The Great Grid Upgrade

Grimsby to Walpole

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Volume 1 - Environmental Impact Assessment Scoping Report

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EIA Scoping Report Contents

Glossary

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Term	Definition
Abnormal Indivisible Loads (AIL)	Large loads to be delivered to the construction site which by their nature cannot be broken into smaller multiple deliveries.
Above Ordnance Datum (AOD)	An Ordnance Datum or OD is a vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD. Usually mean sea level is used for the datum.
Acoustic environment	The sound with contribution from all sources, as modified by the current environment and associated conditions. This is related to the ambient sound, which is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
Acute health effect	An adverse health effect that manifests itself immediately or shortly after exposure to a causative factor (e.g., soil contamination). Associated with short-term exposures.
Additional measures	Further measures required in order to achieve the anticipated outcome. These may be implemented as part of the development consent or through inclusion in the ES. These are referred to as 'secondary measures' in accordance with Institute of Environmental Management and Assessment (IEMA) guidelines.
Agricultural Land Classification (ALC)	A standardised method for classifying agricultural land according to its versatility, productivity, and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5). ALC is determined using the MAFF Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land,1988.
Air Insulated Switchgear (AIS)	An air insulated switchgear composing electrical disconnect switches or circuit breakers used to control, protect and isolate electrical equipment.
Air Quality Management Areas (AQMAs)	If a local authority finds any places where the Air Quality Objectives (AQO) are not likely to be achieved, it must declare an AQMA there. This area could be just one or two streets, or it could be much bigger. Then the local authority will put together a plan to improve the air quality - a Local Air Quality Action Plan (AQAP).
Air Quality Objectives (AQO)	The AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.

Term	Definition
Air Quality Standards (AQS)	The AQS Regulations report limit values at differing averaging periods for certain pollutants. There are limits provided for the protection of human health for SO_2, NO_2, Benzene, CO and Pb. Target values have been set for the concentration of $PM_{2.5}$.
Annex 1 habitat	Annex 1 Habitat refers to a habitat as defined under the EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.
Archaeological Interest	A heritage asset with value from the potential to hold evidence about the past that can be retrieved though specialist investigation.
Architectural/Artistic Interest	A heritage asset with value from contemporary appreciation of a heritage asset's aesthetics.
Area of Outstanding National Beauty (AONB)	An AONB is land protected by the Countryside and Rights of Way Act 2000 (CROW Act). It protects the land to conserve and enhance its natural beauty.
Artificial ground	Deposits that have accumulated or been placed through human activity.
Associated development	Development which is associated with a Nationally Significant Infrastructure Project (NSIP), as defined in the Planning Act 2008. It should be subordinate to, and necessary for, the construction and/or the effective operation of the NSIP that is the subject of the Development Consent Order (DCO) application.
Background sound/noise level	The A weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels. This represents the underlying sound level in the absence of contributions from the sound source under assessment relating to the residual sound level but characterised by LA90,T.
Baseline	The situation prevailing before the Project is commenced (the current baseline), and also to the situation that would prevail in the future without the Project (the projected future baseline).
Best and Most Versatile (BMV) agricultural land	Defined as land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3a) agricultural quality. BMV agricultural land is afforded a degree of protection against development within planning policy.
Biodiversity Net Gain (BNG)	BNG is an approach to development which aims to leave nature in a better state than it was before the project was completed. National Grid has made a commitment to

Term	Definition
	delivering a BNG target of 10% above baseline on its development projects (as agreed with Ofgem).
Birds of Conservation Concern	Quantitative criteria are used to assess the population status of bird species found in the UK, which are placed on the red, amber or green list. With those on the red list being at most risk.
Bronze Age	-2,600 to -700
Cable Sealing End Compound (CSEC)	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Chartered Institute for Archaeologists (CIfA)	The leading professional body representing archaeologists working in the UK and overseas.
Chartered Institute of Ecology and Environmental Management	The leading professional membership body representing and supporting ecologists and environmental managers in the UK, Ireland and abroad.
Chronic health effect	An adverse health effect that occurs as a result of long-term regular or continuous exposure to a causative factor (e.g., soil contamination).
Code of Construction Practice (CoCP)	A written code of standards and procedures that developers and contractors must adhere to.
Construction Environmental Management Plan (CEMP)	The purpose of the CEMP is to outline how construction of the Project will avoid, minimise or mitigate effects on the environment and surrounding area. The CEMP will detail the implementation of measures in accordance with environmental commitments outlined in the ES. It is a 'live' document which is to be reviewed and updated at regular intervals throughout the Project life cycle.
Corridor	A broad area, within which a new overhead line could be routed.
Corridor Preliminary Routeing and Siting Study (CPRSS)	The CPRSS reports the process undertaken as part of the Options Identification and Selection Stage (Stage 2) to identify an emerging preferred corridor, siting zones and siting areas within which the required infrastructure for the Project may be located.
Cumulative effects	There are two types of effect, intra-project effects and inter-project effects. The former occurs as a result of two or more impacts acting together (i.e., combined), to result in a new or changed effect on a single receptor. The latter arise as a result of the Project in combination with other large-scale developments or projects.

Term	Definition
Decibel (dB)	Noise is conventionally measured in decibels (dB). The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the dB scale which extends from 0 to 140dB corresponding to the intensity of the sound pressure level.
Development Consent Order (DCO)	Where the Secretary of State (SoS) proposes to grant consent for a NSIP, this will be through a DCO which is normally made as a statutory instrument – a form of secondary legislation. The DCO not only provides planning consent for the Project but may also incorporate other consents and include authorisation for the compulsory acquisition of land.
Direct effects	Direct effects are those that result directly from the Project.
Double tee	A connection from both circuits on either side of the same structure, creating a third and fourth circuit on another structure.
Driver delay	Traffic delays to non-development traffic.
Dust	Generic term used to describe larger non-respirable airborne particulates (typically those which are deposited rapidly and normally associated with soiling/marking of property, cars, vegetation etc.).
Early Medieval	410 to 1066 CE
Effects	For the purposes of the EIA, the term ‘effects’ are the consequences of changes (e.g., habitat becomes degraded by changes in drainage pattern).
Electricity System Operator (ESO)	Body required to support and guide the future development of the electricity transmission system in Britain.
Electricity Ten Year Statement (ETYS)	The Electricity Ten Year Statement (ETYS) is the ESO’s view of future transmission requirements and the capability of Great Britain’s National Electricity Transmission System (NETS) over the next 10 years. Using the data from the Future Energy Scenarios (FES), points on the transmission network are identified where more transfer capacity is needed to continue to deliver electricity reliably from where it is generated to where it is needed.
Electricity transmission system	The electricity transmission system is made up largely of 400kV, 275kV and 132kV assets connecting separately owned generators and interconnectors with the demand for electricity fed directly from the transmission system, and distribution systems. The ‘transmission’ classification applies to assets at 132kV or above in Scotland or offshore. In England and Wales, it relates to assets at 275kV and above.

Term	Definition
	The electricity transmission system is designed to make sure there is sufficient transmission capacity to ensure that the system can be operated in an economic and efficient way by the ESO, ensuring power can be moved from where it is generated to demand centres across Britain. This planning and development of the electricity transmission system is governed by the Security and Quality of Supply Standard (SQSS) which ensure that the network is developed and operated securely and is resilient to any foreseeable network faults and disruption.
Electromagnetic fields (EMF)	Electric fields are created by differences in voltage: the higher the voltage, the stronger will be the resultant field. Magnetic fields are created when electric current flows: the greater the current, the stronger the magnetic field. An electric field will exist even when there is no current flowing. If current does flow, the strength of the magnetic field will vary with power consumption, but the electric field strength will be constant.
Embedded measures	Modifications to the location, design or operation of the development identified during the iterative design process in order to prevent or reduce likely adverse effects, and that are an inherent part of the Project. These are referred to as 'primary measures' in accordance with IEMA guidelines and will be embedded within the design of the Project. In addition, best practice/industry standard measures also form embedded mitigation.
Environmental Gain (EG)	National Grid has defined 'Environmental Gain' with Ofgem as being an amalgam of BNG and the status of Natural Capital (NC). This sees a simple formula being used to calculate overall EG.
Environmental Impact Assessment (EIA)	An EIA is a tool for systematically examining and assessing the impacts and effects of a development on the environment. The objective of the EIA is to identify any likely significant effects which may arise from the Project and identify measures to prevent, reduce or offset any adverse effects.
Environmental Statement (ES)	The outcome of the EIA process is reported within a document called an ES.
Fear and intimidation	In the context of traffic and transport, these may be experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths.
Flood Risk Assessment (FRA)	The FRA will assess the flood risk both to and from the Project and demonstrate how that flood risk will be managed over the Project's lifetime.

Term	Definition
Future baseline	This is the theoretical situation that would exist in the absence of the Project. This is based upon extrapolating the current baseline using technical knowledge of likely changes over the identified period (for example anticipated habitat change over time, climate change projections, traffic and waste volume growth over time, etc.).
Future Energy Scenarios (FES)	Published annually by the ESO the Future Energy Scenarios sets out credible ways that the UK can achieve Net Zero by 2050, as well as the UK Government's commitment to a decarbonised electricity system by 2035. Based on extensive stakeholder engagement, research and modelling, each scenario considers how much energy might be needed; where it could come from; and how we maintain a system that is reliable.
Gas Insulated Switchgear (GIS)	Gas insulated switchgear (usually Sulphur hexafluoride (SF6)) composing electrical disconnect switches or circuit breakers used to control, protect and isolate electrical equipment.
Good practice measures	Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements or actions that are considered to be standard practice used to manage commonly occurring environmental effects. These are referred to as 'tertiary measures' in accordance with the IEMA guidelines and would also be embedded within the design of the Project.
Graduated Swathes	Indicate the broad areas where the components of the new overhead lines forming part of the Project are likely to be located.
Ground dissolution (of limestone)	A reduction in the solid mass of rock as a result of groundwater dissolving it. This loss of mass can cause ground instability at the surface.
Ground gas	A general term to include all gases occurring and generated within the ground whether originating from Made Ground or from natural soil or rock. Typically used to mean only potentially hazardous ground gases, such as carbon dioxide, methane, hydrogen sulphide and carbon monoxide.
Habitat of Principal Importance (HPI)	HPI are covered under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The term is interchangeable with 'UK Priority BAP Habitat', 'Section 41 habitat' and 'NERCs41 habitat'.
Habitats Regulations Assessment (HRA)	A HRA refers to the several distinct stages of Assessment which must be undertaken in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine

Term	Definition
	Habitats and Species Regulations 2017 (as amended) to determine if a plan or project may affect the protected features of a habitats site before deciding whether to undertake, permit or authorise it.
Heavy Duty Vehicle (HDV)	Goods vehicles + buses >3.5 t gross vehicle weight.
Heavily Modified Water Body	Significant water bodies that have changed water category due to modifications.
Heritage Significance	The significance of a heritage asset is the product of the value it holds for this and future generations as a result of its historic, archaeological, architectural or artistic interests.
Historical Interest	A heritage asset with value from its association with past events or past people; or where a heritage asset is illustrative of a particular asset type, theme, or period.
Holford Rules	A series of guidelines/rules for the routeing and design of new overhead lines or overhead line extensions. The guidelines were initially developed in 1959 and have been reviewed on a number of occasions by National Grid and by the other UK transmission licence holders. The guidelines provide a set of design criteria that have stood the test of time and became accepted industry best practice in overhead line routeing. The guidelines now form an important part of national planning policy relating to the development of electricity networks, as set out in National Policy Statement EN-5.
Horlock Rules	A series of guidelines/rules for the siting and design of new substations, or substation extensions, including consideration of line entries and SECs. The guidelines were initially developed in 2003 and have been reviewed on a number of occasions by National Grid, with a revised version issued in 2009. The Horlock Rules provide a set of principles which avoid, or reduce the environmental impacts associated with the development of new substation infrastructure.
Impacts	For the purposes of the EIA and this Scoping Report, the term ‘impacts’ is used to describe the changes that arise as a result of the Project (e.g., changes in drainage pattern).
Index of Multiple Deprivation (IMD)	The IMD is the official measure of relative deprivation for small areas (neighbourhoods) in England. The IMD are calculated based on the following factors: income deprivation, employment, health and disability, education, skills and training, barriers to housing and services, crime and living environment.
Indirect and secondary effects	Indirect and secondary effects are those which are not caused immediately by the Project but arise as a consequence of it. As such they would normally occur later in time or at locations

Term	Definition
	farther away than direct effects. An example would be where water or gas pipes are damaged as a result of the Project, and the consequences of that damage is fire or flood risk to other receptors.
Institute of Air Quality Management (IAQM)	The professional body for air quality practitioners
Institute of Environmental Management and Assessment (IEMA)	A professional body for practitioners working in the fields of environmental management and assessment.
Inter-project effects	Arise as a result of the Project in combination with other large-scale developments or projects.
Internal Drainage Board (IDB)	A public body that manage water levels in an area, known as an internal drainage district, where there is a special need for drainage. IDBs undertake works to reduce flood risk to people and property, and manage water levels for agricultural and environmental needs within their district.
Intra-project effects	Effects that occur as a result of two or more impacts acting together (i.e., combined, to result in a new or changed effects on a single receptor).
Iron Age	-800 BCE to 43 CE
Joint Nature Conservation Committee (JNCC)	The JNCC are the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.
Kilometre	A unit of measurement
Kilovolts (kV)	A unit of electromotive force, equal to 1,000 volts.
Landscape and Ecology Management Plan (LEMP)	A LEMP details the immediate long-term commitments to manage the planting, protection and enhancement of biodiversity in and around a new development site.
Landscape Character Area (LCA)	Discrete geographical areas of a particular landscape type with a broadly consistent character, which might include: pattern of topography, land use, vegetation cover, geology, cultural and ecological features, pattern of evolution, visual and perceptual qualities and habitats.
Landscape Character Type (LCT)	Generic, typically homogenous types of landscape that may occur in different parts of the country. They have similar geology, topography, drainage patterns, vegetation, land use, patterns of settlement and aesthetic character.

Term	Definition
Light Duty Vehicle (LDV)	Cars and small vans <3.5 t gross vehicle weight.
Listed Building	A building or structure of special historical or architectural/artistic interest. Designated by the Department for Digital, Culture, Media and Sport. All buildings built before 1700 which survive in anything like their original condition are likely to be listed, as are most buildings built between 1700 and 1850.
Local Geological Sites	A non-statutory designation for regionally important geological and geomorphological sites that have been identified as being of importance locally.
Local Wildlife Site (LWS)	Non-statutory nature conservation sites of local value.
Lower Layer Super Output Area (LSOA)	LSOAs are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level above which adverse effects on health and quality of life can be detected.
Medieval	1066 to 1540 CE
Mesolithic	-10,000 to -4,000 BCE
Modern	1901 to present
National Cycle Network (NCN)	The NCN is a UK-wide network of signed paths and routes for walking, cycling, wheeling and exploring outdoors.
National Grid Electricity Transmission (NGET) ('National Grid')	National Grid operate the national electricity transmission network across Great Britain and own and maintain the network in England and Wales, providing electricity supplies from generating stations to local distribution companies. National Grid does not distribute electricity to individual premises, but its role in the wholesale market is vital to ensuring a reliable, secure and quality supply to all.
National Policy Statement (NPS)	Government planning policy relating to the development of NSIPs is set out in the relevant NPS. NSIPs should be developed in accordance with the relevant NPS. In the case of new transmission routes the relevant energy-related NPS are EN-1; Overarching NPS for Energy and EN-5; Electricity Networks Infrastructure.
Nationally Significant Infrastructure Project (NSIP)	NSIPs are developments (relating to energy, transport, water, or waste) which are identified in the Planning Act 2008 and require a type of consent known as "development consent".

Term	Definition
National Site Network (NSN)	The national site network includes all existing and future SACs and SPAs following the replacement of the EU Habitats and Wild Birds Directives with UK regulation.
Natural Capital (NC)	The total stock of natural resources and services provided by natural assets which benefit people.
Natural Superficial Deposits	Geologically recent deposits that consist of various sediments (clay, sand, gravel etc.) and sit on top of the bedrock.
Neolithic	-4,000 to -2,200 BCE
Nitrate Vulnerable Zones	Areas covering 62% of England designated as a result of the EU's Nitrates Directive in order to reduce the level of nitrates in surface and groundwater. Farmers with land in nitrate vulnerable zones have to follow mandatory rules to tackle nitrate loss from agriculture.
Nitrous Dioxide (NO_2)	Reddish brown gas (in high concentrations), respiratory irritant and precursor to photochemical processes which produce other pollutants, photochemical smog and contribute to global warming.
Nitrous Oxide (NOx)	Inert product of combustion, which does not contribute to local air pollution.
Non-Road Mobile Machinery (NRMM)	A broad category which includes mobile machines, and transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads.
Options appraisal	A robust and transparent process used to compare options and to assess the positive and negative effects they may have across a wide range of criteria including environmental, socio-economic, technical and cost factors. The outcome is to identify a Strategic Proposal for the Project.
Options Identification and Selection	Work undertaken to determine the preferred corridor and preliminary routeing and siting options for the Project. It is intended to demonstrate how National Grid's statutory duties, licence obligations, policy considerations, environmental, socio-economic, technical, cost, and programme issues have been considered and provide information on the approach to the identification and appraisal of route corridors and siting locations.
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Palaeolithic	-1,000 000 to -10,000 BCE

Term	Definition
Particulate matter (PM_{10} and $PM_{2.5}$)	PM is the term used to describe condensed phase (solid or liquid) particles suspended in the atmosphere. Their potential for causing health problems is directly linked to the size of the particles. PM_{10} is particulate matter with a diameter of 10 microns or less (also referred to as micrometres or 1/1000th of a meter). $PM_{2.5}$ is particulate matter 2.5 microns or less in diameter.
Pathway (for contamination)	A route or means by which a receptor could be, or is, exposed to or affected by a contaminant.
Pedestrian amenity	The effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width/separation from traffic.
Pedestrian delay	The ability of people to crossroads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions.
Permanent effects	These are effects that will remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary.
Phytotoxic	Displaying toxicity towards plants.
Polybrominated diphenyl ethers (PBDE)	Polybrominated diphenyl ethers are a group of man-made organobromine compounds.
Post Medieval	1540 to 1901
Power control devices	Power control devices are designed to increase or decrease the apparent reactance of a line, thereby pushing power away from or pulling more power towards the circuit on which they are installed.
Preliminary Environmental Information Report	A report that compiles and presents the Preliminary Environmental Information gathered for a project.
Project Need Case	Sets out the reasons why the Project is required.
Public Rights of Way (PRoW)	These are designated routes under the CROW Act 2000, which the public can use at any time.
Pylon	Overhead line structure used to carry overhead electrical conductors, insulators and fittings.
Radon	A naturally occurring radioactive chemical element, which occurs as a gas.
Ramsar sites	Wetlands of international importance designated under the Ramsar Convention.
Rating level	The specific sound level, with the addition of character corrections to consider certain acoustic features that could

Term	Definition
	potentially increase the significance of impact. If no acoustic features are present then the rating level is equal to the specific sound level.
Receptor	A component of the natural or man-made environment such as water or a building that is affected by an impact.
Registered Battlefield	Register of nationally significant military engagements maintained and designated by Historic England.
Registered Park and Garden	Register of historic parks, gardens, grounds, and planned open spaces maintained and designated by Historic England.
River Basin Management Plan	A regional plan that sets out how organisations, stakeholders and communities would work together to improve the water environment and fulfil the requirements of the Water Framework Directive.
Road links	A linear spatial object that describes the geometry and connectivity of a road network between two points in the network.
Rochdale Envelope	The 'Rochdale Envelope' or 'Design Envelope' approach is employed where the nature of a proposed development means that some details of a project have not been confirmed (for instance, the precise dimensions of structures) when an application is submitted, and flexibility within clearly defined parameters is therefore sought to address uncertainty.
Romano-British	43 to 410 CE
Root Protection Area (RPA)	A notional area of tree root spread (as calculated per BS5837) considered as the minimum volume necessary to ensure tree health and function.
S41 of NERC Act	Section 41 of the NERC Act 2006 lists species of principal importance in England for the purpose of conserving biodiversity
Schedule 1 Species	Bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), for which it is an offence to intentionally or recklessly disturb birds and their young at, on or near an 'active' nest.
Scheduled monument	Nationally important archaeological sites. Designated by the Department for Digital, Culture, Media and Sport. These can be above or below-ground and do not need to be ancient.
Scoping Opinion	A Scoping Opinion is requested from the Planning Inspectorate on behalf of the SoS, to inform the requirements of EIA process and ultimately the ES which will be submitted as part of the application for development consent. Through the scoping process the views of the statutory consultees and other relevant organisations on the proposed scope of the EIA are sought.

Term	Definition
Scoping Boundary	A Scoping Boundary has been defined to represent the likely maximum extent of development.
Security and Quality of Supply Standard (SQSS)	The SQSS sets out a coordinated set of criteria and methodologies that the Transmission Licences shall use in the planning and operation of the national electricity transmission system.
Setting	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate an asset, or may be neutral.
Severance	The separation of people from places and other people and places or impede pedestrian access to essential facilities.
Significant Observed Adverse Effect Level (SOAEL)	This is the level above which significant adverse effects on health and quality of life occur.
Site of Ecological Importance (SEI)	An old system of designated sites designated by the local authority (on the basis of their wildlife and amenity value which are gradually being reviewed and reassessed against new LWS selection criteria and where they qualify will be replaced by LWS.
Site of Importance for Nature Conservation (SINC)	Non-statutory nature conservation sites, these are equivalent to LWS.
Site of Special Scientific Interest (SSSI)	An area of land designated by Natural England as of special interest by reason of its flora, fauna or geological or physiographical features.
Siting Area	An area of land within which a new CSEC or substation could be sited.
Siting Zone	An area of land within a study area, within which multiple Siting Areas could be located.
Source (of contamination)	A substance that is in, on or under the land and that has the potential to cause harm or to cause pollution of Controlled Waters.
Source Protection Zone (SPZ)	Zones defined by the Environment Agency to protect groundwater sources such as wells, boreholes and springs from potential contamination.
Special Areas of Conservation (SACs)	Protected areas in the UK designated under the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales.

Term	Definition
Special Protection Areas (SPA)	Protected areas for birds in the UK classified under the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales.
Species of Principal Importance (SPI)	Covered under Section 41 of the NERC Act 2006. The term is interchangeable with ‘UK Priority BAP Species’, ‘Section 41 species’ and ‘NERCs41 species’.
Specific sound level	The equivalent continuous A-weighted sound pressure level produced by a specific sound source (i.e., the sound source under assessment in accordance with BS 4142:2014) at the assessment location over a given reference time interval, Tr.
Strategic Proposal	The outcome of the strategic options appraisal; the Strategic Proposal is then taken forward to the Options Identification and Selection stage.
Strategic Road Network (SRN)	The SRN is made up of motorways and trunk roads (the most significant 'A' roads).
Substation	Electrical equipment in an electric power system through which electrical energy is passed for transmission, transformation, distribution or switching.
Sulphur hexafluoride (SF_6)	Sulphur hexafluoride is a highly effective electrical insulator used in high-voltage electrical applications. It's a greenhouse gas that has a global warming impact of 22,800 times that of carbon dioxide.
Sustainable Drainage Systems	Measures designed to control surface runoff close to its source, including management practices and control measures such as storage tanks, basins, swales, ponds and lakes. Sustainable drainage systems allow a gradual release of water and thereby reduce the potential for downstream flooding.
Temporary effects	These are effects that are related to environmental changes associated with a particular activity and that will cease when that activity finishes.
Transboundary effects	Transboundary effects are those effects that would affect the environment in another state within the European Economic Area (EEA).
Tree Preservation Order (TPO)	A statutory designation protecting trees, administered by the relevant local planning authority.
Underground Cable	An insulated conductor carrying electric current designed for underground installation.

Term	Definition
Vibration	Vibration is an oscillatory motion. The magnitude of vibration can be defined in terms of displacement, i.e., how far from the equilibrium something moves, velocity (how fast something moves), or acceleration (the rate of change of velocity).
World Heritage Site	A natural or man-made site, area, or structure recognised as being of outstanding international importance and therefore as deserving special protection. Sites are nominated to and designated by the World Heritage Convention.
Zone of Influence (ZoI)	An identified geographical area around the Project where there is a potential for impacts to occur.
Zone of Theoretical Visibility (ZTV)	The likely (or theoretical) extent of visibility of a development, usually shown on a map.

Abbreviations

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Abbreviations	Full Term
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ABST	Advanced Bat Survey Techniques
AC	Alternating Current
ACoW	Arboricultural Clerk of Works
ADS	Archaeological Data Service
AEP	Annual Exceedance Probability
AGLV	Areas of Great Landscape Value
AIA	Arboricultural Impact Assessment
AIL	Abnormal Indivisible Load
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
ANC	Association of Noise Consultants
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Standard
ASR	Annual Status Report
ASTI	Accelerated Strategic Transmission Investment
ATCs	Automatic Traffic Counts
AVR	Accurate Visual Representations
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BESS	Battery Energy Solar Storage
BFI	Base Flow Index
BGS	British Geological Survey
BMV	Best and Most Versatile (land)
BNG	Biodiversity Net Gain
BNL	Basic Noise Level
BoCC	Birds of Conservation Concern

Abbreviations	Full Term
BPM	Best Practicable Means
BRAG	Blue Red Amber Green
BS	British Standards
BTO	British Trust for Ornithology
CA	Conservation Area Note: Countryside Agency if required to be used in full)
CAMS	Catchment Abstraction Management Strategy
CCC	Climate Change Committee
CCGT	Combined Cycle Gas Turbine
CCR	Climate Change Resilience
CDM	Construction Design and Management
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology an Environmental Management
CIfA	Chartered Institute for Archaeologists
CIHT	Chartered Institution of Highways and Transportation
CIRIA	Construction Industry Research and Information Association.
CJEU	Court of Justice for the European Union
CLAIRE	Contaminated Land: Applications in Real Environments
CoCP	Code of Construction Practice
COMAH	Control of Major Accident Hazard
CNP	Critical National Party
COPD	Chronic Obstruction Pulmonary Dease
CPRSS	Corridor Preliminary Routing and Siting Study
CROW (Act)	Countryside and Rights of Way Act, 2000
CRT	Canals and Rivers Trust
CRTN	Calculation of Road Traffic Noise
CSS	Countryside Stewardship Scheme
CTMP	Construction Traffic Management Plan
CWS	County Wildlife Site
CWTP	Construction Worker Travel Plan

Abbreviations	Full Term
dB	Decibel
DC	Direct Current
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DLL	District Level Licence
DM	Do-Minimum
DMP	Dust Management Plan
DrMP	Drainage Management Plan
DMRB	Design Manual for Roads and Bridges
DNO	Distribution Network Operator
DTM	Digital Terrain Model
EA	Environment Agency
EC	European Commission
EcIA	Ecological Impact Assessment
ECoW	Environmental Clerk of Works
eDNA	Environmental DNA
EG	Environmental Gain
EGL	Eastern Green Link
EIA	Environmental Impact Assessment
EMFs	Electric and Magnetic Fields
EMS	Environmental Management System
EN-1	Overarching National Policy Statement for Energy
EN-5	National Policy Statement for Electricity Networks Infrastructure
EnvCoWs	Environmental Clerk of Works
EPA	Environmental Protection Act
EPR	Environmental Permitting Regulations
EPS	European Protected Species
EqIA	Equalities Impact Assessment
ES	Environmental Statement
ESO	Electricity System Operator
EU	European Union

Abbreviations	Full Term
FCD	Field Capacity Days
FRA	Flood Risk Assessment
FRAP	Flood Risk Activity Permit
FWRA	Foundation Works Risk Assessment
FZ	Flood Zone
GCN	Great Crested Newt
GCR	Geological Conservation Review
GDP	Gross Domestic Product
GEP	Good Ecological Potential
GES	Good Ecological Status
GHG	Greenhouse Gas
GI	Geotechnical Investigation
GIS	Gas Insulated Switchgear/Geographic Information System (note context)
GLNP	Greater Lincolnshire Nature Partnership
GLVIA3	Guidelines for Landscape and Visual Impact Assessment Third Edition
GPS	Geographic Positioning System
GVA	Gross Value Added
GVLIA	Guidelines for Landscape and Visual Impact Assessment
GW	Gigawatt. One billion (10^9) watts
GW1[1]	Grimsby West - siting area GW1
GW2	Grimsby West - siting area GW2
GW3	Grimsby West - siting area GW3
GW4	Grimsby West - siting area GW4
GW5	Grimsby West - siting area GW5
GWDTE	Groundwater Dependant Terrestrial Ecosystems
HA	Highways Agency
ha	Hectare
HCA	Homes & Communities Agency
HDV	Heavy Duty Vehicle
HER	Historic Environment Record

[1] Chapter 3 Main Alternatives Considered lists GW1 to GW5 as the identified siting areas withing Grimsby West siting zone.

Abbreviations	Full Term
HGV	Heavy Goods Vehicle
HIS	Habitat Suitability Index
HLA	Historic Landscape Assessment
HLC	Historic Landscape Characterisation
HLCA	Historic Landscape Character Area
HM	His Majesty's
HMWB	Heavily Modified Water Body
HND	Holistic Network Design
HPI	Habitat of Principal Importance
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
HVDC	High Voltage Direct Current
Hz	Hertz
IAQM	Institute of Air Quality Management
ICCI	In-Combination Climate Change Impact
ICE	Inventory of Carbon and Energy
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IDB	Internal Drainage Board
IEMA	Institute of Environmental Management and Assessment
IHBC	Institute of Historic Building Conservation
IMD	Index of Multiple Deprivation
INNS	Invasive Non-Native Species
IPC	Infrastructure Planning Commission (replaced by the Planning Inspectorate)
IROPI	Imperative Reasons of Overriding Public Interest
ISO	International Standards Organisation
JNCC	Joint Nature Conservation Committee
km	Kilometre
kV	Kilovolt
kV/m	kilovolts per metre
LBAP	Local Biodiversity Action Plan
LCA	Landscape Character Areas
LCS	Lincolnshire Connection Substations

Abbreviations	Full Term
LCT	Landscape Character Type
LDF	Local Development Framework
LDP	Local Development Plan
LDV	Light Duty Vehicle
LEMP	Landscape Ecological Management Plan
LEP	Local Enterprise Partnership
LGS	Local Geological Sites
LI	Landscape Institute
LNR	Local Nature Reserve
LHA	Local Highway Authority
LOAEL	Lowest Observed Adverse Effect Level
LoD	Limit of Deviation
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LSE	Likely Significant Effect
LSOA	Lower Super Output Areas
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
m	metre/million
MCAA	Marine and Coastal Access Act
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi-Agency Geographic Information for the Countryside
MCZ	Marine Conservation Zones
MMO	Marine Management Organisation
MP	Member of Parliament
MPS	Minerals Policy Statement
MW	Megawatt. One million (10^6 / 1,000,000) watts
NAQO	National Air Quality Objective
NAQS	National Air Quality Strategy
NB	Note well (Nota Bene)
NBIS	Norfolk Biodiversity Information Service
NBN	National Biodiversity Network
NC	Natural Capital

Abbreviations	Full Term
NCA	National Character Area
NCN	National Cycle Network
NCR	National Cycle Route
NERC	Natural Environment and Rural Communities Act
NETS	National Electricity Transmission System
NFM	Natural Flood Management
NGET	National Grid Electricity Transmission
NGR	National Grid Reference
NHLE	National Heritage List for England
NIA	Noise Important Areas
NIC	National Infrastructure Commission
NMP	National Mapping Programme
NMU	Non-Motorised User
NNR	National Nature Reserve
NO	Nitrogen Monoxide
NO_2	Nitrogen Dioxide
NOA	Network Options Assessment
NOx	Nitrous Oxide
NPG	Northern Power Grid
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NPS	National Policy Statement
NRFA	National River Flow Archive
NRMM	Non-Road Mobile Machinery
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
NSN	National Site Network
NSR	Noise Sensitive Receiver
NTL	Normal Tide Limit
NTS	Not to Scale / Non-Technical Summary (note context)
NVC	National Vegetation Classification
NVQ	National Vocational Qualification
NVZ	Nitrate Vulnerable Zones

Abbreviations	Full Term
OD	Ordnance Datum
OELS	Organic Entry Level Stewardship
OFWAT	Water Services Regulation Authority
OHID	Office for Health Improvement and Disparities
OHL	Overhead Line
ONS	Office of National Statistics
OS	Ordnance Survey
OWF	Offshore Wind Farm
PA	Planning Act
PAS 2080	Publicly Available Specification 2080
PD	Permitted Development
PEI Report	Preliminary Environmental Information Report
PFOS	Perfluorooctane sulphonate
PHE	Public Health England
PIC	Personal Injury Collision
PINS	Planning Inspectorate
PM_{10} and $PM_{2.5}$	Particulate matter
PPE	Personal Protective Equipment
PRoW	Public Right of Way
PRF	Potential Roost Features
pSAC	Proposed Special Area of Conservation
pSPA	Proposed Special Protection Area
PSR	Primary Surveillance RADAR
PV	Photovoltaic
RADAR	Radio Detection and Ranging
RAF	Royal Air Force
RAMS	Risk Assessment and Method Statement
RBD	River Basin Districts
RBMP	River Basin Management Plan
RCA	River Condition Assessment
RIGS	Regionally Important Geological Site
RLCT	Regional Landscape Character Types
RNR	Roadside Nature Reserves

Abbreviations	Full Term
RoFSW	Risk of Flooding from Surface Water
RPA	Root Protection Area
RPG	Registered Parks and Gardens
RSPB	Royal Society for the Protection of Birds
RVAA	Residential Visual Amenity Assessment
SAC	Special Area of Conservation
SEC	Sealing End Compounds
SEI	Site of Ecological Importance
SFRA	Strategic Flood Risk Assessment
SF_6	Sulphur Hexafluoride
SINC	Site of Importance for Nature Conservation
SLA	Special Landscape Area
SMP	Soil Management Plan
SMR	Standardized Mortality Rate
SNIC	Site of Nature Conservation Importance
SOAEL	Significant Observed Adverse Effect Level
SOR	Strategic Optioneering Report
SoS	Secretary of State
SPA	Special Protection Area
SPI	Species of Principal Importance
SPZ	Source Protection Zone
SQSS	Security and Quality of Supply Standard
SRN	Strategic Road Network
SSS	Substation Siting Study
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
SWMP	Site Waste Management Plan
TA	Transport Assessment
TAN	Technical Advice Note
tCO_2e	Tonnes of Carbon Dioxide equivalent
TGN	Technical Guidance Note
TMP	Traffic Management Plan
T&D	Transmission and Distribution

Abbreviations	Full Term
TPO	Tree Preservation Order
Ccc\UGC	Underground Cabling
UAV	Unmanned Aerial Vehicle
UK	United Kingdom
UKBAP	United Kingdom Biodiversity Action Plan
UKHAP	United Kingdom Habitat Action Plan
UKHSA	United Kingdom Health Security Agency
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
WC	Wetness Class
WeBS	Wetland Birds Survey
WFD	Water Framework Directive
WHO	The World Health Organisation
WSI	Written Scheme of Investigation
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1. Introduction

nationalgrid

Contents

1.1 Overview

1.1.1 This Environmental Impact Assessment (EIA) Scoping Report has been prepared by Ove Arup and Partners Ltd and AECOM Ltd, on behalf of National Grid Electricity Transmission plc (National Grid), to support a request for a Scoping Opinion from the Secretary of State (SoS) for the Department for Energy Security and Net Zero, for the purposes of Regulation 10(1) of The Infrastructure Planning (Environmental Impact Assessment Regulations 2017 (the "EIA Regulations") (Ref 1.1) for the Grimsby to Walpole Project (the "Project")

1.1.2 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under Part 3(16) of the Planning Act 2008 ("PA 2008") (as amended) (Ref 1.2) because it comprises a new electricity line above ground with a length of more than 2 kilometres (km), and with an operating voltage of above 132 kV.

1.1.3 The proposal by National Grid is to reinforce the transmission network with a new 400 kilovolt (kV) electricity transmission line over a distance of approximately 140 km starting from a new 400 kV substation west of the town of Grimsby in North East Lincolnshire and ending at a new 400 kV substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District. The Project also includes the construction of two new 400 kV Lincolnshire Connection substations located south-west of Mablethorpe in East Lindsey, a new 400 kV substation in the vicinity of the Spalding Tee-Point in South Holland District and potentially the decommissioning of the current Grimsby West Substation.

1.1.4 National Grid owns, builds and maintains the electricity transmission network in England and Wales, and operates the high voltage electricity network throughout Great Britain, transporting electricity from generators (such as wind farms, solar farms and power stations) to local distribution network operators. Under the Electricity Act 1989 (Ref 1.3), National Grid holds a transmission licence, under which it is required to develop and maintain an efficient, coordinated and economical electricity system.

1.1.5 National Grid is also required, under Section 38 of the Electricity Act 1989, to comply with the provisions of Schedule 9 of the Act. Schedule 9 requires licence holders, in the formulation of proposals to transmit electricity, to:

Schedule 9(1)(a) '…have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest;' and

Schedule 9(1)(b) '…do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects'.

1.2 The need for the Project

1.2.1 The Government's recent British Energy Security Strategy (Ref 1.4) outlines the ambition to increase energy from offshore wind to 50GW by 2030 – more than enough to power every home in the UK. This has led to a shift towards offshore renewable generation of power away from coal powered generation in the north and the Midlands. The UK is also transporting more power between countries across the North Sea, using interconnectors. These factors have driven a change in the energy landscape across the UK in particular the East of England including the Yorkshire and Humber, East

Midlands, and Norfolk regions of England where reinforcement of the network (overhead lines (OHLs), pylons, cables and other infrastructure that transports electricity around the country) is required to deliver this change.

1.2.2 The existing electricity transmission network in the Humber and East Midlands region was developed in the 1960s and has historically been able to meet demand. However, due to the changes noted above in terms of delivering net zero emissions, the network does not have the capability to reliably and securely transport all the energy that will be connected by 2030, whilst operating to the standards it is required to. The Project is part of The Great Grid Upgrade and along with a number of other projects will support the UK's net zero target by reinforcing the electricity transmission network along the East Coast and facilitating the connection of planned offshore wind generation, interconnectors with other countries and other sources of electricity, allowing clean green energy to be carried on the network.

1.2.3 National Grid has considered alternative strategic options to reinforce the network and alternative route corridors, as part of the options appraisal process (see **Chapter 3 Main Alternatives Considered**). The reinforcement is necessary to support the connection of new generation projects in Scotland and the north-east of England in the next decade and beyond. National Grid identified that the existing transmission system would not be sufficient to meet connection demand going forward. Without additional network capability, offshore wind and interconnectors will be constrained at times of high wind generations and high imports. The operation of the network would become sub-optimal in the long term, less efficient, and more carbon intensive sources of generation would potentially be used at those times, hindering progress towards net zero.

1.2.4 The network reinforcement would provide greater security to the network in the region and reduce the risk of outages (a period of interruption to electricity supply) from limited network availability. If the network is not reinforced, outages could result in a greater risk of widespread supply interruptions. The transmission network needs to be able to maintain a minimum level of security of supply, as defined within the National Electricity Transmission System Security and Quality of Supply Standards.

1.3 The requirement for Environmental Impact Assessment

1.3.1 Environmental Impact Assessment (EIA) is a process required by UK law which brings together information about the likely significant effects of a development. The legal basis for EIA lies in European Community Directive 85/337/EEC2 (the "EIA Directive"). The EIA Directive is transposed into UK law through several pieces of legislation.

1.3.2 In relation to NSIPs, EIA is required for certain developments under the EIA Regulations (Ref 1.1). Under the EIA Regulations, EIA is mandatory for development projects defined under Schedule 1. Those development projects defined in Schedule 2 only require EIA if they are likely to have significant effects on the environment by virtue of their nature, size or location. As the proposed Project comprises an overhead with a voltage of 220 kV or more and its length is greater than 15 km, the Project falls within the provisions of Schedule 1. Considering the nature and size of the Project, an EIA will be prepared in line with Regulation 8(1)(b) of the EIA Regulations, National Grid hereby provides notice that the application for a Development Consent Order (DCO) will be accompanied by an Environmental Statement (ES).

1.4 Geographical Context

1.4.1 A description of the proposed Project is outlined in **Chapter 4 Description of the Project.**

1.4.2 The majority of the Project is located in the East Midlands Region, with a section to the north in Yorkshire and Humber, and a section to the south in Norfolk, as illustrated on **Figure 1.1 Scoping Boundary.** The Scoping Boundary lies within seven local planning authority areas: the northern part of the Project lies within North East Lincolnshire and West Lindsey and East Lindsey, the central parts of the Project lie within North Kesteven, Boston, South Holland and Fenland, and the southern parts of the Project lie within Kings Lynn and West Norfolk.

1.4.3 The Project is located in an area that is predominantly rural, with large parts of the land under arable use. The towns of Grimsby, Louth, Boston, and Spalding are located within 5 km of the Project. There are also multiple villages and individual properties near to the Project.

1.4.4 There are numerous OHLs of varying voltage in the vicinity of parts of the Project, most notable is the existing 400 kV 4 KG OHL which routes west out of the existing Grimsby West Substation, parallel to the northern edge of the Scoping Boundary, and the existing 400 kV 4ZM which routes through the proposed Weston Marsh Substation. There are also three existing 400 kV substations located within 1.5 km of the Scoping Boundary these are the existing Grimsby West Substation, Spalding North Substation and Walpole Substation.

1.4.5 The Scoping Boundary is based on the preferred corridor identified within the Corridor Preliminary Routing and Sitting Study which aimed to avoid unnecessary impacts on the Lincolnshire Wolds National Landscape, the Humber Estuary Special Areas of Conservation, Site of Special Scientific Interest and Special Protection Area (SPA), and the Greater Wash SPA, taking into account the ecological and visual concerns regarding these designated sites.

1.5 Purpose of the Scoping Report

1.5.1 Scoping forms a key stage of the EIA process; providing a framework for identifying potential significant effects arising from the Project and distinguishing the environmental topics to be addressed within the ES.

1.5.2 This Scoping Report sets out the proposed content, methodologies to be adopted and the potential likely significant environmental effects that are proposed to be considered in the EIA.

1.5.3 The opinion of the SoS is being sought specifically on:

- the environmental topics that should be included in the EIA;
- the relevant components of the Project and the resultant likely significant effects;
- those effects not likely to be significant that do not need to be considered further;
- the approach to setting the Study Areas for each topic;
- the data that has been gathered (and will be gathered);
- the assessment methods that will be used to determine likely significant effects; and

- the approach to determining the environmental measures that could be incorporated into the Project to avoid, prevent, reduce or, if necessary, offset significant effects.

1.5.4 This Scoping Report has been prepared in accordance with the EIA Regulations (Ref 1.1), as well as having due regard to Planning Inspectorate (PINS) Advice Note Seven (Ref 1.5).

1.5.5 Regulation 10(3) of the EIA Regulations defines the information that must be provided when requesting a scoping opinion, namely:

"(a) a plan to sufficiently identify the land;

(b) a description of the proposed development including its location and technical capacity;

(c) an explanation of the likely significant effects of the development on the environment; and

(d) such other information or representations as the person making the request may wish to provide or make".

