible. The effect would therefore be **negligible**, which is not significant in EIA terms.

23.7.1.4 Impact 5: Designated Sites

~~368~~378. The presence of the Project within a designated geological site has the potential to damage or have an adverse impact to the features of the designated site. There are two designated sites noted for geological features within the study area.

~~369~~379. The Chapel Point – Wolla Bank Site SSSI & GCR lies 200m outside the Order limits. The mitigation by avoidance approach has been taken with the SSSI & GCR, therefore will not be directly or indirectly affected by the proposed development. The Lincolnshire Coast Submerged Forest LGS is present within the ECC1 study area.

~~370~~380. The submerged landscape of the Lincolnshire coast was once visible for many miles along the foreshore between Mablethorpe and Skegness, however, is now much reduced in extent and rarely exposed beneath the encroaching sea levels and beach nourishment materials.

~~371~~381. The HDD ducts [for landfall installation](#) will pass beneath the intertidal area ~~between~~~~from~~ a point seawards of MLWS ~~and to~~ a location onshore landwards of the beach with a temporary construction compound situated on the western site of Roman Bank Road, and there is no above ground infrastructure located within the intertidal area, thereby ~~limiting the likelihood of significant effects~~[avoiding the interaction](#) on geological and soil receptors ~~and with exposures or near-surface layers of Lincolnshire Coast Submerged Forest LGS~~ in the intertidal area [and within 500m of Mean Low Water Springs \(MLWS\)](#). [The commitment for the exit pits to be a minimum of 500m from the intertidal area is secured in the oCoCP.](#)

~~372~~382. Damage to the coastal landforms and designated features are unlikely because trenchless methods, such as HDD, would follow a close to parabolic profile under the beach and generally be up to 15 m below the surface with no risk of erosion exposure. Detailed targeted site investigation will be carried out to inform the final detailed design, prior to construction. This will confirm the ground conditions within the areas of construction.

~~373~~383. Detailed construction plans will be required in areas where the Project passes through areas of potential high sensitivity and appropriate pollution management controls (as described in the embedded mitigation Table 23.19) will be required to maintain the integrity of these areas.

~~374~~384. Where the boundary of the Project is within or in very close proximity to the designated sites control of working areas and marking out of the site boundary would be employed to avoid or reduce disturbance to these areas from construction plant and activities.

~~375.~~385. The controls which would be adopted at site in accordance with best practice would ensure that the potential magnitude of impact on the designated SSSI/GCR and LGS is negligible, and the sensitivity has been assessed as major thus the significance of effect is **minor adverse**. No additional mitigation, over and above best practice, is required.

23.7.1.5 Impact 6: Agricultural Drainage

~~376.~~386. There is also potential during construction that a temporary impact on field drainage and irrigation systems could occur, which can lead to a reduction in productivity and other farming practices.

~~377.~~387. Soil types found within the Order limits and at the landfall are mostly freely draining loamy and clayey soils. Existing field drains are likely to be at a depth of between 0.5m – 1.5m, and are expected to be made of ceramic, plastic pipes or other materials. More information regarding the local drainage system is provided in Chapter 24 (document reference 6.1.24) and an Outline Surface Water Drainage Strategy (SWDS) ~~outline drainage strategy is provided as part of the Outline CoCP (document reference 8.1.5) is provided in Chapter 24 (document reference 6.1.24).~~

~~378.~~388. The Project have committed to ~~HDD at~~ HDD or other trenchless techniques for all major crossings including main rivers, flood defences and IDB owned and managed ordinary watercourses, most roads, remains of national importance and all railway lines. ~~landfall, therefore~~ Therefore, there will be no disturbance to agricultural drainage where the cable is installed using HDD. Duct installation in trenched locations requires the excavation of the cable trench and stockpiling of soils and has the potential to cause an adverse impact to the field drainage systems. As such, it is likely that intersected drains would be impacted by any excavation works planned through agricultural fields.