1.5.6 **Table 1.1** identifies where the information set out in Regulation 10(3) and PINS Advice Note Seven can be found within this Scoping Report.

Table 1.1: Compliance with Regulation 10(3) and PINS Advice Note Seven

Suggested information to be included within the Scoping Report	Location within this Scoping Report
The Project	
Referenced plans presented at an appropriate scale to cover clearly all known features associated with the Project	The Scoping Boundary is shown on **Figure 1.1 Scoping Boundary**
A description of the Project including its location and its technical capacity	**Chapter 4 Description of the Project**
EIA Approach and Topic Areas	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	**Chapter 3 Main Alternatives Considered**.
An explanation of the approach to addressing uncertainly which remains in relation to the elements of the Project	**Chapter 5 EIA Approach and Methodology**
A summary table describing each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	Each of the technical chapters (**Chapter 6** to **Chapter 19**) include a summary table identifying those sources, impact and receptors proposed to be scoped in and out of the ES.

Suggested information to be included within the Scoping Report	Location within this Scoping Report
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided	This is presented within section 6 of each of the technical chapters (**Chapter 6** to **Chapter 19**).
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	Information on the baseline characteristics is included in section 4 of each of the technical chapters (**Chapter 6** to **Chapter 19**).
Aspects and matters to be scoped in, the report should include details or the methods to be used to assess the impacts and to the determine the significance of effect e.g., the criteria for determining sensitivity and magnitude	Sources, impacts and receptors proposed to be 'scoped in' for the purpose of the ES are identified within section 6 of each of the technical chapters (**Chapter 6** to **Chapter**). The proposed EIA approach and methods are described in **Chapter 5 EIA Approach and Methodology** and in section 7 of each of the technical chapters (**Chapter 6** to **Chapter 19**) which describe how they will apply that methodology to their assessments or where it differs due to specific topic guidance, set out their proposed methodologies.
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	These are set out within section 5 of each of the technical chapters (**Chapter 6** to **Chapter 19**). An Initial Outline Code of Construction Practice (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**.
Information Sources	
Reference to any practice and best guidance to be relied upon	This is presented within each of the technical chapters (**Chapter 6** to **Chapter 19**).
Evidence or agreements reached with consultation bodies	Each technical chapter (**Chapter 6** to **Chapter 19**) will include a table showing the summary of engagement undertaken with stakeholders to date.

1.6 Structure of this Scoping Report

1.6.1 The structure of this Scoping Report is outlined in **Table 1.2**. For ease of presentation, **Volume 1** presents the main text of this Scoping Report; **Volume 2 Appendices** and **Volume 3 Figures**.

Table 1.2: Scoping Report Structure

Chapter/Appendix	Content
Volume 1 – Main Text	
Chapter 1 Introduction	An introduction to the Project and the purpose and structure of the Scoping Report.
Chapter 2 Regulatory and Planning Policy Context	A review of the legislative and policy relevant to the Project.
Chapter 3 Main Alternatives Considered	This chapter outlines the evolution of the Project, reasonable alternatives considered and the reasons for selecting the preferred Project.
Chapter 4 Description of the Project	This chapter describes the Project including permanent features and associated temporary works. It describes the general characteristics of the Project, outlines areas of flexibility in relation to design parameters, and how the Project would be constructed, operated and maintained.
Chapter 5 EIA Approach and Methodology	A description of the overall EIA methodology (including cumulative effects) that is proposed for the Project including temporal durations and approach to mitigation.
Chapter 6 Landscape **Chapter 7 Visual** **Chapter 8 Ecology and Biodiversity** **Chapter 9 Historic Environment** **Chapter 10 Water Environment** **Chapter 11 Geology and Hydrogeology** **Chapter 12 Agriculture and Soils** **Chapter 13 Transport and Movement** **Chapter 14 Air Quality** **Chapter 15 Noise and Vibration** **Chapter 16 Socio-economics, Recreation and Tourism** **Chapter 17 Health and Wellbeing** **Chapter 18 Climate Change** **Chapter 19 Major Accidents and Disasters**	There is a chapter for each of the environmental topics which describe aspects to be scoped in and out of the EIA. These technical chapters are structured as follows: • the regulatory and planning policy context specific to the topic area; • the proposed topic Study Area; • a description of the relevant baseline including data sources used; • a summary of engagement undertaken to date presented in a table; • any embedded or good practice measures take into consideration when proposing the scope; • potential for significant effects; • proposed assessment methodology; and • concluding statements explaining the matters proposed to be scoped into and out of the ES.
Volume 2 Appendices	Provides the Appendices which support Volume 1.
Volume 3 Figures	Provides the Figures which support Volume 1.

1.7 Competence

1.7.1 Regulation 14(4) of the EIA Regulations (Ref 1.1) requires that an ES is prepared by "competent experts" and that the ES is accompanied by a competent expert statement outlining the relevant expertise or qualifications of such experts.

1.7.2 This Scoping Report has been prepared and coordinated by a team who are members of the Institute of Environmental Management and Assessment EIA Quality Mark Scheme (Ref 1.6). This is an independently reviewed voluntary standard, requiring organisations to commit to excellence in their EIA activities. All specialists have demonstratable expertise in their fields. These credentials are demonstrated by 'Competent expert statement,' as detailed in **Appendix 1A Competent Expert Statement.**

1.8 Other Assessments

1.8.1 In addition to the EIA, the preparation of the DCO application for the Project requires other standalone assessments to be undertaken such as a Water Framework Directive assessment and a Flood Risk Assessment, to meet the requirements of other policy and legislation, such as The Conservative of Habitat and Species Regulations 2017 (as amended) (Ref 1.7). Whilst the outcomes of these assessments may be drawn upon when undertaking the EIA (and vice versa), the scope of these other assessments will be discussed and agreed with appropriate regulatory authorities in line with their own regulatory requirements and relevant policy and legislation, rather than within this Scoping Report.

1.8.2 Where appropriate, however, the individual topic chapters in this Scoping Report outline where the findings of one of the additional assessments are to be drawn upon when undertaking the EIA, and any proposed scope of the relevant additional assessment is set out to facilitate consultation with relevant consultees in relation to this Scoping Report.

1.9 Net Gain Commitments

1.9.1 Under the Environment Act 2021 (Ref 1.8) it will be mandatory for all (terrestrial) NSIPs submitted from November 2025 to deliver biodiversity net gain (BNG). The requirement is to achieve at least 10% measurable net gain, which is to be secured for at least 30 years. The detail of BNG requirements for NSIPs will be set out within a biodiversity gain statement. Defra is developing a draft biodiversity gain statement and will publish a public consultation on its content in due course.

1.9.2 National Grid's Environmental Action Plan 2021-2026 (Ref 1.9) makes a commitment to achieving at least 10% gain in environmental value (including biodiversity) on all construction projects by 2026.

1.9.3 This commitment requires delivery of quantifiable enhancement for biodiversity from the pre-development baseline, measured using the Defra statutory biodiversity metric (Ref 1.10) with actions formalised and secured by long term management arrangements with external organisations and partners.

1.10 Stakeholder Engagement

1.10.1 This section sets out the National Grid's approach to stakeholder engagement and consultation. It provides an overview of the general approach, the engagement and consultation that has taken place to date, and that is proposed in the future.

1.10.2 Engagement and consultation with technical stakeholders and the local community is a key element of the EIA process and will inform the design and assessment of the Project.

General approach

1.10.3 The Applicant will continue to ensure stakeholders are engaged and consulted in a useful and inclusive manner. The general approach to engagement and consultation includes:

- Engagement and consultation activities scheduled at key points of the design and assessment process;
- Proactive and effective engagement with statutory and non-statutory stakeholders, including local residents who are most likely to be impacted by the Project;
- A focus on the matters of greatest importance and relevance to stakeholders to ensure efficient use of their time;
- Use of varied and accessible engagement techniques – including a mix of online and in person channels. One-way and two-way communications will be utilised;
- Opportunities for stakeholders to share their experience and knowledge to help identify potential effects, mitigations and enhancements at an early stage of the design process;
- Addressing stakeholder queries and concerns in an efficient and effective manner; and
- Feedback which will be recorded, analysed and used to inform the EIA, optioneering and design of the Project.

Summary of engagement and consultation undertaken

1.10.4 A summary of engagement undertaken since January 2024 is provided in **Table 1.3**.

Table 1.3: Summary of engagement undertaken

Date	Engagement and consultation activity	Stakeholders engaged/consulted
November 2021 to 18 January 2024	Initial project briefings during options appraisal phase	Initial project briefings with various local planning authorities and Statutory Environmental bodies.
18 January 2024 to 13 March 2024	Non-Statutory Consultation	Public consultation with communities and stakeholders. Feedback received from Statutory Environmental Bodies, non-

Date	Engagement and consultation activity	Stakeholders engaged/consulted
		statutory environmental groups, community members, parish councils and Members of Parliament.
January 2024 and ongoing	Statutory Environmental Bodies / Technical Stakeholders	Engagement with the following Statutory Environmental Bodies / Technical Stakeholders to discuss the Project: • Lincolnshire Wolds Area of Outstanding Natural Beauty Partnership; • Environment Agency; • Natural England; • Historic England; and • National Trust.
25 April 2024	Local Authority Engagement	Engagement with officers at Lincolnshire County Council to introduce and discuss the Project.
10 May 2024	Local Authority Engagement	Engagement with officers at Cambridgeshire County Council to introduce and discuss the Project.
14 June 2024	Local Authority Engagement	Engagement with officers at Norfolk County Council to introduce and discuss the Project.

1.10.5 The Applicant has engaged with Landowners regarding the surveys that have been undertaken to support the assessment of the Project and design optioneering. These discussions will continue through the ongoing programme of surveys.

1.10.6 The Applicant will continue to engage with other developers in the area to consider opportunities for coordination, including Eastern Green Link 3 and 4, also being developed by National Grid.

Future engagement and consultation

1.10.7 In line with the requirements of the PA 2008 (Ref 1.2), the Applicant will undertake further consultation and engagement with communities and stakeholders as the proposed Project continues to develop.

1.10.8 The programme of ongoing stakeholder engagement and consultation will be structured around key milestones in the design development and assessment process. This will provide the opportunity to update and consult stakeholders on the evolving design and decision-making process.

1.10.9 Engagement and consultation will continue throughout the stages of the Project, with the following stakeholders:

- Statutory bodies;
- Non-statutory bodies;
- Local authorities;
- Directly affected individuals and asset owners; and
- Local communities.

1.10.10 Statutory Consultation will be held in 2025, and the Preliminary Environmental Information (PEI) Report will be issued as part of this. The PEI Report will enable consultees to understand the likely environmental effects of the proposed Project and help to inform their responses to the Statutory Consultation.

1.10.11 The Applicant will set up Technical Working Groups which will be themed to allow collaborative engagement across core environmental issues. The aim is to encourage attendees representing different environmental organisations to assist in reaching resolution with all parties, to inform the EIA.

1.10.12 Through the process of engagement and consultation the aim is to reach agreement, as far as possible, with stakeholders prior to the submission of the DCO. Statements of Common Ground will be developed between the Applicant and relevant stakeholders to document any remaining areas of disagreement which will be shared with the Planning Inspectorate at the point of submitting the DCO application.

1.10.13 A summary of the engagement and consultation activities undertaken, and how feedback has been taken into account will be documented in the Consultation Report which will accompany the DCO application.

1.11 References

Ref 1.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [online]. Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made [Accessed 08 July 2024].

Ref 1.2 Planning Act 2008 [online]. Available at: https://www.legislation.gov.uk/ukpga/2008/29/part/3 [Accessed: 22 April 2024].

Ref 1.3 Electricity Act 1989 [online]. Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents [Accessed 08 July 2024].

Ref 1.4 British energy security strategy, Department for Business, Energy & Industrial Strategy and Prime Minister's Office (April 2022) [online]. Available at: https https: //www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy [Accessed**:** 22 April 2024].

Ref 1.5 Planning Inspectorate (2020). Advice Note Seven. EIA: Process, Preliminary Environmental Information, and Environmental Statements [online]. Available at: https: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-an [Accessed: 22 April 2024].

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2. Regulatory and Planning Policy Context

nationalgrid

Contents

2.1 Introduction

2.1.1 This chapter provides an overview of the legislative and planning policy context that applies to the Project. This includes national, regional, and local planning policy and marine policy, which has been considered across all environmental topic chapters in the preparation of this Environmental Impact Assessment (EIA) Scoping Report. Additional legislation and policy are applicable to some topics. Any such topic specific legislation is set out in the relevant technical chapters (Chapter 6 to Chapter 19). The Planning Statement which will accompany the Development Consent Order (DCO) Application will identify and consider relevant legislation and policies and provide analysis on planning policy compliance. This section of the of the Scoping Report sets out the relevant strategic regulatory and planning policy context for the Project.

2.1.2 Legislation and policies relevant for different environmental topics are set out below with specific details included in **Appendix 2A Environmental Legislation**, **Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy**.

2.1.3 The Applicant will consider and have regard to all relevant national, regional and local planning policy and relevant legislation in the evolution of the design of the Project, and in the assessment of the impacts of the Project in accordance with Section 104 of the Planning Act 2008.

2.1.4 During the pre-application stage and in the preparation of the PEIR, the ES and other appropriate application documents the Applicant will also have due regard to the National Infrastructure Planning Guidance in accordance with Section 50 of the Planning Act 2008. There are two parts of the National Infrastructure Planning Guidance that are relevant to the pre-application stage:

2.1.5 Introduction to National Infrastructure Planning Guidance (April 2024) (Ref 2.1), which sets out the role and scope of the National Infrastructure Planning Guidance and,

2.1.6 Planning Act 2008: Pre-application stage for Nationally Significant Infrastructure Projects (April 2024) (Ref 2.2), which provides guidance on the pre-application stage for NSIPs and the Planning Act 2008: Pre-application stage for Nationally Significant Infrastructure Projects, April 2024.

2.2 Key Legislation

The Planning Act 2008

2.2.1 The Planning Act 2008 (“PA 2008”) (Ref 2.3) provides the statutory framework for deciding applications for a DCO for nationally significant infrastructure projects. It also defines the application process under which a DCO is sought. The PA 2008 sets out that the projects meeting certain defined criteria, are classified as Nationally Significant Infrastructure Projects (NSIPs). It requires that developers wishing to construct, operate and maintain NSIPs must obtain a DCO from the relevant Secretary of State (SoS) to authorise the project.

2.2.2 As the Project consists of the installation of an electric line above ground of more than 132 kV and more than 2 kilometres (km) in length, it is classified as an NSIP under Section 14(1)(b) of the PA 2008, and therefore it is necessary to seek permission via a DCO from the SoS.

The Infrastructure Planning (EIA) Regulations 2017

2.2.3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the "EIA Regulations") (Ref 2.4) govern the EIA process relevant to NSIPs. Schedule 1 of the EIA Regulations lists those projects for which an EIA is required and Schedule 2 lists projects which may be considered EIA development, based on the selection criteria provided in Schedule 3 on characteristics of the development, its location and the types and characteristics of the potential impacts.

2.2.4 Under these Regulations (paragraph 20 of Schedule), a project is Schedule 1 if it fulfils the following criteria *"Construction of overhead electrical power lines with a voltage of 220 kV or more, and a length of more than 15 km"*. The Project comprises the construction and operation of a 400 kV overhead electricity transmission line over approximately 140 km, therefore the Project falls under Schedule 1 and requires a statutory EIA.

2.2.5 This EIA Scoping Report provides formal notification to the SoS, under Regulation 8(1)(b) of the EIA Regulations, that the Applicant proposes to provide an Environmental Statement (ES) in respect of the Project and requests a Scoping Opinion from the SoS under Regulation 10 of the EIA Regulations. Therefore, this development is EIA development through Regulation 6(2) of the EIA Regulations.

2.2.6 Regulation 5(2) states that the EIA must:

"identify, describe, and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors-

Population and human health:

Biodiversity, with particular reference to species and habitats protected under Directive 92/43/EEC and 2009/147/EC:

Land, soil, water, air, and climate:

Material assets, cultural heritage, and landscape; and,

The interaction between the factors referred to in sub-paragraphs (a) to (d)".

*These factors are considered within the topic-specific chapters (**Chapter 6** to **Chapter 19**).*

2.2.7 In addition, Regulation 5(4) states that the EIA should include, where relevant,

"*the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development*".

2.2.8 This is considered within **Chapter 19 Major Accidents and Disasters**.

2.2.9 Schedule 4(5) of the EIA Regulations sets out the information for inclusion in the ES, and states that a description should be included, of the significant effects arising from

"the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources".

2.2.10 The approach to addressing this requirement is set out within **Chapter 5 EIA Approach and Methodology**.

Marine and Coastal Access Act 2009

2.2.11 The Marine and Coastal Access Act 2009 (MCAA 2009) (Ref 2.5) sets out a spatial planning system for the management of the marine environment, which includes a requirement to obtain a marine licence for works affecting the sea from the appropriate marine licensing authority, the Marine Management Organisation (MMO). The MMO is responsible for determining applications in accordance with the Marine Policy Statement (MPS) and any applicable marine plans, unless relevant considerations indicate otherwise.

2.2.12 Licensable marine activities are defined under Section 66 of the MCCA 2009, and include activities related to construction works over the sea. The definition of the 'sea' includes any area which is submerged at mean high water springs and the waters of every estuary, river or channel where the tide flows at mean high water spring tide up to the Normal Tidal Limit (NTL). The NTL is the extent to which a body of water is affected by the ebb and flow of the tides. This may encompass rivers and their estuaries, including those areas that are controlled by locks. The definition of 'over' the sea includes a location directly above or overhanging the sea such as a bridge, open piled structure or cantilever.

2.2.13 Applicants can apply for a 'Deemed Marine Licence' as part of the DCO process under Part 4 of the MCCA 2009 and by virtue of Section 149A of the PA 2008 (Ref 2.3) which was inserted by the MCCA 2009. The Applicant will include a Deemed Marine Licence within its draft DCO if appropriate and required to facilitate the crossing of tidal waterways of the River Welland and the River Nene by the overhead electricity lines proposed in the Project.

Electricity Act 1989

2.2.14 Section 9(2) of the Electricity Act 1989 (Ref 2.6) places general duties on National Grid as a license holder:

"to develop and maintain an efficient, co-ordinated and economical system of electricity transmission…"

2.2.15 In addition, Section 38 and Schedule 9 of the Electricity Act 1989 requires an electricity licence holder such as National Grid, when formulating proposals for new lines and other works, to:

"have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what it reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."

2.2.16 National Grid's Stakeholder, Community and Amenity Policy (Ref 2.7), published December 2016, sets out how the company will meet the Schedule 9 duty placed upon it by the legislation.

Countryside and Rights of Way Act 2000

2.2.17 A National Landscape is, from November 2023 the new name for Areas of Outstanding Natural Beauty (AONB). They are designated under the provisions of Part IV of the Countryside and Rights of Way Act 2000 (Ref 2.8) for the purpose of conserving and

enhancing the natural beauty of an area and securing its permanent protection against development that would damage its special qualities. National Grid, as a statutory undertaker, has a duty under Section 85 of the Act (as amended in s245 of the Levelling up and Regeneration Act 2023) (Ref 2.9) which states:

"In exercising or performing any functions in relation to, or so as to affect, land in an AONB in England, a relevant authority must seek to further the purpose of conserving and enhancing the natural beauty of the AONB".

Related Assessments

2.2.18 In addition to the EIA, the Project will be assessed in accordance with the other regulatory regimes, where they apply. Information on these is included in the environmental topic chapters of this Scoping Report where applicable. These include the Conservation of Habitats and Species Regulations 2017 (Ref 2.10), as amended by the Conservation of Habitats and Species (Amended) (EU Exit) Regulations 2019 (Ref 2.11) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (hereafter "the Habitats Regulations") (Ref 2.12), the Flood Risk Regulations (2009) (Ref 2.13) and the Water Framework Directive (WFD) (Ref 2.14).

Habitat Regulations

2.2.19 The Habitats Regulations (Ref 2.10) transposed the requirements of European Council Directive 92/43/EEC ('the Habitats Directive') (Ref 2.15) into English law. The Habitats Regulations apply to plans and projects that may have significant effects on the Natura 2000 ecological network (sites designated under the Habitats Directive and the Wild Birds Directive (Council Directive 2009/147/EC (Ref 2.16), which codified 79/409/EEC (Ref 2.17)). Sites designated in England under the Habitats Regulations include Special Protection Areas (SPAs) and Special Areas of Conservation (SACs).

2.2.20 Following changes made to the Habitats Regulations (as amended) by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 2.11), SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network and now form part of the 'UK National Site Network' (UK 'NSN'). The term 'European sites' is used to refer collectively to such sites throughout this Scoping Report. It is also government policy that Ramsar sites, potential SPAs, possible SACs, and sites used to compensate for adverse effects on European sites are considered in the Habitats Regulation Assessment (HRA) process. This is described in paragraph 181 of the National Planning Policy Framework (NPPF) (Ref 2.18).

2.2.21 The Habitats Regulations require an Appropriate Assessment if a project is likely to have a significant effect on a European site. If that Appropriate Assessment concludes that a project will have an adverse effect on a NSN site or a European site then a derogation case must be considered.

Flood Risk Regulations

2.2.22 The Flood Risk Regulations (2009) (Ref 2.13) transposes the European Commission Floods Directive (2007/60/EC) (Ref 2.19) into law in England and Wales and implements its provisions. The key objective is to coordinate the assessment and management of flood risks within Europe. The Flood and Water Management Act (2010) (Ref 2.20) places a series of responsibilities on local authorities with the primary aim of improving local flood risk management.

2.2.23 The Regulations and Act require an appropriate Flood Risk Assessment (FRA) which will be submitted, forming part of the DCO application. The FRA will assess the flood risk both to and from the Project and demonstrate how that flood risk will be managed over the Project's lifetime. The FRA will give due regard to climate change.

Water Framework Directive

2.2.24 The primary aim of the WFD (Ref 2.14) is to improve/maintain the Ecological Status/Potential of all water bodies and to prevent deterioration in status of the water bodies and their associated WFD quality elements.

2.2.25 Regulatory bodies responsible for implementing the WFD are the Environment Agency (main rivers) and Local Authorities / Lead Local Flood Authorities (ordinary watercourses).

2.2.26 The EIA will be supported by a standalone WFD compliance assessment in relation to hydrological receptors. The hydrology WFD assessment will be integrated within the ES. WFD compliance for surface waterbodies will be assessed, based on the results of assessments for hydromorphology and water quality, plus the results of the assessment of effects on aquatic biology undertaken as part of the ecology and biodiversity assessments. Assessment of WFD compliance for groundwater bodies will be reported within the Geology and Hydrogeology chapter of the ES.

2.3 National Planning and Marine Policy

2.3.1 This section sets out the current national planning policy documents which the SoS must have regard to when determining the DCO application for the Project. The following documents have been considered relevant in the context of the EIA and in the preparation of this EIA Scoping Report.

2.3.2 The Project is an NSIP which requires development consent under the PA 2008 (Ref 2.3). Section 104 of the PA 2008 outlines the importance of National Policy Statements (NPS) to the decision-making process which applications for development consent are considered. Section 104(2) states, inter alia:

"In deciding the application, the SoS must have regard to -

a) any additional policy statement which has effect in relation to development of the description to which the application relates (a 'relevant national policy statement')…

d) any other matters which the SoS thinks are both important and relevant to the SoS decision"

2.3.3 As identified in paragraph 1.3.4 of the Overarching NPS for Energy EN-1 (Ref 2.21), for infrastructure projects providing above ground electric lines at or above 132 kV (meeting the thresholds set out in the PA 2008), the following NPSs will be the primary basis for SoS decision making:

- Overarching National Policy Statement for Energy (EN-1) (NPS EN-1) (Adopted 2024) (Ref 2.21); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (NPS EN-5) (Adopted 2024) (Ref 2.22).

2.3.4 As background to the recently adopted NPSs referred to above, it is noted that an Electricity Networks Commissioner was appointed in 2022 to work with and advise the

Government on how to halve the build time for new transmission infrastructure from around 12-14 to 7 years. The Commissioner's report (Ref 2.24) and a companion report (Ref 2.25) including a set of 43 recommendations, referred to as the 'Winser Report', was published in August 2023. This Report acknowledged that the speeding up the delivery of strategic transmission is both vital and challenging, and the recommendations on how to accelerate the deployment of strategic electricity transmission infrastructure in Great Britain covered every part of the process and set out an integrated programme of reform.

2.3.5 The Government's response to the Winser Report was set out in the Transmission Acceleration Action Plan (November 2023) (Ref 2.26). This Plan recognises that Great Britain's transmission network must undergo unprecedented expansion, as the economy electrifies to deliver energy security and Net Zero. It confirms that with the increasing shift towards electrification of transport, heating and industrial processes, a significant amount of additional grid capacity is required, and to deliver this expansion in time, there is a need to significantly reduce the current end-to-end build time for transmission infrastructure. The Action Plan accepted the 43 recommendations set out in the Winser Report, to accelerate the expansion of the transmission network.

2.3.6 The recently published updated versions of NPSs EN-1 and EN-5 (17 January 2024) include changes to ensure the appropriate balance between the need to build vital infrastructure and the impacts this can have on the environment and communities and to ensure that the planning policy framework is suitably robust to support the infrastructure required for the transition to net zero carbon emissions. Low-carbon infrastructure, including large electricity grid infrastructure projects, are given 'Critical National Priority' status to reflect the need for critical national infrastructure. The NPSs reinforce the Government's ambitions for high quality energy infrastructure set out in the British Energy Security Strategy (April 2022) and the Growth Plan (September 2022). Further details are provided below.

Overarching National Policy Statement for Energy (EN-1)

2.3.7 National Policy Statement EN-1 (Ref 2.21) sets out the Government's overarching policy regarding the development of NSIPs in the energy sector. It outlines high-level objectives, policy, and the regulatory framework. EN-1 emphasises the need for new energy projects to contribute to a secure, diverse, and affordable energy supply. NPS-EN-1 is underpinned by the principle that there will be a need for significant amounts of new large-scale energy infrastructure to meet the Government's energy objectives. Paragraph 2.1.3 states:

"To produce the energy required for the UK and ensure it can be transported to where it is needed, a significant amount of infrastructure is needed at both local and national scale. High quality infrastructure is crucial for economic growth, boosting productivity and competitiveness."

2.3.8 It states at paragraph 2.1.6 that large-scale energy infrastructure:

"will be required to ensure the UK can provide a secure, reliable, and affordable supply of energy, while also meeting our decarbonisation targets".

2.3.9 Section 3 of NPS-EN-1 explains why the government sees a need for significant amounts of new large-scale energy infrastructure to meet its energy objectives and why the government considers that the need for such infrastructure is urgent. However, it is recognised at paragraph 3.1.2 that:

"…it will not be possible to develop the necessary amounts of such infrastructure without some significant residual adverse impacts. These effects will be minimised by the application of policy set out in Parts 4 and 5 of this NPS. See also Part 2 of each technology specific NPS."

2.3.10 NPS-EN-1 refers to the urgent need for infrastructure covered by the NPS, and the weight that should be accorded to the need, and states at paragraphs 3.2.6 and 3.27 that:

"3.2.6 The Secretary of State should assess all applications for development consent for the types of infrastructure covered by this NPS on the basis that the government has demonstrated that there is a need for those types of infrastructure which is urgent, as described for each of them in this Part.

3.2.7 In addition, the Secretary of State has determined that substantial weight should be given to this need when considering applications for development consent under the Planning Act 2008."

2.3.11 Paragraph 3.3.4 and 3.37 of EN-1 recognise that there are several different types of electricity infrastructure that are needed to deliver the Government's energy objectives, which includes electricity networks which are needed to connect the output of other types of electricity infrastructure with consumers and each other.

2.3.12 Paragraph 3.3.68 of EN-1 states that substantial onshore reinforcement works are needed to meet decarbonisation targets, and that forecasts show that the transmission network will require a doubling of north to south power transfer due to increased generation in Scotland and North of England, with substantial reinforcement in the Midlands to accommodate increased power flows.

2.3.13 Paragraph 3.3.69 recognises that it is important to note that the crucial national benefits of increased system robustness through new electricity network infrastructure projects are shared by all users of the system. Paragraph 3.3.70 states that:

"As all new grid projects have a role in efficiently constructing, operating and connecting low carbon infrastructure to the National Electricity Grid, the scope of networks CNP infrastructure is not limited to those associated specifically with a particular project."

2.3.14 Paragraph 3.3.71 of EN-1 recognises that for regions with multiple windfarms or offshore transmission projects it is expected that a coordinated approach will be delivered which is likely to reduce the network infrastructure costs as well as the cumulative environmental impacts and impacts on coastal communities by installing a smaller number of larger connections, each taking power from multiple windfarms instead of individual point-to-point connections for each windfarm.

2.3.15 It also acknowledges in paragraph 3.3.78 that the case for a new connection or network reinforcement is demonstrated if the proposed development represents an efficient and economical means of:

"…• connecting a new generating station to the network;

• reinforcing the network to accommodate such connections; or

• reinforcing the network to ensure that it is sufficiently resilient and capacious (per any performance standards set by Ofgem) to reliably supply present and/or anticipated future levels of demand.

In considering the 'economic and efficient' approach the network project also needs to follow good design, avoidance, and mitigation principles (and/ or biodiversity

compensation where needed for transmission in the marine environment), as referenced in EN-5".

2.3.16 Paragraph 3.3.79 recognises the crucial role of networks in connecting other kinds of electricity infrastructure (such a generation stations) and states that:

"… it is especially important that the Secretary of State considers network projects as elements of a coherent and strategically necessary system, whether or not they are linked together in specific NSIPs. For instance, when evaluating applications for new electricity networks infrastructure the Secretary of State should have regard to the fact that given,

i) the government's strategic commitment to ambitious levels of interconnection capacity and offshore wind generation, and

ii) the tightly interdependent infrastructure chain linking interconnection and offshore generation with onshore demand centres, delays in the approval of associated new network developments could cause significant economic waste and set back the strategically vital goals of decarbonisation and energy security."

2.3.17 Paragraph 3.3.80 supports a coordinated approach for electricity network infrastructure should be considered at both the strategic and more detailed project design levels for onshore transmission, offshore transmission, and offshore generation and interconnector developments. This coordinated approach is likely to provide the highest degree of consumer, environmental, and community benefits and reduce the potential for unwarranted and avoidable disruption, inefficiency, and visual impacts.

2.3.18 Paragraph 3.3.83 refers to the urgent need for new electricity infrastructure and states that:

"Given the urgent need for new electricity infrastructure and the time it takes for electricity NSIPs to move from design conception to operation, there is an urgent need for new (and particularly low carbon) electricity NSIPs to be brought forward as soon as possible, given the crucial role of electricity as the UK decarbonises its economy."

2.3.19 Section 4 of EN-1 sets out the general policies for the submission and assessment of applications relating to energy infrastructure and the weighting of impacts and benefits of projects to be applied by the SoS in decision making. Paragraph 4.1.3 states:

"Given the level and urgency of need for infrastructure of the types covered by the energy NPSs set out in Part 3 of this NPS, the Secretary of State will start with a presumption in favour of granting consent to applications for energy NSIPs. That presumption applies unless any more specific and relevant policies set out in the relevant NPSs clearly indicate that consent should be refused."

2.3.20 The critical national priority (CNP) for low carbon infrastructure is introduced in section 4.2. Paragraph 4.2.4 states that the Government has concluded that there is a CNP for the provision of nationally significant low carbon infrastructure, with paragraph 4.2.5 confirming that this includes electricity grid infrastructure including all power lines in the scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations.

2.3.21 Paragraph 4.2.7 confirms that the CNP policy applies following the normal consideration of the need case, the impacts of the Project, and the application of the mitigation hierarchy. As such, it is relevant during SoS decision making and specifically in reference to any residual impacts that have been identified. Of particular relevance to the EIA process, paragraph 4.2.8 notes that:

"During decision making, the CNP policy will influence how non-HRA and non-MCZ residual impacts are considered in the planning balance. The policy will therefore also influence how the Secretary of State considers whether tests requiring clear outweighing of harm, exceptionality, or very special circumstances have been met by a CNP Infrastructure application…"

2.3.22 Section 4.5 provides details of how effects on the marine environment should be considered, noting that individual Marine Plans must be consulted to understand the marine relevant specific considerations, and suggests that the marine license regulator (the MMO in England) are approached during the pre-application stage to understand any need for additional marine licenses alongside the DCO application.

2.3.23 Section 4.6 provides details of how environmental and biodiversity net gain should be considered and confirms that this approach to development aims to leave the natural environment in a measurably better state than beforehand. Projects should therefore not only avoid, mitigate and compensate harms, following the mitigation hierarchy, but also consider whether there are opportunities for enhancements. The ES should include a statement demonstrating how wider environmental net gains have been considered, and where appropriate, incorporated into proposals as part of good design of the Project.

2.3.24 Section 4.7 provides details on the criteria for good design for energy infrastructure. Paragraph 4.7.1 states:

"The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important."

2.3.25 Section 4.10 of EN-1 details how the effects of climate change should be taken into account during the design stage to ensure new energy infrastructure is sufficiently resilient against the possible impacts of climate change. Specifically, as new energy infrastructure is typically likely to remain operational over many decades, the direct and indirect impacts of climate change when considering the Project location, design, build, operation and where appropriate decommissioning will need consideration.

2.3.26 Part 5 of NPS EN-1 sets out generic impacts in respect of matters such as air quality and emissions, greenhouse gas emissions, biodiversity and geological conservation, civil and military aviation and defence interests, coastal change, dust and odour, flood risk, historic environment, landscape and visual, land use, noise and vibration, socio-economics, traffic and transport, resource and waste management, and water quality and resources. These generic impacts have been considered in the preparation of this Scoping Report.

Overarching National Policy Statement for Energy (EN-5)

2.3.27 NPS EN-5 (Ref 2.22) relates to electricity networks, and Part 2 provides general assessment principles and technology-specific policies relating to matters including climate change adaptation, consideration of good design, biodiversity and geological conservation, landscape and visual and noise and vibration. Section 2.12 of EN-5 establishes a co-ordinated approach to offshore-onshore transmission.

2.3.28 Paragraph 2.1.5 of NPS EN-5 reinforces Section 4.2 of EN-1 which supports the urgent need for new low carbon infrastructure and confirms that:

"all power lines in scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure… are considered to be CNP infrastructure."

2.3.29 Paragraph 2.2.10 of EN-5 reiterates the duties under Section 9 of the Electricity Act 1989, both in relation to developing and maintaining an economical and efficient network and, in formulating proposals for new electricity network infrastructure, to:

"have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and…do what [they] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."

2.3.30 Section 2.3 of NPS EN-5 details how electricity network infrastructure should consider climate change adaptation and resilience within the design of new schemes. Paragraph 2.3.2 details that applicants should set out to what extent the proposed development is expected to be vulnerable and how it has been designed to be resilient to: flooding, particularly for substations; the effect of wind and storms on overhead lines; higher than average temperatures leading to increased transmission losses; and earth movement or subsidence caused by flooding or drought, for underground cables.

2.3.31 EN-5 includes policies on the design of electricity network infrastructure, and paragraph 2.9.20 states:

"Although it is the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty)."

2.3.32 These policies have been considered in the preparation of this Scoping Report.

Marine Policy Statement

2.3.33 The MPS (March 2011) (Ref 2.23) provides the framework for preparing Marine Plans and taking decisions affecting the marine environment.

2.3.34 The objective of Marine Plans is to ensure that marine resources are used in a sustainable way in line with the high level marine objectives and thereby: promote sustainable economic development; enable the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects; ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets; and contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.

2.3.35 The Project has limited interaction with the marine environment, although the proposed route of the Project will necessitate the crossing of two navigable rivers which fall under the jurisdiction of the MMO: the River Welland and the River Nene. Relevant policies contained in the MPS will be considered as part of the assessment of the Proposed Project and compliance with the MPS.

National Planning Policy Framework

2.3.36 The revised NPPF was most recently updated in December 2023 (Ref 2.18). Paragraph 5 of the NPPF sets out that it does not contain specific policies for NSIPs and states that:

"These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework)".

2.3.37 Notwithstanding the above, paragraph 157 of the NPPF confirms the Framework's support for the transition to a low carbon future in a changing climate. It states that:

"the planning system should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience...and support renewable and low carbon energy and associated infrastructure."

2.3.38 While EN-1 (Ref 2.21) and EN-5 (Ref 2.22) remain the prime decision-making documents, where they do not provide guidance, each technical chapter will consider whether there is important and relevant policy in the NPPF that may require consideration by the decision-making authority.

2.3.39 At this stage, it is not possible to confirm if such secondary guidance will be considered important or relevant by the SoS, and it is therefore included for completeness to allow the SoS to make such a determination.

2.3.40 Paragraph 159 of the NPPF states that:

"New Development should be planned for in ways that:

a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and

b) can help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards."

2.3.41 The NPPF is supported by the National Planning Practice Guidance.

2.4 Regional Planning Policy

2.4.1 Regional Marine Plans are also relevant to the Project. The East Inshore and East Offshore Marine Plan (Ref 2.27) will be considered in the preparation of the DCO application.

2.5 Local Planning Policy

2.5.1 Local planning policies provided by relevant County and District or Unitary Authorities have also been considered in the development of this Scoping Report. The main local planning policy documents that could be relevant to the Project comprise the following.

- Lincolnshire County Council
    - Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 2.28) and Minerals and Waste Site Locations, adopted 2017 (Ref 2.29).(A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and the first stage in this process was the public consultation Issues and Options which took place between June and August 2022) (Ref 2.28).
- Cambridgeshire County Council
    - Cambridgeshire and Peterborough Minerals and Waste Local Plan adopted July 2021 (Ref 2.31).
- Norfolk County Council
    - Norfolk Core Strategy and Minerals and Waste Development Management Policies Development Plan Document and Site Allocations 2010-2026. (noting the Council is currently producing an up-to-date Minerals and Waste Local Plan) (Ref 2.32).
- North East Lincolnshire Council
    - North East Lincolnshire Local Plan, adopted in 2018 (Ref 2.33) (noting a Draft Local Plan Review is currently underway, and a Draft Local Plan with Options was subject to public consultation in January-March 2024 (Ref 2.34).
- West Lindsey District Council
    - Central Lincolnshire Local Plan adopted April 2023. (Ref 2.35).
- South East Lincolnshire (covering South Holland District Council and Boston Borough Council
    - South East Lincolnshire Local Plan (South Holland District Council and Boston Borough Council joint plan), adopted 2019. (Ref 2.36).
- East Lindsey District Council
    - East Lindsey Local Plan, adopted in 2018 (the council is currently producing a Local Plan Partial Review) (Ref 2.37).
- Fenland District Council
    - The Fenland District Council Local Plan adopted May 2014, (the Fenland New Local Plan is currently being prepared, with the consultation draft stage published August 2022) (Ref 2.38).
    - Cambridgeshire and Peterborough Minerals and Waste Local Plan adopted July 2021 (Ref 2.31).
- Kings Lynn and West Norfolk District Council
    - Kings Lynn and West Norfolk Local Plan - Site Allocations and Development Management Policies, adopted September 2016. (noting the council is currently producing an up-to-date local Plan and will replace the Local Plan and Core Strategy) (Ref 2.39).
    - King’s Lynn & West Norfolk Borough Council Local Development Framework, Core Strategy, adopted 2011 (Ref 2.40).

2.6 National Grid Policy and Guidance

2.6.1 National Grid has its own policies and processes that are followed when developing projects. The key policies that are applicable to the Project include:

- Holford Rules (Ref 2.41): A series of guidelines/rules for the routeing and design of new overhead lines or overhead line extensions. The guidelines were initially developed in 1959 and have been reviewed on a number of occasions by National Grid and by the other UK transmission licence holders. The guidelines provide a set of design criteria that have stood the test of time and became accepted industry best practice in overhead line routeing. The guidelines now form an important part of national planning policy relating to the development of electricity networks, as set out in National Policy Statement EN-5;
- Horlock Rules (Ref 2.42): A series of guidelines/rules for the siting and design of new substations, or substation extensions, including consideration of line entries and SECs. The guidelines were initially developed in 2003 and have been reviewed on a number of occasions by National Grid, with a revised version issued in 2009. The Horlock Rules provide a set of principles which avoid, or reduce the environmental impacts associated with the development of new substation infrastructure.
- National Grid's Stakeholder, Community, and Amenity Policy (Ref 2.7): This document describes the ten commitments that National Grid has made to the way that electricity and gas works are carried out in the UK. This includes setting out how National Grid will meet its amenity responsibilities and how stakeholders and communities are involved on projects; and
- National Grid's Approach to Consenting (Ref 2.43): This document outlines the project development process for major infrastructure projects, from initial inception to consent and construction. National Grid's Approach to Consenting is divided into six stages.

2.6.2 National Grid also has an extensive range of process and guidance documents that govern how projects are designed and implemented. Specific documents are referenced later in the Scoping Report chapters where relevant.

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3. Main Alternatives Considered

nationalgrid

Contents

3.1 Introduction

3.1.1 Regulation 14(d) in conjunction with Schedule 4, paragraph 2 of The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (Ref 3.1) states that an Environmental Statement should include a description of reasonable alternatives studied by the promotor and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. While there is no statutory requirement to include an assessment of alternatives in support of a request for a Scoping Opinion, the Planning Inspectorate's Advice Note Seven EIA: Preliminary Environmental Information, Screening and Scoping (Ref 3.2) recommends that a Scoping Report includes *"an outline of the reasonable alternatives considered and the reasons for selecting the preferred option".*

3.1.2 The current stage of the Project design is the result of an iterative process that commenced at Project inception when the initial need to reinforce the network was identified in Network Options Assessment (NOA) 2020/2021 (Ref 3.3). Following the identification of a strategic proposal, National Grid has been through an iterative options identification and selection process to determine the preferred option for the Project, which comprises the emerging preferred corridor on which the Scoping Boundary has been based (**Figure 3.1 Routeing and Siting Study Area**). A preliminary exercise has also identified where it might be more appropriate to site the Project within the emerging preferred corridor, the outcome of which is referred to as the "graduated swathe" – (**Figure 3.7 Overhead Line Graduated Swathe** and **Figure 3.8 Grimsby West Substation Graduated Swathe**) comprising coloured shading of varying intensity to indicate areas more likely (darker colour) and less likely (lighter colour) to be the location of the proposed infrastructure.

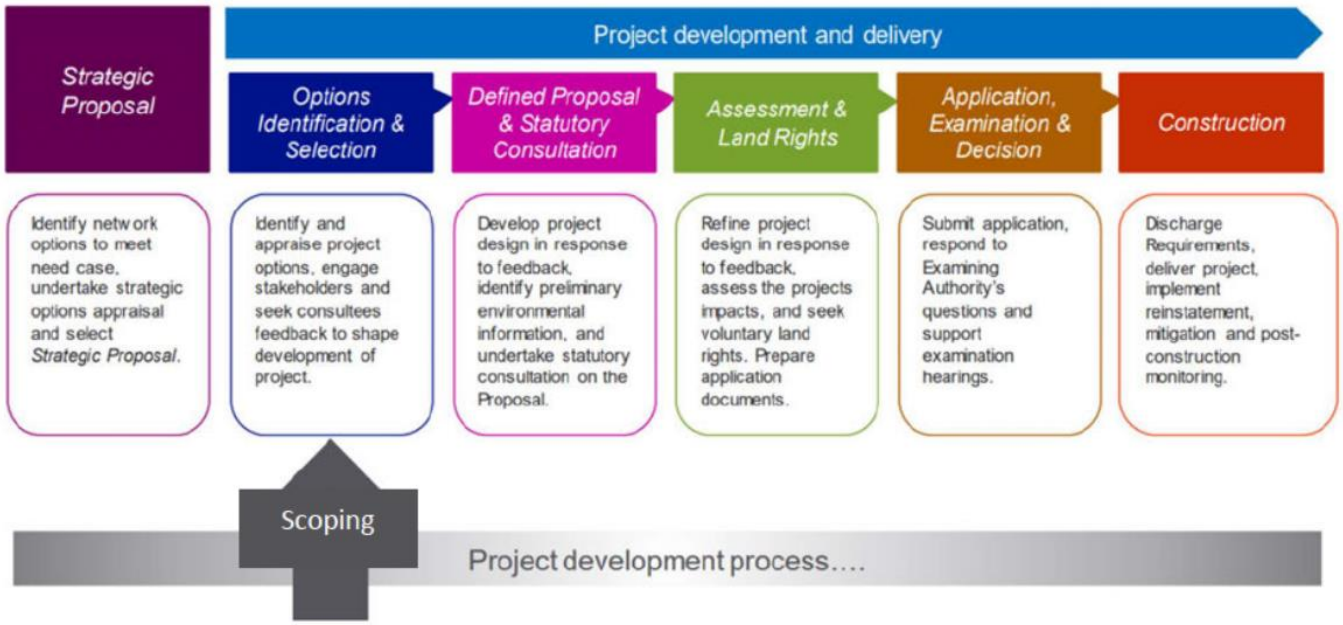
3.1.3 The design process will continue up to the application for development consent in parallel with, and informed by, the EIA process and statutory consultation.

3.2 National Grid Approach to Options Identification and Selection

3.2.1 National Grid's Approach to Consenting (Ref 3.4) outlines the development process for major infrastructure projects, from initial inception to consent and construction. The approach is divided into the following six stages, as detailed on **Image 3.1**:

- Stage 1: Strategic Proposal;
- Stage 2: Options Identification and Selection;
- Stage 3: Defined Proposal and Statutory Consultation;
- Stage 4: Assessment and Land Rights;
- Stage 5: Application, Examination and Decision; and
- Stage 6: Construction.

Image 3.1: National Grid's Consenting Process (Our Approach to Consenting, National Grid, 2022)



3.2.2 National Grid undertakes options identification and selection for its individual projects. There are often a number of different ways that a project can be developed, involving different locations, technologies or designs. Each project requires judgements and decisions about the most appropriate way to achieve the required outcome. The options appraisal process provides information to help inform those judgements during the options identification and selection process.

3.2.3 Options appraisal is a robust and transparent process that is used to compare options and to assess the positive and negative effects they may have, across a wide range of criteria including environmental, socio-economic, technical, and cost factors. The aim is to determine a preferred option or options that can be consulted upon, taking into account National Grid's statutory duties, established policy and principles, and any other relevant information. Further details on the options identification and selection process can be found in Our Approach to Consenting (Ref 3.4).

3.2.4 At each stage in the options identification and selection process, transparent methods are used to inform the iterative decision-making and design development processes, including inputs from engineers and environmental consultants. Interim decision making takes into account feedback from prescribed bodies, as defined in the Planning Act 2008 (Ref 3.5), other stakeholders and the local community through an extensive programme of engagement and consultation. Such feedback continues to be taken into account throughout the process. In addition, the Project has been subject to periodic internal challenge and review to ensure the robustness of the decisions are made in the light of a changing environmental baseline related to technical, physical and economic matters.

3.2.5 Project decisions have considered National Grid's statutory obligations set out in Sections 9 and 38 of the Electricity Act 1989, its licence requirements, policy and guidance including the relevant National Planning Statements (NPSs) EN-1 and EN-5 and the Holford and Horlock Rules (Ref 3.6 and Ref 3.7), which provide industry-guidance on the routeing and siting of electricity transmission infrastructure, and all other relevant considerations.

3.2.6 The following sections provide a background to the Project and a summary of the alternatives that have been considered at each stage to date.

3.3 Background to the Project

3.3.1 The UK has set a world-leading target to tackle climate change, which is to achieve net zero by 2050. This includes delivering 50 Gigawatt (GW) of offshore wind farms connected to the electricity transmission network by 2030 and up to 140 GW by 2050. This has led to a shift towards offshore renewable generation of power away from coal powered generation, for instance Summer 2020 saw the longest run without burning coal since the industrial revolution, stretching almost 68 days. The UK is also transporting more power with countries across the North Sea, using interconnectors. These factors have driven a change in the energy landscape across the UK and in particular, the Humber and East Midlands where reinforcement of the network is required to deliver this change.

3.3.2 There is particular growth forecast in offshore wind capacity in Scotland and the north-east of England, as well as interconnectors to European power grids. This will put pressure on the existing network such that reinforcement of the network in the Yorkshire, Humber and Lincolnshire areas have been identified as necessary to ensure optimal operation of the transmission network system and a reliable economic long-term supply.

3.3.3 Every year the Electricity System Operator (ESO) looks at how much energy needs to be carried on the network in the future and where network capability needs to be improved to accommodate. This starts with identifying a range of Future Energy Scenarios (Ref 3.8) which inform the analysis in the Electricity Ten Year Statement (Ref 3.9) which sets out ESO's view of future transmission requirements and where the capability of the transmission network might need to be addressed over the next decade. Transmission owners then respond with solutions to address the requirements identified in the Electricity Ten Year Statement. The ESO assesses and publishes its recommendations as to which proposals should proceed in a NOA report each year. See NOA 2021/2022 (Ref 3.3) and NOA 2021/2022 Refresh (Ref 3.10) for further details.

3.3.4 National Grid has also had regard to government targets for offshore wind and the outcomes of the Offshore Transmission Network Review and Holistic Network Design (HND) ensuring that the options identified and selected are future proofed and able to facilitate net zero targets. The HND was published in summer 2022 in parallel with the NOA 2021/2022 Refresh and sets out a blueprint for the connection of the offshore wind needed to meet the Government's 2030 targets, also referred to as the 'Pathway to 2030'.

3.4 Strategic Options Considered for the Project

3.4.1 National Grid Electricity Transmission (NGET) undertook a Strategic Options Review at the Strategic Proposal Stage (Stage 1) which identified the most advantageous strategic solution to bring forward. The Strategic Options Review is reported in the Strategic Options Report (SOR) (Ref 3.11) which describes the future network requirements and the options appraised to meet these requirements. This report addressed two projects in particular, the North Humber to High Marnham and Grimsby to Walpole projects. The consideration of strategic options was part of an iterative process in response to the interaction of a range of emerging energy projects and customer requirements. This report also considered how the projects interact with other proposals, which would

connect power flows from the north of England and Scotland, with strategic options for the projects.

3.4.2 As detailed in the SOR the Project is needed to:

- Connect the growth in the volume of renewable and zero carbon generation to the electricity transmission system in the Humber/Trent and Lincolnshire regions.
- To enable the connection of new offshore wind developments, mainly around Scotland and the East Coast of England, with connections at a number of sites along the East Coasts of both Scotland and England.
- To accommodate increased power flows from the North and East of Great Britain to the Midlands and South.
- To reinforce two 'boundaries' within the transmission system. A 'boundary' in this context splits the system into two parts, crossing critical circuit paths that carry power between areas and where power flow limitations may be encountered. These boundaries include the North of England to Midlands Boundary and the Midlands to South of England Boundary.

3.4.3 The strategic options review process responds to the need case described in the SOR. The SOR identified a long-list of options which were capable of meeting the need case.

3.4.4 A focussed list of strategic options were then taken forward for appraisal and evaluated across a range of environmental, socio-economic, and technical factors. Capital costs were identified for each option based on NGET's recent market knowledge.

3.4.5 Strategic options considered included onshore options (overhead and underground) as well as offshore options. Technical, environmental and socio-economic factors were not considered to differentiate between offshore and onshore options. However, the offshore options were substantially more expensive than any of the onshore options and onshore options were therefore preferred.

3.4.6 The SOR identified a new primarily overhead line connection between a new Grimsby West Substation to a new substation at Walpole via Lincolnshire Connection Substation(s) (LCS) as the emerging preference.

3.4.7 Since the publication of the SOR, further work has been undertaken on developing and evolving the strategic option for the East Coast generation group. This concluded that establishment of a new substation at Weston Marsh was necessary. Further information on this can be found in the Addendum to the SOR (Ref 3.12).

3.4.8 In addition, further work was undertaken to consider potential electrical configuration options in the Walpole area, including looking at options for use of the existing Walpole Substation and potential areas where a new substation could be connected to the network to narrow down the area of search for the routeing and siting stage. This is summarised in the New Walpole Substation Location Options Report (Ref 3.13) which concluded that the preference for the new Walpole Substation (herein after referred to as Walpole B Substation since the publication of the Corridor and Preliminary Routeing and Siting Study (CPRSS)) was for it to be situated on the Burwell-Walpole circuits.

3.5 Options Identification and Selection

3.5.1 Following identification of the Strategic Proposal, National Grid undertook a CPRSS (Ref 3.14). This presents the findings of the Option Identification and Selection Stage which

identified and assessed preliminary route corridors, siting zones and siting areas, and concluded with the identification of an emerging preferred corridor, preferred siting zones and siting areas, forming an end to end solution. This section summarises the approach to this stage and the key considerations in the identification and assessment of alternatives. For further detail, please refer to the CPRSS (Ref 3.14).

Overview of Approach to Routeing and Siting

3.5.2 The routeing and siting approach is a phased process which enables National Grid to make informed and proportionate decisions on the selection of corridors, and allows possible route alignments to be further refined. This process allows for options to be appraised on a comparable basis, so that a preferred option can be identified and progressed.

3.5.3 The methodologies employed for the nine steps, as defined for this Project, of the Options Identification and Selection Stage are summarised in **Image 3.2**.

Image 3.2: CPRSS Methodology (Grimsby to Walpole Corridor Preliminary Routeing and Siting Study, National Grid, 2024)

3.5.4 Once the corridors, siting zones and siting areas had been identified an options appraisal process was undertaken which considered the following four main factors:

- Environmental constraints;
- socio-economic factors;
- technical considerations; and
- cost.

3.5.5 The approach to developing the Study Area for the Project was based on balancing NGET's duty to develop an efficient, co-ordinated and economical system of transmission (Section 9 of the Electricity Act 1989), NGET's environmental duties under Section 38 and Schedule 9 of the Electricity Act 1989, Holford Rule 1 (which is to *"avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence"*) (Ref 3.6) and Horlock Rule 2 (which is to *"as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections"*) (Ref 3.7).

Study Area

3.5.6 Given the large geographical extent of the Project, distinct but interrelated Study Areas have been defined since the SOR (Ref 3.11) and SOR Addendum (Ref 3.12) for each component of the Project. Five distinct Study Areas were identified, one for each component of the Project (new 400 kV overhead line connection, new Grimsby West Substation, LCS-A and LCS-B, new Weston Marsh Substation, and Walpole B Substation) through a five-phase process which is detailed in the CPRSS (Ref 3.14) and illustrated on **Figure 3.1 Routeing and Siting Study Area**.

Identification of Siting Zones and Siting Areas

3.5.7 A siting area is an area which has the capacity to accommodate the siting of a single substation. A siting zone is an area which has the capacity to accommodate multiple siting areas.

3.5.8 The identification of the siting zones and siting areas takes into consideration the key drivers for each substation, the technical parameters and the relevant environmental and technical constraints identified.

3.5.9 In siting substations, areas that benefit from the below factors were identified:

- The availability of existing screening elements and the potential to introduce additional screening elements;
- Proximity to major roads, to minimise the extent of required new access roads; and
- Outside of flood zones of a medium risk (Flood Zone 2) and high risk (Flood Zone 3), in line with the policy tests (sequential and exception tests) as set out in Section 5 of NPS EN-1.

3.5.10 Where the identified Study Area for siting zones resulted in the identification of one zone, then preliminary siting areas were identified. Identification of the siting zones and siting areas was informed by the Horlock Rules (Ref 3.7) and Holford Rules (Ref 3.6) to take

account of the combined effects of both the substations and the overhead line connections. The following guiding principles informed identification:

- Using or adapting existing infrastructure will generally be of benefit/advantage compared with creating new infrastructure.
- Using available brownfield land will generally be of benefit/advantage compared with utilising greenfield land.
- Shorter routes (for overhead line or underground connections) will generally be of benefit/advantage compared with longer routes, as smaller scale infrastructure projects are generally likely to have lower environmental, safety, sustainability, and cost implications (for comparable technology options).
- Financially less-expensive options, both in terms of capital and lifetime cost, will generally be of benefit/advantage, as these support NGET's statutory duty under Section 9 of the Electricity Act 1989 to develop and maintain an 'efficient, co-ordinated and economical' transmission network.
- Options which avoid or minimise and mitigate impacts on environmental or socio-economic features will generally be of benefit/advantage compared with those which have likely significant residual effects, as less environmentally damaging or socially disruptive sites support NGET's statutory duty under Schedule 9 of the Electricity Act 1989 to 'have regard to the desirability of preserving amenity', and will more readily achieve consent.

3.5.11 The identification of siting zones and siting areas was then taken into consideration when identifying corridors for overhead lines and, where required, underground cables.

New Grimsby West Substation

3.5.12 Due to the size of the Grimsby West Study Area, it was considered that it effectively constituted a siting zone. Therefore, it was considered appropriate to instead identify potential siting areas within this siting zone (referred to as the 'Grimsby West Zone'). The identification of potential Grimsby West siting areas was undertaken taking into consideration the required land take, distribution of environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.13 The functional footprint of the substation assuming that it is an Air Insulated Switchgear (AIS) substation is up to 600 m by 200 m (approximately 12 ha) dependent upon the number of connections required. Based on this broad technical parameter, landscape specialists, using Geographic Information Systems mapping software, identified potential siting areas within the Grimsby West Zone. The siting areas identified were sufficient in size for siting of the new Grimsby West Substation.

3.5.14 Key drivers for the location of a new Grimsby West Substation include:

- Seek to minimise the length of connections between the new substation and the existing 400 kV overhead line between Grimsby and Keelby, for reasons of operational efficiency and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.
- Seek to minimise the length and technical complexity of connections between the new substation and the existing Northern Power Grid (NPG) 132 kV substation, for reasons of operational efficiency and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

- Seek to utilise land owned by NGET, to minimise the extent of development which would be required on third-party land, and therefore socio-economic impacts and costs.

3.5.15 The Grimsby West Siting Zone has avoided most environmental features. Therefore, the identification of potential siting areas was driven by the proximity to existing transmission infrastructure and the presence of existing wind turbines, the proposed Aura Power Solar Farm, the residential property at Pyewipe Farm and blocks of woodland. Taking these into consideration, five siting areas were identified, from west to east these are:

- Siting area GW1 – an area approximately 800 m by 1,200 m, located north-west of Aylesby and existing wind turbines which encompasses the existing 400 kV overhead line to the north.
- Siting area GW2 – an area approximately 800 m by 600 m, located immediately north of Aylesby and south of existing wind turbines.
- Siting area GW3 – an area approximately 800 m by 700 m, located east of Aylesby and north-east of Laceby. Aylesby Road travels through the centre of the site.
- Siting area GW4 – an area, approximately 600 m by 500 m, located west of Wybers Wood and immediately north of Laceby Beck, Aylesby Road travels through the north-west.
- Siting area GW5 – an area approximately 900 m by 600 m, located west of Wybers Wood which encompasses the existing 400 kV overhead line, the National Grid and NPG substations at Grimsby West.

3.5.16 The identified siting areas were then subject to a back-check and review and further analysis by the project team. The review resulted in the removal of siting area GW4 as it was identified that the siting area was wholly covered by a local plan housing allocation for the Grimsby West Urban Extension (GWUE).

3.5.17 The Grimsby West siting zones are illustrated in **Figure 3.3 Grimsby West Siting Zones**.

Selection of the preferred option

3.5.18 As identified in the CPRSS (Ref 3.14), environmentally there were few factors to differentiate between each of the siting areas for the new Grimsby West Substation. Siting area GW3 had comparatively less interaction with the identified socio-economic and environmental features than other siting areas. However, siting area GW3 also had comparatively less existing screening to limit visual intrusion, was located closest to Laceby Beck and its associated flood zone and was in proximity to residential receptors at Pyewipe Farm. Although, siting areas GW1 and GW2 were located furthest from Laceby Beck and residential receptors, they both had a considerable overlap with the Aura Farm Solar Farm and siting area GW1 overlapped with the Viking Carbon Capture Storage (CCS) Nationally Significant Infrastructure Project (NSIP) and was within 250 m of Lindens Farm Airstrip. Siting area GW5 overlapped with the Aura Farm Solar Farm and the GWUE allocation, however it also offered the greatest opportunity to reuse existing infrastructure and to limit the spread of development (and associated impacts) by the opportunity to take advantage to existing screening provided by vegetation.

3.5.19 From a technical perspective, there were notable factors to differentiate the siting areas for the new Grimsby West Substation. The presence of Aura Farm Solar Farm

overlapped with siting areas GW1, GW2 and GW5, and Viking CCS NSIP overlapped with siting area GW1 which would have increased the technical complexity of substation design to avoid these proposed assets. Additionally, siting areas GW2, and GW3 would have required more complex connections to the existing NPG 132 kV substation. The presence of major existing buried statutory undertaker assets would have also substantially constrained the flexibility for siting within siting area GW1 and, to a lesser extent, constrained siting flexibility within siting areas GW2 and GW3. Siting area GW5 offered the comparatively better location for siting the new Grimsby West Substation from a technical perspective due to its proximity to the existing 400 kV 4 KG overhead line and NPG 132 kV substation. It also offered the opportunity for reduced civil infrastructure associated with permanent access and would have therefore been less complex to deliver. An additional benefit of the siting area GW5 was that it provided the opportunity to utilise existing land within NGET ownership.

3.5.20 Overall, when considering all features within the Study Area, siting area GW5 offers the best opportunity for flexible siting. The opportunity to reuse existing infrastructure and land within NGET ownership, combined with the presence of existing screening vegetation allows the footprint of any substation in the area to be limited and well screened (limiting intrusion in the surrounding area in line with the Horlock Rules) from nearby sensitive receptors, respectively. Additionally, the proximity of GW5 to the existing 400 kV 4 KG overhead line and NPG 132 kV substation alongside opportunities to reduce additional civil infrastructure and permanent access requirements means that it would be less technically complex to construct. Therefore, from the assessment of the siting area options, siting area GW5 was identified as the emerging preference for the new Grimsby West Substation.

New Lincolnshire Connection Substations

3.5.21 The Project proposes the construction of two new LCS which are required to provide new connection points on the network. The northernmost LCS is referred to as LCS-A, whilst the southernmost LCS is referred to as LCS-B. The substations will be connected by the new 400 kV overhead line. The functional footprint of the substations, assuming that they are both AIS substations, is up to 700 m by 200 m (approximately 14 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other environmental works.

3.5.22 The identification of potential siting zones for the LCS (LCS-A and LCS-B), was undertaken, taking into consideration the required land take of each new LCS, assumptions around the location and extent of other customer or planned transmission connection infrastructure, environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.23 Key drivers for the location of two new LCS include:

- Seek to identify locations which provide the potential for infrastructure (required to facilitate a connection to the two new LCS and into the electricity transmission network) for contracted and planned projects, to be in reasonable proximity to the two new LCS as part of a co-ordinated approach to transmission applications outlined in NPS EN-1. The connection of these projects to the two new LCS is a key project driver.
- Balance the distance from the coast (to minimise the length of connections from potential landfall locations for contracted and planned projects) against the potential need for considerable overhead line deviations.

- Consider the pattern of development and/or environmental features between the two new LCS and the coast to avoid locating where these may significantly constrain connections by contracted and planned projects.

3.5.24 Review of a long-list of 19 relatively unconstrained areas identified that some were contiguous and some very close to each other. Where this was the case, the relatively unconstrained areas were grouped, resulting in 12 LCS siting zones which were considered in the Options Appraisal. From north to south these were:

- Siting zone LCS1 – an area, approximately 2 km by 2 km, located north-east of South Cockerington and generally east of (partially overlapping) North Cockerington.
- Siting zone LCS2 - an area, approximately 2.9 km by 2 km, located east of Grimoldby and Manby, it encompasses the B1200 which routes east to west across the siting zone.
- Siting zone LCS3 - an area, approximately 2.5 km by 1.9 km, located east of Great Carlton and north of Gayton le Marsh.
- Siting zone LCS4 – an area, approximately 1.6 km by 1.4 km, located south of Little Carlton, south-west of Great Carlton, north-east of Castle Carlton and north of South Reston.
- Siting zone LCS5 - an area, approximately 2 km by 1.1 km, located south-west of Woodthorpe, north-west of Galley Hill and north of Greenfield Wood/Mother Wood.
- Siting zone LCS6 - an area, approximately 2.7 km by 2.1 km, located south of Beesby, north of Thoresthorpe and immediately east of Saleby (Saleby is encompassed within the siting zone), it encompasses the A1120 which routes along the western edge of the siting zone.
- Siting zone LCS7 – an area, approximately 3.3 km by 2 km, located south of Galley Hill, west of Saleby, north of Tothby (encompassed within the siting zone) and Alford) and east of Greenfield Wood/Mothers Wood, it encompasses the A1120 which routes along the eastern edge of the siting zone.
- Siting zone LCS8 - an area, approximately 3.6 km by 2.6 km, located south of Markby, encompasses Asserby, east of Huttoft and north of Thurlby, it encompasses the A1111 which routes north to south along the western edge of the siting zone.
- Siting zone LCS9 - an area, approximately 2.4 km by 1.5 km, located south of Alford, east of Farlesthorpe and west of Mawthorpe, it encompasses the B1196 which routes north to south long the western edge of the siting zone.
- Siting zone LCS10 – an area, approximately 3.1 km by 2.1 km, located south-east of Willoughby, encompasses Sloothby, north of Boothby and east of Welton Low Wood.
- Siting zone LCS11 – an area, approximately 2.2 km by 1.4 km, located directly west of Manby and north-east of Little Carlton, it encompasses Manby Showground and the B1200 routes from west to east along the northern edge of the siting zone.
- Siting zone LCS12 – an area, approximately 2.8 km by 1.7 km, located south-west of Strubby, south-west of Maltby le Marsh, north-west of Beesby, north-east of Woodthorpe, it encompasses the B1373 which routes south-east to north-west in the west of the siting zone.

3.5.25 The LCS siting zones are illustrated in **Figure 3.4 LCS Siting Zones**.

Selection of the preferred option

3.5.26 As identified in the CPRSS (Ref 3.14), from an environmental perspective, there were different preferences for each topic (for example, siting zones LCS5, LCS6, LCS8, LCS11 were more preferred from a landscape and visual perspective but may not be preferred when considering other environmental topics) such that no one LCS siting zone emerged as the clearly preferred option. However, considering the scale of the infrastructure to be sited for the LCS (including the potential implications of overhead line entries), those impacts related to landscape and visual were considered to carry the most weight in decision making. Therefore, the least preferred siting zones were LCS9 and LCS10.

3.5.27 Consideration of environmental and technical matters as well as the Holford and Horlock Rules informed the identification of a preferred siting zone. From a technical standpoint, those siting zones which performed the worst and were least preferred were Siting Zones LCS1, LCS3, LCS4, LCS9, and LCS10. Of the remaining siting zones (LCS2, LCS5, LCS6, LCS7, LCS8, LCS11 and LCS12), there were constraints still present meaning technical complexity was still a consideration. In considering these constraints, no one siting zone was considered preferred.

3.5.28 A comparative appraisal was then undertaken which considered the potential environmental, socio-economic, technical, Holford and Horlock Rules implications of siting the LCS-A and LCS-B in the various combinations of these identified LCS siting zones. The LCS siting zones looked at for this included LCS5, LCS6, LCS7, LCS8, LCS11 and LCS12. The combinations of siting zones were:

- LCS5 – this LCS siting zone could be combined with either LCS6, LCS7, LCS8, LCS11 or LCS12.
- LCS6 – this LCS siting zone could be combined with either LCS5, LCS7, LCS8, LCS11 or LCS12.
- LCS7 – this LCS siting zone could be combined with either LCS5, LCS6, LCS8, LCS11 or LCS12.
- LCS8 – this LCS siting zone could be combined with either LCS5, LCS6, LCS7, LCS11 or LCS12.
- LCS11 – this LCS siting zone could be combined with either LCS5, LCS6, LCS7, LCS8 or LCS12.
- LCS12 – this LCS siting zone could be combined with either LCS5, LCS6, LCS7, LCS8 or LCS11.

3.5.29 Overall, after considering the emerging preferences for the overhead line Corridor and the LCS siting zones in combination, the CPRSS (Ref 3.14) identified a hybrid zone of LCS6 and LCS8 (resulting in LCS6/8) and an amended LCS5 siting zone as the preferred siting zones. The amended LCS5 siting zone includes two areas immediately adjacent to the south-east and south-west of the original LCS5 siting zone, providing additional flexibility for siting without significantly increasing the potential for significant environmental effects. LCS6/8 is a combination of LCS6 and LCS8 and includes the area between the two zones. This combination will help to limit the technical complexity of siting, and potentially limit the impacts upon the water environment and designated heritage assets.

New Weston Marsh Substation

3.5.30 The new Weston Marsh Substation will connect a new 400 kV transmission line to Walpole B Substation. In addition, the new Weston Marsh Substation will connect to the existing 400 kV 4ZM transmission line that runs south east of Sleaford towards King's Lynn, and the existing 400 kV 2WS transmission line that runs east of Spalding towards a Tee-Point with the 400 kV 4ZM transmission line between Sleaford and King's Lynn. Due to the proposed location of the new Weston Marsh Substation, it will also enable flexibility as the design evolves in relation to the connection of the new LCS-B circuit to the rest of the transmission network.

3.5.31 The functional footprint of the substation assuming that it is an AIS substation is up to 700 m by 200 m (approx. 14 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other environmental works.

3.5.32 The identification of potential Weston Marsh siting zones took into consideration the required land take, distribution of environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.33 Key drivers for the location of Weston Marsh Substation include:

- The existing 400 kV 2WS overhead line currently has lower capacity conductors compared to the remainder of the circuits between Bicker Fen and Walpole. This is currently limiting the amount of power which can safely flow on the 400 kV 4ZM overhead line. By turning in both the 400 kV 4ZM and 2WS overhead line routes into a new Weston Marsh Substation this issue is resolved, as north-south power flows between the Bicker Fen substation and Walpole B Substation can bypass the 400 kV 2WS overhead line via the new Weston Marsh Substation. Seeking to locate close to the Spalding Tee-Point will minimise the extent of required diversions to the existing overhead lines to facilitate the turn-in of the circuits to the new Weston Marsh Substation.
- Seek to identify locations which provide the potential for infrastructure (required to facilitate a connection to the new Weston Marsh Substation and into the electricity transmission network) for contracted projects to be in reasonable proximity to the new Weston Marsh Substation. The connection of these projects to the new Weston Marsh Substation is a key driver for the substation.
- Seek to have two separate circuits heading south from the Spalding Tee-Point to the existing Walpole Substation and a Walpole B Substation to improve overall resilience of the energy network.
- Seek to locate close to the Spalding Tee-Point to minimise the length of circuit reconfiguration of the existing 400 kV 4ZM overhead line between Sleaford and the Walpole Substation, and the 400 kV overhead lines into the new substation, for reasons of operational efficiency and resilience and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

3.5.34 The identification of potential siting zones was driven by the presence of scattered residential properties, blocks of woodland, a dense drainage network, and proximity to the Spalding Tee-Point. Taking these factors into consideration four siting zones were identified. From west to east these were:

- Siting zone WMZ1 - an area, approximately 3.8 km by 1.7 km, located north of the River Welland. The Risegate Eau waterbody crosses from north-west to south-

east, and the A16 and 400 kV 4ZM overhead line crosses the west of the siting zone.

- Siting zone WMZ2 – an area, approximately 5.2 km by 2.1 km, located east of the River Welland (which is at the west of WMZ1) and at the Spalding Tee-Point. The 400 kV 4ZM and 2WS overhead lines cross the centre and east (respectively) of the siting zone.
- Siting zone WMZ3 – an area, approximately 3.4 km by 2.3 km, located adjacent to the Spalding Tee-point. The 400 kV 4ZM overhead line crosses the centre of the WMZ3 and the 400 kV 2WS overhead line is adjacent to the east of the siting zone.
- Siting zone WMZ4 – an area, approximately 3.2 km by 3.7 km, located north-east of the Spalding Tee-Point. The B1357 and A17 cross the centre of the WMZ4 from north to south.

3.5.35 The Weston Marsh siting zones are illustrated in **Figure 3.5 Weston Marsh Siting Zones**.

Selection of the preferred option

3.5.36 As identified in the CPRSS (Ref 3.14), Siting zone WMZ4 was overall the least environmentally preferred due to its proximity to The Wash designated sites and length of the diversions required to connect the existing 400 kV overhead lines (2WS and 4ZM). Siting in WMZ4 would have resulted in greater intrusion of infrastructure into the surrounding environment. When comparing the other siting zones there was less to differentiate between them. WMZ1 was more distant from heritage assets but would have required a longer diversion of the 2WS 400 kV overhead line (over the River Welland which may have required taller pylons) and may have interacted with siting of the Outer Dowsing Offshore Wind Farm. Therefore, siting in WMZ1 was less preferred. Siting zones WMZ2 and WMZ3 were closest to the Spalding Tee-Point and, if siting near it, were generally distant from surrounding receptors which would help to limit the spread of infrastructure into the surrounding area. From a technical perspective, there were notable factors to differentiate between the Weston Marsh siting zones. Siting zones WMZ2 and WMZ3 would limit the construction works and complexity for overhead line diversions (2WS and 4ZM) given their proximity to the Spalding Tee-Point, whereas these would be increased at WMZ1 and WMZ4.

3.5.37 Overall, when considering all features and constraints relevant to the siting of the new Weston Marsh Substation, there was little to choose between WMZ2 and WMZ3 (assuming careful siting). WMZ2 was marginally preferred from an environmental perspective and WMZ3 was marginally preferred from a technical perspective. Both siting zones offered the best opportunities for flexible siting whilst reducing the intrusion of infrastructure, and therefore environmental impacts (in line with the Horlock Rules), into the surrounding area.

3.5.38 After considering the emerging preferences of the Corridor and Weston Marsh siting zones in combination, siting zone WMZ2 was identified as the emerging preference.

New Walpole Substation

3.5.39 The Walpole B Substation will connect to the existing 400 kV 4ZM transmission line that runs north from Burwell towards the existing 400 kV Walpole Substation. The functional footprint of the substation assuming that it is an AIS substation is up to 800 m by 200 m

(approximately 16 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other environmental works.

3.5.40 The identification of potential Walpole siting zones took into consideration the required land take, distribution of environmental, socio-economic and technical constraints, and the Holford and Horlock Rules.

3.5.41 Key drivers for the location of Walpole B Substation include:

- Seek to identify locations to provide the required reinforcement of the electricity transmission system to provide additional north-south power flows per the SOR Addendum (Ref 3.12).
- Seek to identify locations which provide the potential for EGL3 and EGL4 infrastructure (required to facilitate a connection to the Walpole B Substation and into the electricity transmission network) to be in reasonable proximity to the new Walpole B Substation as part of a co-ordinated approach to transmission applications outlined in NPS EN-1. The connection of these future projects to the Walpole B Substation is one of the key drivers for the substation.
- Seek to locate close to the existing 400 kV 4ZM overhead line between Burwell and the existing Walpole Substation to minimise the length of circuit reconfiguration and 400 kV overhead lines into the new substation for reasons of operational efficiency and to minimise environmental impacts (by reducing the geographical extent of effects) and costs.

3.5.42 The identified siting zones for the Walpole B Substation for consideration at Options Appraisal from north to south were:

- Siting zone WLP1 – an area, approximately 1.8 km by 1.4 km, located west of the A1101, south-east of the North Level Main Drain and north of Newton–in–the-Isles.
- Siting zone WLP2 - an area, approximately 1.3 km by 1.1 km, located west of the River Nene, east of the A1101, north-west of the Wisbech Compressor Gas (Wisbech Compressor) Station and south-west of Foul Anchor.
- Siting zone WLP3 - an area, approximately 1.7 km by 0.9 km, located west of the River Nene, east of the A1101 and Newton, north-west of the Wisbech Compressor Station and south-west of Foul Anchor.
- Siting zone WLP4 – an area, approximately 2.5 km by 0.9 km, located east of the River Nene, south-east of the existing Walpole Substation and north-west of West Walton.
- Siting zone WLP5 - an area, approximately 2.7 km by 1.5 km, located directly south of the Rose and Crown Farm Solar Farm, north of Walton Highway and West Walton.
- Siting zone WLP6 - an area, approximately 2.5 km by 1.6 km, located south-west of Emneth, north-east of Outwell and east of Friday Bridge.

3.5.43 The Walpole B siting zones are illustrated in **Figure 3.6 Walpole B Siting Zones**.

Selection of the preferred option

3.5.44 As identified in the CPRSS (Ref 3.14), environmentally there were few factors to differentiate between each of the siting zones when considering the siting of the Walpole B Substation in isolation. However, when also considering the required diversions of the

4ZM (Burwell to Walpole) 400 kV overhead line to the siting zones, there was a strong preference for siting zones that avoided multiple overhead line crossings of the River Nene. Therefore, WLP4, WLP5 and WLP6 were more preferred. Each of these siting zones presented different opportunities for siting; WLP5 and WLP4 would reduce the length of diversions of the 4ZM 400 kV overhead line and limit the spread of impacts into the surrounding areas, whereas WLP6 was likely to result in a spread of impacts into the surrounding areas but was wholly located outside of Flood Zone 3 (albeit upon a denser drainage network).

3.5.45 From a technical perspective, there were notable factors to differentiate between the siting zones. Most notably, the closer proximity of WLP4 and WLP5 to the 400 kV 4ZM (Burwell to Walpole) overhead line would necessitate significantly less connection infrastructure compared with the other siting zones. Though it is noted that more infrastructure would have been required to develop permanent accesses (or upgrade existing roads) to these siting zones compared to others given their distance from nearby A-roads. The concentration of existing infrastructure within WLP1, WLP2, and WLP3 would have limited the flexibility for siting (such as orientations), increased the complexity of construction and, in the case of WLP2, would have likely resulted in outages being required during construction. It was recognised that the Rose and Crown Solar Farm may have posed a slight technical challenge for siting within WLP5 and that the proposed Grantham to Bexwell pipeline NSIP may have conflicted with siting in WLP6.

3.5.46 When considered in isolation, siting zones WLP4, WLP5 and WLP6 were the emerging preferences for the Walpole B Substation. Following consideration of the emerging preferences of the Corridor and Walpole siting zones in combination, a combination of siting zones WLP4 and WLP5 (resulting in WLP4/5) was identified in the CPRSS (Ref 3.14) as the emerging preference for the Walpole siting zone.

Route Corridor Options

3.5.47 The preliminary route corridor options were identified in the CPRSS (Ref 3.14) between the start and end points for the Project, as illustrated on **Figure 3.2 Corridors (Overhead lines)**. The complex network of corridors were divided into ‘sections,’ with a series of connection links. This allowed an emerging preference to be identified using a series of sections of one corridor, via connection links where relevant, to a series of sections of another, to bypass areas of greater constraint and create an ‘end-to-end’ solution taking account of the siting of substations.

3.5.48 As noted above, because complex, overlapping permutations of preliminary corridors were identified, they were divided into discrete parts called ‘sections,’ so that each individual section could be appraised without duplication. The individual sections of the corridor are as follows:

- Western Corridor options have the prefix ‘W’ e.g., western option Section 1 is known as Section W1;
- Eastern Corridor options have the prefix ‘E’;
- Central Corridor options have the prefix ‘C’;
- Southern Corridor options have the prefix ‘S’; and
- Northern Corridor options have the prefix ‘N’.

3.5.49 The links are named according to the Section they join, e.g. E4-C4 provides a link from section E4 of the Eastern Corridor to section C4 to the Central Corridor.

3.5.50 The CPRSS (Ref 3.14) identified a network of potential corridors and links which are shown in **Figure 3.2 Corridors (Overhead lines)**. The Corridor options emerging as preferred from the CPRSS are listed below.

Grimsby West to Burgh le Marsh

Selection of the preferred route

3.5.51 Within the CPRSS (Ref 3.14), Sections and Links were considered in different stages. Stage 1 considered the best performing Sections between the 4ZM 400 kV overhead line and the A46. The result of this was progression of Sections W1, E1 and C1.

3.5.52 Stage 2 considered the best performing Sections and Links between the A46, North Thoresby and North Cotes. As a result, an overhead line using the Sections C2 to C6 was preferred to limit impacts on the Area of Outstanding Natural Beauty (AONB) (its setting and views/from the AONB) and visual receptors (at the more populated urban fringes of Grimsby and Cleethorpes) and reduce technical complexity and environmental impacts associated with narrower areas or underground cabling. This is followed by Link C4-W4/W4-C4 and Link W4-C4, which were progressed to increase the routeing flexibility for overcoming the narrower area in Section C4 between Brigsley and Waltham.

3.5.53 Stage 3 considered the best performing Sections and Links between North Cotes and Burgh le Marsh. As part of this, Sections W7 to W13 were preferred as they avoided constrained areas of reservoir flooding, Flood Zone 2 and 3, the Louth Canal, ecologically designated sites along the Lincolnshire Coast and cumulative visual impacts with existing wind farms and formed a more direct route. This is followed by Sections E12 to E14 which were preferred as they reduced the potential for impacts on the setting of the AONB, receptors at Alford, the Grade II Well Hall Registered Park and Garden and avoided the Branch Line Local Nature Reserve and peaty soils through the avoidance of Section W14. Finally, Link E12-W13/W13-E12 was progressed as use of this Link is comparatively free of constraints and would allow the convergence of the two component routes outlined above.

3.5.54 Overall, after considering the emerging preferences of the Corridor in combination with substation siting zones, Section E1, Sections C1 to C6, Sections W7 to W13, Link W13-E12, Sections E12 to E14 and Section C7 emerged as the preferred option in the CPRSS (Ref 3.14).

Burgh le Marsh to Weston Marsh

Selection of the preferred route

3.5.55 Within the CPRSS (Ref 3.14), Sections and Links were considered at different stages. Stage 1 considered the best performing Sections and Links between Burgh le Marsh and Frithville. As a result, using Sections C8 to C13 was preferred provided that the route through Sections C8 and C9 routed further from the National Grid Electricity Distribution 132 kV overhead line (seeking to limit potential landscape and visual impacts), as they avoided a route in proximity to the AONB and denser settlement pattern further north and the National Site Networks and Ramsar sites and expansive views further south. These Sections were considered to connect well to the previous

emerging preference of Section C7. Furthermore, use of Sections N6 and N7 was preferred as they have few material constraints to routeing an overhead line and allow for a more direct route (in line with Holford Rule 3).

3.5.56 Stage 2 considered the best performing Sections and Links between Frithville and the B1397 Spalding Road. A route using Sections C14 to C16 were preferred as they provide a more direct route and contain few features that significantly constrain the routeing of an overhead line. This is followed by routeing through Section S8 into Section S9 which would allow an overhead line route to be more direct (and therefore in greater compliance with Holford Rule 3). Routeing via the western leg of Section S9 and into Sections S10A and S11 was preferred and was considered less likely to create a wirescape with the 4ZM 400 kV overhead line or result in encircling settlements. Furthermore, use of Link C16-S8 allowed the most direct route to be taken between the preferred Sections C16 and S8.

3.5.57 Stage 3 considered the best performing Sections and Links between the B1397 Spalding Road and Weston Marsh. There are few material constraints to routeing within Section C20 and use of Section C21A was preferred as it would avoid crossing the 4ZM 400 kV overhead line.

3.5.58 Overall, the emerging preferred overhead line route between Burgh le Marsh and Weston Marsh (in order from north to south) was Sections C8 to C13, Sections N6 to N7, Sections C14 to C16, Link C16-S8, Sections S8 to S10A, Section S11, Section C20 and Section C21A.

Weston Marsh to Walpole

Selection of the preferred route

3.5.59 Within the CPRSS (Ref 3.14), a number of Sections and Links were considered in the area. Sections C22 to C28A were identified as the preferred Sections and while technical complexities and environmental challenges exist within the Central Corridor (Sections C22 to C28A), it is considered that these can be mitigated through careful routeing. A route using this Corridor (compared to the Northern Corridor) is also unlikely to require acquisition or direct oversail of residences.

Option Selection

3.5.60 The Option Selection process is presented in Chapter 13 of the CPRSS. In summary, the preferred end to end solution comprises the following:

- Grimsby West Substation – GW5;
- Grimsby West to the LCS – Section W1 or E1, Sections C2 to C6, Sections W7 to W12, Link W12-E12, Sections E12 to E14 and Section C7;
- LCS – LCS5 and LCS6/8;
- LCS to Weston Marsh – Sections C8 to C13, Sections N6 to N7, Sections C14 to C16, Link C16-S8, Sections S8 to S10A, Section S11, Section C20 and Section C21A;
- Weston Marsh – WMZ2;
- Weston Marsh to Walpole – Section C22 to C28A; and

- Walpole – WLP4/5.

3.5.61 An overview of the preferred end-to-end solution including the preferred substation siting zones can be found in **Figure 3.9 End to End Solution**.

3.6 Development of the Scoping Boundary

3.6.1 A final preferred option for the alignment of the Project has not yet been confirmed. To retain flexibility, a Scoping Boundary (**Figure 3.1 Routeing and Siting Study Area**) has been defined to represent the maximum extent of the Project, which aligns with the geographical extent of the emerging preferred corridor identified by the CPRSS (Ref 3.14) and described above in Section 3.5.

3.6.2 The precise alignment of the Project, location of construction compounds and haul road(s) are not available at this stage as they are still under development. Feedback from the non-statutory consultation is still being considered and may result in changes to the Project. Therefore, the Scoping Boundary has been used to determine the scope of the Environmental Statement in this Scoping Report. The Scoping Boundary aligns with the emerging preferred corridor presented at non-statutory consultation and is presented on **Figure 1.1 Scoping Boundary**. The cut-outs from the Scoping Boundary have been removed for the purposes of Scoping, however, no project infrastructure will be located within these cut-outs that were presented at non-statutory consultation.

3.7 References

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4. Description of the Project

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Contents

4.1 Introduction

4.1.1 This chapter provides a description of the Project and an outline of key activities that would be undertaken during construction, operation, and decommissioning.