389. The construction footprint has been minimised as far as practicable (see Chapter 3 (document reference 6.1.3)). Land would be reinstated to its pre-construction condition as soon as reasonably possible following cable installation, dependent on weather conditions and excluding permanent infrastructure (OnSS, joint box and link box locations).

390. The embedded mitigation measures, described in Table 23.19 include reinstating field drainage systems following construction, the provision of an Agricultural Liaison Officer and a local specialised drainage consultant ~~tractor~~ (to undertake surveys and create drawings pre- and post-construction, to locate drains and ensure appropriate reinstatement), the implementation of the final CoCP, SMP and an Outline ~~Drainage Strategy~~ SWDS to minimise water within the trench and ensure ongoing drainage of surrounding land, in order to avoid any material change to the soil resource.

391. Land drainage systems will be maintained during construction and reinstated on completion. All existing land drainage records collated will form part of a full pre and post construction land drainage design, as set out within the Outline SMP and relevant section on drainage within the Outline CoCP. During construction temporary drainage will be installed within the working width to intercept existing field drains and ditches in order to maintain the

integrity of the existing field-drainage system. Post construction 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.

~~379.~~392. The Project has contracted a local drainage consultant to collate land drainage plans and design pre and post construction drainage schemes which will allow drainage to be maintained during construction. The pre and post construction drainage schemes will also address the diversion or interruption of any water supplies and the management of irrigation systems.

~~380.~~393. The Project has committed to undertaking preconstruction soil ~~British Standard~~ testing on topsoil and where required, subsoil which will ~~feed~~ be used to inform the detail of the ~~into-final~~ SMP. These surveys will take place post consent, pre-construction. The commitment to testing ~~will be~~ is contained within the Outline SMP.

~~381.~~394. The SMP would include construction method statements for soil handling, would be produced by a competent soil science contractor and agreed with the relevant regulator, in advance of the works. This would be completed pre-construction once an earthworks contractor has been appointed and detailed earthworks phasing information is available. The contractor would be required to comply with the SMP, ~~included in the CoCP.~~

~~382.~~395. When accounting for the embedded mitigation proposed, the impacts would be localised, short-term and reversible following the construction phase, and therefore of negligible magnitude. As the sensitivity of the receptor is considered to be moderate, the resultant level of effect would be **minor adverse** that is not significant in EIA terms.

23.7.2 Operation and Maintenance

23.7.2.1 Impact 1 and 2: Ingress and accumulation of hazardous ground gases, structures and services laid in direct contact with contaminated soils and groundwater

~~383.~~396. The design of the onshore ECC and 400kV cable corridor has considered contaminated land and the layout will be designed as far as practicable to avoid any areas of potential contamination. Closed landfills are present within the study area; however, none are considered to pose an impact to the Project, due to nature of material accepted, age of infilling and the proposed works associated with the Project. The embedded mitigation sets out measures should unexpected contamination be identified.

~~384.~~397. Potential sources for contamination will be referenced during the design phase to ensure that both temporary and permanent designs consider these potential in-ground risks and ensure that engineering design mitigates the potential for gas accumulation and corrosion/degradation of the infrastructure. This will ensure the selection of appropriate materials that provide adequate protection from contaminated soils and/or groundwater.

~~385.~~398. The sensitivity of the receptor is minor, and the magnitude is deemed to be negligible. The effect would therefore be **negligible**, which is not significant in EIA terms.

23.7.2.2 Impact 3: Operational impacts on geology/ground conditions and associated longer term risks to human and environmental receptors

~~386.~~399. Significant ground disturbance is considered unlikely during the operational phase.

Contractors appointed to carry out repair and/or maintenance activities would use existing access infrastructure. Contractors would be required to adopt appropriate working methods and control measures such as mitigation and best practice measures set out as part of the CoCP.