4.1.2 The area of land presented in **Figure 1.1 Scoping Boundary** is the Scoping Boundary which is the subject of this Environment Impact Assessment (EIA) Scoping Report. The Scoping Boundary is based on the emerging preferred corridor which was subject to non-statutory consultation. The emerging preferred corridor comprises of land identified, at this stage of the Project development and design process, as potentially being required to construct and operate the Project. The cut-outs from the emerging preferred corridor have been removed from the Scoping Boundary for the purposes of Scoping. No project infrastructure is intended to be located within those cut-outs that were presented at non-statutory consultation.

4.1.3 The precise alignment of the Project, location of construction compounds and haul road(s) are not available at this stage as they are still under development. Feedback from the non-statutory consultation is still being processed and may result in changes to the Project. Therefore, the Scoping Boundary has been used to inform the scope of the Environmental Statement (ES) proposed in this Scoping Report. The Scoping Boundary is the same as the emerging preferred route corridor presented at non-statutory consultation which covers the maximum extent of where infrastructure could be located and is presented on **Figure 1.1 Scoping Boundary.** The Study Area as defined by each technical discipline reflects the area where likely significant effects are likely to occur from the infrastructure located within the Scoping Boundary.

4.1.4 For the purposes of scoping, the Scoping Boundary allows sufficient area for flexibility in design. The Scoping Boundary will be refined through the development of the Project and will take account of:

- ongoing technical studies and design development;
- environmental surveys and assessment; and
- feedback received through stakeholder engagement and non-statutory and statutory consultation.

4.1.5 A more detailed description of the Project will be presented in the Preliminary Environmental Information (PEI) Report and subsequently the ES (which will accompany the Development Consent Order (DCO) application).

4.1.6 This chapter sets out the evolving description of the Project and has been split into the following sections, which provide:

- an overview of the proposed Project;
- a description of the proposed Project from north to south;
- an overview of project design principles and design mitigation measures;
- an overview of the planning policy relevant to the Project design;
- an overview of the proposed infrastructure of the Project;
- the construction methods that are outlined for installing the infrastructure associated with the Project;
- operation and maintenance requirements; and

- how the Project is proposed to be decommissioned, if required.

4.2 Project Overview

4.2.1 The Project is needed to increase the capability of the national electricity transmission system (NETS) to carry clean green energy from the north of England to the Midlands and East Anglia. It is also required to connect and carry power from offshore windfarms, interconnectors, solar/ battery storage proposals and high voltage direct current (HVDC) links that are planned to connect to NETS. This would be achieved by reinforcing the national transmission network with a new 400 kilovolt (kV) electricity transmission line over a distance of approximately 140 kilometres (km) starting from a new 400 kV substation in Grimsby and ending at a new 400 kV substation in Walpole.

4.2.2 The Project, which this EIA Scoping Report covers is at an early stage of development, but is expected to include the following elements:

- Approximately 140 km of new 400 kV overhead transmission line (OHL).
- A new 400 kV substation to be built in the vicinity of the existing Grimsby West 400 kV Substation in North East Lincolnshire (to be referred to as Grimsby West Substation). The existing substation will be decommissioned, in all, or part.
- Two new 400 kV Lincolnshire Connection substations located south-west of Mablethorpe in East Lindsey (to be referred to as Lincolnshire Connection Substation A and Lincolnshire Connection Substation B).
- A new 400 kV substation in the vicinity of the Spalding Tee-Point in South Holland District (to be referred to as Weston Marsh Substation).
- A new 400 kV substation in proximity to the existing Walpole Substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District (herein after referred to as Walpole B Substation).
- Replacement of short sections of existing 400 kV OHL and local changes to the lower voltage distribution networks to facilitate the construction of the new OHL and substations.

4.3 Description of each section within the Scoping Boundary

4.3.1 Non-statutory consultation has occurred, and feedback is currently being analysed. The Scoping Boundary is based on the emerging preferred corridor that was presented at the non-statutory consultation shown in **Figure 1.1 Scoping Boundary.** The design will develop in response to feedback from the non-statutory consultation and statutory consultation as well as in response to the EIA and other technical studies. The precise location of the components of the Project including temporary working areas are not known at this stage.

4.3.2 The Scoping Boundary has therefore been designed to represent the potential area within which the Project would be located.

4.3.3 For the purpose of scoping, the Project has been divided into seven sections. The sections are split from north to south by the geographical alignment of the Scoping Boundary. The seven sections are described in **Table 4.1Error! Reference source not found.**.

Table 4.1: Description of principal features within the Scoping Boundary north to south by section

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
Section 1-Grimsby West Substation	North East Lincolnshire West Lindsey	Lincolnshire	This Section comprises the new Grimsby West Substation. It also comprises the existing Grimsby West Substation, the Norther Power Grid 132 Kv Substation, and the existing overhead line between the existing Grimsby West Substation and Keadby.	This Section is within the local authority areas of North East Lincolnshire and West Lindsey, the county authority of Lincolnshire and the parishes of Riby, Aylesby and Healing. This Section comprises of low-lying landscape between Laceby and Grimsby, which forms part of Middle Marsh, the westernmost part of the wide coastal plan that extends from the Lincolnshire Wolds to the coast. The average elevation is approximately 10 m above ordnance datum (AOD) to 15 m AOD. This Section is located in the Lincolnshire Coast Marshes National Character Area (NCA), characterised by a wide coastal plain extending from Barton-upon-Humber in the north, across to Grimsby at the mouth of the Humber and south to Skegness. The Lincolnshire Wolds National Landscape is located to the west. The closest residential area is Grimsby. Within the wider rural area there are a number of other villages including Aylesby, Healing, Wybers Wood and Laceby. There are a number of water bodies in this Section, including numerous unnamed ordinary watercourses. Local roads include Aylesby Road which crosses this Section in a west to east direction. Within the area there are several footpaths, bridleways and local access roads that provide important links between rural dwellings and villages.

[1] Measurement based on centre line of the emerging preferred route corridor

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
				There are a number of environmental features near this Section, including, a National Site Network (NSN), Ramsar and Special Site of Scientific Interest (SSSI) approximately 3.5 km to the east at the coast associated with the Humber Estuary, Church of St Nicholas Grade I listed building to the north east, a scheduled monument (two moated sites at Healing Hall) to the north, and Lincolnshire and Northamptonshire Drinking Water Safeguard Zone (Groundwater). This Section is also located within Source Protection Zone (SPZ) 2 and 3.
Section 2- Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A	North East Lincolnshire East Lindsey	Lincolnshire	This Section of the Scoping Boundary comprises of overhead line between Grimsby West Substation and the Lincolnshire Connection Substation (LCS) A. The approximate length of this Section is 34.5km.	This Section is located within the local authority areas of North East Lincolnshire and East Lindsey, the county authority of Lincolnshire and the parishes of Laceby, Bradley, Barnoldby Le Beck, Brigsley, Ashby cum Fenby, Holton Le Clay, Waithe, Grainsby, North Thoresby, Fulstow, Ludborough, Covenham St. Bartholomew, Utterby, Covenham St Mary, Brackenborough with Little Grimsby, Yarburgh, Alvingham, Keddington, South Cockerington, Grimoldby, Stewton, Manby, Legbourne, Little Carlton, Reston, Great Carlton, Gayton Le Marsh, and Withern with Stain. This Section runs predominantly in a south easterly direction between the proposed Grimsby West Substation and the proposed Lincolnshire Connection Substations and it is situated within the Lincolnshire Coast Marshes NCA. This Section is approximately 34.5 km, and it is predominantly rural in character, with a pattern of medium-scale rectilinear fields divided by drains and occasional hedgerow. This Section has a sense of being undeveloped and sparsely settled. Much of the landscape is open with long views to the west of the

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
				Lincolnshire Wolds and the coast where wind turbines both onshore and offshore are a prominent vertical element. The closest towns are Grimsby and Louth, however, within the area there are a number of other villages including Laceby, Brigsley, North Thoresby, Alvingham, Manby and Grimoldby. There are a number of water bodies in this Section including the Louth Canal and the Great Eau River. Principal highways in this Section include the A46, the A16 and the A157. Other roads include the B1203, the B1202 and the B1200. Within the area there are several footpaths, bridleways and local access roads that provide links between rural dwellings and villages. There are a number of environmental features located just outside this Section of the Scoping Boundary, including a scheduled monument situated north of Louth (Deserted Village) and another situated to the north east of Louth (Louth Park Abbey). The Lincolnshire Wolds National Landscape is located to the west. The Greater Wash Special Protected Area (SPA) and the Humber Estuary SPA, and Special Area of Conservation (SAC) are located to the east of this Section along the Lincolnshire coastline. This Section also contains SPZs 1, 2, and 3 and a Lincolnshire and Northamptonshire Drinking Water Safeguard Zone (Groundwater).
Section 3- Lincolnshire Connection Substation A and B (including the	East Lindsey	Lincolnshire	This Section of the Scoping Boundary comprises the LCS A and B and the	This Section is within the local authority area of East Lindsey, the county authority of Lincolnshire and the parishes of Withern with Stain, Claythorpe, Strubby with Woodthorpe, Aby with Greenfield, Beesby with Saleby, Markby, Bilsby, and Huttoft. This Section is located in the Lincolnshire Coast Marshes NCA. The land in this Section gently rises towards the dip slope of the

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
overhead line between them).			overhead line between them. The approximate length of this Section is 9.5 km.	Lincolnshire Wolds and has average elevation of around 10m AOD. The Section comprises of farmland which is mainly in arable production with medium to large-scale fields bounded by ditches and hedges. The closest residential area is Alford. Within the wider rural area there are a number of other villages including Huttoft, Markby, Bilsby, Asserby and Beesby. Strubby Airfield is located to the east of LSC A. There are a number of drains in this Section. Principal highways in this Section include the A1104, and the A1111. Other roads include the B1373. There are a number of environmental features located just outside this Section, including Withern Wood and Hornby/Mother Woods which are both Ancient Woodland Sites, a scheduled monument (Markby Priory) and the southern extent of the Lincolnshire Wolds National Landscape which lies to the west. Within the area there are a number of footpaths, bridleways and local access roads that provide important links between rural dwellings and villages. This Section also contains SPZs 1, 2, and 3.
Section 4- Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation.	East Lindsey Boston South Holland	Lincolnshire	This Section of the Scoping Boundary comprises an overhead line between Lincolnshire Connection	The existing Bicker Fen, to Spalding North to West Burton and the existing Bicker Fen to Walpole, to West Burton 400 kV overhead line passes through the southern part of this Section. This Section of the Scoping Boundary is located within the local authority areas of East Lindsey, Boston, and South Holland and the county authority of Lincolnshire. It also includes the parishes of Bilsby, Huttoft, Mumby, Farlesthorpe, Cumberworth, Willoughby with Sloothby, Hogsthorpe, Addlethorpe , Orby,

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
			Substation B to Weston Marsh Substation. The approximate length of this Section is 64 km	Burgh Le Marsh, Croft, Bratoft, Irby in the Marsh, Firsby, Thorpe St. Peter, Wainfleet All Saints, Wainfleet St. Mary, Little Steeping, Eastville, Halton Holegate, Toynton St. Peter, Toynton All Saints, East Keal, New Leake, Stickford, Midville, Sibsey, Stickney, Frithville and Westville, Carrington and New Bolingbroke, Thornton Le Fen, Langriville, Holland Fen with Brothertoft, Frampton, Kirton, Swineshead, Wigtoft, Sutterton, Gosberton, Surfleet, and Algarkirk. This Section is approximately 64 km long. The first part of this Section is located in the Lincolnshire Coast Marshes NCA and travels in a southern direction between the proposed Lincolnshire Connection Substation B and the A158 to the east of Burgh le Marsh after which it is routed in a predominantly in a south westerly direction to the Steeping River. From here the Section continues in a southern/south western direction crossing into The Fens NCA where the landscape is low lying with much of it below sea level. Large or very-large open arable fields are typically rectilinear and bounded by drains and roads rather than hedgerows. Extensive views to level horizons and huge skies are characteristic of this Section and provide a strong sense of rural remoteness and tranquillity. The closest residential areas are Alford, Skegness and Boston. Within the wider rural area there are a number of other villages including Burgh Le Marsh and Stickney. There are a number of water bodies in this Section including the River Witham, Steeping River, River Welland, South Forty Foot Drain and New Hammond Beck. Principal highways in this Section include the A158, A16, A1121, A52, and the A16. Other roads include the B1449, B1183, B1195, B1184, B1192, B1391,

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
				and the B1397. Within the area there are several footpaths, bridleways and local access roads that provide links between rural dwellings and villages including The Cross Britain Way and The Macmilan Way. There are a number of environmental features in this Section, including Risegate Eau and Surfleet Bank Local Wildlife Sites (LWS). The Scoping Boundary also contains SPZs 1, 2, and 3.
Section 5-Weston Marsh Substation	South Holland	Lincolnshire	This Section of the Scoping Boundary comprises the Weston Marsh Substation as well as the Spalding Tee-Point where two existing 400 kV overhead lines meet, these are the 400 kV 4ZM transmission line that runs south east of Sleaford to King's Lynne and the 400	The existing Bicker Fen, to Spalding North to West Burton and the existing Bicker Fen to Walpole, to West Burton 400 kV overhead line passes through this Section. The Bicker Fen to Spalding North to West Burton and the Spalding North to Walpole 400 kV overhead line also passes through this Section. This Section is within the local authority areas of South Holland, the county authority of Lincolnshire, and the parishes of Weston and The Moultons. This Section is located within The Fens NCA. The landscape comprises of low-lying flat farmland of Weston Marsh, which lies immediately to the east of the embanked River Welland. The average elevation is around 10 m AOD with much of it below sea level. The closest residential area is Spalding. Within the wider rural area there are a number of other villages including Pinchbeck and Surfleet. There are several drains within this area. Marsh Road crosses this Section. There are a number of environmental features in this Section, including three designated heritage assets; Wykeham Chapel

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
			kV 2WS transmission line that runs east of Spalding towards a Tee Point with the 400 kV 4ZM transmission line between Sleaford and King's Lynn.	scheduled monument, Wraggmarsh House Farmhouse Grade II listed building, and Pigeoncote Grade II listed building.
Section- 6 Overhead line from Weston Marsh Substation to Walpole B Substation	South Holland Fenland	Lincolnshire Cambridgeshire	This Section of the Scoping Boundary comprises overhead line between Weston Marsh Substation to Walpole B Substation. The approximate length of this Section is 26 km.	The existing Spalding North to Walpole and Bicker Fen to Walpole to West Burton 400 kV overhead line is located to the north of this Section. This Section is within the local authority areas of South Holland and Fenland, the county authorities of Lincolnshire and Cambridgeshire and in the parishes of Weston, The Moultons, Whaplode, Holbeach, Fleet, Gedney, Sutton St. James, Gedney Hill, Sutton St. Edmund, Tydd St. Giles, Newton-in-the-Isle, and West Walton. This Section is located in The Fens NCA and runs predominantly in a south easterly direction between the proposed Weston Marsh Substation and the proposed Walpole Substation. This Section is approximately 26 km and encompasses large-scale, open and expansive low-lying fenland landscape, which is rural in character and highly

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
				productive agriculturally. Much of the land is below sea level and dependent on the interconnected networks of ditches and dykes that drain the surrounding farmland into Rivers Welland and Nene. The closest towns are Spalding and Wisbech. Within the wider rural area there are a number of other villages including Weston and Sutton St James. There are a number of water bodies in this Section including the River Nene and South Holland Main Drain. Principal highways in this Section include the A151, and the A1101. Other roads include the B1357, B1165, B1168, and the B1165. Within the area there are several footpaths, bridleways and local access roads that provide important links between rural dwellings and villages including the Sustrans reclassified route. There are a number of environmental features in this Section, including in Pigeoncote Grade II listed building, Burtoft and Grade II Manor Farmhouse.
Section 7- Walpole B Substation	Kings Lynn and Norfolk	Norfolk	This Section of the Scoping Boundary comprises the Walpole B Substation.	The existing Walpole A Substation and its existing grid supply points is located approximately 1.2 km north of the Walpole B Substation. The existing Burwell Main to Walpole 400 kV overhead line passes through the eastern Section of the Walpole B Substation Scoping Boundary. This Section is within the local authority area of Kings Lynn and Norfolk, the county authority of Norfolk and the parishes of West Walton and Walpole. This Section is located within the Fens NCA and is characterised by the low-lying flat farmland between the embanked River Nene and the A47. Most of the land is below

Section Name	Local Authority	County Authority	Project Proposals and Approximate Section Length[1]	Description of Principal Features within the Section
				sea level, relying on pumped drainage and the control of sluices at high and low tides to maintain its agricultural viability. The closest town is Wisbech. Within the wider rural area there are a number of other villages including West Walton, Walton Highway, Inglebrough and Newton-in-the-Isle. There are a number of water bodies in this Section, including minor water watercourses, tributaries associated within the River Nene and/or field drainage ditches. Local roads include Mill Road which crosses this Section. Within the area there are a number of footpaths, bridleways and local access roads that provide important links between rural dwellings and villages. Grade II listed building, Ingleborough Mill, is located within this Section.

4.4 Project design approach

Good Design Principles

4.4.1 The Project will be designed, constructed, maintained, and operated in accordance with applicable health and safety legislation and regulations. The Project will comply with relevant design safety standards including the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) (Ref 4.1) which sets out the criteria and methodology for planning and operating the National Electricity Transmission System. National Grid policies and processes, which contain details on design standards required to be met when designing, constructing, maintaining, and operating assets such as those proposed on the Project, will be adhered to.

4.4.2 The design principles will be informed by the National Infrastructure Commission (NIC) guidance (Ref 4.2Ref 4.1) and will be established to inform the development of the Project design, both for construction and operation. Design principles set desirable design outcomes which the Project should endeavour to achieve, as far as is reasonably practicable, and facilitate an integrated design approach which draws together engineering, environment, sustainability and social value design considerations. Design principles ensure that these aspects are robustly addressed during the design, assurance and environmental assessment of the Project. Applying the design principles additionally helps to ensure that the Project meets the criteria in the relevant National Policy Statements (NPS), which are EN-1 (Ref 4.3), the *Overarching National Policy Statement for energy* and EN-5 (Ref 4.4), the *National Policy Statement for electricity networks infrastructure*.

4.4.3 The Project is currently being designed as an OHL using the guidance provided in Section 2.9.20 in EN-5 (Ref 4.4): "*overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty).*"

4.4.4 The Project is being designed in accordance with The Holford Rules (Ref 4.5) which are mentioned in Sections 2.9.16 and 2.9.17 of EN-5 (Ref 4.4), as well as The Horlock Rules (Ref 4.6) which are also mentioned in EN-5 in Sections 2.9.18 and 2.9.19.

The Holford Rules

4.4.5 Paragraph 2.8.7 of the existing NPS EN-5 (Ref 4.5) makes clear *"that the Holford Rules, and any updates, form the basis for the approach to routeing new overhead lines"*. In summary, the Holford Rules state that routeing of high voltage overhead transmission lines should where practicable:

- avoid altogether the areas of the highest amenity value;
- choose the most direct line with no sharp changes in direction;
- be positioned against tree and hill backgrounds as far as possible;
- prefer moderately open valleys with woods;
- be kept as far as possible from smaller lines, converging routes and other poles, masts, wires, and cables to avoid a concentration or 'wirescape'; and

- approach urban areas through industrial zones, where they exist; and when residential and recreational land intervenes between the approach line and the substations, carefully compare costs of undergrounding, for lines other than those of the highest voltage.

4.4.6 Whilst the guidelines were initially developed in 1959, they have been reviewed on a number of occasions by National Grid Electricity Transmission plc (National Grid) and by the other UK transmission licence holders. One of the reviews was against the Electricity Act 1989. The guidelines have stood the test of time and have become accepted industry best practice in overhead line routeing.

The Horlock Rules

4.4.7 The Horlock Rules (Ref 4.6) state that:

- in the development of system options consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements, against the consequential environmental effects, in order to avoid as far as possible adverse impacts;
- siting should seek to avoid areas of the highest amenity, cultural or scientific value by the overall planning of the system connections;
- areas of local amenity value, important existing habitats and landscape features should be protected as far as reasonably practicable;
- siting should take advantage of the screening provided by landform and existing features and the potential use of site layout and levels;
- proposals should keep visual, noise and other environmental effects to a minimum;
- land use impacts of the proposal should be considered when planning siting;
- early consideration should be given to the options available for pylons and ancillary development appropriate to individual locations;
- space should be used effectively to limit the area required consistent with appropriate mitigation measures and to minimise the adverse impacts on existing land use and rights of way, whilst also having regard to the potential for any future extension;
- for the design of access roads, perimeter fencing, earth shaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings;
- in open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance; and
- the inter-relationship between pylons, ancillary structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of pylons on prominent ridges should be minimised by siting pylons against a background of trees rather than open skylines.

4.4.8 The Horlock Rules (Ref 4.6) predominately apply to the siting of substations and line approaches. The general principles underlying the Horlock Rules (Ref 4.6) are the avoidance of areas of high amenity and apply equally to the siting of Sealing End

Compounds (SECs), although the balance of impacts and constraints will often be different.

4.4.9 As detailed above, the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 4.4) in paragraph 2.9.18 confirms that the Horlock Rules "*should be embodied in Applicants' proposals for the infrastructure associated with new overhead lines"*.

4.5 Planning Policy

4.5.1 **Chapter 2 Regulatory and Planning Context** sets out the overarching policy relevant to the Project including NPS EN-1 (Ref 4.3) and EN-5 (Ref 4.4). Paragraph 4.7.1- 4.72 of EN-1 states:

'The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important.

4.5.2 *Applying good design to energy projects should produce sustainable infrastructure sensitive to place, including impacts on heritage, efficient in the use of natural resources, including land-use, and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.'*

4.5.3 Section 2.4 NPS EN-5 (Ref 4.4) states that the design principles set out in EN-1 should be considered by the Applicant however '*the Secretary of State should bear in mind that electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant's ability to influence the aesthetic appearance of that infrastructure*.'

4.5.4 The Project will also be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN5 including the International Commission on Non-Ionizing Radiation Protection (ICNIRP) (Ref 4.7) guidelines for electric and magnetic fields (EMFs) and precautionary policy.

4.6 Design and control mitigation measures

4.6.1 National Grid's options appraisal process seeks to embed and mitigate environmental effects through route and site selection as part of the design process.

4.6.2 Sensitive routeing and siting is a principal design measure that has been embedded into the Project design since the start. This measure aims to avoid and reduce, as far as practicable, impacts on identified receptors and ensures compliance with NPS EN-1 (Ref 4.3) and NPS EN-5 (Ref 4.4) as well as The Holford (Ref 4.5) and Horlock Rules (Ref 4.6).

4.6.3 Another design measure that will be embedded into the Project is the selection of the most appropriate technology type which is currently under consideration.

Compliance with policy

4.6.4 The project design will be compliant with the guidelines and policies relating to transmission infrastructure stated in NPS EN-5 (Ref 4.4), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (1998) (Ref 4.7), as well as adhering to National Grid design standards. Compliance with these guidelines ensures the Project is adhering to policies related to: biodiversity and geological conservation, landscape and visual, noise and vibration, EMF and, sulphur hexafluoride (SF6).

4.6.5 The Project design will also comply with design safety standards including NETS SQSS (Ref 4.1) and the suite of National Grid policies and processes which contain details on design standards required to be met when designing, constructing, and operating its projects.

4.6.6 Standard control and management measures would be implemented during construction of the Project to limit impacts through adherence to good site practices and achieving legal compliance. Such measures are detailed within **Appendix 4A Initial Outline Code of Construction Practice.**

Limits of Deviation

4.6.7 As recognised by the Planning Inspectorate's Advice Note Nine (Ref 4.9), a necessary and proportionate degree of flexibility needs to be incorporated into the design of a development so that unforeseen issues encountered after a development has been consented can be addressed. In this instance, for example, previously unidentified poor ground conditions, or the identification of significant unrecorded archaeological remains, may require a pylon to be re-sited. Therefore, to allow for this necessary and proportionate degree of flexibility, limits of deviation (LoD) will be developed for the Project components. The LoDs would provide a maximum distance or measurement (horizontal and/or vertical) of variation within which every component of the Project would be located.

Approach to materials and waste

4.6.8 Delivery of the Project requires sourcing of materials for construction. These fall into the following broad categories:

- new materials required for the Project, such as galvanised steel for pylons, reinforced concrete for the foundations, insulator sets (typically glass, porcelain or polymeric) and aluminium/copper conductors. recycled materials;
- recycled materials; and
- temporary materials, such as aggregate for access routes and site compounds, works cabins and security fencing would be required during construction. Where practicable temporary materials would be sourced from other construction projects within the region and reused at other construction projects after completion of the Project.

4.6.9 The material sources are unlikely to be identified until the detailed design stage of the Project, which would happen post-consent. The nature of the Project means that it is difficult to use secondary sources during construction of the Project, as this can affect the operation and the design life of the Project. However, National Grid has existing processes in place to source materials from sustainable sources and to use recycled

materials where these do not compromise the required design standards and operational life of the Project.

4.6.10 Waste materials would be produced by the Project. The contractor would be required to produce a Site Waste Management Plan (SWMP) prior to construction (commitment GG22 in **Appendix 4A Initial Outline Code of Construction Practice**). This would set out the measures to reduce the generation of waste in the first place and appropriate measures to reuse and recycle materials where practicable. It would also identify appropriate waste facilities to dispose of materials.

4.6.11 Soil may need to be removed from site in certain circumstances, such as where the soil was found to be contaminated, in which case, the soils would be managed in an appropriate manner, as set out in the good practice measures within **Appendix 4A Initial Outline Code of Construction Practice** and the future SWMP.

Approach to energy consumption

4.6.12 The Project aims to support the UK's transition to Net Zero emissions by 2050. As outlined in **Chapter 3 Main Alternatives Considered**, National Grid has a statutory duty to develop and maintain an efficient, coordinated, and economical electricity transmission system. Therefore, the Project would contribute to supporting the UK's Net Zero transition. Notwithstanding the role of the Project in achieving the UK's Net Zero transition, it will result in energy consumption during construction.

4.6.13 The Project would consume energy during manufacture and construction. The Project will consider a range of measures to reduce energy consumption during construction, such as the use of energy efficient plant and tools. The Project will aim to use local grid connections for temporary site power, where viable. Where not viable an alternative sustainable option should be used, such as appropriately sized alternatively fuelled or hybrid generators, where practicable.

4.6.14 A Construction Traffic Management Plan (CTMP) will set out measures to reduce journeys and hence energy consumption from those journeys, such as car sharing and using public transport where practicable. It will also set out commitments regarding using electric vehicles or vehicles conforming with emission standards ratings (see commitment TT01 and TT02 in **Appendix 4A Initial Outline Code of Construction Practice**).

4.6.15 Energy consumption during maintenance and operation would be limited to the energy required to maintain and operate the Project and transmission losses. National Grid also has existing processes in place to monitor its energy consumption across the network. If consented, the operational energy requirements would be managed as part of the wider network operation.

4.6.16 The measures outlined above would reduce the energy consumption of the Project during both construction and operation in line with the good design principles.

4.7 Project components

Overhead Line

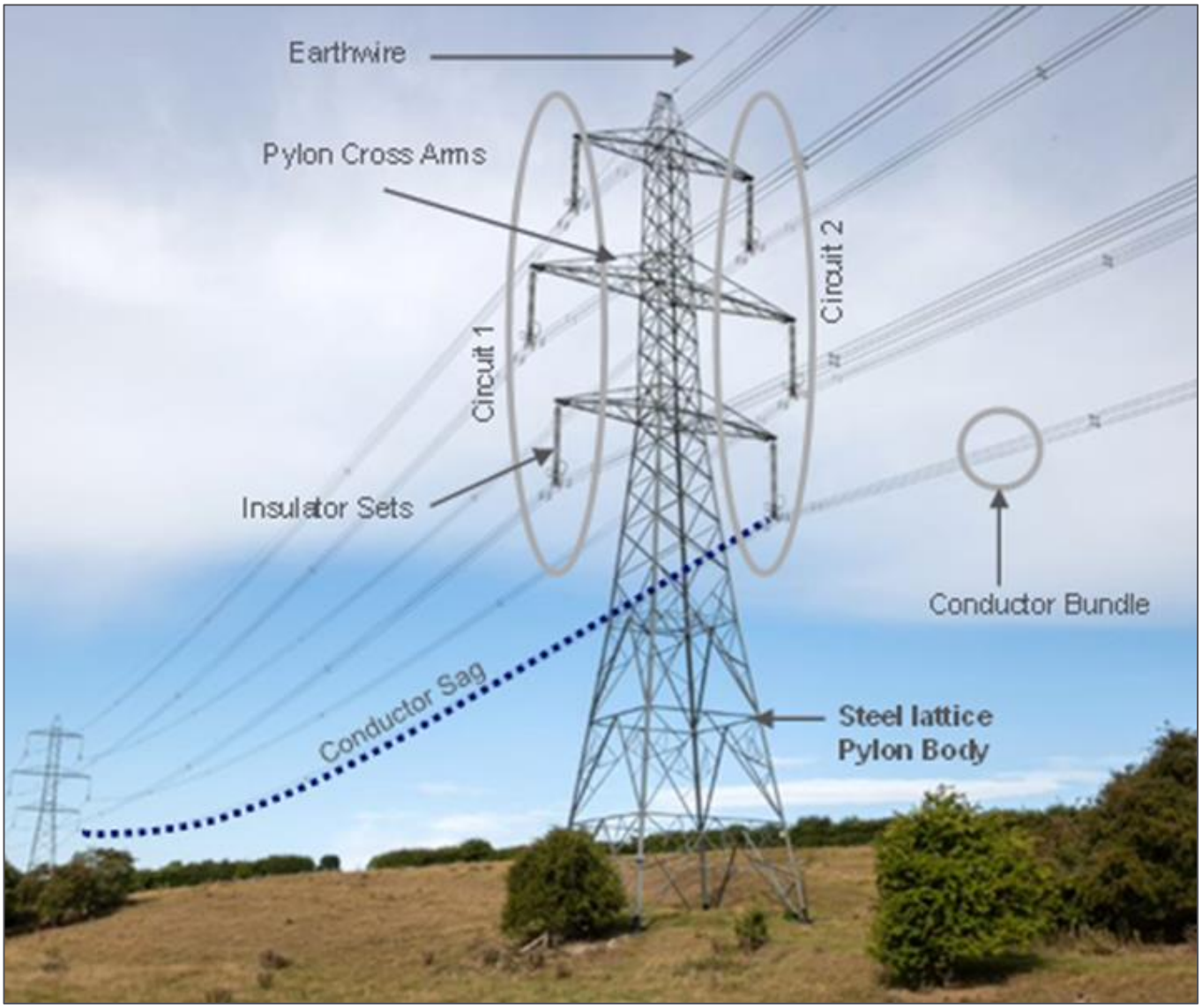
4.7.1 It is an assumption under paragraph 2.9.20 of NPS EN-5 (Ref 4.4) that "overhead lines should be the strong starting presumption for electricity networks in general". Where used on the Project the OHL would comprise of conductors supported by pylons. A

typical pylon operating at 400 kV is approximately 50 m in height but can be 60 m in height in difficult areas. A typical span distance between pylons is approximately 350 m. In broad terms there are typically three pylons for every kilometre of overhead line.

4.7.2 Pylons are either suspension pylons, from which the conductor is simply suspended, or tension pylons, which are more robust structures that hold conductors in tension where the alignment of an OHL changes direction or to maintain tenson in long straight sections of the route. The conductors are connected to the pylon by an insulator assembly consisting of a set of insulators (components made from a material with a high resistance to the flow of electric current such as glass, porcelain or polymeric) and steel fittings and conductor clamps. Additional fittings, such as spacers and vibration dampers, would be fitted to the conductors. Spacers prevent the conductors from touching each other and vibration dampers prevent oscillations from the conductors from reaching the insulator fittings and minimise effects of fatigue loading. Arcing horns will also be required, which are required to protect insulators from damage due to dangerous electrical conditions, such as overvoltages due to electrical faults or lightning strikes.

4.7.3 The main components of an overhead line are shown in **Image 4.1,** which shows a typical steel lattice suspension pylon.

Image 4.1: Components of a Typical Transmission Connection



4.7.4 Where the route of the overhead line changes, angle pylons (sometimes referred to as tension pylons) are used. Angle pylons have slightly wider bases and insulators alignment with the conductors, taking the strain of the sideways forces created by the change in direction. An angle (tension) pylon is shown in Image 4.2**.**

Image 4.2: Suspension Pylon (left) and Angle Pylon (right)

Pylons

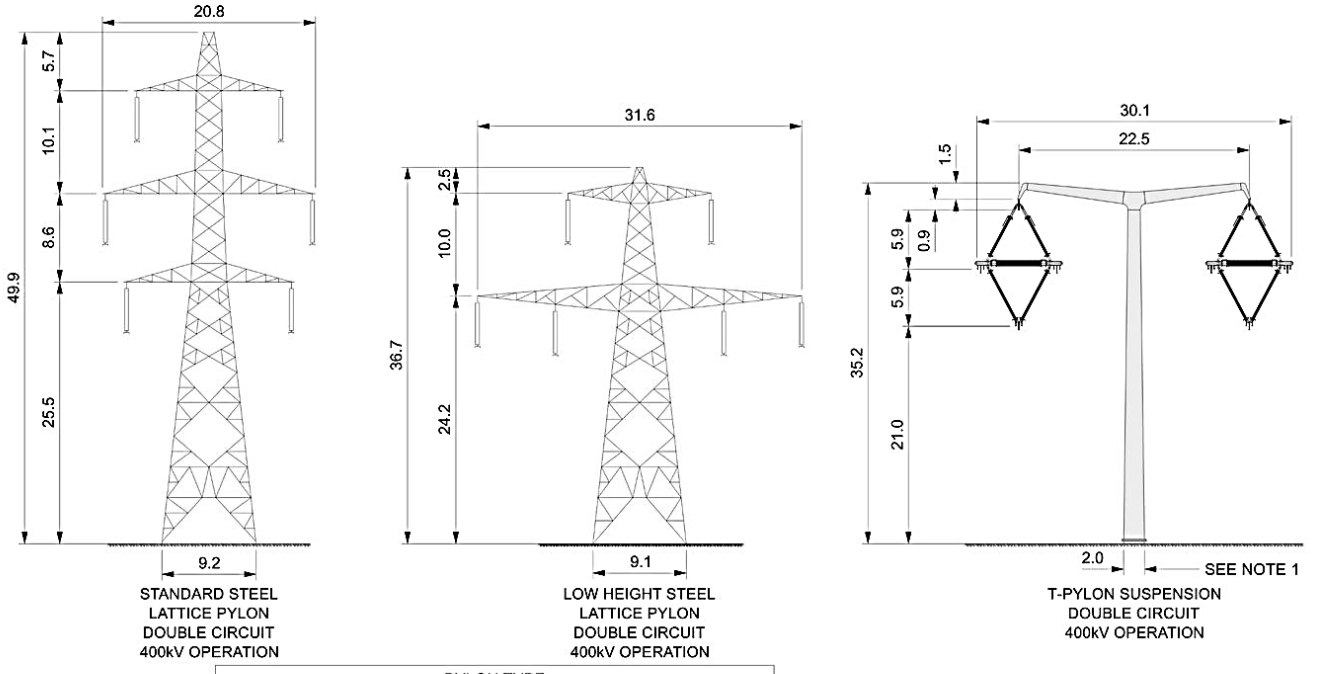
4.7.5 It is likely that the proposed pylons for the Project would comprise steel lattice with three arms on either side of a central body. Typical heights for steel lattice pylons are around 50 m, however the proposed height of each pylon would depend on the specifics of each location such as topography, land use and crossings. Indicative pylon heights will be provided within the ES which will be limited by a vertical LoD to be defined through the development of the Project and the need to cross other electricity networks, watercourses and other obstacles.

4.7.6 Alternative pylon designs may also be considered, where mitigation (e.g. for landscape and visual effects) is required. The alternative designs which may be considered are:

- Low height steel lattice; and
- T pylon.

4.7.7 Alternative pylon designs are illustrated in **Image 4.3.**

Image 4.3: Alternative Pylon Types



CHARACTERISTIC	PYLON TYPE: STANDARD LATTICE PYLON	LOW HEIGHT LATTICE PYLON	T-PYLON	
STANDARD HEIGHT	49.9m	36.7m	35.2m	
STANDARD PYLON DESIGN WIDTH	20.8m	31.6m	30.1m	
STANDARD BASE DIMENSIONS	9.2m SQUARE	9.1m SQUARE	2m DIAMETER	SEE NOTE 1
MIN & MAX PYLON HEIGHTS	43.9m - 67.9m	32.23m - 45.73m	32.2m - 38.2m	
MIN & MAX PYLON BASE WIDTHS	7.96m - 13.32 SQUARE	7.93m - 11.26m SQUARE	APPROX 2m MIN to MAX	SEE NOTE 1

NOTE 1

1. FOR T-PYLON SUSPENSION, 2m IS MEASURED ABOVE BASEPLATE. EXACT DIMENSION AT GROUND LEVEL MAY VARY.

Conductors and insulators

4.7.8 The conductor type is expected to be triple Aracaria comprising a maximum of three conductors per bundle, and a total of 18 conductors per pylon together with a earthwire/fibre optic cable.

4.7.9 Insulators can be made of different types of material, but the most common industry standard is either glass, porcelain, or polymeric.

4.7.10 Suspension pylons would typically have a single insulator string hanging vertically downwards from each crossarm end to carry the conductor bundle. A tension pylon would typically have one insulator string per conductor on both sides of the tower (i.e. two insulator strings for a conductor bundle consisting of two conductors, giving four insulator strings on each cross arm when both sides of the tower are taken into account) and these are oriented roughly horizontally outwards from the crossarm ends and take the tension of the conductors.

Line swap overs

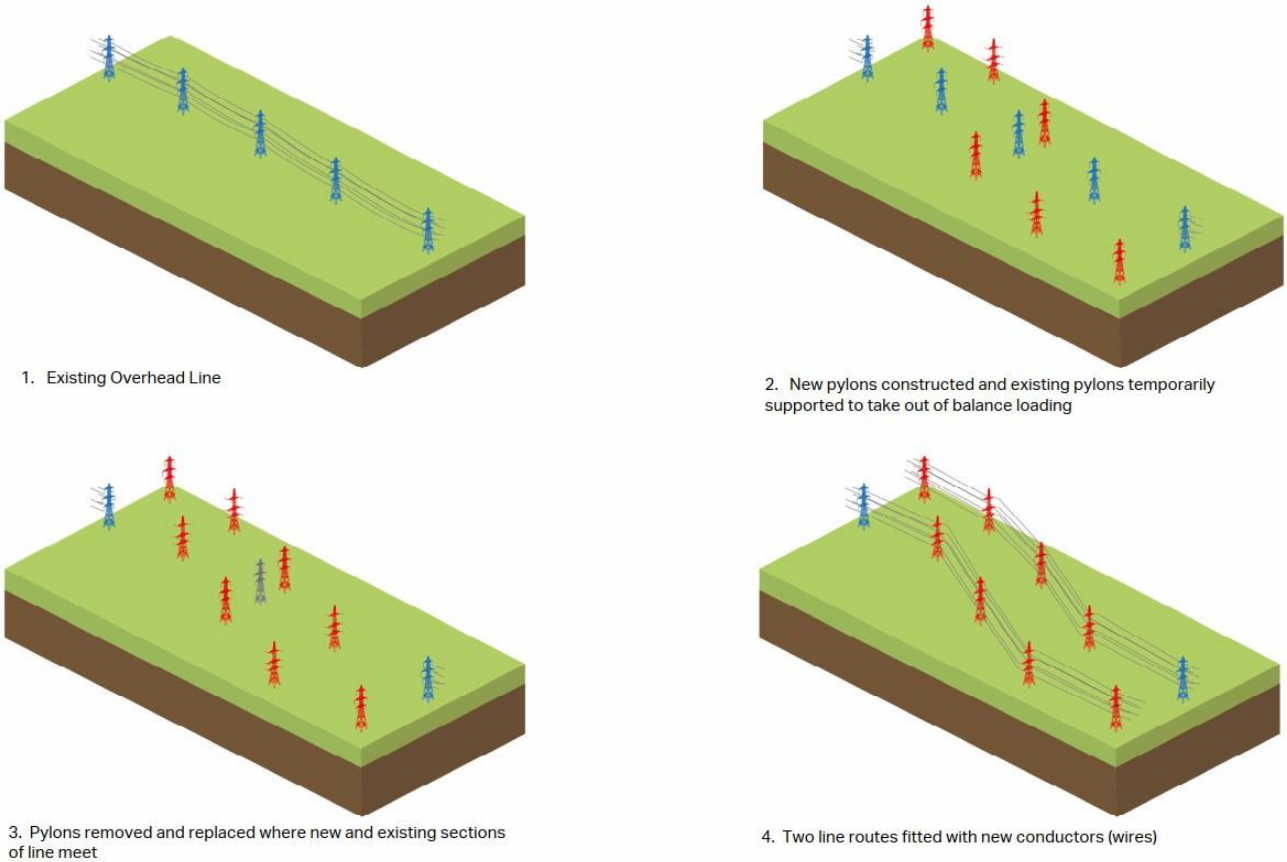
4.7.11 The emerging preferred route corridor selected for the Project and subsequently the Scoping Boundary includes sections where a parallel design with the existing 400 kV OHLs could be developed. The exact alignments will be developed through ongoing technical and environmental studies and surveys alongside stakeholder and consultation feedback. Where parallel designs are taken forward, there may be a need for line swap overs.

4.7.12 Line swap overs comprise reconfiguration of an existing OHL to allow the OHL routes to remain parallel without the need for a line 'duck-under' or cross over. A duck under or cross over is where one overhead line is routed underneath another line resulting in significantly taller pylons on the higher line due to one line being routed underneath the other introducing operational and safety concerns. Line swap overs allow for the continuation of a route from a section of new pylons to a section of existing pylons, whilst the parallel route is a continuation of a route from a section of existing pylons to a section of new pylons.

4.7.13 Line swap overs are achieved by removing a section of existing line and forming two unconnected ends, which are then each connected to a new line approaching from either side. A line swap over is illustrated schematically on **Image 4.4.**

4.7.14 Temporary diversions of localised sections of the existing route may also be required to ensure continuity of supply on the affected routes.

Image 4.4: Schematic of a Line Swap Over



Substation Connections

4.7.15 The Project would connect into five new 400 kV substations and ensure that the Project meets the relevant technical standards for the network reinforcement it is seeking to achieve. These substations would also connect new customers to the electricity network; the connections into each substation are included in **Tables 4.3** to **4.6**.

4.7.16 There are two main types of substations: Air Insulated Switchgear (AIS) substations and Gas Insulated Switchgear (GIS) substations.

4.7.17 An AIS substation is constructed with switchgear which relies on open air components, can require large clearance areas for operation and safety and takes up a larger area of land compared to a GIS substation. AIS substations are typically lower cost and typically involve less construction time, with fewer components required and easier maintenance. However, they require a larger area of land and, as they are exposed to the elements, are not recommended for certain environments such as coastal areas.

4.7.18 A GIS substation is constructed with switchgear using gas filled components, which allows operation and safety clearances to be reduced when compared to an AIS substation. GIS substations typically require less space, and this may have a reduced visual impact as a result. However, they tend to be more costly, require specialised operation and maintenance, have longer outage repair times and typically require the use of sulphur hexafluoride (SF6) - a greenhouse gas that has a global warming impact 22,800 times that of carbon dioxide.

4.7.19 The five new substations are known as Grimsby West; Lincolnshire Connection Substations A and B; Weston Marsh and Walpole B. The exact location of the five new substations is yet to be determined precisely . However, the siting areas of the five new substations will be located within the Scoping Boundary and are detailed in the Corridor Preliminary Routing and Siting Study (CPRSS) (Ref 4.9) and are shown in **Figures 3.3** to **3.6**. The substation type at each location is yet to be confirmed.

New Grimsby West Substation

4.7.20 The existing National Grid Substation incorporates two supergrid transformers (SGTs) which supply the adjacent Northern Power Grid (NPG) 132 kV Substation. An appraisal will be undertaken by National Grid to assess the asset health of the existing supergrid transformers in addition to providing additional capacity for Northern Powergrid.

4.7.21 The new Grimsby West Substation will be located within Section 1 of the Scoping Boundary situated in the local authorities of North East Lincolnshire and West Lindsey. The precise location of the substation will be confirmed at statutory consultation. The functional footprint of the substation assuming that it is an AIS substation is up to 600 m by 200 m (approximately 12 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

4.7.22 The contracted customers and planned onshore and offshore transmission connections that the Project needs to accommodate at the new Grimsby West Substation are included in **Table 4.2** which are correct at the time of producing this Chapter in July 2024.

Table 4.2: Connections into the new Grimsby West Substation

Customer Connections
Ecoenergy Solar and Battery Energy Solar Storage (BESS)
Stallingborough Solar and BESS
Carbon Free 2020 Solar and BESS
Stallingborough Carbon Capture

4.7.23 Separate consents will be required by these projects to bring the electrical connections from their projects to connect to their own associated onshore substations or converter stations with further cables then required to connect the new generation into Grimsby West Substation (as applicable) to allow the power to be transported on the new overhead lines comprised in the Project.

New Lincolnshire Connection Substations

4.7.24 The Project proposes the construction of two new LCSs which are required to provide new connection points on the network. The northernmost LCS is referred to as LCS-A, whilst the southernmost LCS is referred to as LCS-B. The substations will be connected by the new 400 kV OHL.

4.7.25 The LCS Substations will be located within Section 3 of the Scoping Boundary, situated in the local authority of East Lindsey. The precise location of the substations will be confirmed at statutory consultation. The functional footprint of the substations, assuming that they are both AIS substations, is up to 700 m by 200 m (approximately 14 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

4.7.26 The contracted customers and planned onshore and offshore transmission connections that the Project needs to accommodate at the LCSs are included in **Table 4.3** which are correct at the time of producing this Chapter in July 2024.

Table 4.3: Connections into the New Lincolnshire Connection Substations

Customer Connections
Eastern Green Link 3 / 4 (Three-ended connection)
Aminth (Volta Energy Aminth Energy Ltd) Interconnector
Mablethorpe Storage (Statera) Electrolyser and Combined Cycle Gas Turbine (CCGT)
Frontier Power SENCA (Nu Link) (formerly SENECA Frontier Power International Ltd) Interconnector
EcoMablethorpe Solar and BESS
Mablethorpe Green Energy (Inova) Solar and BESS
Offshore DC link (OWF connection recommended by the ESO in the Holistic Network Design (HND)).

4.7.27 Separate consents will be required by these projects to bring the electrical connections from their projects to connect to their own associated onshore substations or converter stations with further cables then required to connect the new generation into LCS-A or LCS-B (as applicable) to allow the power to be transported on the new overhead lines comprised in the Project.

New Weston Marsh Substation

4.7.28 The new Weston Marsh Substation will connect a new 400 kV transmission line to Walpole B Substation. In addition the new Weston Marsh Substation will connect to the existing 400 kV 4ZM transmission line that runs south east of Sleaford towards King's Lynn, and the existing 400 kV 2WS transmission line that runs east of Spalding towards a Tee-Point with the 400 kV 4ZM transmission line between Sleaford and King's Lynn. Due to the proposed location of the new Weston Marsh Substation, it will also enable flexibility as the design evolves in relation to the connection of the new LCS-B circuit to the rest of the transmission network.

4.7.29 The new Weston Marsh Substation will be located within Section 5 of the Scoping Boundary, situated in the local authority of South Holland. The precise location of the substation will be confirmed at statutory consultation. The functional footprint of the substation assuming that it is an AIS substation is up to 700 m by 200 m (approx. 14 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

4.7.30 The contracted customers and planned onshore and offshore transmission connections that the Project needs to accommodate at the new Weston Marsh Substation are included in **Table 4.4** which are correct at the time of producing this Chapter in July 2024.

Table 4.4: Connections into the New Weston Marsh Substation

Customer Connections
Holbeach Marsh Energy Park
Spalding Photovoltaic (PV) and BESS Station
Outer Dowsing OWF Connection

4.7.31 Separate consents will be required by these projects to bring the electrical connections from their projects to connect to their own associated onshore substations or converter stations with further cables then required to connect the new generation into Weston Marsh Substation (as applicable) to allow the power to be transported on the new overhead lines comprised in the Project.

Walpole B Substation

4.7.32 The Walpole B Substation will connect to the existing 400 kV 4ZM transmission line that runs north from Burwell towards the existing Walpole Substation.

4.7.33 The Walpole B Substation will be located within Section 7 of the Scoping Boundary and is situated within the local authority of Kings Lynn and Norfolk.

4.7.34 The contracted customers and planned onshore and offshore transmission connections that the Project needs to accommodate at the Walpole B Substation are included in **Table 4.5** which are correct at the time of producing this Chapter. The precise location of the substation will be confirmed in response to analysis of feedback from non-statutory consultation as well as technical and environmental studies. The functional footprint of the substation assuming that it is an AIS substation is up to 800 m by 200 m (approximately 16 ha) It should be noted that this excludes related development

including access arrangements, drainage, landscaping and other associated environmental works.

Table 4.5: Connections into the Walpole B Substation

Customer Connections
Eastern Green Link 3
Eastern Green Link 4
Walpole Flexible Generation

4.7.35 Separate consents will be required by these projects for their project infrastructure connections to the Walpole B Substation. It is noted however that the Walpole B Substation is a key connection point for both the Project and the proposed EGL 3 and 4 projects. The Walpole B Substation will be developed by one of these projects, however, for the purpose of EIA and seeking development consent orders (DCOs) it is currently included as part of both projects.

4.8 Construction

4.8.1 This section describes how the infrastructure described above would typically be constructed and installed. An Outline Code of Construction Practice (CoCP) has been produced and is included in **Appendix 4A Initial Outline Code of Construction Practice**. The topic chapters (**Chapters 6-19**) have taken account of the control and management measures which are set out in the Initial Outline CoCP when determining the proposed scope of assessment.

Construction Programme

4.8.2 Subject to gaining development consent in 2028, it is anticipated that access and construction of the Project would commence in 2029, starting with enabling works including site clearance activities, the installation of construction compounds and access roads. It is expected the main construction works (construction of substations and OHL) would continue through to 2033 (four years).

4.8.3 Reinstatement would be required following the construction period.

4.8.4 The construction programme will be developed as the Project progresses and will take account of seasonal constraints such as protected species breeding or hibernation seasons.

Construction Compounds

4.8.5 Construction activities would begin with the preparation and installation of construction compounds. The location of the construction compounds will be determined through the development of the Project and will be presented in the ES.

4.8.6 A typical layout for a construction compound includes the following:

- security gate house;

- plant and construction vehicle parking;
- site office parking area;
- site offices and welfare facilities;
- fencing;
- lighting;
- laydown area;
- storage area;
- wheel wash;
- collection, storage and disposal of surface water, in addition to water from within the compound including grey and foul water;
- soil bund;
- spoil storage area;
- power supplies (where feasible to do so, alternatively fuelled generators will be used and/or a local grid connection); and
- fuel storage.

4.8.7 Smaller satellite compounds may be required at specific working areas along the route to ensure the provision of welfare, storage, and mess room facilities for site operatives.

Overhead Line Construction

4.8.8 The construction of the 400 kV OHL would generally follow the sequence outlined below as work progresses along the length of the OHL:

- survey;
- ground investigation;
- installation of bellmouths and creation of visibility splays at highway accesses;
- installation of stock proof fencing and gates or equivalent;
- topsoil stripping, temporary drainage installation where required;
- installation of access tracks (including culverts and bridges) and demarcated pylon working areas;
- installation of pylon foundations (pad and column, mini pile, tube pile or bespoke);
- working area and layout of steelwork in preparation for erection;
- assembly (painting if required) and erection of steelwork;
- installation of protection prior to stringing of conductors, including scaffolding;
- installation of insulator assemblies on suspension pylons;
- establishment of machine sites for conductor stringing;
- conductor stringing;
- temporary earthing;

- installation of insulator assemblies on tension and terminal pylons;
- installation of pylon signage including safety notice plate and anti-climbing devices;
- removal of construction equipment and reinstatement of ground and restoration of soils;
- removal of access tracks and bellmouths; and
- removal of construction compounds and reinstatement of ground.

4.8.9 Activities such as surveys, archaeological investigation, ground investigation, construction of bellmouths and access tracks could commence without the full construction compounds in place.

4.8.10 Vegetation clearance may be undertaken prior to or during any of the activities identified above, this would be in accordance with any ecological requirements identified through the EIA.

4.8.11 Dependant on local conditions, haul roads may be required to be established from suitable access points from the existing road network in the area.

4.8.12 The following sections provide summary information about the activities listed above.

Installation of bellmouths and the creation of visibility splays

4.8.13 Where new accesses or widening of existing accesses from the public highway are required, bellmouths would be installed. The installation of bellmouths may require realignment of existing underground services and the creation of visibility splays to create a line of sight for the safe use of the bellmouth. Within the visibility splay, vegetation would need to be cut to a specified height or visual obstacles removed depending on local conditions, the speed rating of the road and whether traffic management was in place.

Topsoil stripping

4.8.14 The topsoil may be required to be stripped from the access tracks, site compounds and pylon working areas. The topsoil would be stored carefully to one side; typically, topsoil would be stored in bunds. To avoid the growth of weeds, such as thistles and ragwort, a suitable herbicide application will be used. Temporary drainage would be installed as required, with necessary environmental protection measures (such as silt fences) installed where required.

Drainage

4.8.15 Temporary drainage would be required during construction, to deal with rainfall and water encountered during excavation where appropriate. The drainage design will include a variety of potential measures to address silt runoff. Construction sustainable drainage systems (SuDS) would be used if necessary and where appropriate to do so.

Installation of access tracks (including culverts and bridges) and pylon working areas

4.8.16 A two-way stone access track/haul roads would typically be 9-10 m wide, which, coupled with the area for soil storage and drainage between the track and the fence line, would, give a typical swathe of 21 m. There would be stone laid on geotextile membrane. Other accesses may also be used comprising of interlocking panels, depending on ground

conditions and the duration and type of use. Soil stabilisation techniques could be considered subject to local conditions.

4.8.17 The stone access tracks would be constructed using secondary or primary aggregates. The total amount of aggregate material that would be needed for the construction of the stone access tracks (including bellmouths) and pylon working areas will be determined through the development of the Project and reported in the ES. On completion of construction, the access tracks would be removed, and aggregates taken to an appropriate facility which could include recycling, or onward use, for example as secondary aggregate in the construction industry or being reused by other construction projects.

4.8.18 Culvert installations would be required for temporary access tracks to cross ditches and watercourses. The size and depth of a culvert is dependent upon the dimensions of the crossing, sensitivity, and importance of the watercourse. To maintain the flow of a watercourse during installation of the culvert a pump would be used on site. Throughout all the stages of the Project, close engagement will be kept with the relevant Internal Drainage Boards (IDBs).

4.8.19 Should culverts not be suitable for a particular crossing, due to either the sensitivity of the watercourse or engineering requirements, a temporary bridge would be installed.

4.8.20 Temporary bridges may need to accommodate a mobile crane (approximately 250 t capacity, subject to detailed design) and the temporary bridge support requirements would be assessed on a site-by-site basis. Most bridge crossings would be of a short span and flat deck construction; however, bailey style bridges may also be used. All bridges would be clear span and the foundations would be placed clear of the main channel of the watercourse, where feasible.

4.8.21 Once the foundations are in place the temporary bridge would be fitted. Although the installation method is dependent on the type of bridge being installed, a typical bridge would be delivered in sections. Each bridge component would be assembled on site and lifted into position by crane. With the bridge in position, decking panels would be lifted and fixed into position.

4.8.22 Pylon working areas would typically be 70 m x 70 m. They would either be stone laid on a geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. Soil stabilisation techniques could be considered subject to local conditions.

Installation of pylon foundations (pad and column, mini pile or tube pile)

4.8.23 The foundations for the pylons would either be pad and column, mini pile or tube pile (or bespoke if required). The selection of foundation type would depend upon the ground conditions encountered.

Assembly and erection of steelwork[2]

4.8.24 The steelwork components would be brought to each pylon working area. In some circumstances, construction may be undertaken using helicopters, although at this stage specific locations are not currently known.

[2] This is based on a steel lattice pylon.

4.8.25 The steelwork components would be bolted together on the ground. The pylon would be assembled in sections beginning from ground upwards, using a mobile crane.

4.8.26 To lift the topmost sections of the pylons, a crane with a capacity of up to 250 t may be required for the reach and weight of the sections to be positioned into place. A smaller capacity crane could be used to lift pylon sections up to the limit of reach of the crane considering load to be lifted. Though in this instance the larger capacity crane would still be required to complete the pylon.

Crossing protection prior to stringing of conductors

4.8.27 Temporary scaffolding and nets would be installed during construction where required as a safety measure to protect assets such as roads, railways, and distribution network OHLs (where not already relocated underground) and could include hedgerows which would be crossed by the proposed 400 kV OHL. This is required to protect these features during conductor stringing from the accidental dropping of conductors and any of the associated equipment. Temporary closures of some affected assets, such as roads, may be required during these works in order to install the protective netting, or indeed may be used instead of installing scaffolding.

4.8.28 The scaffolding would be transported to site using a lorry or tractor and trailer and assembled either side of the feature being protected.

4.8.29 Alternative methods may be utilised dependant on local site conditions/restrictions, such as aerial catenary support systems, where feasible.

Installation of insulators

4.8.30 The insulators would be fastened to the cross arms of the pylons, with running wheels hung from the end of the insulators to carry the pilot wires in preparation for installing the conductors.

Establishment of machine sites for conductor stringing

4.8.31 The conductors are usually installed from tension pylon to tension pylon, often termed a ‘section’, with machine sites required at either end of the section.

4.8.32 The machine sites for conductor stringing would normally be located within the pylon conductor pulling positions, sited on interlocking panels laid directly onto the ground surface reducing disturbance to the underlying soils.

4.8.33 A conductor pulling position would be established at each end of the section with a winching machine (‘winch’) and empty steel reels to accept pilot wires. At the other end of the section the full conductor drums would be arranged in close proximity to the tensioning machine (‘tensioner’).

Conductor stringing

4.8.34 The conductors would be delivered to pulling positions, using lorries, or tractor and trailer on large cable drums and, depending on the conductor type, each completed drum could weigh up to 8 t, although larger and heavier drums are possible depending on the supplier and the length of conductor.

4.8.35 The drums containing the conductors would typically be delivered to the construction compound, or satellite compound, first, and would be distributed from there.

4.8.36 Light pilot wires would be laid at ground level (and over temporary scaffolding protecting assets such as roads and railway lines) along the length of the section between the pulling positions. Some vegetation management could be required. The pilot wires would be lifted and fed through running wheels on the cross arms of all the pylons in the section, and then fed around the winch at the pulling position. The light pilot wires are used to pull through heavier, stronger pilot wires which are in turn used to pull conductors through from their drums. The tensioning machine would keep the wires off the ground and prevent the conductors running freely when the winch pulls the pilot wire. When the conductor is fully 'run out', it would be fastened at its finished tension and height above ground by a linesman working from platforms on the pylons which are suspended beneath the conductors. Additional fittings, such as spacers, vibration dampers and arcing horns would be fitted.

4.8.37 To counterbalance the out of balance loading at the tension pylons at the end of a conductor stringing section, it is normal to install temporary backstays or concrete blocks for safety of installation. The temporary backstays or concrete blocks would be removed as the conductor stringing process starts on the next section. Temporary backstays might also be required at other locations such as connecting new conductor to existing conductor, temporary diversions, and temporary spans.

Removal of construction equipment, reinstatement of ground and restoration of soils

4.8.38 Once the 400 kV OHL is constructed, the access tracks and working areas at the pylon site would be removed and the ground reinstated to its previous condition. Other surfaces would be reinstated, and accesses would be restored to the condition they were in at the commencement of the works, unless agreed otherwise.

Cable Installation

4.8.39 Should underground cables be required, cables would be normally installed in excavated trenches. A cement-bound sand mix is used as backfill to protect the cables and help dissipate any heat generated by the cables in operation.

4.8.40 For a new 400 kV transmission circuit installed underground, the working width of the land required for construction is typically between 40 m and 120 m, subject to a range of factors such as the number of circuits being installed and the number and size of cables needed.

4.8.41 Due to the weight and size of underground cables needed to operate at 400 kV, the maximum single cable length that can be transported to a project location by road is typically between 800 m and 1,000 m. To achieve cable routes in excess of these lengths individual cables must be joined together on site. This necessitates joint bays at intervals along the route. Where joint bays are located the working width may need to be wider than 120 m.

4.8.42 Where specific environmental or infrastructure features preclude the use of underground cables, as described above, it may be practicable to install ducts using a trenchless installation technique such as horizontal directional drilling (HDD). In this instance cables are pulled into pre-installed ducts. The maximum length of HDD installed ducts is limited by the weight of the cables to be installed. Where trenchless techniques are required, the working width may need to be wider than 120 m.

4.8.43 Where HDD is not technically viable, then a tunnelled solution for underground cables can be considered. Tunnels can be constructed using a variety of techniques, but all

involve major civil engineering activities, which result in substantial additional costs, increased construction risks and extended programme durations. Typically, permanent buildings are required at either end of the tunnel section to support operation, including access to and potential ventilation of the tunnel and for cooling of the underground cables.

New Substations

4.8.44 Construction activity would begin with site preparation including setting up the temporary accommodation, parking and laydown area and will incorporate measures to address any associated flood risk. Temporary fencing would be installed early in the construction programme to secure the construction area. The permanent access road would be installed to connect the proposed substations to the nearest main road. On completion a permanent, appropriate level of security fence would remain in place to ensure 24 hour security for the site.

4.8.45 The initial preparatory works would comprise the temporary removal of the top layer of ground and laying a temporary stone capping to provide a clean and stable working area. Typically, the topsoil and a layer of subsoil would be excavated within the footprint, and this would be replaced with clean imported granular fill to form the surface of the compound. A series of copper earth tapes would be installed below the ground to create an earth mat to distribute any electrical charge transferred to the ground by earthed equipment and infrastructure in the proposed substations.

4.8.46 The permanent foul, oily water, including below ground oil separator, and surface water drainage systems would be installed once the preparatory works are complete. In addition, concrete foundations would be installed for the electrical equipment and control buildings. The majority of electrical equipment would be mounted on steel posts fixed to concrete foundations.

4.8.47 Reinforced concrete bunds would be installed for each SGT and would comprise a perimeter concrete wall, a base slab continuous with the wall and a central plinth for supporting the SGT. The bunds act as a secondary oil containment measure. SGTs would be transported to site as Abnormal Indivisible Load (AIL) and installed within the bunds.

4.8.48 Logistics planning will be undertaken to ensure appropriate routes and mitigation strategies are adopted for abnormal load movements to ensure safe delivery of heavy substation equipment (e.g. supergrid transformers).

4.8.49 Concrete for the foundations and bunds would be ready-mixed, brought to site in lorries and placed using small plant such as cranes and excavators.

4.8.50 Once the electrical equipment is installed, commissioning tests would be undertaken to check that the individual items of plant and the system as a whole works as required.

4.8.51 Following successful testing, the substations would be connected to the electricity transmission system ready for operation.

4.9 Operation

4.9.1 During operation the Project would reinforce the electricity transmission network in Lincolnshire, Cambridgeshire and Norfolk, and facilitate the connection of planned offshore wind generation, battery storage/solar, combined cycle gas turbines,

interconnectors with other countries, increased distribution network capacity and subsea links to Scotland.

4.9.2 The Project would be operated remotely in the same way as National Grid operates the rest of the network.

4.10 Maintenance

Overhead Line

4.10.1 The OHL would be subject to annual inspection from the ground by foot patrol, small van, or by air using drone/helicopter to check for visible faults or signs of wear. The inspections would also indicate if plant/tree growth or third-party developments were at risk of affecting safety clearances. Inspections would provide input as to when refurbishment was required.

4.10.2 The overhead line could support telecommunication equipment such as small mobile telephone antennae and would contain optical fibres within the earthwire. If this were to be the case, independent companies would require access for maintenance purposes using pickup trucks and vans. Access for the optical fibres will usually be at the joint box positions located just above the anticlimbing devices on certain pylons. Position and frequency of joint boxes is subject to further design work.

4.10.3 Access for vegetation management, telecommunications and fibre optic maintenance would be along routes agreed with the landowners and may require interlocking track mat panels.

4.10.4 The overhead line would be made up of a variety of materials, including concrete and steel for the foundations, steelwork for the pylon and aluminium for the conductors. All these materials have an expected lifespan, which would vary depending on how the overhead line was used and where it is located. Typically, pylon steelwork and foundations have a life expectancy of approximately 80 years, the conductors have a life expectancy of approximately 40 to 60 years and the insulators and fittings have a life expectancy of approximately 25 to 40 years. The lifespan of the overhead line may be longer than the anticipated 80 years, depending on its condition, the environment to which it is exposed, refurbishments and transmission network requirements.

4.10.5 Minor repairs or modifications may be required from time to time for local earthwire damage, addition of jumper weights, local conductor damage, broken insulator units, damaged or broken spacers, broken or damaged vibration dampers, damaged or broken anti climbing guards. Minor repairs would be programmed locally by a maintenance team using pickup trucks and vans to access site along routes agreed with landowners. Access may require interlocking track mat panels.

4.10.6 Refurbishment work would be undertaken typically on one side of the pylon at a time, so that the other side could be kept ‘live’ or in use.

4.10.7 Refurbishment work could involve:

- the replacement of conductors and earth wires;
- conductor greasing;
- the replacement of insulators and steelwork that holds the conductors and insulators in place, insulator fittings, conductor fittings, tower signage;

- painting or replacement of the pylon steelwork;
- replacement of telecommunication equipment (by separate companies); and
- foundation repairs/upgrades.

4.10.8 Refurbishment would usually be carried out in two stages because the OHL has two circuits, one on each side of the pylon. This means that work can be undertaken on one side only, so that the other side can be kept 'live'. Once all the work has been completed on the first side, the circuit would be re-energised, and the opposite side switched off, so that the work could be carried out on the other side.

4.10.9 The refurbishment works would require temporary access tracks, a small compound and potentially scaffolding to protect roads and other features during the work.

4.10.10 Vans are used to carry workers in and out of site and trucks are used to bring new materials and equipment to site and remove old equipment. Temporary works including installation of access routes and installation of scaffolding to protect roads, railways and footpaths would be required as necessary for the OHL refurbishment (similar to the initial construction requirements).

New Substations

4.10.11 The substations would be typically unmanned during operation, however operational requirements may require sites to be manned permanently or temporarily. Routine site visits would be required to visually inspect condition of equipment, structures, and buildings for signs of damage or wear. The routine maintenance would be carried out in line with maintenance policies and procedures.

4.11 Decommissioning

4.11.1 NPS EN-1 (Ref 4.3Ref 4.3) paragraph 4.3.5 states that the ES should cover the decommissioning of a project, however decommissioning of electricity networks is not specifically covered in NPS EN-5 (Ref 4.4) which recognises that generally, nationally significant electricity networks are likely to have an ongoing function, but will be subject to maintenance, reinforcement works and for assets to be replaced when they come to the end of their lifespan. There are currently no specific plans to decommission the Project, with the exception of decommissioning of the existing Grimsby West Substation (in full or part). It is expected that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. To date, relatively few transmission projects have been decommissioned since the main expansion of such infrastructure in the 1950s and 1960s.

4.11.2 As set out in NPS EN-5 (Ref 4.4) paragraph 2.1.4, it is states that nationally significant electricity networks are likely to have an ongoing function, that will be subject to maintenance and reinforcement works. Such assets would be replaced at the end of their lifespan.

Overhead Line

4.11.3 If the Project is required to be decommissioned sections of overhead line between the new substations would be removed. Fittings such as dampers and spacers would be removed from the conductors. The conductors would be cut into manageable lengths or

would be winched onto drums in a reverse process to that described for construction. The conductor, fittings and insulator assemblies would be removed from the pylons and lowered to the ground.

4.11.4 Each pylon would most likely be dismantled by crane, with sections cut and lowered to the ground for further dismantling and removal from site. Depending on the access and space available, it may be possible to cut the pylon legs and then pull the pylon to the ground using a tractor. The pylon could be cut into sections on the ground. Unless there was a compelling need for removal of all the foundations, these would be removed to approximately 1.5 m deep, sufficient for safe agricultural use of the land and subsoil and topsoil reinstated. All waste would be removed from site and recycled in line with waste disposal regulations at the time.

Substations

4.11.5 Typically, the above ground features of the substations would be removed (unless otherwise agreed). Any above ground buildings would be demolished and taken off site for suitable disposal along with any other above ground features such as electrical equipment. Any temporary access tracks and working areas required would be removed and the site reinstated to an appropriate end use.

4.11.6 If the Project, or any part of it, is to be decommissioned, a written scheme of decommissioning would be submitted for approval by the relevant planning authorities at least six months prior to any decommissioning works. The decommissioning works would follow National Grid processes at the time for assessing and avoiding or reducing any environmental impacts and risks.

4.12 References

Ref 4.1 National Electricity Transmission (February 2017). System Security and Quality of Supply Standard [online]. Available: GB Security and Quality of Supply Standard (nationalgrid.com) (Accessed: 4 July 2024).

Ref 4.2 National Infrastructure Commission (February 2020). Design Principles for National Infrastructure. [online] Available: NIC-Design-Challenges-Pamphlet-Print-Spread-Version.pdf. (Accessed: 4 June 2024).

Ref 4.3 Department for Energy Security & Net Zero (January 2024). Overarching National Policy Statement for Energy (EN-1) [online]. Available: Overarching National Policy Statement for energy (EN-1) - GOV.UK (www.gov.uk) (Accessed: 4 July 2024).

Ref 4.4 Department of Energy Security & Net Zero (January 2024). National Policy Statement for Electricity Networks Infrastructure (EN-5) [online]. Available: Electricity Networks National Policy Statement - EN-5 (publishing.service.gov.uk) (Accessed 4 July 2024).

Ref 4.5 National Grid. Holford Rules. [online] Available at: Microsoft Word - The Holford Rules.doc (nationalgrid.com) (Accessed 25 May 2024).

Ref 4.6 National Grid. Horlock Rules. [online] Available at: Microsoft Word - horlock_rules.doc (nationalgrid.com) (Accessed 25 May 2024).

Ref 4.7 International Commission on Non-Ionizing Radiation Protection (2020). ICNIPR Guidelines for Limiting Exposure to Electromagnetic Fields (100 kHz to 300 GHz) [online]. Available: *ICNIRPrfgdl2020.pdf*. (Accessed:4 July 2024).

Ref 4.8 Planning Inspectore (July 2018). Natoinally Significant Infrastructure Projects – Advice Note Nine: Rochdale Envelope [online]. Available: Nationally Significant Infrastructure Projects - Advice Note Nine: Rochdale Envelope - GOV.UK (www.gov.uk). (Accessed 25 May 2024).

Ref 4.9 National Grid (January 2024). Grimsby to Walpole Corridor Preliminary Routing and Siting Study. [online] Available at: download (nationalgrid.com) (Accessed 4 June 2024).

5. EIA Approach and Methodology

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Contents

5.1 Introduction

5.1.1 This Chapter outlines the overall methodology that will be used to undertake the Environmental Impact Assessment (EIA). The EIA will follow the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) and other relevant guidance, as specified in this Chapter.

5.1.2 EIA is a process of compiling, evaluating and presenting information about the likely significant environmental effects, both adverse and beneficial, that could occur as a result of a project. The assessment is designed to help produce an environmentally sympathetic project and to provide decision makers and statutory consultees with the environmental information they require during determination of an application for consent. The early detection of likely significant adverse environmental effects enables appropriate mitigation (i.e. measures to avoid, reduce or offset likely significant adverse effects) to be identified and incorporated into the design of a project, or commitments to be made, for example to environmentally sensitive construction methods and practices. The approach is iterative and involves close working between the Applicant, the EIA team and the designers.

5.1.3 Three main EIA documents are produced as part the Development Consent Order (DCO) pre-application process:

- **Scoping Report**: The Scoping Report sets out the likely significant effects from a project (scope). It also presents the data collected and the proposed assessment methodology and approach that would be used during the EIA. The Scoping Report is prepared by the applicant and then issued by the Planning Inspectorate (PINS) to consultees for comment on the scope and methodology proposed, informing the scoping opinion to be adopted by PINS;
- **Preliminary Environmental Information Report (PEI Report)**: The PEI Report sets out the information that 'is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development' (Planning Inspectorate, 2020). The PEI Report is used by consultees to inform their consultation responses during the Statutory Consultation; and
- **Environmental Statement (ES)**: The ES presents the results of the EIA undertaken for the Project. It identifies the likely significant effects that would result if the Project was implemented, and any proposed mitigation to reduce those significant effects. The ES is submitted as part of the application for development consent and is taken into account during the decision-making process.

5.2 General Approach

5.2.1 This chapter describes the methodology which will be used to assess the potential effects on the natural, human and built environment as a result of the Project. In accordance with the EIA Regulations, the assessments undertaken will evaluate and identify the likely significant environmental effects arising from the proposed pre-construction, construction (this phase will also consider the effects from the part or full decommissioning of the current Grimsby West Substation) and operational phases of the Project. This information will be presented in an ES.

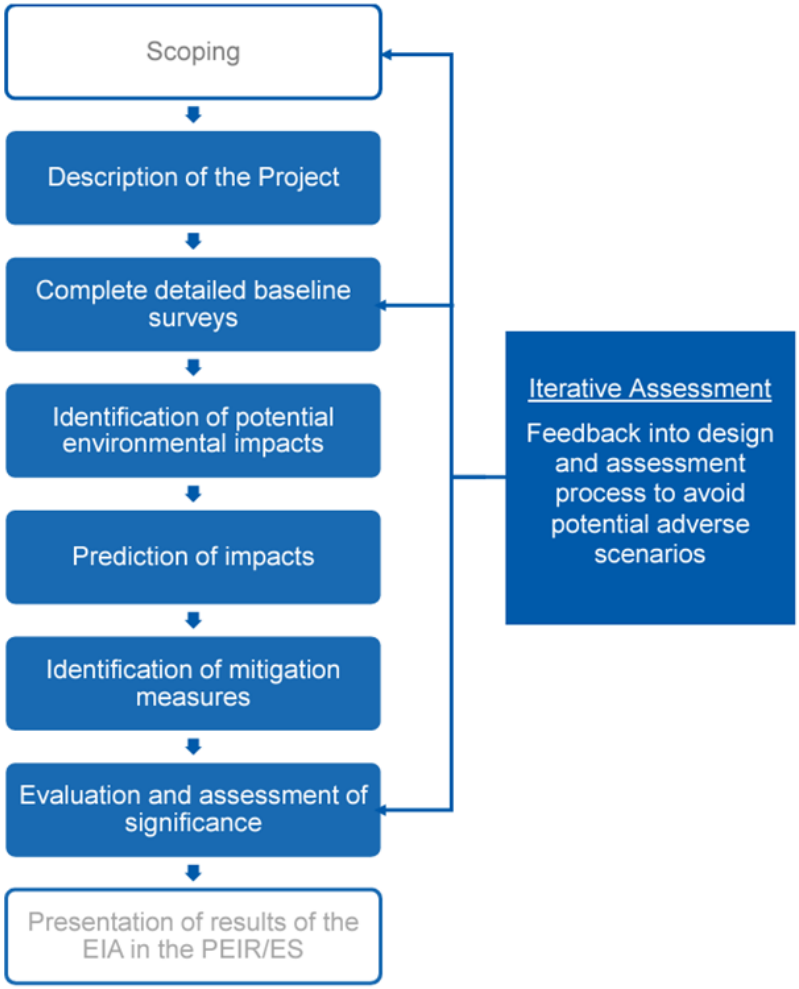
5.2.2 Each topic chapter within this Scoping Report includes a description of the methodology that is proposed for determining significant effects for that relevant topic. The Scoping Report, and ultimately the ES, would also be supported by professional judgement and

discussion from the technical specialist author to justify the final judgements on significance.

5.2.3 In general, the assessment within the ES would follow a receptor-based assessment approach. Receptors are those aspects of the environment which are sensitive to change as a result of sources such as dust, noise, and construction activities. When deciding on which receptors to include within the Scoping Report, consideration has been given to Regulation 5(2) and Schedule 4 paragraph 4 of the EIA Regulations and the Planning Inspectorate Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Ref 5.1). The EIA will identify environmental effects and, if any, propose project specific mitigation measures to avoid, reduce or offset adverse environmental effects or maximise environmental benefits.

5.2.4 The EIA process involves the main steps on **Image 5.1**.

Image 5.1: EIA Process



The ‘Rochdale Envelope’ Approach

5.2.5 Major infrastructure projects such as linear infrastructure projects for overhead lines, above ground installations and underground cables, typically need some flexibility to be

maintained for detailed design and construction, if conditions are found that would otherwise prevent or delay construction. Examples can include previously unknown archaeological assets which interact with the location of proposed pylons. To mitigate such issues, a flexible approach to design parameters is used within the EIA process which is typically referred to as the 'Rochdale Envelope'. This approach allows for a realistic worst-case assessment to be undertaken and is the basis for the assessment in technical **Chapters 6-19** of this Scoping Report.

5.2.6 By developing a realistic worst-case scenario in response to critical technical and engineering parameters, as well as the emerging findings of the EIA and feedback from stakeholders, it is possible to strike a balance between the level of design information needed for the purpose of EIA and the application for consent, while still retaining a level of design flexibility needed as the Project moves into detailed design and construction.

5.2.7 The EIA process will aid and inform the design process and support the identification of a design freeze that is flexible enough to accommodate change in future stages but not so flexible that it could over-state or unnecessarily amplify the potential environmental impacts of the Project.

5.3 Approach to Scoping

5.3.1 Scoping sets the proposed scope for the EIA process and, when done right, it makes the subsequent phases more straightforward. A robust scope, focussed on the potential for likely significant environmental effects is required in order to ensure the EIA is focused and proportionate. The process of scoping helps to ensure that the topics covered, the baseline information used, and the methods of assessment are appropriate, and have considered the views of decision makers and consultees where appropriate.

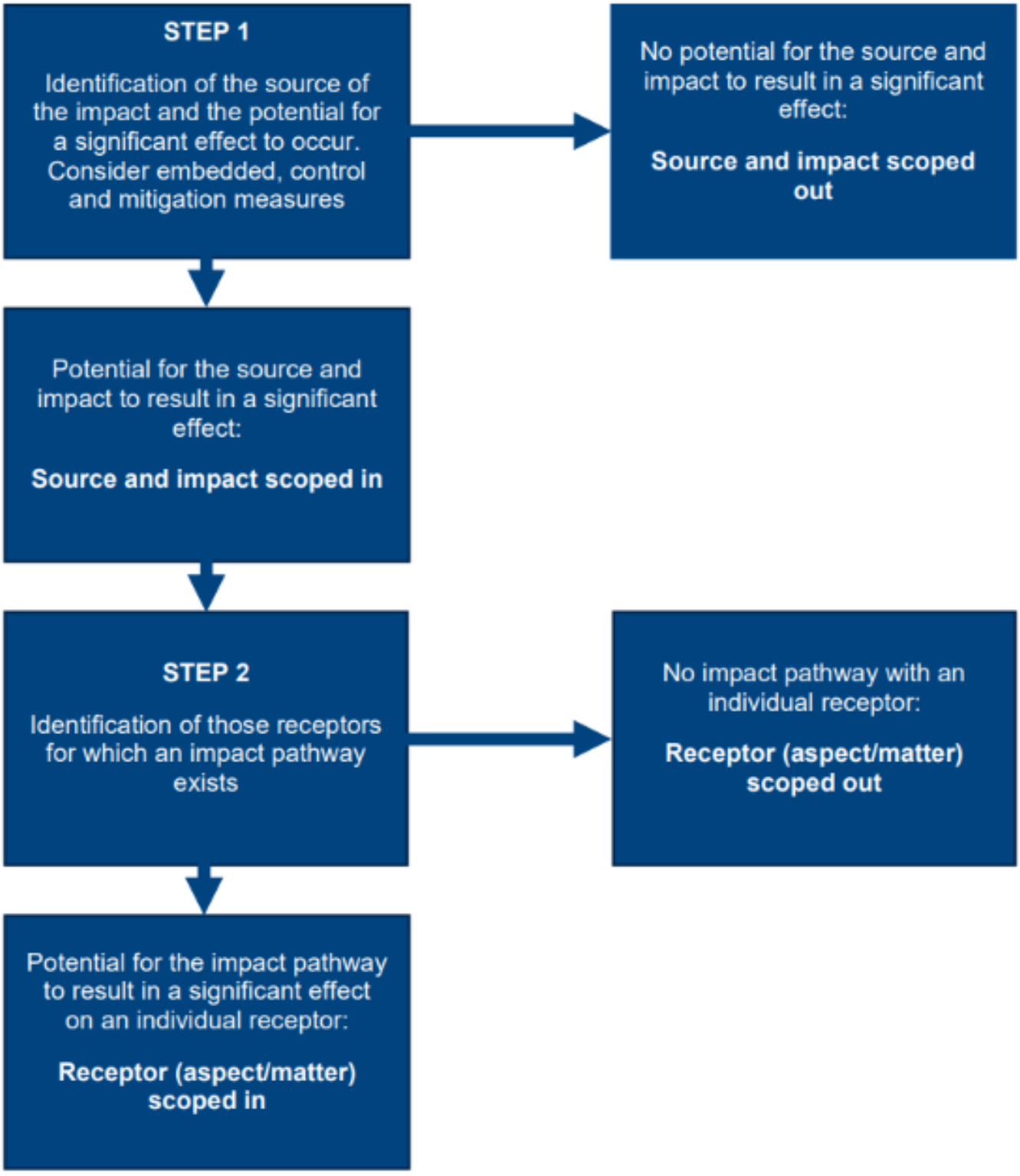
5.3.2 The EIA scoping process establishes which aspects of the environment are likely to be significantly affected by a project and involves identifying:

- the people and environmental resources (collectively known as "receptors") that could be significantly affected by the Project; and
- the work required to take forward the assessment of potential likely significant effects.

5.3.3 The approach taken in preparation of this Scoping Report has also been informed by the Planning Inspectorate's Advice Note Seven (Ref 5.1) and reflects that the EIA Regulations require an ES to focus on aspects of the environment likely to be subject to significant effects. In line with guidance and legislation, this Scoping Report seeks to, where appropriate, scope out aspects/matters from further assessment with suitable justification provided. This will streamline the assessment to focus on key likely significant effects and ensure the EIA for the Project is proportionate in accordance with the Institute of Environmental Management and Assessment (IEMA) (2017) Delivering Proportionate EIA guidance document (Ref 5.2).

5.3.4 The method used to determine the proposed scope of the EIA has utilised a staged process, which assesses the probability of significant impacts through a source, pathway, and receptor-based approach. This is to ensure transparency and provide a clear justification as to why particular receptors and aspects/matters are either proposed to be scoped in or scoped out of the EIA, with the aim of ensuring that the ES is proportionate. The approach taken to the identification of the proposed scope is presented in **Image 5.2.**

Image 5.2: Approach to the identification of the proposed scope of assessment



Technical Scope

5.3.5 The technical scope of assessment for each environmental aspect is detailed in technical **Chapters 6-19** and this includes proposals for scoping matters in or out of the EIA. The technical scope also details the approach to baseline data collection and assessment methodologies and is the basis for the assessment in technical **Chapters 6-19** of this Scoping Report.

Spatial Scope

5.3.6 The Project Scoping Boundary is described in **Chapter 4 Description of the Project** and shown in **Figure 1.1 Scoping Boundary**. At the current stage of the design process, the land within the Scoping Boundary has been identified as potentially being required for temporary or permanent purposes for the construction or operation of the proposed Project.

5.3.7 The extent of the Study Area is determined by the environmental topic and specific receptors under consideration and is described in each topic chapter. Each topic chapter applies a buffer to the Scoping Boundary, if required, to determine the extent of the Study Area. The Study Area proposed for each topic therefore comprises an area sufficient to encompass the spatial extent over which impacts relevant to that topic and the related receptors may operate. These Study Areas will be refined in relation to the Order Limits, once determined.

5.3.8 The spatial scope for each environmental aspect, the area over which changes to the environment are predicted to occur as a consequence of the Project, depends on the nature of the potential effects and the location of receptors that could be affected. The spatial scope takes account of:

- the physical area of the Project;
- the nature of the baseline environment;
- the manner and extent to which environmental effects may occur; and
- relevant guidance, best practice and/or legislation.

5.3.9 The Study Areas are based on the distance over which an impact is likely to occur. Study areas are defined in each of the topic chapters and vary between topics. Each technical chapter describes the Study Area to be considered, providing a clear explanation as to why the Study Area has been adopted. The spatial scope of each assessment may be refined for both the PEI Report and the ES in response to comments from consultees or further assessment work.

Temporal Scope

5.3.10 Subject to gaining development consent, construction works would be expected to start in 2029 and be completed by 2033.

5.3.11 The EIA will predict the changes (effects) to the current and future baseline during the construction and operation phases of the Project. The general approach is summarised below and any variations from this are discussed in the relevant topic chapters:

- Baseline year: the baseline is the reference level of the environmental conditions without implementation of the Project, against which the potential effects of the Project are assessed. The baseline year is 2024, when the majority of baseline surveys are to take place. For certain topics the baseline environment is expected to change over time, and for these topics this change has been predicted to enable robust identification of the effects of the Project against a future baseline;
- Construction Phase: these are effects that are likely to occur during the construction phase of the Project. This will include effects resulting from the activities associated with installation of the OHL, substations and works to facilitate the connection of the OHL into the substations at Grimsby West Substation, Lincolnshire Connection

Substations A and B, Weston Marsh Substation and the new Walpole Substation (herein after referred to as Walpole B Substation). It also includes effects associated with the temporary works such as access tracks, haul roads, construction compound areas and work activities. This phase will also include the effects from the part or full decommissioning of the current Grimsby West Substation; and

- Operational Phase: these are effects that will potentially occur as a result of the presence, operation and maintenance of the Project.