~~387.~~400. Any possible impacts will be kept to a minimum. It is considered that the effects on geology and ground conditions of the maintenance and repairs at the landfall and along the onshore ECC and 400kV cable corridor will not be significant.

~~388.~~401. The sensitivity of the receptor is minor, and the magnitude is deemed to be negligible. The effect would therefore be **negligible**, which is not significant in EIA terms.

23.7.2.3 Impact 4: Agricultural Drainage

~~389.~~402. Potential impacts regarding the Project on the land use of agricultural drainage systems are only considered to occur at the construction phase. During the operational phase, once the landfall, ECC, 400kV cable corridor, OnSS and ancillary infrastructure are already in place, the impacts on agricultural drainage will have already occurred, been mitigated and reinstated. The land-take of the Project is unlikely to interfere with drainage post-construction mitigation and reinstatement as the infrastructure would be stationary. Further impacts on flood risk and hydrology are considered in Chapter 24 (document reference 6.1.24).

~~390.~~403. The embedded mitigation measures, described in Table 23.19, contain a commitment to develop an SMP ~~part of the CoCP~~, which ~~would~~ includes reinstatement of field drainage systems during initial restoration of the land. An Outline Operational Drainage Management Plan has been submitted (document reference 8.12) which demonstrates that, through the processes and criteria outlined, adequate drainage can be provided to ensure that the OnSS remains free from flooding from surface water and does not exacerbate the risk of surface water flooding locally or elsewhere.

~~391.~~404. When accounting for the embedded mitigation proposed, the impacts would be localised, short-term and reversible following the construction phase, and therefore, at the operational phase, these impacts would be considered to be of a negligible magnitude. As the sensitivity of the receptor is considered to be moderate, the resultant level of effect would be **minor adverse**, which is not significant in EIA terms.

23.7.3 Decommissioning

23.7.3.1 Impact 1 and 2: Short term risks to construction workers and offsite human receptors during decommissioning of onshore ECC and associated infrastructure

~~392.~~405. During decommissioning phase, the risks to construction workers and offsite human receptors impacts on geology and ground conditions will be similar to those assessed for the construction phase. Good practice measures (similar to those identified within the outline CoCP) would be employed during decommissioning. A decommissioning plan that will be secured through the DCO would be agreed with statutory authorities at the time of decommissioning.

~~393.~~406. The sensitivity of the receptor is major, and the magnitude is deemed to be negligible. The effect would therefore be **minor adverse**, which is not significant in EIA terms.

23.8 Cumulative Effects Assessment

- ~~394.~~[407.](#) This cumulative impact assessment for geology and ground conditions has been undertaken in accordance with the methodology provided in Volume 3, Appendix 5.3 Onshore Cumulative Effects Assessment Approach (document reference 6.3.5.3).
- ~~395.~~[408.](#) The projects and plans scoped in as relevant ‘other developments’ to the assessment of cumulative impacts to geology and ground conditions are based upon a screening exercise undertaken on an initial long list of reasonably foreseeable other developments located within the Project’s zone of influence; be it consented schemes not built out or schemes for which planning consent is actively being sought.
- ~~396.~~[409.](#) 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.
- ~~397.~~[410.](#) The determination of the short list of other developments is documented in Appendix 5.3 (document reference 6.3.5.3).
- ~~398.~~[411.](#) The greatest potential for cumulative effects arises when the construction phase of another development overlaps with the construction phase of the Project (e.g., excavation works, substation construction etc.). 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.
- ~~399.~~[412.](#) Therefore, potential cumulative effects to geology and the soils environment between the Project and other developments are considered plausible only where the development footprint and timeline of both developments overlap during construction.
- ~~400.~~[413.](#) The process identified several projects on a short list, which may cause cumulative impacts to geology and ground conditions; however, all except two of these are deemed beyond the boundaries of the Project to be considered for specific consideration for geology and ground conditions.
- [414.](#) The other developments scoped into the cumulative impact assessment of geology and ground conditions are the NGSS required to support the Project and the Naylor Farms application, located on land to the East of Surfleet Bank and West of Woad Farm (application ref H17-1097-23).
- ~~401.~~[415.](#) The summary of inter-relationships with other NSIP projects provided in document 19.6 has identified four of these large scale developments, namely the Grimsby to Walpole project, the Eastern Green Link 3 and 4, Meridian Solar Farm and Ossian Offshore Wind that have an aspect of their proposed development located within 250m of the Project. However, these have been scoped out of the cumulative assessment owing to the limited information available, which is insufficient to enable a meaningful assessment.