5.3.12 The initial design life of the Project is around 40 years but with regular maintenance, such as changing out the conductors for new ones, is likely to extend further. It is expected that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. To date, relatively few transmission projects have been decommissioned since the main expansion of such infrastructure in the 1950s and 1960s. It is assumed that decommissioning would only be undertaken if there were substantial changes to how electricity is transmitted around the country or significant changes to the sources of generation and areas of demand. At the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. At the point where the Project requires decommissioning, National Grid would consider and implement an appropriate decommissioning strategy taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements. The environmental effects associated with decommissioning are likely to be similar to those associated with construction, subject to any changes to the baseline environment in the intervening period.

5.3.13 As the regulatory framework, good working practices, and the future baseline are all likely to have altered at the time of decommissioning, it is not possible to assess the probable future effects at the present time. National Grid therefore proposes to scope decommissioning out of the assessment. The exception to this is where decommissioning works are proposed at the existing Grimsby West Substation (in part, or in full) as part of the construction phase of the Project.

5.3.14 The environmental assessment uses defined temporal scales to characterise the duration of potential effects. For the purposes of assessment, the following definitions are applied unless otherwise defined in the specific topic chapter:

- Permanent – these are effects that will remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary; and

- Temporary – these are effects that are related to environmental changes associated with a particular activity and that will cease when that activity finishes.

5.3.15 The temporal nature of effects could be different to the phase in which the effects occur. For example, effects as a result of vegetation clearance during construction may be felt for a number of years after construction has been completed, before any replanted habitats have matured. For the purposes of the EIA, the effects are described under the phase within which the impact arises, (i.e. in the above example, vegetation loss assessed for the construction phase).

5.3.16 The future baseline is the theoretical situation that would exist in the absence of the Project. This is based upon extrapolating the current baseline using technical knowledge of likely changes to predict this (e.g. predictable changes such as climate change,

changes that can be predicted based on reasonable assumptions and modelling calculations, information about other relevant developments etc.).

5.3.17 Each technical chapter of the ES will define the baseline (current or future or both) against which the environmental effects of the Project will be assessed. The baseline conditions to be assessed for each environmental topic are outlined in technical chapters of this Scoping Report. Where relevant, topic chapters provide further information on the temporal elements within the Project programme that will be considered for their assessment.

Mitigation Measures Adopted as Part of The Project

5.3.18 A number of measures would be adopted as part of the Project to avoid and reduce the likely significant effects that would be experienced during implementation. These fall into one of three categories as detailed below.

5.3.19 **Design mitigation measures** are those that are intrinsic to and built into the design. Design measures may include, for example, working within the existing topography to reduce pylon visibility and reducing habitat loss by minimising land take. They can also include the avoidance of designated sites through sensitive routeing, siting and design. Initial embedded measures are described within **Chapter 3 Main Alternatives Considered** and **Chapter 4 Description of the Project**.

5.3.20 The design mitigation measures which form an intrinsic part of the Project design would be described within the ES.

5.3.21 **Control and management measures** comprise management activities, control measures and techniques, that would be implemented during construction of the Project to limit impacts. They include adherence to good site practices and achieving legal compliance. These measures may include, for example, applying construction site dust suppression techniques within working areas, which the Main Works Contractor would be required to implement as part of their working practices under the terms of their contract. Control and management measures to address construction-related impacts are described in each of the technical chapters and are detailed in **Appendix 4A Initial Outline Code of Construction Practice (CoCP)**. As the Project evolves these will be added to as appropriate and will be supplemented by other control and management documents such as the Construction Traffic Management Plan (CTMP).

5.3.22 In addition, licenses through separate regimes may also be required. For example, ecological licences and assents granted by Natural England and various permits relating to water and waste granted by the Environment Agency. On the presumption that the regulatory authorities would not permit the works unless the potential impacts have been appropriately managed, it is assumed that these licensable activities are considered measures adopted as part of the Project.

5.3.23 Additional Mitigation Measures comprise measures over and above any embedded and standard mitigation measures, for which the EIA has identified a requirement to further reduce significant environmental effects, for example landscape planting.

5.3.24 All additional mitigation measures will be described within the ES and secured through the DCO or through other statutory agreements.

5.3.25 Environmental compensation is considered where mitigation at an affected location is not possible to avoid or reduce a significant effect. Where identified, compensation measures forming part of the Project would be described within the ES.

5.3.26 Mitigation measures are assumed to be in place or at least achievable prior to undertaking the scoping of likely significant effects, in accordance with guidance from the IEMA Guide to Shaping Quality Development (Ref 5.3).

5.4 Assessment of Effects and Determination of Significance

5.4.1 Regulation 5(2) of the EIA Regulations (Ref 5.4) states that *"the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors: (a) population and human health, (b) biodiversity…, (c) land, soil, water, air and climate, (d) material assets, cultural heritage and the landscape; e) the interaction between the factors referred to in sub-paragraphs (a) to (d)."*

5.4.2 Schedule 4 paragraph 5 of the EIA Regulations (Ref 5.4) requires a description of the likely significant effects of the development on the environment. The assessment of the significance of effects for the majority of topics will be based on the steps set out in the following paragraphs.

Identification of Potential Effects

5.4.3 The likely significant effects (beneficial and adverse) of the Project will be predicted and evaluated using appropriate evaluative techniques, many of which follow specific best practice guidelines for a particular topic. Potential effects will be identified first, usually in summary, as an indication of what effects could theoretically occur in the absence of mitigation (other than mitigation inherent in the design of the Project).

Assessing Effects and Determining Residual Significance

5.4.4 There is no statutory definition of what constitutes a "significant" effect within the EIA Regulations and whilst the determination of the significance of effects is important to informing the decision-making process, defining what is significant is not a simple task. The process typically involves consideration of two aspects of a potential effect, namely the sensitivity and/or value of the receptor or resource, and the magnitude of the impact on the receptor/resource.

5.4.5 The significance of the residual effects (those that are predicted to remain after the environmental mitigation measures have been implemented) will be determined by reference to criteria for each assessment topic. Specific significance criteria for each technical discipline will give due regard to the following:

- scale of the impact;
- impact duration, and whether effects are temporary, revisable, or permanent;
- effect nature (whether direct or indirect, reversible or irreversible, beneficial or adverse);
- where the effect occurs in isolation, is cumulative, or will interact with other effects;
- performance against any relevant environmental quality standards;
- sensitivity of the receptor; and
- compatibility with environmental policies.

5.4.6 Each technical chapter of this Scoping Report includes a description of the proposed approach to determining the significance of effects, including how professional judgement may be applied. The technical chapters use the terminology for magnitude, sensitivity and significance described in the following sections unless there is a need to deviate due to specific topic guidance. Where there is a requirement to deviate this justification is provided within the technical topic chapter.

Magnitude of impact

5.4.7 General criteria for defining the magnitude of an impact, or change, are set out in **Table 5.1**. Key factors that influence this include:

- scale of change – the scale of change refers to the degree of change to or from the baseline environment caused by the impact being described;
- spatial extent – the spatial extent is the full area over which the impact occurs; and
- duration and frequency – the duration is a measure of how long the impact is expected to last. Frequency refers to how often the impact would occur; it may be continuous or periodic.

Table 5.1: Impact magnitude criteria

Magnitude	General criteria
Large	Adverse: Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features, or elements. Beneficial: Large scale or major improvement of resource, including extensive restoration or major improvement of attribute quality.
Medium	Adverse: Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. Beneficial: Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Small	Adverse: Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Beneficial: Minor benefit to, or in addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk or negative impact occurring.
Negligible	Adverse: Very minor loss of detrimental alteration to one or more characteristics, features or elements. Beneficial: Very minor benefit to or positive addition of one or more characteristics, features or elements.

Sensitivity and value of the receptor

5.4.8 The sensitivity of a receptor or feature is characterised by its vulnerability to change and its ability to recover. The value of a receptor or feature reflects its overall importance and the value placed on it by society; this may be reflected by its level of statutory or policy protection or else a value may be attributed through consultation and the application of professional judgement. Criteria for defining the sensitivity and/or value of

a receptor are set out in **Table 5.2**. Characterisation of the receptor is achieved by balancing out these considerations to determine the receptors sensitivity:

- vulnerability – the vulnerability of the receptor relates to its capacity to accommodate change i.e. the tolerance/intolerance of the receptor to change;
- recoverability – the ability of the receptor to return to the baseline state; and
- importance – the importance of the receptor or feature is a measure of the value assigned to that receptor based on biodiversity and ecosystem services, social value and economic value. Importance of the receptor is also defined within a geographical context, whether it is important internationally, nationally or locally.

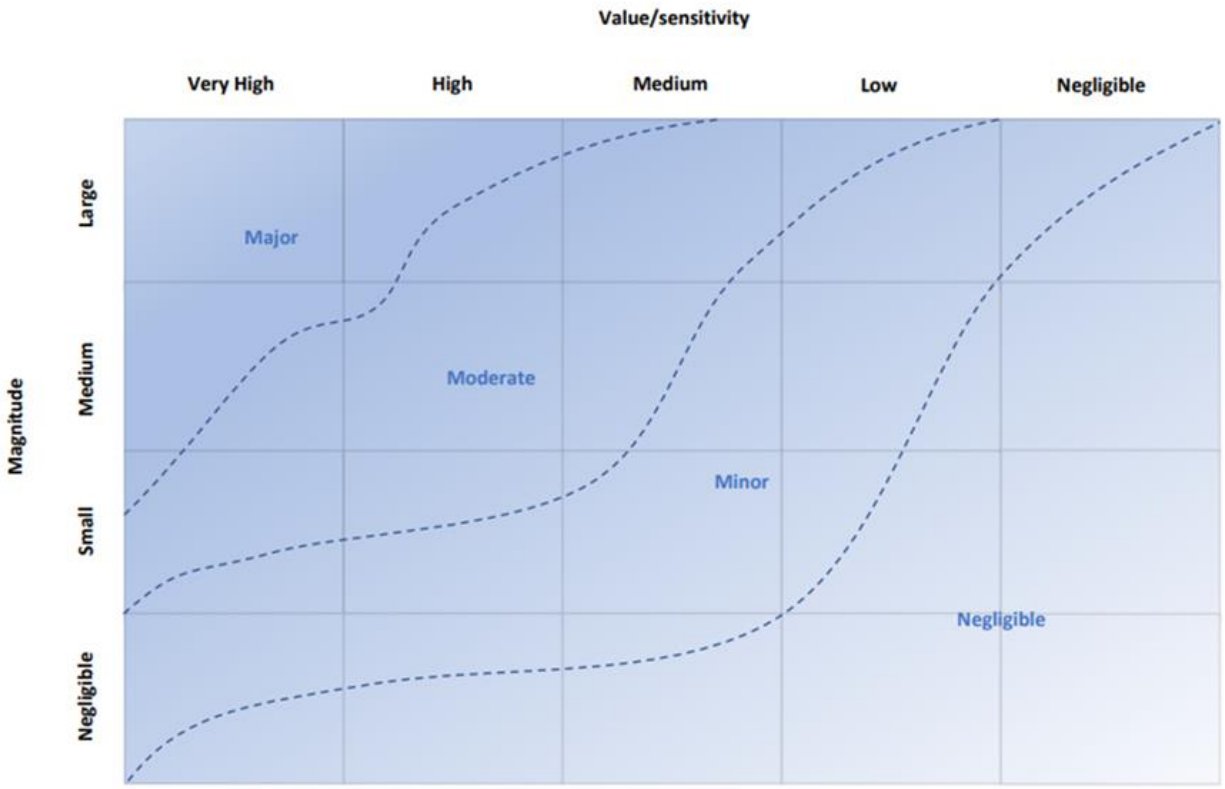
Table 5.2: Sensitivity criteria

Value	General criteria
Very High	Very high importance and rarity, value at an international level and limited potential for recovery or substitution.
High	High importance and rarity, value at a national level and limited potential for recovery or substitution.
Medium	Medium importance and rarity, value at a regional level and limited potential for recovery or substitution.
Small	Low or medium importance and rarity, value at local level and limited potential for recovery or substitution.
Negligible	Not considered to be important, valued at a local level, easy to replace

Evaluating the significance of effects

5.4.9 Having established the magnitude of change and sensitivity of the receptor, the significance of an effect can be assessed. To aid transparency in the assessment process, the matrix shown in **Image 5.3** will be used as the basis for assigning significance to an effect; however, the identification of significance typically requires the application of professional judgement. As an illustration, a high sensitivity receptor subject to a large magnitude of change would experience a major or moderate significance effect, and a low sensitivity receptor subject to a small magnitude of change would experience a minor or negligible significance effect.

Image 5.3: Basis of assigning significance



5.4.10 Each of the specialist disciplines will apply magnitude and sensitivity criteria that best suit the topic area, and for some topics these may be defined in industry guidelines.

5.4.11 Following the classification of an effect using the methodology, a clear statement will then be made in the ES as to whether that effect is significant or not significant. Major and moderate effects are typically considered to be significant, whilst minor and negligible effects are considered to be not significant. However, professional judgement will also be applied in reaching conclusions as to the significance of effects. Typical definitions for the classification of effects are shown in **Table 5.3.**

Table 5.3: Classification of effects

Significance	General criteria	Significant effect
Major	A large and detrimental change to a valuable/sensitive receptor; likely exceeding an accepted (often legal) threshold. A large and beneficial change, resulting in improvements to the baseline or a major contribution being made to national targets. These effects may represent key factors in the decision-making process. Potentially associated with sites and features of international and national importance or likely to be important considerations at a regional or district scale.	**Yes**

Significance	General criteria	Significant effect
	Major effects may relate to resources or features that are unique and which, if lost, cannot be replaced or relocated.	
Moderate	A medium scale change that, although not beyond an accepted threshold, is still considered to be generally unacceptable, unless balanced out by other significant positive benefits of a project. Likely to be in breach of planning policy, rather than legal statute. These effects, if adverse, are likely to be important at a regional scale and on their own could have a material influence on decision making. A positive moderate effect is a medium scale change that is significant in that the baseline conditions are improved to the extent that guideline targets (e.g. UK BAP targets) are contributed to.	**Yes (typically)**
Minor	A small change that, whilst adverse, does not exceed legal or planning policy thresholds. A small positive change, but not one that is likely to be a key factor in the overall balance of issues. These effects may be raised as local issues and may be of relevance in the detailed design of a project but are unlikely to be critical in the decision-making process.	**No**
Negligible	A very small change that is so small and unimportant that it is considered acceptable to disregard. Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.	**No**

Residual effects

5.4.12 Residual effects are those that are predicted to remain after the proposed mitigation measures have been implemented. These will be described at the end of each topic chapter within the ES.

5.5 Cumulative Effects

Introduction

5.5.1 Cumulative effects are the result of multiple actions on environmental receptors or resources. The cumulative effects assessment of the Project would consider the following types of effect:

- Intra-project cumulative effects (sometimes referred to as combined or interactive effects): these effects occur where a single receptor is affected by more than one source of effect from the Project.
- Inter-project cumulative effects: these effects occur as a result of a number of developments, including effects which individually might not be of significance, but

when considered together could create a significant cumulative effect on a shared receptor when considered together with the Project.

5.5.2 The assessment of cumulative effects will form a key element of the EIA for this Project. As set out in **Chapter 4 Description of the Project** various projects are currently identified as expected to connect to the proposed substation infrastructure including Eastern Green Links 3 and 4 and Outer Dowsing Offshore Wind Farm Connection. In addition, other proposed infrastructure projects are currently being developed within the region including various solar farms proposal. The Applicant is currently working closely with a number of these projects to provide a co-ordinated approach to project development, where possible.

5.5.3 The cumulative effects assessment will be based on publicly available data relating to proposed and committed developments as set out in the Inspectorate's Advice Note Seventeen (Ref 5.5) which are in the public domain or have been provided to the Project team. As far as possible, the Project team will collaborate with customers, other developers and relevant statutory consultees, to identify information which may be pertinent to the cumulative effects assessment.

5.5.4 Where there are specific limitations associated with available data, these would be highlighted within the assessment that would be presented in the ES.

Legislation, Planning Policy and Technical Guidance

5.5.5 Schedule 4 of the Infrastructure Planning (EIA) Regulations 2017 (the EIA Regulations) (Ref 5.4) states that an ES is to include a description of the likely significant effects of a development on the environment, which should cover, amongst others, cumulative effects. Paragraph 5(e) describes cumulative as: "*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*". In addition, Regulation 5(2)(e) of the EIA Regulations requires that the EIA considers the interaction of environmental effects associated with the Project. The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction and operation of the Project on the same receptor, or group of receptors.

5.5.6 National Policy Statement EN-1 (Ref 5.6) states at paragraph 4.3.3 that "*The Regulations require an assessment of the likely significant effects of the proposed project on the environment , covering the direct effects and any indirect, secondary, cumulative, transboundary, short, medium and long-term, permanent and temporary, positive and negative effects at all stages of the project."*

5.5.7 National Policy Statement EN-5 (Ref 5.7) provides topic-specific guidance for electrical infrastructure including overhead lines but makes only limited reference to cumulative considerations. Paragraph 2.9.10 states that "*Cumulative adverse landscape, seascape and visual impacts may arise where new overhead lines are required along with other related developments such as substations, windfarms and/or other new sources of generation."*

5.5.8 Paragraph 115 of the NPPF (Ref 5.8) states that "*Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe*". Paragraph 191 states that "*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural*

environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development". Paragraph 192 states that "*Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas*".

5.5.9 Planning Inspectorate Advice Note Seventeen, Cumulative Effects Assessment (Ref 5.5), sets out a staged approach to cumulative effects assessment for Nationally Significant Infrastructure Projects and provides template formats for documenting the assessment within an applicant's ES.

Approach to Cumulative Effects Assessment

5.5.10 Concurrently with professional judgement, the Inspectorate's Advice Note Seventeen (Ref 5.5) would be used to inform the scope of the cumulative effects assessment, and to assist the identification and mitigation of likely significant effects.

Intra-project cumulative effects

5.5.11 Intra-project cumulative effects (sometimes referred to as combined or interactive effects) occur where a single receptor is affected by more than one source of effect or aspect of the Project. An example of an intra-project effect would be where a local community is affected by dust, noise, and traffic disruption during the construction of the Project, with the result being a greater level of nuisance than each individual effect alone.

5.5.12 A useful summary of the principle of cumulative intra-project effects is provided by the Planning Inspectorate in Advice Note Nine: Rochdale Envelope (Ref 5.9).

5.5.13 "The ES should not be a series of separate unrelated topic reports. The interrelationship between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain how interrelationships have been assessed in order to address the environmental impacts of the proposal as a whole. It need not necessarily follow that the maximum adverse impact in terms of any one topic impact would automatically result in the maximum potential impact when a number of topic impacts are considered collectively. In addition, individual impacts may not be significant but could become significant when their interrelationship is assessed. It will be for the developer to demonstrate that the likely significant impacts of the project have been properly assessed".

5.5.14 In line with this requirement, a description of the likely significant intra-project cumulative effects will be provided within the ES.

5.5.15 There is no standard approach to the assessment of intra-project effects although it should be carried out with reference to guidance and to professional judgement. Some environmental topics consider receptors that are not considered by any other topics and so intra-project cumulative assessment is unlikely to be necessary. Other receptors may be considered by multiple topics, and as such intra-project cumulative effects are more likely to occur. Receptors considered in multiple chapters are likely to include local residents, communities, and businesses. It should be noted that some elements of the assessment inherently consider intra-related effects. For example, the terrestrial ecology and nature conservation assessment of effects considers the potential for multiple impacts affecting particular features such as disturbance effects on faunal

receptors resulting from noise and vibration, visual disturbance and lighting. Where this is the case, this is described within the individual aspect chapter.

5.5.16 It is proposed to undertake the assessment of intra-project cumulative effects using a three-stage approach. The first stage consists of a pre-screening exercise to determine whether a receptor is exposed to more than one type of effect. Those receptors identified as experiencing more than one type of effect will be taken through to the second stage. The second stage will consist of a screening exercise to identify the significance each type of effect has on each receptor. Those receptors exposed to two or more types of effect, with a significance of effect greater than negligible, will be taken forward to the third stage. The third stage is the main intra-project assessment, which will consider if the combination of effects is likely to lead to overall effects of greater significance.

5.5.17 An initial pre-screening assessment is presented in **Table 5.4** showing how the receptor groups are likely to interact between chapters. This will be revisited as part of the ES to ensure all receptors considered within the ES are taken through this pre-screening assessment.

Table 5.4: Pre-screening stage

Receptors	Topic Chapters												
	L	V	E&B	CH	WE	G&H	A&S	T&M	AQ	N&V	S-E	H&W	CC	MAD
Landscape Character and Designations	✓	✓	✓	✓										
Visual Receptors	✓	✓		✓					✓	✓	✓			
Commercial Receptors										✓	✓			
Ecological Receptors	✓		✓						✓	✓				
Notable Habitats	✓		✓		✓				✓					
Designated Heritage Assets	✓	✓		✓										
Non-designated Heritage Assets				✓										
Water Resources					✓	✓								
Watercourses and Waterbodies					✓	✓								
Flood Risk Receptors					✓									

Receptors	Topic Chapters													
	L	V	E&B	CH	WE	G&H	A&S	T&M	AQ	N&V	S-E	H&W	CC	MAD
BMV Agricultural Land							✓							
Agricultural Holdings							✓				✓			
Soil							✓				✓			
Public Rights of Way		✓						✓			✓			
Cycle Routes		✓						✓			✓			
Roads								✓						
Communities		✓								✓	✓			
Geology						✓								
Mineral Reserves						✓					✓			
Groundwater						✓								
Human Health												✓		✓
Climate			✓		✓								✓	

+Acronyms used above : L: Chapter 6 Landscape, V: Chapter 7 Visual, E&B: Chapter 8 Ecology and Biodiversity, CH: Chapter 9 Historic Environment, WE: Chapter 10 Water Environment, G&H: Chapter 11 Geology and Hydrogeology, A&S: Chapter 12 Agriculture and Soils, T&M: Chapter 13 Transport and Movement, AQ: Chapter 14 Air Quality, N&V: Chapter 15 Noise and Vibration, SE: Chapter 16 Socio-economics, H&W: Chapter 17 Health and Wellbeing, CC: Chapter 18 Climate Change, MAD: Chapter 19 Major Accidents and Disasters.

Inter-project cumulative effects

5.5.18 Inter-project cumulative effects occur where a receptor is affected by two or more projects at the same time, potentially amplifying the overall effect. Individually the effects may not be significant, but when considered together could create a significant cumulative effect.

5.5.19 In accordance with the approach contained within the Inspectorate's Advice Note Seventeen (Ref 5.5), the approach to the assessment of inter-project cumulative effects would follow a staged approach.

Stage 1a: Identify Zone of Influence (ZoI)

5.5.20 The Zone of Influence (ZoI) is the geographic area within which a development is likely to affect environmental receptors. As such, the ZoI would vary for different types of

receptors. The ZoI used for this Scoping Report is based on a distance extending from either side of the Scoping Boundary. As the Project develops, the ZoI would be based on the relevant distances (according to the individual environmental topic) around the proposed Order Limits.

5.5.21 The ZoI used for environmental topics are listed in **Table 5.5**. The rationale for the distances chosen are explained in the relevant topic chapters.

Table 5.5: ZoI for environmental topics

Environmental Topic	Study Areas
Landscape and visual	5 km
Ecology and biodiversity	10 km*
Historic environment	3 km
Water environment	<0.5 km
Geology and hydrogeology	<0.5 km
Agriculture and soils	<0.5 km
Traffic and movement	This is currently based on the Scoping Boundary. The ES will be based on more detailed information relating to construction activities and transport routes, which may increase the Study Area for this topic.
Air quality	250 m
Noise and Vibration	300 m
Socio-economics, recreation and tourism	500 m
Health and wellbeing	500 m
Climate change	Not applicable
Major accidents and disasters	Not applicable
*the 10 km Study Area encompasses statutory designated sites of international, national and local nature conservation value, and non-designated sites. A wider 30 km Study Area is identified in Chapter 8 Ecology and Biodiversity for the identification of any Special Areas of Conservation or Special Protection Areas where (respectively) bats or bird species with large foraging ranges are noted as, or one of, the qualifying features.	

Stage 1b: Identify long list of other development

5.5.22 The Study Area within which to search for other developments that have the potential to have cumulative effects with the proposed Project is based on the ZoI for environmental effects. This is illustrated on **Figure 5.1 Inter-Project Cumulative Effects Assessment Study Area**. This will be kept under review as the Project develops and the long list updated as required.

5.5.23 The long list will be categorised into three tiers as outlined in **Table 5.6**. Minor planning applications will be excluded from the assessment, as these relate to projects of small scale and local significance. These projects are highly unlikely to give rise to significant cumulative environmental effects over and above the Project in isolation. All reasons for

excluding any development from further consideration will be clearly recorded and presented in the ES to present a clear audit trail.

Table 5.6: 'Other development' for inclusion in the inter-project cumulative effects assessment

Tier	Development
Tier 1	Under construction, where the project is classified as 'major development', whether under the Planning Act 2008 (PA2008) (Ref 5.10) or other consent regimes.
	Permitted application(s), where the project is classified as 'major development,' whether under the PA2008 (Ref 5.10) or other consent regimes, but not yet implemented.
	Submitted application(s), where the project is classified as 'major development,' whether under the PA2008 (Ref 5.10) or other consent regimes, but not yet determined.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects (publicly available), and/or the relevant local planning authorities planning portal where the project is classified as 'major development' and a scoping or screening report has been submitted.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects (publicly available), and/or the subject of pre-application discussion with a relevant local planning authority, where a scoping or screening report has not been submitted. Projects registered on the local planning authority's portal classed as major development but do not require EIA.
	Identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that the amount of information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

Stage 2: Establishing a shortlist of 'other existing development and/ or approved development'

5.5.24 Following Stage 1, the projects included on the long list will be screened as to the temporal scope, scale and nature of the development to identify whether they would be likely to result in a potential for a significant cumulative effect with the Project. Professional judgement would be used during the assessment of threshold criteria to determine whether developments should be scoped in or out of the assessment. This would include developments that were below the threshold criteria, but with characteristics that were likely to give rise to a significant effect or could give rise to cumulative effects by virtue of its proximity to the Project.

5.5.25 The following inclusion/exclusion criteria will be used for the assessment:

- **Temporal Scope:** other projects with an overlapping construction phase (currently expected to be 2029-2033 and in some cases operational effects would be scoped

into the assessment. Planning applications considered include those submitted five years prior to submission, this is because planning permissions typically expire after a period of three to five years (unless an application for extension is permitted). The status of planning applications will be monitored to include committed projects and those applications that remain undetermined but could still provide forthcoming committed developments.

- **Scale and nature of development:** development identified as Schedule 1 and 2 developments in the Environmental Impact Assessment (EIA) Regulations (Ref 5.4) would be considered further. Development not identified as Schedule 1 or 2 developments would be scoped out of the assessment, except where professional judgement identifies specific scenarios where there is a high likelihood of significant environmental effects arising in combination with the Project.
- **Sensitivity of the receiving environment:** where there are potential source-pathway-receptor linkages between the Project and other development, cumulative effects would be considered further. Other development with no clear source-pathway-receptor linkage would be scoped out of the assessment.
- **Consultation**: requests from relevant stakeholders for the inclusion of specific projects and/or plans within the cumulative effects assessment.

Stage 3: Information gathering

5.5.26 Further information on the short-listed developments will be gathered to inform the final cumulative effects assessment, where this is available. This will include:

- proposed design and location information;
- construction and operational timescales; and
- results of any environmental assessments completed for the other developments.

5.5.27 Project data will be gathered and obtained from local planning authority planning portals, the Planning Inspectorate's website, discussion with other developers and engagement with local planning authorities.

Stage 4: Assessment

5.5.28 An assessment of the cumulative effects of the Project with the 'other existing development and/or approved development' identified in Stage 2 will be undertaken using the following methodology:

- Each of the 'other existing developments and/or approved development' will be assessed in turn with the Project to determine if both activities/proposals give rise to significant cumulative effects during either construction or operation;
- The assessment will consider the apportionment of effect between the Project and the 'other existing development' - e.g. is the contribution to the effect demonstrably related to one development or is there an equal contribution from either development based on professional judgement;
- The assessment will consider whether certain assessments (e.g. transport and associated air quality/ noise vehicular emissions assessments) are inherently cumulative and have been undertaken on a worse-case basis. In such circumstances no additional cumulative assessment will be undertaken;

- Cumulative effects will be identified by considering whether:
    - there would be any change in the significant effects from the Project, as identified within the individual topic chapters of the PEI Report and ES, taking into consideration any effects from the short listed 'other existing development and/or approved development'. For example, a moderate adverse significant effect becoming a major adverse significant effect; or where the effects of the Project on key receptors potentially affected by the short listed 'other existing development and/or approved development' would trigger a significant effect where the effects of the Project in isolation would be non-significant. For example, a minor adverse non-significant effect becoming a moderate adverse significant effect;
- Significant and non significant effects of the Project will be taken from the environmental topic chapters to inform the significance of cumulative effects with other developments. Effects will be identified as direct, indirect, short-term or long-term, permanent or temporary; and
- All likely significant cumulative effects and a description of the proposed mitigation and monitoring measures that may be required will be documented and presented in an accessible format similar to that in Matrix 2 provided in Appendix 2 of Advice Note Seventeen (Ref 5.5) and tabulated within the ES.

5.6 Monitoring

5.6.1 Schedule 4, Paragraph 7 of the EIA Regulations (Ref 5.4) states that, where appropriate, the ES should include a description of any proposed monitoring arrangements where likely significant residual effects have been identified. The monitoring requirements will be detailed within the ES topic chapters to include clear and proportionate objectives for monitoring, the parameters to be monitored, the methodology for the monitoring, a timescale for implementation, identification of the party who will be responsible for the monitoring, and an outline of the remedial actions to be undertaken should results be adverse.

5.7 Approach to the Environmental Statement

5.7.1 The PINS Advice Note Seven (Ref 5.1) requires that applicants provide an outline structure of what the ES will contain. The structure of the ES for the Project will broadly follow the same order of chapters that are presented in this Scoping Report, acknowledging that changes may need to be made within the ES to address the advice from the Scoping Opinion, both in terms of presentation of the Project to aid understanding and address the design requirements as they evolve.

5.7.2 An indicative outline structure of the ES is set out in **Table 5.7**.

Table 5.7: Indicative structure of the ES

ES Volume	Title	Likely content
Volume A: Introduction and Overview	Non-Technical Summary (NTS)	A concise and standalone document which will provide a description of the Project, EIA process and its findings in a manner that is easily understood by the general public.
	Chapter 1- Introduction	Setting out an overview of the Project including the Project need. The purpose and structure of the ES and a brief summary of the other relevant assessments and documents.
	Chapter 2- Legislative, Regulatory and Planning Policy Context	This chapter will set out the legislative, national, and local planning context, other relevant guidance and policies and any applicable consents and permits.
	Chapter 3- Main Alternatives Considered	This chapter will set out the reasonable main alternatives considered and the reasons for the selection of the preferred options.
	Chapter 4- Approach to Preliminary Environmental Information	This chapter will provide a description of the overall EIA methodology that is proposed on the Project including temporal durations and approach to mitigation.
	Chapter 5- Project Description	This chapter will provide a description of the Project and how the Project would be constructed, operated maintained and decommissioned.
Volume B: Section Specific Assessments	Section 1- Grimsby West Substation	Within every section of the Project there will be a subsection for each environmental topic scoped into the EIA. The section chapters will be structured as follows: • Introduction; • Section Description; • Stakeholder Engagement and Consultation; • Evolution of the Section Design; • Landscape; • Visual; • Ecology and Biodiversity; • Historic Environment;
	Section 2- Grimsby West Substation to Lincolnshire Connection Substation A	
	Section 3- Lincolnshire Connection Substation A and B	
	Section 4- Lincolnshire Connection Substation B to Weston Marsh Substation	
	Section 5- Weston Marsh Substation	

ES Volume	Title	Likely content
	Section 6- Weston Marsh Substation to Walpole B Substation	• Water Environment; • Geology and Hydrogeology; • Agriculture and Soils; • Transport and Movement; • Noise and Vibration; • Recreation and Tourism; and • Summary of the assessment for the section.
	Section 7- Walpole B Substation	
Volume C: Route Wide Assessments	Traffic and Movement	There will be route wide assessments for environmental topics scoped into the EIA, the topic chapters will be structured as following: • Scope and Approach; • Baseline Conditions; • Project Design and Mitigation; • Assessment of Effects; and • Summary.
	Socio-economics	
	Health and Wellbeing	
	Climate Change	
	Air Quality	
	Landscape	
	Visual	
	Ecology and Biodiversity	
	Historic Environment	
	Water Environment	
	Geology and Hydrogeology	
	Agriculture and Soils	
	Cumulative Effects	
	Summary and Next Steps	
Volume D: Technical Figures	Figures	Figures to support Volumes A, B and C.

ES Volume	Title	Likely content
Volume E: Technical Appendices	Appendices	Appendices to support Volumes A, B and C.

5.8 References

Ref 5.1 Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advicenote-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/ [Accessed: 22 April 2024].

Ref 5.2 Institute for Environmental Management and Assessment (2017). Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice. [online] Available at: https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia [Accessed: 22 April 2024].

Ref 5.3 Institute of Environmental Management and Assessment (2015). Environmental Impact Assessment Guide to Shaping Quality Development. [online] Available at: https://www.iaia.org/pdf/wab/IEMA%20Guidance%20Documents%20EIA%20Guide%20to%20Shaping%20Quality%20Development%20V6.pdf [Accessed: 22 April 2024].

Ref 5.4 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ref 5.5 Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/ [Accessed: 22 April 2024].

Ref 5.6 Department for Energy Security & Net Zero (January 2024). Overarching National Policy Statement for Energy (EN-1) [online]. Available: Overarching National Policy Statement for energy (EN-1) - GOV.UK (www.gov.uk) (Accessed: 4 July 2024).

Ref 5.7 Department of Energy Security & Net Zero (November 2023). National Policy Statement for Electricity Networks Infrastructure (EN-5) [online]. Available: Electricity Networks National Policy Statement - EN-5 (publishing.service.gov.uk) (Accessed 4 July 2024).

Ref 5.8 Department for Levelling Up Housing and Communities (December 2023). National Planning Policy Framework [online] Available: National Planning Policy Framework - GOV.UK (www.gov.uk) (Accessed 5 July 2024)

Ref 5.9 Planning Inspectorate (2018). Advice Note Nine: Rochdale Envelope. [online] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/ [Accessed: 22 April 2024].

Ref 5.10 Planning Act 2008 [online]. Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents [Accessed 08 July 2024].

6. Landscape

nationalgrid

Contents

6.1 Introduction

6.1.1 This chapter presents how the landscape assessment will consider the potentially significant effects on landscape receptors that may arise from the construction, operation and maintenance of the Project (as explained in **Chapter 4 Description of the Project**). This chapter of the Scoping Report describes the methodology to be used for the landscape assessment, the datasets to be used to inform the assessment, an overview of the baseline conditions, the potential likely significant effects to be considered within the assessment, and how potential likely significant effects will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the only element of the Project that will involve decommissioning in all or part, is the existing Grimsby West Substation. There are currently no specific plans to decommission the Project as a whole. With the exception of the Grimsby West Substation, decommissioning of the Project has been scoped out of the environmental assessment.

6.1.2 The assessment will consider the landscape as a resource, including effects on the physical elements of the landscape, its aesthetic or perceptual qualities and effects on its character (including landscape designations).

6.1.3 The Project may have direct (physical) effects on the landscape as well as indirect effects on landscape character which may be perceived over a wide area.

6.1.4 The assessment of effects on the views and visual amenity is presented in **Chapter 7 Visual**.

6.1.5 The Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

6.1.6 This chapter has links with other chapters, in particular, **Chapter 8 Ecology and Biodiversity.** For example, changes to vegetation and land cover patterns such as vegetation removal or new planting could alter the character of the landscape.

6.1.7 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory Planning Policy Context;**
- **Chapter 3 Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology.**

6.1.8 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 7 Visual** – visual effects are changes to peoples' experience of the landscape;
- **Chapter 8 Ecology and Biodiversity** - the results of the ecology and biodiversity assessment inform on the potential for direct or indirect landscape effects, for example, changes to vegetation and land cover pattern due to vegetation removal or new planting may alter landscape character; and
- **Chapter 9 Historic Environment** - changes to the statutory and non-statutory heritage assets and their setting could alter the character of the landscape; and **Chapter 15 Noise and Vibration** – noise intrusion can influence the perceptual qualities of the landscape such as tranquillity.

6.1.9 This chapter is supported by the following figures and appendices:

- **Figure 6.1 Proposed Landscape Study Area**;
- **Figure 6.2 Landscape Constraints**;
- **Figure 6.3 National Character Area**;
- **Figure 6.4 Regional and Local Landscape Character Area**; and
- **Appendix 6A Landscape Assessment Methodology.**

6.2 Legislation, Policy and Guidance

6.2.1 **Chapter 2 Regulatory and Planning Policy Context** describes the overall regulatory and planning policy context for the Project. Key legislation, policy, and planning guidance relevant to the assessment of potential effects on landscape associated with the construction, operation, and maintenance of the Project is provided in **Chapter 2 Regulatory and Planning Policy Context, Appendix 2A Key Legislation, Appendix 2B Regional and National Planning Policy** and **Appendix 2C Local Policy.**

National Grid Policy and Guidance

6.2.2 National Grid has its own policies and processes that are followed when developing projects. The key policies that are applicable to this project include:

- Holford Rules (Ref 6.1): Guidelines on overhead line routeing were first formulated in 1959 by Sir William (later Lord) Holford, as advisor to the Central Electricity Generation Board. Holford developed a series of planning guidelines in relation to amenity issues, that have subsequently become known as the 'Holford Rules' and remain a valuable tool in selecting and assessing potential route options as part of the options appraisal process. These have been an important consideration during the development of the Project. The Holford Rules (Ref 6.1) are also expressly considered as part of EN-5 (**Error! Reference source not found.**);
- Horlock Rules (Ref 6.3): National Grid devised the Horlock Rules in 2003, and these were subsequently updated in 2006. The Horlock Rules provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. In summary, like the Holford Rules (Ref 6.1), they facilitate consideration of environmental and amenity considerations within the design and siting of new substation infrastructure. These have been considered during the development of the Project and will continue to be considered as the Project evolves;
- Our Stakeholder, community, and amenity policy (Ref 6.4): This document describes the ten commitments that National Grid has made to the way that electricity and gas works are undertaken in the UK. This includes setting out how National Grid will meet its amenity responsibilities and how stakeholders and communities are involved on projects; and
- Our Approach to Consenting (Ref 6.5): This document describes the options appraisal process that is followed when developing new electricity infrastructure projects. It follows a staged approach to the assessment and sets out the considerations when making decisions as to which option should be taken forward.

6.2.3 National Grid utilises process and guidance documents that govern how projects are designed and implemented. Specific documents are referenced later in the Scoping Report chapters where relevant.

6.3 Consultation and Engagement

6.3.1 The EIA will be informed by consultation and engagement with stakeholders, including Natural England, Lincolnshire Wolds National Landscape Board and various local councils. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

6.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024 and following pre-scoping engagement undertaken with Natural England and the Lincolnshire Wolds National Landscape Board in March 2024. The key points of discussion included:

- The definition and extent of the setting of the Lincolnshire Wolds National Landscape (AONB); and
- Clarifications on the special qualities, with particular reference to the expansive, sweeping views which can be experienced from the Lincolnshire Wolds National Landscape (AONB).

6.3.3 The principal feedback received from both Non-Statutory Consultation and pre-scoping consultation with Natural England and the Lincolnshire Wolds National Landscape Board of relevance to this scoping chapter is included in **Table 6.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 6.1: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
National Trust	National Grid must assess the full, cumulative impact of all existing and proposed major infrastructure projects in this area (including those set out in Table 1 of the consultation document) in the Environmental Impact Assessment. Any identified harm must be adequately addressed in accordance with the mitigation hierarchy.	The assessment of cumulative effects will form a key element of the EIA for the Project. The proposed scope and approach of the cumulative effects assessment is explained **Chapter 5 EIA Approach and Methodology.** An update to the information presented in Table 1 of the Project Background Document (Ref 6.6) which set out proposed new connections in the region, is provided in Tables 4.3 to 4.6 of **Chapter 4 Description of the Project**. The cumulative assessment will include consideration of such projects. The proposed approach to assessing likely significant landscape and visual effects and cumulative effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology.**

Stakeholder	Summary of response	Consideration in the Scoping Report
		An assessment of the likely cumulative landscape and visual effects of the Project will be reported in the landscape, visual and cumulative effects assessment chapters of the PEI Report and ES. Any likely significant environmental effects will be addressed in accordance with the mitigation hierarchy as explained in **Chapter 5 EIA Approach and Methodology.**
National Trust	Whilst the National Trust understand the need for the development and how the corridor has been chosen, we are concerned about the visual impact of the proposals on the landscape. Whilst pleased to see that the proposed route avoids directly passing through the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty (AONB)), the National Trust is concerned about the visual impact of the proposal on the setting of the National Landscape. The route corridor runs parallel to the eastern boundary of the designation and the transmission line and associated infrastructure will be visible in views across the landscape.	An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Ref 6.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Fenland District Council	The preference would be for the lines to be underground, which would substantially reduce the long-term visual impact of this infrastructure. However, if the proposal is to proceed with overground lines, it is not possible to comment on these impacts until such time that as a minimum, a Landscape Visual Impact Assessment (LVIA), including any consideration of statutory designated sites, is produced for consideration.	As detailed in the Corridor Preliminary Routing and Siting Study (CPRSS) Report (Ref 6.8), the starting presumption is for the use of overhead line technology rather than underground cables (in line with National Policy Statement (NPS) EN-5 (Ref 6.2) and National Grid's Approach to Consenting(Ref 6.5)) for areas outside nationally designated landscapes. NPS EN-5 states that "*…..overhead lines should be the strong starting presumption for electricity networks in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape….in these areas where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, ……the application should underground the relevant section of the line.*" The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever

Stakeholder	Summary of response	Consideration in the Scoping Report
		possible. Likely landscape and visual effects of the Project will be undertaken in accordance with GLVIA3 (Ref 6.7) and associated draft clarifications and will be reported in the landscape and visual chapters of the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Lincolnshire County Council	The cumulative impact from the overhead lines, pylons, NGET substations and those substations that will be required for the other energy projects, would have the potential to significantly adversely impact on the character and appearance of the Lincolnshire Wolds National Landscape (AONB).	The proposed scope and approach of the cumulative effects assessment is explained **Chapter 5 EIA Approach and Methodology.** An assessment of the likely cumulative landscape and visual effects of the Project will be reported in the landscape, visual and cumulative effects assessment chapters of the PEI Report and ES. The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts, wherever possible. An assessment of likely significant indirect effects on the natural beauty and special qualities of the Lincolnshire Wolds National Landscape (AONB) will be reported as part of the landscape chapter in the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Lincolnshire County Council	The Council wish to make it fundamentally clear that from information provided, and the initial public reaction to the proposal, that the scheme will have the potential to have significant impact on large swathes of the landscape of the area when viewed from both distance, and locally in relation to the Fens and the impact on and from the AONB.	The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. An assessment of the likely effects of the Project, including on the Lincolnshire Wolds National Landscape (AONB) and Fens will be undertaken in accordance with GLVIA3 (Ref 6.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.