Table 23.23 Potential Cumulative Impacts

Description of effect	Potential for Cumulative Impact	Reason
Construction		
Impact 1: Short term risks to construction workers during development of onshore ECC and associated infrastructure, including the OnSS	Yes	Impacts to human health are likely to be highly localised and confined to the work area. Impacts to 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.
Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering the onshore ECC	Yes	Potential for impacts to be exacerbated by construction of other projects overlapping temporally and spatially increasing potential disturbance to land.
Impact 3: Construction phase impacts upon soil/land quality	Yes	Impacts to Mineral Safeguarded Areas may be exacerbated by other projects.
Impact 4: Sterilisation of mineral deposits	Yes	Impacts to environmental designations may be exacerbated by other projects.
Impact 5: Designated Sites	Yes	Impacts to drainage may be exacerbated by other projects.
Impact 6: Agricultural Drainage	Yes	

~~402.~~[416.](#) The various impacts outlined above (Table 23.23) may lead to potential cumulative effects on geology and ground conditions if the projects overlap spatially and temporally.

~~403.~~[417.](#) The Naylor Farms proposed application boundary overlaps with the Order Limits. The area in which the two projects overlap is to the northwest of Surfleet Bank, where the Project propose a permanent access track, offsite mitigation planting, drainage and a temporary secondary compound.

~~404.~~[418.](#) The scale of the developments will require the projects to include measures to control potential detrimental effects of the construction of the developments on geology and ground conditions. the Project has embedded mitigation measures as part of the design and have committed to measures to mitigate the potential impacts on geology and ground conditions as part of the CoCP. It is expected that Naylor Farms project will have mitigation measures incorporated into the design thus limiting the potential for cumulative effects to occur. However, at the time of writing, information relating to the proposed mitigation

measures associated with the Naylor Farms project are not available.

~~405.~~419. It is therefore considered unlikely that there would be any cumulative effects on ground conditions associated with the Naylor Farms project as any potential impacts will be minimised and managed by adoption of mitigation measures.

~~406.~~420. The National Grid Electrical System Operator (NGESO) has confirmed that the grid connection point for the Project will be into a new substation in the vicinity of Weston Marsh. This will be developed, consented and operated by National Grid Electricity Transmission (NGET).

~~407.~~421. The details of the NGSS are not yet known and therefore the Project adopted a maximum design scenario approach for the NGSS, using high-level, typical assumptions regarding the location and parameters of this infrastructure for the sole purpose of undertaking the CEA. The assumptions, which are based on Industry Standards and broadly typical arrangements for National Grid substations, are indicated in Table 23.24 below.

Table 23.24 NGSS indicative MDS

Parameters	Typical assumptions for the purpose of CEA
NGSS Location	Within the Connection Area
Typical site area (m ²) (fenced operational area, excluding landscaping & drainage)	Circa 140,000 m ² . Assumed to be rectangular in shape (e.g. 700m x 200m)
Typical temporary working area (m ²)	Assumed to be the same as ODOW OnSS (40,000 m ²)

~~408.~~422. There are no designated sites or mineral safeguarding areas in the vicinity of the NGSS, therefore it is considered that there will not be any cumulative impacts to these receptors as a result of the construction or operation of the Project and NGSS.

~~409.~~423. For the remaining potential cumulative impacts, the scale of the NGSS and the Project developments, require the projects to include measures to control potential detrimental effects of the development on geology and ground conditions. The Project has embedded mitigation measures as part of the design and have committed to measures to mitigate the potential impacts on geology and ground conditions as part of the CoCP. It is expected that NGSS will have mitigation measures incorporated into the design thus limiting the potential for cumulative effects to occur. However, at the time of writing, information relating to the proposed mitigation measures associated with the NGSS are not available.

~~410.~~424. Therefore, the residual effect on the receptors and impacts identified in Table 23.23 is not considered to increase from what is predicted for the Project, which are deemed not significant in EIA terms.

23.9 Inter-Relationships

~~411.~~425. This chapter has considered the effect of the onshore elements of the Project on geology and ground conditions in relation to the proposed onshore infrastructure. Effects on

hydrology, hydrogeology and flood risk are considered in Chapter 24 (Document reference 6.1.24).

~~412.~~426. The potential for effects of the Project 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.

427. There are not considered to be any significant inter-related effects between offshore and onshore parts of the Project in terms of geology and ground conditions.

23.10 Transboundary Effects

~~413.~~428. 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 geology and ground conditions.

~~414.~~429. Transboundary effects were agreed by The Inspectorate to be scoped out of the assessment. Therefore, this impact has been scoped out from further consideration within the EIA.

23.11 Conclusions

~~415.~~430. The potential geology and ground conditions receptors in the study area comprise soils, geology and construction workers who may be exposed to ground contamination. These receptors vary in their environmental sensitivity from negligible to major.

~~416.~~431. The assessed magnitude of the various identified impacts of the Project on geology and ground conditions ranges from minor to negligible (adverse). Overall, through the implementation of mitigation measures, including those specified in the CoCP, it is considered that the likely overall effect of the Project on ground conditions and land use throughout the construction, operation and decommissioning of the Project is not significant in EIA terms.

Table 23.25: Summary of Residual Effects

Description of effect	Effect	Additional mitigation measures	Residual impact
Construction			
Impact 1: Short term risks to construction workers during development of onshore ECC and associated infrastructure, including the OnSS;	Minor adverse	None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Impact 2: Risks to offsite human receptors, such as occupants of residential properties bordering the onshore ECC			
Impact3: Construction phase impacts upon soil/land quality	Onshore ECC - Minor adverse	None (CoCP, <u>SMP and OLP</u> is a <u>are requirements</u> of the DCO)	No significant adverse residual effects
	OnSS Areas – Minor adverse	<u>None (CoCP, SMP and OLP are requirements of the DCO)</u> None (CoCP is a requirement of the DCO)	No significant adverse residual effects
	Trenchless Crossing and TJB - Minor adverse	<u>None (CoCP, SMP and OLP are requirements of the DCO)</u> None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Impact 4: Sterilisation of mineral deposits	Negligible	None required	No significant adverse residual effects
Impact 5: Designated Sites	Minor adverse	None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Impact 6: Agricultural Drainage	Minor adverse	<u>None (CoCP, SMP and OLP are requirements of the DCO)</u> None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Operation and Maintenance			

Description of effect	Effect	Additional mitigation measures	Residual impact
Impact 1: Ingress and accumulation of hazardous ground gases	Negligible	None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Impact 2: Structures and services laid in direct contact with contaminated soils and groundwater	Negligible	None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Impact 3: Operational impacts on geology/ground conditions and associated longer term risks to human and environmental receptors	Negligible	None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Impact 4: Agricultural Drainage	Minor	<u>None (CoCP, SMP and OLP are requirements of the DCO)</u> None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Decommissioning			
Impact 1: Risks to offsite human receptors, such as occupants of residential properties bordering the onshore ECC	Minor adverse	None (CoCP is a requirement of the DCO)	No significant adverse residual effects
Cumulative			
None identified.			

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