Stakeholder	Summary of response	Consideration in the Scoping Report
Lincolnshire Wolds National Landscape Board	Whilst we welcome the current preferred route corridor proposal in terms of avoiding a direct line through the Lincolnshire Wolds National Landscape – the Area of Outstanding Natural Beauty (AONB), as per the Holford Rules Guidelines, we remain very concerned that this has been proposed as a completely overhead transmission line with its associated above ground tower pylons and connectors (electrical wires). At this non-statutory consultation stage of the development proposal, we highlight our continuing concerns in terms of the potential for significant and demonstrable landscape and visual impacts upon both the setting and the views from and to the nationally protected Lincolnshire Wolds National Landscape (AONB). The route corridor for the overhead line runs in close proximity and parallel to virtually the entire eastern flank of the Lincolnshire Wolds and would significantly impact upon many of the notable vantage points afforded by the higher ground of the Wolds. The views to the east, across the Lincolnshire Coastal Grazing Marshes are extensive and panoramic, the juxtaposition between the low-lying outer marsh and the Wolds is an important and subtle component of the protected landscapes immediate and wider setting. The nature of the development as currently proposed in its initial stages, will evidently significantly impact upon the extensive rural character and charm of the easterly views which are recognised as one of the special qualities of the Lincolnshire Wolds AONB and a key component of its wider cohesive landscape character and natural beauty. Section 85 of the Countryside and Rights of Way Act 2000 (Ref 6.9) required all relevant authorities to have regard to the purpose of conserving and enhancing the natural beauty of AONBs when	As detailed in the CPRSS Report (Ref 6.8), the starting presumption is for the use of overhead line technology rather than underground cables (in line with NPS EN-5 (Ref 6.2) and National Grid's Approach to Consenting(Ref 6.5)) for areas outside nationally designated landscapes. NPS EN-5 states that "*…..overhead lines should be the strong starting presumption for electricity networks in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape….in these areas where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, ……the application should underground the relevant section of the line.*". The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with GLVIA3 (Ref 6.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**. **Chapter 2 Legislation and Regulatory Context** provides detail on the Countryside and Rights of Way Act (Ref 6.9) including reference to Section 245 of the Levelling-up and Regeneration Act (Ref 6.10).

Stakeholder	Summary of response	Consideration in the Scoping Report
	performing their functions and statutory duty. This has recently been strengthened through Section 245 of the Levelling-up and Regeneration Act (2023) (Ref 6.10) with an amendment of the CRoW Act, to create a new duty on 'relevant authorities' to 'seek to further the purpose of conserving and enhancing the natural beauty when discharging their functions in Areas of Outstanding Natural Beauty'.	
Natural England	In view of the distance of the current proposals from the Lincolnshire Wolds National Landscape (AONB), it is considered that effects are likely. The purpose of this nationally designated landscape is to conserve and enhance the area's natural beauty. Natural England advise that overhead lines within parts of the Western Corridor have the potential to be within the immediate setting of the AONB. Natural England welcome the use of the buffer to review impacts to the AONB but would like to see what landscape and visual evidence, and rationale has been used to underpin the proposal for a 2 km buffer.	An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with GLVIA3 (Ref 6.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. The buffers and weightings adopted as part of the routeing and siting study were used as part of the GIS analysis which provided a guide for the landscape specialists to develop preliminary options for ground-truthing and subsequent comparative appraisal. An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) will be informed by a setting study prepared for the designated area and the Project will continue to consider how effects can be minimised.
Natural England	Natural England advise that the scope of the LVIA should include an assessment of potential construction and operational effects on the defined special qualities of the Lincolnshire Wolds National Landscape (AONB) and the delivery of the area's statutory purpose, as outlined in the Lincolnshire Wolds AONB Management Plan. A breakdown of the development's impact on the special qualities of the AONB should be included for review. Natural England also advise that further details on the design and siting of sealing end compounds	An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with GLVIA3 (Ref 6.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES and will include construction and operational effects on the AONB and other features. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. **Chapter 2 Legislation and Regulatory Planning Context** provides detail on the Countryside and Rights of Way Act (Ref 6.9) regarding statutory purpose.

Stakeholder	Summary of response	Consideration in the Scoping Report
	should be provided, and that the potential effects of sealing end compounds on the Lincolnshire Wolds National Landscape (AONB) should be included within the scope of the LVIA.	No Sealing End Compounds are currently proposed as part of the Project. The potential effects of the proposed substations on the Lincolnshire Wolds National Landscape (AONB) will be considered as part of the assessment. The proposed approach to assessing likely significant landscape effects is explained in **Appendix 6A Landscape Assessment Methodology.**
Natural England	In the meantime, and without prejudicing that guidance, Natural England advises that: The duty to 'seek to further' is an active duty, not a passive one. Any relevant authority must take all reasonable steps to explore how the statutory purposes of the protected landscape (A National Park, the Broads, or National Landscape) can be furthered. The new duty underlines the importance of avoiding harm to the statutory purposes of protected landscapes but also to seek to further the conservation and enhancement of a protected landscape. That goes beyond mitigation and like for like measures and replacement. A relevant authority must be able to demonstrate with reasoned evidence what measures can be taken to further the statutory purpose. The proposed measures to further the statutory purposes of a protected landscape, should explore what is possible in addition to avoiding and mitigating the effects of the development, and should be appropriate, proportionate to the type and scale of the development and its implications for the area and effectively secured. Natural England's view is that the proposed measures should align with and help to deliver the aims and objectives of the designated landscape's statutory management plan. The relevant protected	As noted by Natural England, section 85 of the Countryside and Rights of Way Act 2000 (Ref 6.9) has been amended by section 245 of the Levelling Up and Regeneration Act 2023 (Ref 6.10). These amendments introduce a duty to seek to further the purpose of conserving and enhancing the natural beauty of the relevant AONB when exercising or performing any functions in relation to, or so as to affect, land in the AONB. This replaces the previous expression of the duty, which was to have regard to those purposes. The assessment will consider and reflect this duty as well as any secondary legislation and guidance. These revised statutory duties apply to public bodies when exercising or performing any functions in relation to, or so as to affect, land in an AONB. The Applicant will continue to engage with Natural England as to how the Applicant is discharging its statutory duties as the project design progresses. Assessment will also be informed by a setting study prepared for the designated area, the AoNB's statutory management plan and discussions with stakeholders.

Stakeholder	Summary of response	Consideration in the Scoping Report
	landscape team/body should be consulted.	
Norfolk County Council	A full LVIA should be undertaken, including where necessary a Townscape Assessment. This should consider all potential impacts, both during construction and in-operation, and the cumulative impacts. Where possible cables should be undergrounded to minimise landscape and visual impacts. Impacts on the Landscape Character and Visual Amenity should where possible be avoided this could be through consideration of fine tuning the route or looking at sensitive areas where undergrounding may be more suitable. Irreplaceable landscape features such as ancient woodland should be fully avoided. Every effort should be made to underground the proposed 400 kV line entering Norfolk. In addition, consideration should also be given to ways to minimise impacts; this could be through the use of lower pylons or pylons of an alternative design (i.e. where under-grounding is not feasible). Cumulative impact should be avoided, and National Grid should consider whether there are opportunities to reconfigure; rationalise or underground any existing electricity network infrastructure (in line with para 2.11.2 – 2.11.6 of NPS EN-5); Where impacts cannot be avoided then mitigation measures will need to be identified. Whilst advanced planting and screening will not minimise all impacts, carefully planned incremental planting can be effective at minimising and softening the appearance of infrastructure in the landscape. Often layered planting starting some distance away can help to break up extensive views. This will	An assessment of the likely effects of the Project, including cumulative effects, both during construction and operation will be undertaken in accordance with GLVIA3 (Ref 6.7) and associated draft clarifications and reported in the landscape, visual and cumulative effects assessment chapters of the PEI Report and ES. A townscape assessment is not considered necessary as the Project does not go through any urban areas or town. **Chapter 3 Main Alternatives Considered** describes the evolution of the Project to date and demonstrates that minimising adverse effects on the landscape amenity through sensitive routeing, siting and design in accordance with the Holford Rules (Ref 6.1) and Horlock Rules (Ref 6.3) was a major consideration during its development and will continue in the future design evolution of the Project. As detailed in the CPRSS Report (Ref 6.8), the starting presumption is for the use of overhead line technology rather than underground cables (in line with NPS EN-5 (Ref 6.2) and National Grid's Approach to Consenting (Ref 6.5)) for areas outside nationally designated landscapes. NPS EN-5 (Ref 6.2) states that "*…..overhead lines should be the strong starting presumption for electricity networks in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape….in these areas where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, ……the application should underground the relevant section of the line.*". The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. The landscape and visual assessment will inform modifications and refinements to the evolving design of the Project, including consideration of appropriate mitigation measures to reduce potential residual effects.

Stakeholder	Summary of response	Consideration in the Scoping Report
	be particularly important when considering the screening options for the substation at Walpole where landscape and visual impacts have the potential to be significantly adverse. The massing, location and scale of the substation should be considered to ensure both short distance and long-distance views are taken into account. In addition to layered planting consideration should be given to finishes, orientation of elements and siting of elements within the site to avoid continuous change on the horizon.	
Woodland Trust	Ancient and veteran trees are afforded a high level of protection in planning policy. Veteran trees are disproportionately valuable parts of the natural environment and where they occur outside of woods, they are also particularly important for landscape connectivity. They are also an essential part of our landscape and cultural heritage. Natural England and Forestry Commission's standing advice states that they "*can be individual trees or groups of trees within wood pastures, historic parkland, hedgerows, orchards, parks or other areas. They are often found outside ancient woodlands. They are also irreplaceable habitats... …An ancient tree is exceptionally valuable. Attributes can include its: great age; size; condition; biodiversity value as a result of significant wood decay and the habitat created from the ageing process; and cultural and heritage value… …A veteran tree may not be very old, but it has significant decay features, such as branch death and hollowing. These features contribute to its exceptional biodiversity, cultural and heritage value.*"	**Chapter 3 Main Alternatives Considered** describes the evolution of the Project to date and demonstrates that minimising adverse effects on important landscape elements and features, including ancient woodland through sensitive routeing, siting and design in accordance with the Holford Rules (Ref 6.1) and Horlock Rules (Ref 6.3) was a major consideration during its development and will continue in the future design evolution of the Project. Effects on veteran trees and ancient woodland will be considered and assessed as part of the landscape and visual; and historic environment assessments and reported in the PEI Report and ES. **Appendix 8C Arboricultural Strategy** outlines how veteran trees and ancient woodland will be assessed.
Grimsby West Housing Allocation	We would agree that in landscaping terms and of the options assessed, the siting area GW5 offers the greatest opportunity to take advantage of existing screening	Mitigation measures will be considered as the Project develops to reduce landscape and visual effects. This will take into account how the substation will relate to the Grimsby West Masterplan.

Stakeholder	Summary of response	Consideration in the Scoping Report
	provided by vegetation and is located immediately adjacent to the existing NPG 132 kV and NGET 400 kV infrastructure. Nevertheless, any proposed substation in this area, should also be accompanied with a comprehensive and robust strategic landscaping assessment and mitigation scheme to ensure that it takes into account not only existing views but also how the substation will eventually relate to the Grimsby West Masterplan.	

6.4 Study Area

6.4.1 The extent of the study area is determined by the potential visibility of the Project in the surrounding landscape and is proportionate to the size and scale of the Project and nature of the surrounding landscape. Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Ref 6.7) states that the study area should include '*the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner*'.

6.4.2 Based on the type of overhead line (OHL) infrastructure and experience of assessments of 400 kV OHL (the tallest element of the Project), the visibility of individual pylons approximately 50 m tall is assumed to be a maximum distance of 10 km. Beyond this distance the perceptibility of pylons approximately 50 m tall diminishes considerably in most instances, and in all but the clearest of viewing conditions.

6.4.3 At distances greater than 5 km, indirect effects on the landscape are unlikely to be significant. This is because at 5 km distance, when viewed at arm's length, a 50 m tall pylon will appear to be approximately 0.61 cm high. This is known as the apparent height of the pylon. If a pylon is seen on the skyline in very clear conditions, or a pair of pylons are seen close together at this distance, perceptibility may increase slightly but this is still unlikely to trigger significant effects.

6.4.4 Initial field survey within the proposed 5 km study area has determined that, where visible at distances between 1 km and 3 km, existing pylons are typically noticeable but not prominent. The focus of the assessment will therefore be landscape receptors within 3 km as this is where significant effects are most likely to occur.

6.4.5 Where visible within 1 km, pylons typically occupy more of the view, depending on the amount of screening or backgrounding afforded by landform, vegetation and built development.

6.4.6 Based on these observations, the proposed study area is 5 km from the edge of the Project as shown on **Figure 6.1 Proposed Landscape Study Area**. Until a route alignment is defined as part of the ongoing design work, this will be taken as 5 km from the edge of the Scoping Boundary. The emphasis of the assessment will, however, be based on receptors lying within 3 km as beyond this distance significant landscape effects are highly unlikely to arise.

6.4.7 To support the assessment, Zone of Theoretical Visibility (ZTV) maps will be produced up to a 10 km distance surrounding the Project (see **Appendix 6A Landscape Assessment Methodology** for more details). These will help to determine the area of over which proposed 400 kV OHL could theoretically affect landscape character. The reason the ZTV maps will be prepared over a 10 km distance is to inform the assessment of cumulative landscape impacts with other proposed developments and to ensure that likely significant effects on distant but very sensitive receptors are identified.

6.4.8 These distances will continue to be reviewed and if necessary, amended as the design of the Project progresses.

6.5 Baseline Conditions

Data Sources

6.5.1 The known or predicated current and future baseline environment described in this section has been informed by the following data sources:

- North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (Ref 6.11);
- Lincolnshire Historic Landscape Characterisation Project (Ref 6.12);
- East Lindsey District Landscape Character Assessment (Ref 6.13);
- Landscape Character Assessment of Boston Borough (Ref 6.14);
- Strategic Landscape Capacity Study for South Holland District Council (Ref 6.15);
- Boston Town and Rural Historic Environment Baseline (Ref 6.16);
- Fenland District Council - Wind Turbine Development Policy Guidance (Ref 6.17);
- Fenland District Council – Fenland Draft Local Plan 2021-2040 (Ref 6.18);
- Kings Lynn and West Norfolk Landscape Character Assessment (Ref 6.19);
- Natural England National Character Area Profiles (Ref 6.20);
- East Midlands Region Landscape Character Assessment (Ref 6.21);
- Lincolnshire Wolds Landscape - Countryside Commission (Ref 6.22);
- The Lincolnshire Wolds AONB Landscape Management Plan 2018 – 2023 (Ref 6.23)[1]; and
- West Lindsey Landscape Character Assessment (Ref 6.24)

6.5.2 These sources will continue to be used to inform the design and assessment process. Neighbourhood Plans and Village Design Statements (or their equivalent) will also be reviewed and used to inform the assessment.

[1] Statement in March 2023 confirmed the Lincolnshire Wolds AONB were going to delay the production of the next Landscape Management Plan and save all current policies and objectives within the current Lincolnshire Wolds AONB Management Plan 2018-23 - pending its further review.

Baseline

6.5.3 Given the large geographical extent of the Project, the study area has been subdivided into seven distinct sections from north to south, as shown in **Figure 6.1 Proposed Landscape Study Area**.

- Section 1 - Grimsby West Substation;
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A;
- Section 3 - Lincolnshire Connection Substation A and B (including the overhead line between them);
- Section 4 - Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation;
- Section 5 - Weston Marsh Substation;
- Section 6 - Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation); and
- Section 7- Walpole B Substation.

6.5.4 A description of these sections is provided in **Chapter 4 Description of the Project.**

Overview of current landscape character

6.5.5 A broad overview of the landscape of the study area based on the relevant Natural England's National Character Area (NCA) Profiles (Ref 6.20) is provided below. The NCA boundaries are shown on **Figure 6.3 National Character Area**.

NCA Profile 41: Humber Estuary

6.5.6 The Humber Estuary NCA comprises a narrow coastal strip within the northern part of the Study Area to the east of the A180. It lies to the south of the River Humber is at the point where it opens up into a wide expanse of open water before joining the North Sea beyond Spurn Point. The estuary is a very busy waterway, with both passenger and commercial traffic accessing the many ports both within the estuary and upstream.

6.5.7 Along the coast the industrial complexes with their oil and gas refineries, warehouses, towers, chimneys and lighting columns are a major and distinctive feature of the estuary, especially on the south bank around Immingham and towards Grimsby.

6.5.8 The elevated rolling hills of the Yorkshire Wolds to the north and the Lincolnshire Wolds to the south are clearly visible from the low-lying land within the NCA, while also providing expansive views out over the estuary.

NCA Profile 42: Lincolnshire Coast and Marshes

6.5.9 The Lincolnshire Coast and Marshes NCA covers the northern part of the study are between Grimsby and Skegness. The area is bordered by the North Sea to the east and the rising land of the Lincolnshire Wolds to the west. The plain incorporates three distinctively different but closely interconnected areas which run broadly parallel to the eastern edge of the Lincolnshire Wolds. To the west is the Middle Marsh which comprises a softly undulating arable landscape with a higher coverage of woodlands and hedgerows than the other areas. To the east lies the Outmarsh, an open landscape

of arable farmland and pastures divided by narrow dykes. Beyond this is the coast with its everchanging pattern of intertidal salt marsh, coastal dune and wetland habitat. Much of the NCA coast is designated as a Special Protection Area (SPA) for the large flocks of overwintering migratory and breeding birds its intertidal habitats support. In the south, Gibraltar Point, at the entrance to the Wash, is internationally designated for its area of dunes, salt marsh and shingle. The Wash itself is internationally designated as a Ramsar site.

6.5.10 Several rivers including the Great Eau and River Freshney rise in the chalk streams in the Lincolnshire Wolds and drain slowly across the coastal plain to the North Sea. They flow through an extensive network of catch water drains and dykes, with the Great Eau becoming a raised embanked watercourse across the east of the NCA. To the south, the Steeping River drains to the adjoining The Fens NCA and on to the North Sea. A series of catch water drains and dykes are pumped into the Steeping which follows a canalised channel before discharging into the large Wash Estuary, thus providing an important fluvial and ecological link to the Wash. The disused Louth Canal, a canalisation of the River Lud, extends as far as Tetney Lock.

6.5.11 Woodland and hedgerow cover is typically sparse but increases westwards towards the foot of the Lincolnshire Wolds with areas of ancient woodland on the Middle Marsh. The substantial amount of ancient semi-natural woodland includes several Sites of Special Scientific Interest (SSSI) and nature reserves (such as Rigsby, Muckton and Legbourne). More minimal tree and hedgerow cover is found on the lower-lying, open Outmarsh.

6.5.12 Rural areas display a mix of dispersed and nucleated settlement; the latter concentrated in the Middle Marsh. Rural settlements and market towns are strongly characterised by the use of brick and pantile with stone for churches and other high-status buildings. Churches are prominent in the open landscape and their steeples and towers, together with surviving traditional windmills including those at Waltham, and Alford are widely visible.

6.5.13 The larger settlements are concentrated along the coast and include the port of Grimsby with its iconic landmark brick tower and Immingham, as well as resort towns such as Cleethorpes, Mablethorpe and Skegness. Industrial areas are in parts of the coastal strip, and there are many large holiday resorts and caravan parks. In places offshore and onshore wind turbines are present and distinctive on the skyline.

6.5.14 The undeveloped wild coast with its long views, high levels of tranquillity and many nature reserves makes it important for recreation and green tourism.

6.5.15 Transport routes include several major A roads connecting to the Humber Bridge and out to the M180. Offshore wind energy schemes connect to the grid through this NCA and the Theddlethorpe Gas Terminal on the coast is an important infrastructure link with the wider network.

6.5.16 There are long, wide coastal views across this NCA. Inland, the NCA rises to the dip slope of the Lincolnshire Wolds, from where there are long, open views over the coastal plain and marshes. Looking inland, the Wolds forms the backdrop to many views. The Lincolnshire Wolds National Landscape (AONB) covers three per cent of the Lincolnshire Coast and Marshes NCA and, while most of this designated landscape falls within the adjacent Lincolnshire Wolds NCA, there are very strong visual, recreational and access links with the coast and marshes.

NCA Profile 43: Lincolnshire Wolds

6.5.17 The Lincolnshire Wolds NCA occupies much of the western part of the Study Area. It comprises a long, narrow band of rolling agricultural land dominated by a west-facing chalk escarpment approximately 50 m high. Situated on the highest land in Lincolnshire, it affords long views and strong visual links with adjacent NCAs. To the east there are views across the Lincolnshire Coast and Marshes NCA towards the coast and out to sea. To the north the Wolds slope down to the Humber Estuary and to the south are the low lying Fens.

6.5.18 The Wolds display a rolling landscape of open, rural character. Whilst the west side of the Wolds ends in a distinctive chalk escarpment, the east side is masked by clay tills which creates more undulating and rounded landforms as the Wolds descend gently into the Middle Marsh.

6.5.19 Steep-sided dry valleys, open plateau hilltops, long, open views and planted beech woods also contribute strongly to the distinctive sense of place. Much of the NCA forms part of the Lincolnshire Wolds National Landscape (AONB) because of its natural beauty. This is an important food producing landscape and the rural economy is mainly based on arable farming with large cereal units together with some pasture.

6.5.20 Springs and chalk streams are characteristic of the area and the headwaters of several rivers, including the Bain, Waring and Lymn, rise in the Wolds. The Great Eau and Waithe Beck drain to the North Sea via the Lincolnshire Coast and Marshes NCA. The River Lymn drains south through the southern edge of the Lincolnshire Coast and Marshes NCA to the Great Steeping River.

6.5.21 Extensive arable areas mean that there are limited semi-natural habitats remaining. Isolated chalk grasslands located on the steepest uncultivated slopes and the broad, herb-rich road verges along ancient trackways and drover roads provide species-rich grassland habitat.

6.5.22 The area is characterised by a range of varied yet unified features including open, arable plateau hill tops, chalk escarpments, deep dry valleys with sinuous beech woods and isolated ash trees punctuating the skyline. The area is sparsely settled with many villages hidden within the folds of the landscape and modest country houses and farmsteads. There are no major urban areas within the Wolds, but a series of small market towns lie at the foot of the hills. The largest of these is Louth which is often referred to as the ‘Capital of the Wolds’. The remains of the Cistercian abbey at Louth Park just east of the town was founded in 1139 and is now a scheduled monument. Louth is home to St. James’ Church, a medieval perpendicular church with crocketted spire which at 87m is one of the tallest spires in the country and is a prominent landmark visible over a wide area.

6.5.23 Although the NCA is generally unwooded in character, there are some substantial areas of woodland, particularly on the lower-lying clay soils overlapping with the adjacent Lincolnshire Coast and Marshes NCA. These create areas of localised enclosure and restrict longer views.

6.5.24 The whole area is rich in archaeological remains, including ancient trackways, tumuli along the scarp and a high concentration of deserted medieval villages. Bronze-age round barrows and an important collection of Neolithic long barrows are located on thin chalk soils on the edges of escarpments and ridges.

6.5.25 Generally, the NCA has a very open character with extensive outward views both eastwards to the coast and westwards across the Central Lincolnshire Vale. The views

within the NCA are equally dramatic and are shaped by the open rolling hills, hidden valleys and continually changing patterns of farming. The ridge-top locations provided by the Bluestone Heath Road and the west-east drovers roads provide some of the area's best known and most frequented locations and afford panoramic views out across the study area.

NCA Profile 46: The Fens

6.5.26 The Fens NCA is a distinctive, historic and human-influenced wetland landscape lying to the west of the Wash estuary, which is the largest estuarine system in Britain and supports an extensive habitat mosaic of salt marshes, intertidal banks of sand and mud, shallow waters and deep channels. The area is notable for its large-scale, flat, open landscape with extensive vistas to level horizons. The level, open topography creates the impression of big skies which convey a strong sense of place, tranquillity and isolation.

6.5.27 Elevations rarely pass the 10 m contour, and typically vary by little more than 1m to 2 m over long distances. Much of the land is below sea level, relying on pumped drainage and the control of sluices at high and low tides to maintain its agricultural viability.

6.5.28 Water from much of the East Midlands drains eastwards across the Fens into the Wash through four major rivers: the Witham, Welland, Nene and Great Ouse. These rivers are characterised by artificial canalised courses that run straight for long distances and are bounded by high banks to contain the watercourse from the lower adjacent fields. In some locations 'roddons', sinuous silt banks that are fossilised remnants of tidal creek systems, are elevated up to 2 to 3 m above the dark peat soils which have subsequently wasted because of continuous cultivation, drainage and wind erosion of the peat. This irreversible wastage creates an ever-greater demand for artificial drainage of the land. Remnants of the original fen, as at Wicken Fen, are rare exceptions.

6.5.29 There are some marked variations and graduations in the Fens landscape. The 'settled inland fens', run in a broad arc inland from the Wash between King's Lynn and Boston and form an ancient, small-scale landscape of sinuous lanes and relative intimacy with a higher density of settlements, some notable churches and remnant grasslands. The extensive 'peaty fens' or 'black fens', which were finally comprehensively drained in the 17th to 19th centuries, comprise broad rectilinear fields and straight roads. The only consistent relief to the level landform are the notches of the drainage ditches and the raised berms and banks of the artificial drainage channels.

6.5.30 The rich peaty soils support large-scale cultivation of arable and horticultural crops. Holdings of more than 100 ha make up over 70 per cent of farmed land. Open fields, bounded by a network of drains and rivers (some embanked), create a strongly geometric/rectilinear landscape pattern. The structures create local enclosure and a slightly raised landform, which is mirrored in the road network that largely follows the edges of the system of large fields.

6.5.31 Overall, woodland cover is sparse, notably a few small woodland blocks, occasional avenues alongside roads, isolated field trees and shelterbelts of poplar, willow and occasionally leylandii hedges around farmsteads, and numerous orchards around Wisbech. Various alders, notably grey alder, are also used in shelterbelts and roadside avenues.

6.5.32 The settlement pattern follows the historical development of the area. The settled inland fens or 'townlands' comprise medium to large settlement clusters around Boston, Spalding, Holbeach and Wisbech, with many villages having medieval churches, such

as West Walton. The medieval pattern of north–south drove lines, between settlements on the coast and fen edge respectively, was crossed in the 19th century by the A17 and A47. Since then, the settlements in these townlands have spread along these principal routes to create ribbon developments of smallholdings, modern bungalows, farmsteads with large agricultural barns, and food processing buildings, such as Sutton Bridge. The 'peaty fens' inland are, by contrast, very sparsely settled with isolated farmsteads and houses on local areas of raised land being the only built elements for long distances. Linear shelterbelts of poplar, willow and tall Leyland cypress hedges are often found around the isolated farmsteads. Many fenland buildings are now derelict, while the linear roads have likewise suffered showing significant undulations.

6.5.33 Around Boston there is a higher density of settlement and more urban views associated with the coalescence of settlements along the south western side of the town and expansion of road, retail and housing development along the A16 and other arterial roads. At 83m tall, the iconic octagonal medieval tower of St Botolph's Church in Boston, known as the 'Boston Stump' is a prominent and widely visible skyline feature.

6.5.34 Extensive views to level horizons and huge skies are characteristic of the Fens and provide a strong sense of rural remoteness and tranquillity. Wind turbines and pylons are prominent, but do not detract from the sense of isolation and tranquillity, created by the level horizons and the scale of the landscape.

6.5.35 Long straight roads and rail lines are often situated on elevated banks and interrupt views across the fen plain. Industrial and residential development locally impact on views, and light pollution associated with transport networks has become increasingly prevalent.

Designated landscapes

National designations

6.5.36 The Lincolnshire Wolds National Landscape (AONB) lies to the west of the study area as shown on **Figure 6.2 Landscape Constraints**. At its closest point near Utterby, it lies within 1 km from the Scoping Boundary. No above ground infrastructure would fall within the designated area. It is therefore proposed to exclude consideration of the direct effects on the landscape of the Lincolnshire Wolds National Landscape (AONB) from the assessment with the exception of any effects arising from temporary access routes. An assessment of likely significant indirect effects on the natural beauty and special qualities of the Lincolnshire Wolds National Landscape (AONB) will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the ES.

6.5.37 In 2020, North Lincolnshire Council made a formal request to Natural England to consider making a Variation Order to the existing Lincolnshire Wolds National Landscape (AONB). The request covers an area to the north of the National Landscape (AONB) and lies outside the Scoping Boundary.

6.5.38 In June 2021, Natural England announced proposals for new protected areas across England, alongside a new programme to examine how more areas could benefit from landscape improvements and deliver more for people and nature. Under these proposals, Natural England announced that extensions are being considered to two existing National Landscapes (AONB) (Surrey Hills National Landscape and the Chilterns National Landscape) as well as two new National Landscape (AONB) (Yorkshire Wolds National Landscape and Cheshire Sandstone Ridge National

Landscape). There is no programme available regarding consideration of the proposed extension to the Lincolnshire Wolds National Landscape (AONB).

6.5.39 It is therefore proposed to exclude the proposed extension of the Lincolnshire Wolds National Landscape (AONB) from the assessment as it has no formal status and lies outside the Scoping Boundary. This will be kept under review should the situation change as the Project progresses.

6.5.40 The North Norfolk National Landscape (AONB) lies to the south-east outside of the study area as shown on **Figure 6.2 Landscape Constraints**. There would be no direct effects on the landscape. At its closest point it lies approximately 14 km from the nearest point on the Scoping Boundary. At this distance it is highly unlikely that there would be any significant indirect effects on the natural beauty of special qualities of the designated area. It is therefore proposed to exclude consideration of direct and indirect effects on the landscape of the North Norfolk National Landscape (AONB) from the assessment.

Local designations

6.5.41 Areas of Great Landscape Value (AGLV) are locally important landscapes identified in the Central Lincolnshire Local Plan (Ref 6.25). One AGLV falls within the 5 km Study Area and adjoins the northern boundary of the Lincolnshire Wolds National Landscape (AONB). There would be no direct effects on the landscape, and it is therefore proposed to scope these out of the assessment. Indirect effects will be scoped into the assessment.

National Character

6.5.42 As noted above, the study area is covered by four NCA profiles:

- NCA Profile 41: Humber Estuary
- NCA Profile 42: Lincolnshire Coast and Marshes;
- NCA Profile 43: Lincolnshire Wolds; and
- NCA Profile 46: The Fens.

6.5.43 Given the industrial character of the part of NCA Profile 41: Humber Estuary within the study area, it is proposed to scope this out of the assessment. The other NCAs will be included in the assessment and reported in the landscape chapter of the ES.

Regional and local character

6.5.44 The study area is covered by several overlapping landscape character assessments.

6.5.45 To avoid double counting the assessments, it is therefore proposed to use the following landscape character assessments as the baseline and boundaries for the assessment:

- North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (Ref 6.11);
- East Midlands Region Landscape Character Assessment (Ref 6.21);
- Character areas in the Fenland District Council Local Plan (Ref 6.18); and
- Kings Lynn and West Norfolk Landscape Character Assessment and Guidelines (Ref 6.19).

6.5.46 These assessments identify a combination of landscape character types (LCT) and landscape character areas (LCA). To ensure a consistent level of detail across the study area, it is intended to use the boundaries of the LCA in the North East Lincolnshire Landscape Character Assessment (Ref 6.11) and Kings Lynn and West Norfolk Landscape Character Assessment (Ref 6.19) and the boundaries of the LCT in the East Midlands Region Landscape Character Assessment (Ref 6.21) as these are of a similar size as shown on **Figure 6.4 Regional and Local Landscape Character Area**.

6.5.47 To the north of the study area, there is some overlap in the boundaries of the North East Lincolnshire Landscape Character Assessment (Ref 6.11) and the East Midlands Region Landscape Character Assessment (Ref 6.21). To avoid confusion, the smaller boundaries of the North East Lincolnshire Landscape Character Assessment (Ref 6.11) will take precedent in the areas of overlap.

6.5.48 A small part of the study area near Wisbech lies outside the landscape character assessments listed above but is covered by the LCA defined in the Fenland District Council Draft Local Plan 2021 – 2040 (Ref 6.18). These areas will therefore form the basis for the assessment of the landscape around Wisbech.

North East Lincolnshire Landscape Character Assessment

6.5.49 The North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (Ref 6.11) divides the landscape into LCA and LCT of which the following fall partly within the study area:

- LCT 1: Industrial Landscape (Humber Estuary LCA);
- LCT 2: Open Farmland (Lincolnshire Coast and Marshes LCA);
- LCT 3: Wooded Open Farmland (Lincolnshire Coast and Marshes LCA);
- LCT 4: Flat Open Farmland (Lincolnshire Coast and Marshes LCA);
- LCT 5: Sloping Farmland (Lincolnshire Coast and Marshes LCA); and
- LCT 6: High Farmland (Lincolnshire Wolds LCA).

6.5.50 As shown on **Figure 6.4 Regional and Local Landscape Character Area**, the Scoping Boundary lies almost entirely within the LCT 3: Wooded Open Farmland (Lincolnshire Coast and Marshes LCA) and its landscape would potentially be directly and indirectly affected by the Project and therefore will be included in the assessment.

6.5.51 LCT 2: Open Farmland (Lincolnshire Coast and Marshes LCA), LCT 4: Flat Open Farmland (Lincolnshire Coast and Marshes LCA), LCT 5: Sloping Farmland (Lincolnshire Coast and Marshes LCA) and LCT 6: High Farmland (Lincolnshire Wolds LCA) are rural landscapes lie partly within the Scoping Boundary. They therefore have the potential to be indirectly affected and will be included in the assessment.

6.5.52 LCT 1: Industrial Landscape (Humber Estuary LCA) would be highly unlikely to experience significant landscape effects from the Project. Notwithstanding the potential for intervisibility, which would be limited due to intervening settlement, the presence of the 400 kV OHL and Grimsby West Substation would not fundamentally alter the composition or character of the views out from the LCT or indirectly influence the character of the landscape within the LCT. It is therefore proposed to exclude this LCT from the assessment.

East Midlands Region Landscape Character Assessment

6.5.53 The East Midlands Region Landscape Character Assessment (Ref 6.21) divides the landscape into regional landscape character types (RLCT) of which the following fall partly within the study area:

- RLCT 1A: Coastal Saltmarshes and Mudflats;
- RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats;
- RLCT 1C: Shallow Coastal Waters;
- RLCT 1E: Offshore Industries, Fisheries and Navigations;
- RLCT 2A: Settled Fens and Marshes;
- RLCT 2B: Planned and Drained Fens;
- RLCT 2C: Fen and Marsh Margin Farmlands;
- RLCT 4B: Wooded Vales;
- RLCT 7A: Chalk Wolds; and
- RLCT 7B: Wolds Scarps, Ridges and Valleys.

6.5.54 As shown on **Figure 6.4 Regional and Local Landscape Character Area**, the Scoping Boundary lies within RCLT 2A: Settled Fens and Marshes, RLCT 2B: Planned and Drained Fens, RLCT 2C: Fen and Marsh Margin Farmlands. The landscapes within these LCT would potentially be directly and indirectly affected by the Project and will therefore be included in the assessment.

6.5.55 RLCT 7A: Chalk Wolds and RLCT 7B: Wolds Scarps, Ridges and Valleys lie partly within the Scoping Boundary. They therefore have the potential to be indirectly affected and will be included in the assessment.

6.5.56 Although RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats, RLCT 1C: Shallow Coastal Waters, RLCT 1A: Coastal Saltmarshes and Mudflats, RLCT 1E: Offshore Industries, Fisheries and Navigations clip the eastern edges of the study area, due to their coastal location, the presence of the 400 kV OHL would not fundamentally alter the composition or character of the views out from the RLCT, or indirectly influence the character of the landscape within the RLCT. It is therefore proposed to exclude these RLCT from the assessment.

6.5.57 RLCT 4B: Wooded Vales clips the very western edge of the study area. The presence of the 400 kV OHL would not fundamentally alter the composition or character of the views out from the RLCT, or indirectly influence the character of the landscape within the RLCT. It is therefore proposed to exclude this RLCT from the assessment.

Kings Lynn and West Norfolk Landscape Character Assessment and Guidelines

6.5.58 The Kings Lynn and West Norfolk Landscape Character Assessment (Ref 6.19) divides the landscape into LCA of which the following fall partly within the study area:

- LCA D2: Walpole, Terrington and Clench Warton (The Fens - Settled Inland Marshes);
- LCA D3: Terrington St John (The Fens - Settled Inland Marshes);

- LCA D4: Emneth, West Walton and Walsoken (The Fens - Settled Inland Marshes LCT); and
- LCA E4: Marshland St. James (The Fens - Open Inland Marshes LCT).

6.5.59 As shown on **Figure 6.4 Regional and Local Landscape Character Area**, the Scoping Boundary lies within LCA D3: Terrington St John and LCA D4: Emneth, West Walton and Walsoken. The landscapes within these LCTs would potentially be directly and indirectly affected by the Project and will therefore be included in the assessment.

6.5.60 LCA D2: Walpole, Terrington and Clench Warton lies partly within the study area. It therefore has the potential to be indirectly affected and will be included in the assessment.

6.5.61 LCA E4: Marshland St. James clips the south-eastern edge of the study area. The presence of the 400 kV OHL or the Walpole Substation would not fundamentally alter the composition or character of the views out from the LCA or indirectly influence the character of the landscape within the LCA. It is therefore proposed to exclude this LCA from the assessment.

Fenland District Council Draft Local Plan 2021 – 2040 (Draft Local Plan Consultation August 2022)

6.5.62 The Fenland District Council Local Plan (Ref 6.18) divides the district into LCA of which the following fall partly within the study area:

- The Fens; and
- Wisbech Settled Fen.

6.5.63 As shown on **Figure 6.4 Regional and Local Landscape Character Area**, these LCA fall within the Scoping Boundary. The landscapes within these LCA would potentially be directly and indirectly affected by the Project and will therefore be included in the assessment.

6.5.64 Information from the more detailed landscape units in the above assessments as well as information from the local landscape character assessments listed in Section 6.6 of this chapter will be used to provide additional more detailed baseline information and inform the assessment where relevant.

Neighbourhood Plans and Village Design Statements

6.5.65 As noted above, existing and emerging Neighbourhood Plans and Village Design Statements (or their equivalent) will be used to inform the baseline landscape assessment and the assessment of effects on the landscape and views within each parish council area within the Scoping Boundary, which will be included in the ES.

Future Baseline

6.5.66 Landscape change is an ongoing and inevitable process and will continue across the study area irrespective of whether the Project goes ahead. Change can arise through natural processes (e.g., the maturity of woodlands) and natural systems (e.g., river erosion) or, as is often the case, occurs due to human activity, land use, management, or neglect.

6.5.67 There are continued pressures on the landscape brought about by loss of existing features such as hedgerows, introduction of new features such as new housing, wind

turbines, overhead lines, quarries, roads etc and decline in quality or state of repair of features such as dereliction of the urban fringe; neglect of hedgerows; scrub invasion leading to loss of a smooth rolling topography; introduction of standardised suburban housing styles to a previously architecturally diverse settlement.

6.5.68 Climate change is increasingly acknowledged as a key driver of future landscape change. The low-lying landscapes along the Lincolnshire Coast are particularly vulnerable to sea level change. Changing weather patterns and increased storms also pose risks to agriculture, tourism, and local infrastructure.

6.5.69 Future baseline is also related to consented proposals which are not yet present in the landscape but are expected to be constructed. This includes other high voltage electricity infrastructure, and wind and solar developments.

6.5.70 Ash trees (*Fraxinus excelsior*) within the study area may be affected by ash dieback. This is a disease of ash trees caused by a fungus of Asian origin called *Hymenoscyphus fraxineus* (formerly called *Chalara fraxinea*). The disease causes leaf loss and crown dieback in affected trees and is usually fatal. The future baseline therefore assumes that there would be loss of ash trees in the long term across the study area, but that other tree species would occupy gaps created in the short term, and overall levels of vegetation would remain similar to existing. An Arboricultural Impact Assessment will record incidents of ash dieback during site surveys as explained in **Appendix 8C Arboricultural Strategy**).

6.6 Design and Control Measures

Design Measures

6.6.1 The Project has avoided designated sites and sensitive receptors as far as possible. This is in accordance with the Holford Rules (Ref 6.1) and Horlock Rules (Ref 6.3) which will continue to be used to inform the routeing, siting, and design process in order to minimise potential landscape effects.

6.6.2 The landscape assessment will inform modifications and refinements to the detailed design of the Project, including consideration of individual pylon locations during the design and assessment process, and the identification of any further appropriate mitigation measures to reduce potential residual effects.

6.6.3 Notwithstanding the application of the principles outlined in the Holford Rules (Ref 6.1) and Horlock Rules (Ref 6.3), given the intrinsic characteristics of overhead line infrastructure, some significant adverse landscape effects are likely to be unavoidable. That a new overhead line can give rise to adverse landscape effects is acknowledged in EN-5 (paragraph 2.9.7) (**Error! Reference source not found.**). Paragraph 2.9.8 of EN-5 (**Error! Reference source not found.**) also notes that new substations, sealing end compounds (including terminal towers), and other above-ground installations that serve as connection, switching, and voltage transformation points on the electricity network may also give rise to adverse landscape and visual impacts.

Control and Management Measures

6.6.4 An Initial Outline Code of Construction (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction**. Measures relevant to the control and management of impacts that could affect the landscape assessment are:

- LV01: The contractor(s) will retain vegetation where practicable. Where vegetation is lost and trees cannot be replaced in situ due to the restrictions associated with land rights required for operational safety, native shrub planting approved by National Grid will be used as a replacement, in accordance with outline vegetation reinstatement plans to be included within an outline Landscape Environmental Management Plan (LEMP). Replacement vegetation will be planted as close by as practicable and will complement landscape character and be sympathetic to the local habitat type in order to provide a high biodiversity value.
- LV02: The contractor(s) will apply the relevant protective principles set out in British Standard (BS) 5837:2012: Trees in relation to Design, Demolition and Construction – Recommendations (Ref 6.26). This will be applied to trees within the Order Limits which will be preserved through the construction phase, and to trees outside of the Order Limits where such measures do not hinder or prevent the use of the relevant working width for construction. All works to high grade trees, including trees under Tree Preservation Orders and veteran trees, will be undertaken or supervised by a suitably qualified arboriculturist.
- LV03: A five-year aftercare period will be established for all reinstatement and mitigation planting.
- LV04: Construction lighting will be directional and minimised where possible.
- B07: Where the works require the crossing or removal of hedgerows, the gap will be reduced to a width required for safe working. New hedgerow planting will contain native, woody species of local provenance.

6.6.5 Additional measures of potential relevance to the avoidance or reduction of effects on landscape character include the following:

- NV01: Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise will be set out within the Construction Environmental Management Plan (CEMP).

6.6.6 The Project has also committed to producing an Outline LEMP (commitment GG03), which will set out the measures to protect existing vegetation and details regarding the reinstatement and additional planting. This will also account for biodiversity net gain targets (see **Chapter 8 Ecology and Biodiversity**).

6.7 Potential for Significant Effects

6.7.1 This section identifies the potential for the Project to give rise to significant effects taking into account the design and control measures identified in Section 6.6.

6.7.2 **Table 6.2** sets out the potential sources and impacts resulting from the construction and maintenance and/or operational activities associated with the Project, whether these impacts are likely to give risk to significant effects, receptors identified with the Study Area and whether the receptors are scoped in or scoped out of the assessment.

6.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage, the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Potential sources of impacts

Sources of construction impacts

- Construction activities:
  - site clearance, tree felling and boundary/hedgerow removal;
  - topsoil stripping and earthworks particularly associated with construction compounds and site accesses;
  - undergrounding of third-party services;
  - construction, presence of and removal of construction compounds, parking and laydown areas;
  - movement of construction related traffic including delivery and removal of material to and from site, off-site road traffic including workers travelling to and from site;
  - movement of vehicles along temporary access tracks;
  - construction, presence and removal of temporary site accesses and access routes, including bellmouths;
  - construction, presence and removal of temporary bailey bridges and culverts;
  - erection, presence and removal of temporary scaffolding;
  - presence of temporary hoardings and/or security fencing or signage;
  - construction of substations including foundations;
  - assembly and erection of the OHL including foundations;
  - construction and removal of temporary pylons and overhead line required for construction;
  - construction site lighting particularly during the winter months.
- Part decommissioning of the existing Grimsby West Substation.

Sources of operational impacts

- The introduction of a new 400 kV OHL into the landscape;
- The introduction of new substations into the landscape;
- Effects of mitigation measures proposed by other topics, particularly re-contoured landform and new planting in relation to the mitigation of ecological and/or visual effects;
- Localised widening of public highways; and
- Operations lighting at substations.

Sources of maintenance impacts

- Periodic vehicle access for routine maintenance and emergency repairs;

- General maintenance activities including cutting back of vegetation along wayleave corridor to ensure safety clearances;
- Maintenance of Biodiversity Net Gain (BNG) and other planted areas; and
- Annual inspection by drone/helicopter.

Table 6.2: Impacts, receptors and potential for significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Nationally Designated Landscapes					
Construction	Activities associated with construction.	Physical and/or perceptual effects on designated landscapes from construction including vegetation removal, site preparation, OHL and substation construction, and presence of compounds, storage areas access routes, plant (including mobile cranes), vehicles and personnel.	Lincolnshire Wolds National Landscape (AONB).	**Yes** – at its closest the Lincolnshire Wolds National Landscape (AONB) lies within 1 km of the Scoping Boundary and the Project is partly within the setting of the designated area. Some of the roads through the designated area may be used as temporary access routes.	**Scoped in**
			Proposed extension of the Lincolnshire Wolds National Landscape (AONB)	No - this area has no formal status and lies outside the Scoping Boundary. This will be kept under review as Project develops.	Scoped out
			North Norfolk National Landscape (AONB).	No – at its closest the North Norfolk National Landscape (AONB) is some 14 km from the Scoping Boundary. At this distance, significant effects due to the presence of	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
				construction activities are highly unlikely to arise.	
National Character Areas					
Construction	Activities associated with construction.	Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	NCA Profile 42: Lincolnshire Coast and Marshes	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
			NCA Profile 46: The Fens.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
Locally Designated Landscapes					
Construction	Activities associated with construction.	Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	Area of Great Landscape Value (AGLV) north of the Lincolnshire Wolds National Landscape (AONB).	**Yes** – potential for indirect effects on overall composition and character.	**Scoped in**
North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study					
Construction	Activities associated with construction.	Physical and/or perceptual effects on the landscape from	LCT 1: Industrial Landscape;	No – the distance of the Scoping Boundary	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	LCT 5: Sloping Farmland; and LCT 6: High Farmland.	(minimum 500 m) from these LCT means that there would be no direct effects and construction activities would not fundamentally alter the composition or character of the views out from the LCT or indirectly influence the character of the landscape within the LCT.	
			LCT 2: Open Farmland; LCT 3: Wooded Open Farmland; and LCT 4: Flat Open Farmland.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
East Midlands Region Landscape Character Assessment					
Construction	Activities associated with construction.	Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	RLCT 1A: Coastal Saltmarshes and Mudflats; RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats; RLCT 1C: Shallow Coastal Waters; RLCT 1E: Offshore Industries, Fisheries and Navigations;	No – the distance of the Scoping Boundary (minimum 1.7 km) from these RLCT means that the construction activities would not fundamentally alter the composition or character of the views out from the RLCT or indirectly influence the character of	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			RLCT 4B: Wooded Vales; and RLCT 7B: Wolds Scarps, Ridges and Valleys.	the landscape within the RLCT.	
			RCLT 2A: Settled Fens and Marshes; RLCT 2B: Planned and Drained Fens; RLCT 2C: Fen and Marsh Margin Farmlands; and RLCT 7A: Chalk Wolds	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
Kings Lynn and West Norfolk Landscape Character Assessment and Guidelines					
Construction	Activities associated with construction.	Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	LCA D2: Walpole, Terrington and Clench Warton and LCA E4: Marshland St. James.	No – the distance of the Scoping Boundary (minimum 1.3 km) from these LCA means that the construction activities would not fundamentally alter the composition or character of the views out from the LCA or indirectly influence the character of the landscape within the LCA.	Scoped out
			LCA D3: Terrington St John and LCA	**Yes** – potential for direct effects on landscape	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			D4: Emneth, West Walton and Walsoken.	elements and features and indirect effects on overall composition and character.	
Fenland District Council Draft Local Plan 2021-2040 (Draft Local Plan Consultation August 2022)					
Construction	Activities associated with construction.	Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	LCA The Fens; and LCA Wisbech Settled Fen.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
Project Wide Construction Effects					
Construction	Nighttime lighting of construction activities.	Effects on landscape character from nighttime lighting of construction activities.	All landscape receptors.	**Yes** – there may be a requirement for nighttime lighting of the substations, construction compounds and site access points throughout the route.	**Scoped in**
Construction	Effects of mitigation measures proposed by other topics, particularly re-contoured landform, and new planting in relation to the mitigation of ecological and/or visual effects.	Physical and perceptual effects on landscape character and resources from changes to landform and introduction of landscape elements such as trees and hedgerows	All landscape receptor groups listed above as scoped into the assessment.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Localised widening of public highways.	Physical and perceptual effects on landscape character and resources from permanent loss of roadside vegetation.	All landscape receptor groups listed above as scoped into the assessment.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
Nationally Designated Landscapes					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape.	Perceptual effects on the natural beauty and special qualities of the Lincolnshire Wolds National Landscape (AONB) or North Norfolk National Landscape (AONB) due to the presence of the of the new infrastructure.	Lincolnshire Wolds National Landscape (AONB).	**Yes** – at its closest the Lincolnshire Wolds National Landscape Area lies within 1 km of the Scoping Boundary and the Project is partly within the setting of the designated area.	**Scoped in**
			Proposed extension of the Lincolnshire Wolds National Landscape (AONB)	No - this area has no formal status and lies outside the Scoping Boundary. This will be kept under review as Project develops.	Scoped out
			North Norfolk National Landscape (AONB).	No – at its closest the North Norfolk National Landscape (AONB) is some 14 km from the Scoping Boundary. At this distance, significant effects due to the presence of the new infrastructure are highly unlikely to arise.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
National Character Areas					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape.	Physical and/or perceptual effects on the landscape from long-term loss of landscape elements and features, and introduction of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows	NCA Profile 42: Lincolnshire Coast and Marshes	**Yes** – potential for indirect effects on views with consequent effects on landscape character.	**Scoped in**
			NCA Profile 46: The Fens.	**Yes** – potential for indirect effects on views with consequent effects on landscape character.	**Scoped in**
Locally Designated Landscapes					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape.	Physical and perceptual effects on landscape character and resources from long-term loss of landscape elements and features, and introduction of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows.	AGLV north of the Lincolnshire Wolds National Landscape (AONB).	**Yes** – potential for indirect effects on views with consequent effects on landscape character.	**Scoped in**
North East Lincolnshire Landscape Character Assessment					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape	Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and	LCT 1: Industrial Landscape.	No – the distance of the Scoping Boundary (minimum 1.8 km) from this LCT and the industrial character of the LCT means that the presence	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		presence of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows		of the new infrastructure would not fundamentally alter the composition or character of the views out from the LCT or indirectly influence the character of the landscape within the LCT.	
			LCT 3: Wooded Open Farmland.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
			LCT 2: Open Farmland, LCT 4: Flat Open Farmland, LCT 5: Sloping Farmland and LCT 6: High Farmland.	**Yes** – potential for indirect effects on views with consequent effects on landscape character.	**Scoped in**
East Midlands Region Landscape Character Assessment					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape	Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and presence of new infrastructure. Potential changes to landform and introduction of landscape	RLCT 1A: Coastal Saltmarshes and Mudflats; RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats; RLCT 1C: Shallow Coastal Waters;	No – the distance of the Scoping Boundary (minimum 3 km) from this RLCT means that the presence of the new infrastructure would not fundamentally alter the composition or character of the views out from the RLCT or indirectly influence the character of the landscape within the RLCT.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		elements such as trees and hedgerows	RLCT 1E: Offshore Industries, Fisheries and Navigations, RLCT 4B: Wooded Vales.		
			RCLT 2A: Settled Fens and Marshes, RLCT 2B: Planned and Drained Fens, RLCT 2C: Fen and Marsh Margin Farmlands.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
			RLCT 7A: Chalk Wolds, RLCT 7B: Wolds Scarps, Ridges and Valleys.	**Yes** – potential for indirect effects on views with consequent effects on landscape character.	**Scoped in**
Kings Lynn and West Norfolk Landscape Character Assessment and Guidelines					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape	Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and presence of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows.	LCA E4: Marshland St. James.	No – the distance of the Scoping Boundary (minimum 4.8 km) from this LCT means that the presence of the new infrastructure would not fundamentally alter the composition or character of the views out from the LCA or indirectly influence the character of the landscape within the LCA.	Scoped out
			LCA D3: Terrington St John and LCA	**Yes** – potential for direct effects on landscape	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			D4: Emneth, West Walton and Walsoken.	elements and features and indirect effects on overall composition and character.	
			LCA D2: Walpole, Terrington and Clench Warton.	**Yes** – potential for indirect effects on views with consequent effects on landscape character.	**Scoped in**
Fenland District Council Draft Local Plan 2021-2040 (Draft Local Plan Consultation August 2022)					
Operation	The introduction of the operational 400 kV OHL and substations into the landscape	Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and presence of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows.	LCA The Fens; and LCA Wisbech Settled Fen.	**Yes** – potential for direct effects on landscape elements and features and indirect effects on overall composition and character.	**Scoped in**
Project wide operational effects					
Operation	Nighttime lighting of substations.	Effects on landscape character from operational nighttime lighting.	All landscape receptor groups listed above as scoped into the assessment.	**Yes** – there may be a requirement for 24/7 security lighting.	**Scoped in**
Operation	Effects of mitigation measures proposed by other topics, particularly re-contoured landform,	Physical and perceptual effects on landscape character and resources from changes to landform and introduction of	All landscape receptor groups listed above as	**Yes** – potential for direct effects on landscape elements and features and	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
	and new planting in relation to the mitigation of ecological and/or visual effects.	landscape elements such as trees and hedgerows.	scoped into the assessment.	indirect effects on overall composition and character.	
Operation	Localised widening of public highways.	Physical and perceptual effects on landscape character and resources from permanent loss of roadside vegetation.	All landscape receptor groups listed above as scoped into the assessment.	No – Any roadside vegetation lost during widening works would be reinstated like for like and therefore unlikely to result in significant effects.	Scoped out
Maintenance	Periodic vehicle/helicopter/drone access for routine maintenance and emergency repairs.	Physical and perceptual effects on landscape character and resources from routine maintenance activities including temporary access tracks, storage compounds, vehicle and personnel movements.	All landscape receptor groups listed above as scoped into the assessment.	No – Maintenance activities would be temporary, short term and unlikely to result in significant effects.	Scoped out
Maintenance	General maintenance activities including cutting back of vegetation along wayleave corridor to ensure safety clearances.	Physical and perceptual effects on landscape character and resources from general maintenance activities including cutting back of vegetation.	All landscape receptor groups listed above as scoped into the assessment.	No – Vegetation management is unlikely to have ongoing significant effects, the main effect would be from the initial loss during construction and the effects of this are covered under construction above.	Scoped out

6.8 Proposed Assessment Methodology

Proposed Data Sources

6.8.1 In addition to the published landscape character assessments listed in Section 6.6, it is proposed to use the following data sources to inform the landscape assessment:

- Ordnance Survey (OS) 1:10,000, 1:25,000, 1:50,000 and 1:250,000 base mapping;
- OS Terrain® 50 mid-resolution and LIDAR Composite 2017 – 50 cm (DTM);
- Google Earth Pro aerial photography, and Google Maps Street View;
- Base mapping from ArcGIS Map Service;
- Open source GIS data; and
- National, regional, and local landscape character assessments listed in Section 6.6 of this Chapter.

Technical Guidance

6.8.2 The landscape assessment will be undertaken in accordance with the following good practice and guidance documents:

- The Holford Rules – Guideline for the Routeing of New High Voltage Overhead Transmission Lines (Ref 6.1);
- The Horlock Rules – Guidelines on the Siting and Design of National Grid Substations (Ref 6.3);
- Landscape Institute and Institute for Environmental Management and Assessment (IEMA) (2013) Guidelines for Landscape and Visual Impact Assessment – 3rd Edition (GLVIA3) (Ref 6.7);
- Landscape Institute (2023) Notes and Clarifications on aspects of the 3rd Edition Guidelines on Landscape and Visual Impact assessment (GLVIA3) – Consultation (Ref 6.27);
- Landscape Institute (2021) Technical Guidance Note 02/21 Assessing Landscape Value Outside National Designations (Ref 6.28);
- Natural England (2014) An Approach to Landscape Character Assessment (Ref 6.29);
- Natural England (2019) An Approach to Landscape Sensitivity Assessment – to inform spatial planning and land management (Ref 6.30); and
- Planning Inspectorate (2019); Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (AN17) (Ref 6.31).

Proposed Assessment Methodology

6.8.3 The following text summarises the methodology proposed to be used for the landscape assessment. This builds on the general assessment methodology

presented in **Chapter 5 EIA Approach and Methodology** and is explained more fully in **Appendix 6A Landscape Assessment Methodology**.

6.8.4 The methodology for undertaking the landscape assessment is based on principles set out in GLVIA3 (Ref 6.7) and its associated draft clarifications (Ref 6.27). GLVIA3 (Ref 6.7) is the established good practice guidance for landscape and visual impact assessment and complies with the requirements of EN-1 and EN-5. GLVIA3 advocates that the assessment should reflect the scale and complexity of the development which is being assessed and should focus on the 'likely' significant effects, rather than every conceivable effect. This approach provides greater opportunity to scope out receptors where it can be justified that significant effects would be unlikely to arise.

6.8.5 As explained in Section 6.6, the baseline descriptions and character area boundaries for the assessment will be based on existing published landscape character assessments.

6.8.6 The assessment will consider the effects at construction and year 1 operation, and year 15 operation when any new planting will be established.

6.8.7 Where relevant, the assessment will consider any inter-relationship of baseline information and impacts from the Project between different aspects of the environment.

6.8.8 For example, the outputs of **Chapter 8 Ecology and Biodiversity** will provide information on existing vegetation and species including ancient woodland and veteran trees, **Chapter 9 Historic Environment** will be cross-referenced in relation to historic assets including historic landscapes and registered parks and gardens which may contribute to value of the landscape.

6.8.9 Information contained in the Arboriculture Impact Assessment will be referenced to inform the assessment and mitigation proposals as explained in **Appendix 8C Arboricultural Strategy**.

Site-Based Assessment

6.8.10 The findings of the desk-based study will be supplemented with a programme of seasonal site surveys. This will include surveys during both winter and summer months to fully understand the landscape baseline. Winter surveys will be undertaken at year 1 to show the Project at its most visible. Summer surveys will be undertaken at year 15, to take account of the growth of any planted areas associated with the Project.

Sensitivity

6.8.11 As explained in **Appendix 6A Landscape Assessment Methodology**, the sensitivity of landscape receptors will be determined through separate consideration of the value attached to the landscape (which is established and reported as part of the baseline) and its susceptibility to change arising from the Project, which will be determined through informed professional judgement guided by the indicative criteria set out in Table 6A.2, and Table 6A.3 of **Appendix 6A Landscape Assessment Methodology**. In subdividing sensitivity into the two components of value and susceptibility, the approach differs slightly from the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology**. It does however accord with guidance in GLVIA3 (Ref 6.7) and associated draft clarifications (Ref 6.27).

6.8.12 Judgements on the value attached to the landscape are unrelated to the nature of the development being proposed, whilst judgements on susceptibility may vary depending on the key characteristics of the landscape.

6.8.13 Judgements on value and susceptibility will be recorded as either very high, high, medium or low.

Magnitude

6.8.14 As explained in **Appendix 6A Landscape Assessment Methodology**, the magnitude of change will be determined through consideration of the likely size and scale of the change, which will be determined through informed professional judgement guided by the indicative criteria set out in Table 6A.4 of **Appendix 6A Landscape Assessment Methodology**. Judgements will be recorded as either large, medium, small or negligible. Consideration of the duration and reversibility of effect will be used to further inform the final judgements.

Significance of effects

6.8.15 As explained in **Appendix 6A Landscape Assessment Methodology**, an 'overall profile' approach will be adopted whereby, "*all the judgements against the individual criteria are arranged in a table to provide an overall profile of each identified effect*". GLVIA3 Page 92, para 5.55 (Ref 6.7). This determination requires the application of professional judgement and experience to balance the different variables.

6.8.16 In accordance with GLVIA3 (Ref 6.7), the use of an overly mechanistic approach through reliance upon a matrix will be avoided. Instead, judgements will be supported by clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape receptor. Reference will be made to the relevant viewpoints to support and explain the rationale.

6.8.17 Significance will be recorded as major, moderate, minor or negligible and the direction of change will be categorised as adverse or beneficial. Effects judged to be moderate or major are considered significant.

6.8.18 Once the significance of effect that is likely to be experienced by each landscape receptor has been predicted, a separate description of the geographical distribution of significant effects across the study area will be provided in the landscape assessment summary.

6.9 Assumptions and Limitations

6.9.1 The assessment will be undertaken based upon the design which will indicate the maximum extent and indicative locations of temporary construction and storage areas, access tracks, the location, number and heights of pylons and any other temporary or permanent infrastructure required to facilitate the Project.

6.9.2 To take account of the flexibility allowed for in the draft DCO, consideration will be given to the potential for effects to be of greater significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LOD) or Order Limits. The assumptions made regarding the use of flexibility for the main assessment, and any alternative assumptions, are set out in **Chapter 4 Description of the Project**.

6.9.3 The operational assessment will assume that the works to underground or to relocate existing distribution infrastructure as part of the Project has been undertaken.

6.9.4 Assessment, site work, and photography will be undertaken from publicly accessible locations, such as the public highways and Public Rights of Way (PRoW).

6.9.5 It is not proposed to prepare a ZTV for the construction phase of the Project as there is a great degree of variability in the extent and timeframes of visibility of construction activity. Also, tall construction plant (for example tower cranes and piling rigs) rarely gives rise to significant landscape effects as it is present at each pylon location for a short period of time.

6.9.6 The visibility of the Project and consequent effects on the landscape will not remain constant throughout the year, and as such the assessment will be based on a combination of winter and summer views.

6.9.7 The operational assessment will assume that the works to relocate lower voltage overhead line lines as part of the Project has been undertaken.

6.10 Conclusion

Summary

6.10.1 The proposed scope, as set out in this chapter, is intended to focus the attention of the landscape assessment on likely significant effects and to avoid assessing the same impact twice.

Nationally and Locally Designated Landscapes

6.10.2 During construction and operation, there is the potential for significant indirect effects on the Lincolnshire Wolds National Landscape (AONB) and on the AGLV north of the Lincolnshire Wolds National Landscape (AONB).

Landscape Character Areas

6.10.3 There is potential for significant direct and indirect effects on the landscape character of some RLCA, LCT and LCA.

6.10.4 During construction and operation, the only significant effects are likely to arise where a landscape lies close to the Project (typically within 1 km), and these will diminish with distance. Significant effects beyond 3 km are highly unlikely.

6.10.5 No significant landscape effects are anticipated during maintenance operations.

Proposed Scope of the Assessment

6.10.6 A summary of the proposed scope of the assessment is provided in **Table 6.3**.

Table 6.3: **Proposed scope of the assessment**

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Nationally Designated Landscapes			
Lincolnshire Wolds National Landscape (AONB)	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Lincolnshire Wolds National Landscape (AONB) proposed extension area	No	Construction, operation and maintenance	Scoped out
North Norfolk National Landscape (AONB)	No	Construction and operation and maintenance	Scoped out
National Character Areas			
NCA Profile 42: Lincolnshire Coast and Marshes	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
NCA Profile 46: The Fens	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Locally Designated Landscapes			
AGLV north of the Lincolnshire Wolds National Landscape (AONB).	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
North East Lincolnshire Landscape Character Assessment			
LCT 1: Industrial Landscape	No	Construction, operation and maintenance	Scoped out
LCT 2: Open Farmland	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
LCT 3: Wooded Open Farmland	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
LCT 4: Flat Open Farmland	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
LCT 5: Sloping Farmland	No	Construction and maintenance	Scoped out
	Yes	Operation	**Scoped in**
LCT 6: High Farmland	No	Construction and maintenance	Scoped out
	Yes	Operation	**Scoped in**
East Midlands Region Landscape Character Assessment			
RLCT 1A: Coastal Saltmarshes and Mudflats	No	Construction, operation and maintenance	Scoped out
RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats	No	Construction, operation and maintenance	Scoped out
RLCT 1C: Shallow Coastal Waters	No	Construction, operation and maintenance	Scoped out
RLCT 1E: Offshore Industries, Fisheries and Navigations	No	Construction, operation and maintenance	Scoped out
RCLT 2A: Settled Fens and Marshes	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
RLCT 2B: Planned and Drained Fens	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
RLCT 2C: Fen and Marsh Margin Farmlands	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
RLCT 4B: Wooded Vales	No	Construction, operation and maintenance	Scoped out
RLCT 7A: Chalk Wolds	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
RLCT 7B: Wolds Scarps, Ridges and Valleys	No	Construction and maintenance	Scoped out
	Yes	Operation	**Scoped in**
Kings Lynn and West Norfolk Landscape Character Assessment			
	No	Construction and maintenance	Scoped out

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
LCA D2: Walpole, Terrington and Clench Warton	**Yes**	Operation	**Scoped in**
LCA D3: Terrington St John	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
LCA D4: Emneth, West Walton and Walsoken	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
LCA E4: Marshland St. James	No	Construction, operation and maintenance	Scoped out
Fenland District Council Draft Local Plan 2021 – 2040 (Draft Local Plan Consultation August 2022)			
LCA The Fens	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
LCA Wisbech Settled Fen	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Night-time lighting (Project wide)			
Perceptual effects on visual receptors from night-time lighting	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Effects of mitigation measures proposed by other topics	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Localised widening of public highways.	**Yes**	Construction	**Scoped in**
	No	Operation and maintenance	Scoped out
Periodic vehicle/helicopter/drone access for routine maintenance and emergency repairs.	No	Maintenance	Scoped out
General maintenance activities including cutting back of vegetation along wayleave corridor to ensure safety clearances.	No	Maintenance	Scoped out

6.11 References

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Ref 6.29 Natural England (2014) An Approach to Landscape Character Assessment online]. Available at: https://assets.publishing.service.gov.uk/media/5aabd31340f0b64ab4b7576e/landscape-character-assessment.pdf [Accessed 31 July 2024].

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Ref 6.31 Planning Inspectorate (2019) Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (AN17) [online]. Available at: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seventeen-cumulative-effects-assessment-relevant-to-nationally-significant-infrastructur#:~:text=This%20advice%20note%20sets%20out,within%20an%20applicant's%20Environmental%20Statement. [Accessed 31 July 2024].

7. Visual

nationalgrid

Contents

7.1 Introduction

7.1.1 This chapter presents how the visual assessment will consider the potentially significant effects on visual receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4 Description of the Project**). This chapter of the Scoping Report describes the methodology to be used for the visual assessment, the datasets to be used to inform the assessment, an overview of the baseline conditions, the potential likely significant effects to be considered within the assessment, and how potential likely significant effects will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the only element of the Project that will involve decommissioning in all or part, is the existing Grimsby West Substation. There are currently no specific plans to decommission the Project as a whole. With the exception of the Grimsby West Substation, decommissioning of the Project has been scoped out of the environmental assessment.

7.1.2 The assessment will consider the effects on views and visual amenity.

7.1.3 The assessment of effects on the landscape as a resource is presented in **Chapter 6 Landscape**. The Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

7.1.4 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 3 Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology**.

7.1.5 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 6 Landscape** - visual effects can be considered independently of the effect on the landscape in which it is seen, but landscape effects require consideration of the visual effects of the Project;
- **Chapter 8 Ecology and Biodiversity** - the results of the ecology and biodiversity assessment inform on the potential for direct or indirect visual effects, for example through tree and woodland loss;
- **Chapter 9 Historic Environment** – the cultural heritage assessment identifies historic assets including historic landscapes and registered parks and gardens from where there may be important views; and
- **Chapter 16 Socio-economics, Recreation and Tourism** -the assessment of visual effects on recreational receptors is used to inform the assessment of socio-economic impacts in terms of tourism and recreation.

7.1.6 This chapter is supported by the following figures and appendices:

- **Figure 7.1 Proposed Visual Study Area**;
- **Figure 7.2 Visual Constraints**; and
- **Appendix 7A Visual Assessment Methodology**.

7.2 Legislation, Policy and Guidance

7.2.1 **Chapter 2 Regulatory and Planning Policy Context** describes the overall regulatory and planning policy context for the Project. Key legislation, policy and planning guidance relevant to the assessment of potential visual effects associated with the construction, operation, and maintenance of the Project is provided in **Chapter 2 Regulatory and Planning Policy Context, Appendix 2A Key Legislation, Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy**.

National Grid Policy and Guidance

7.2.2 National Grid has its own policies and processes that are followed when developing projects. The key policies that are applicable to this project include:

- Holford Rules (Ref 7.1) Guidelines on overhead line routeing were first formulated in 1959 by Sir William (later Lord) Holford, as advisor to the Central Electricity Generation Board. Holford developed a series of planning guidelines in relation to amenity issues, that have subsequently become known as the 'Holford Rules' and remain a valuable tool in selecting and assessing potential route options as part of the options appraisal process. These have been an important consideration during the development of the Project. The Holford Rules (Ref 7.1) are also expressly considered as part of EN-5 (Ref 7.2);
- Horlock Rules (Ref 7.3) National Grid devised the Horlock Rules in 2003, and these were subsequently updated in 2006. The Horlock Rules (Ref 7.3) provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. In summary, like the Holford Rules, they facilitate consideration of environmental and amenity considerations within the design and siting of new substation infrastructure. These have been considered during the development of the Project and will continue to be considered as the Project evolves;
- Our Stakeholder, community, and amenity policy (Ref 7.4): This document describes the ten commitments that National Grid has made to the way that electricity and gas works are undertaken in the UK. This includes setting out how National Grid will meet its amenity responsibilities and how stakeholders and communities are involved on projects; and
- Our Approach to Consenting (Ref 7.5): This document describes the options appraisal process that is followed when developing new electricity infrastructure projects. It follows a staged approach to the assessment and sets out the considerations when making decisions as to which option should be taken forward.

7.2.3 National Grid also has an extensive range of process and guidance documents that govern how projects are designed and implemented. Specific documents are referenced later in this chapter where relevant.

7.3 Consultation and Engagement

7.3.1 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities, Lincolnshire Wolds National Landscape Board, National Trust, Natural England, and the Woodland Trust. In addition, engagement will be

undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

7.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. And following pre-scoping engagement undertaken with Natural England and the Lincolnshire Wolds National Landscape Board in March 2024, which included discussions around the definition and extent of the setting of the Lincolnshire Wolds National Landscape (AONB) and clarifications on the special qualities, with particular reference to the expansive, sweeping views which can be experienced from the Lincolnshire Wolds National Landscape (AONB).

7.3.3 The principal feedback received from both Non-Statutory Consultation and pre-scoping consultation with Natural England and the Lincolnshire Wolds National Landscape Board of relevance to this scoping chapter is included in **Table 7.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 7.1: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
National Trust	National Grid must assess the full, cumulative impact of all existing and proposed major infrastructure projects in this area (including those set out in Table 1 of the consultation document) in the Environmental Impact Assessment. Any identified harm must be adequately addressed in accordance with the mitigation hierarchy.	The assessment of cumulative effects will form a key element of the EIA for the Project. The proposed scope and approach of the cumulative effects assessment is explained **Chapter 5 EIA Approach and Methodology.** An update to the information presented in Table 1 of the Project Background Document (Ref 7.6) which set out proposed new connections in the region, is provided in Tables 4.3 to 4.6 of **Chapter 4 Description of the Project**. The cumulative assessment will include consideration of such projects. The proposed approach to assessing likely significant landscape and visual effects and cumulative effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology.** An assessment of the likely cumulative landscape and visual effects of the Project will be reported in the landscape, visual

Stakeholder	Summary of response	Consideration in the Scoping Report
		and cumulative effects assessment chapters of the PEI Report and ES. Any likely significant environmental effects will be addressed in accordance with the mitigation hierarchy as explained in **Chapter 5 EIA Approach and Methodology.**
National Trust	Whilst the National Trust understand the need for the development and how the corridor has been chosen, we are concerned about the visual impact of the proposals on the landscape. Whilst pleased to see that the proposed route avoids directly passing through the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty (AONB)), the National Trust is concerned about the visual impact of the proposal on the setting of the National Landscape. The route corridor runs parallel to the eastern boundary of the designation and the transmission line and associated infrastructure will be visible in views across the landscape.	An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Ref 7.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Fenland District Council	The preference would be for the lines to be underground, which would substantially reduce the long-term visual impact of this infrastructure. However, if the proposal is to proceed with overground lines, it is not possible to comment on these impacts until such time that as a minimum, a Landscape Visual Impact Assessment (LVIA), including any consideration of statutory	As detailed in the Corridor Preliminary Routing and Siting Study (CPRSS) Report (Ref 7.8), the starting presumption is for the use of overhead line technology rather than underground cables (in line with National Policy Statement (NPS) EN-5 (Ref 7.2) and National Grid's Approach to Consenting (Ref 7.5)) for areas outside nationally designated landscapes.

Stakeholder	Summary of response	Consideration in the Scoping Report
	designated sites, is produced for consideration.	NPS EN-5 states that "*…..overhead lines should be the strong starting presumption for electricity networks in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape….in these areas where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, ……the application should underground the relevant section of the line."* The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. Likely landscape and visual effects of the Project will be undertaken in accordance with GLVIA3 (Ref 7.7) and associated draft clarifications and will be reported in the landscape and visual chapters of the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Lincolnshire County Council	The cumulative impact from the overhead lines, pylons, NGET substations and those substations that will be required for the other energy projects, would have the potential to significantly adversely impact on the character and appearance of the Lincolnshire Wolds National Landscape (AONB).	The proposed scope and approach of the cumulative effects assessment is explained **Chapter 5 EIA Approach and Methodology.** An assessment of the likely cumulative landscape and visual effects of the Project will be reported in the landscape, visual and cumulative effects assessment chapters of the PEI Report and ES. The ongoing design and assessment process seeks to

Stakeholder	Summary of response	Consideration in the Scoping Report
		avoid likely significant landscape and visual impacts, wherever possible. An assessment of likely significant indirect effects on the natural beauty and special qualities of the Lincolnshire Wolds National Landscape (AONB) will be reported as part of the landscape chapter in the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Lincolnshire County Council	The Council wish to make it fundamentally clear that from information provided, and the initial public reaction to the proposal, that the scheme will have the potential to have significant impact on large swathes of the landscape of the area when viewed from both distance, and locally in relation to the Fens and the impact on and from the AONB.	The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. An assessment of the likely effects of the Project, including on the Lincolnshire Wolds National Landscape (AONB) and Fens will be undertaken in accordance with GLVIA3 (Ref 7.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**.
Lincolnshire Wolds National Landscape Board	Whilst we welcome the current preferred route corridor proposal in terms of avoiding a direct line through the Lincolnshire Wolds National Landscape – the AONB, as per the Holford Rules Guidelines, we remain very	As detailed in the CPRSS Report (Ref 7.8), the starting presumption is for the use of overhead line technology rather than underground cables (in line with NPS EN-5 (Ref 7.2) and National Grid's Approach to Consenting

Stakeholder	Summary of response	Consideration in the Scoping Report
	concerned that this has been proposed as a completely overhead transmission line with its associated above ground tower pylons and connectors (electrical wires). At this non-statutory consultation stage of the development proposal, we highlight our continuing concerns in terms of the potential for significant and demonstrable landscape and visual impacts upon both the setting and the views from and to the nationally protected Lincolnshire Wolds National Landscape (AONB). The route corridor for the overhead line runs in close proximity and parallel to virtually the entire eastern flank of the Lincolnshire Wolds and would significantly impact upon many of the notable vantage points afforded by the higher ground of the Wolds. The views to the east, across the Lincolnshire Coastal Grazing Marshes are extensive and panoramic, the juxtaposition between the low-lying outer marsh and the Wolds is an important and subtle component of the protected landscapes immediate and wider setting. The nature of the development as currently proposed in its initial stages, will evidently significantly impact upon the extensive rural character and charm of the easterly views which are recognised as one of the special qualities of the Lincolnshire Wolds AONB and a key component of its wider cohesive landscape character and natural beauty. Section 85 of the Countryside and Rights of Way Act 2000 (Ref 7.9) required all relevant authorities to have regard to the purpose of conserving and enhancing the	(Ref 7.5)) for areas outside nationally designated landscapes. NPS EN-5 states that "*…..overhead lines should be the strong starting presumption for electricity networks in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape….in these areas where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, ……the application should underground the relevant section of the line."*. The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with GLVIA3 (Ref 7.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. The proposed approach to assessing likely significant landscape and visual effects is explained in **Appendix 6A Landscape Assessment Methodology** and **Appendix 7A Visual Assessment Methodology**. **Chapter 2 Legislation and Regulatory Planning Context** provides detail on the Countryside and Rights of Way Act (Ref 7.9)

Stakeholder	Summary of response	Consideration in the Scoping Report
	natural beauty of AONBs when performing their functions and statutory duty. This has recently been strengthened through Section 245 of the Levelling-up and Regeneration Act (2023) (Ref 7.10) with an amendment of the CRoW Act, to create a new duty on 'relevant authorities' to 'seek to further the purpose of conserving and enhancing the natural beauty when discharging their functions in Areas of Outstanding Natural Beauty'.	including reference to Section 245 of the Levelling-up and Regeneration Act (Ref 7.10).
Natural England	In view of the distance of the current proposals from the Lincolnshire Wolds National Landscape (AONB), it is considered that effects are likely. The purpose of this nationally designated landscape is to conserve and enhance the area's natural beauty. Natural England advise that overhead lines within parts of the Western Corridor have the potential to be within the immediate setting of the AONB. Natural England welcome the use of the buffer to review impacts to the AONB but would like to see what landscape and visual evidence, and rationale has been used to underpin the proposal for a 2 km buffer.	An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with GLVIA3 (Ref 7.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. The buffers and weightings adopted as part of the routeing and siting study were used as part of the GIS analysis which provided a guide for the landscape specialists to develop preliminary options for ground-truthing and subsequent comparative appraisal. An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) will be informed by a setting study prepared for the designated area and the Project will continue to consider how effects can be minimised.

Stakeholder	Summary of response	Consideration in the Scoping Report
Natural England	Natural England advise that the scope of the LVIA should include an assessment of potential construction and operational effects on the defined special qualities of the Lincolnshire Wolds National Landscape (AONB) and the delivery of the area's statutory purpose, as outlined in the Lincolnshire Wolds AONB Management Plan. A breakdown of the development's impact on the special qualities of the AONB should be included for review. Natural England also advise that further details on the design and siting of sealing end compounds should be provided, and that the potential effects of sealing end compounds on the Lincolnshire Wolds National Landscape (AONB) should be included within the scope of the LVIA.	An assessment of the likely effects of the Project on the Lincolnshire Wolds National Landscape (AONB) including its natural beauty, special qualities and setting will be undertaken in accordance with GLVIA3 (Ref 7.7) and associated draft clarifications and reported in the landscape chapter of the PEI Report and ES and will include construction and operational effects on the AONB and other features. This will be informed by a setting study prepared for the designated area and reported as part of the landscape chapter in the PEI Report and ES. **Chapter 2 Legislation and Regulatory Context** provides detail on the Countryside and Rights of Way Act (Ref 7.9) regarding statutory purpose. No Sealing End Compounds are currently proposed as part of the Project. The potential effects of the proposed substations on the Lincolnshire Wolds National Landscape (AONB) will be considered as part of the assessment. The proposed approach to assessing likely significant landscape effects is explained in **Appendix 6A Landscape Assessment Methodology.**
Natural England	In the meantime, and without prejudicing that guidance, Natural England advises that: The duty to 'seek to further' is an active duty, not a passive one. Any relevant authority must take all reasonable steps to explore how the statutory purposes of the protected landscape (A National Park, the Broads, or National Landscape) can be furthered.	As noted by Natural England, section 85 of the Countryside and Rights of Way Act 2000 (Ref 7.9) has been amended by section 245 of the Levelling Up and Regeneration Act 2023 (Ref 7.10). These amendments introduce a duty to seek to further the purpose of conserving and enhancing the natural beauty of the relevant AONB when exercising or performing any

Stakeholder	Summary of response	Consideration in the Scoping Report
	The new duty underlines the importance of avoiding harm to the statutory purposes of protected landscapes but also to seek to further the conservation and enhancement of a protected landscape. That goes beyond mitigation and like for like measures and replacement. A relevant authority must be able to demonstrate with reasoned evidence what measures can be taken to further the statutory purpose. The proposed measures to further the statutory purposes of a protected landscape, should explore what is possible in addition to avoiding and mitigating the effects of the development, and should be appropriate, proportionate to the type and scale of the development and its implications for the area and effectively secured. Natural England's view is that the proposed measures should align with and help to deliver the aims and objectives of the designated landscape's statutory management plan. The relevant protected landscape team/body should be consulted.	functions in relation to, or so as to affect, land in the AONB. This replaces the previous expression of the duty, which was to have regard to those purposes. The assessment will consider and reflect this duty as well as any secondary legislation and guidance. These revised statutory duties apply to public bodies when exercising or performing any functions in relation to, or so as to affect, land in an AONB. The Applicant will continue to engage with Natural England as to how the Applicant is discharging its statutory duties as the project design progresses. Assessment will also be informed by a setting study prepared for the designated area, the AONB's statutory management plan and discussions with stakeholders.
Norfolk County Council	A full LVIA should be undertaken, including where necessary a Townscape Assessment. This should consider all potential impacts, both during construction and in-operation, and the cumulative impacts. Where possible cables should be undergrounded to minimise landscape and visual impacts. Impacts on the Landscape Character and Visual Amenity should where possible be avoided this could be through consideration of fine tuning the	An assessment of the likely effects of the Project, including cumulative effects, both during construction and operation will be undertaken in accordance with GLVIA3 (Ref 7.7) and associated draft clarifications and reported in the landscape, visual and cumulative effects assessment chapters of the PEI Report and ES. A townscape assessment is not considered necessary as the Project does not go through any urban areas or town. **Chapter 3 Main Alternatives Considered**

Stakeholder	Summary of response	Consideration in the Scoping Report
	route or looking at sensitive areas where undergrounding may be more suitable. Irreplaceable landscape features such as ancient woodland should be fully avoided. Every effort should be made to underground the proposed 400 kV line entering Norfolk. In addition, consideration should also be given to ways to minimise impacts; this could be through the use of lower pylons or pylons of an alternative design (i.e. where under-grounding is not feasible). Cumulative impact should be avoided, and National Grid should consider whether there are opportunities to reconfigure; rationalise or underground any existing electricity network infrastructure (in line with para 2.11.2 – 2.11.6 of NPS EN-5). Where impacts cannot be avoided then mitigation measures will need to be identified. Whilst advanced planting and screening will not minimise all impacts, carefully planned incremental planting can be effective at minimising and softening the appearance of infrastructure in the landscape. Often layered planting starting some distance away can help to break up extensive views. This will be particularly important when considering the screening options for the substation at Walpole where landscape and visual impacts have the potential to be significantly adverse. The massing, location and scale of the substation should be considered to ensure both short distance and long-distance views are taken into account. In addition to layered planting consideration should be given to finishes, orientation of elements and siting of elements	describes the evolution of the Project to date and demonstrates that minimising adverse effects on the landscape amenity through sensitive routeing, siting and design in accordance with the Holford Rules (Ref 7.1) and Horlock Rules (Ref 7.3) was a major consideration during its development and will continue in the future design evolution of the Project. As detailed in the CPRSS Report (Ref 7.8), the starting presumption is for the use of overhead line technology rather than underground cables (in line with NPS EN-5 (Ref 7.2) and National Grid's Approach to Consenting (Ref 7.5)) for areas outside nationally designated landscapes. NPS EN-5 (Ref 7.2) states that "*…..overhead lines should be the strong starting presumption for electricity networks in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape….in these areas where harm to the landscape, visual amenity and natural beauty of these areas cannot feasibly be avoided by rerouting overhead lines, ……the application should underground the relevant section of the line."* The ongoing design and assessment process seeks to avoid likely significant landscape and visual impacts wherever possible. The landscape and visual assessment will inform modifications and refinements to the evolving design of the Project, including consideration of appropriate mitigation measures to reduce potential residual effects.

Stakeholder	Summary of response	Consideration in the Scoping Report
	within the site to avoid continuous change on the horizon.	
Woodland Trust	Ancient and veteran trees are afforded a high level of protection in planning policy. Veteran trees are disproportionately valuable parts of the natural environment and where they occur outside of woods, they are also particularly important for landscape connectivity. They are also an essential part of our landscape and cultural heritage. Natural England and Forestry Commission's standing advice states that they *"can be individual trees or groups of trees within wood pastures, historic parkland, hedgerows, orchards, parks or other areas. They are often found outside ancient woodlands. They are also irreplaceable habitats... …An ancient tree is exceptionally valuable. Attributes can include its: great age; size; condition; biodiversity value as a result of significant wood decay and the habitat created from the ageing process; and cultural and heritage value… …A veteran tree may not be very old, but it has significant decay features, such as branch death and hollowing. These features contribute to its exceptional biodiversity, cultural and heritage value."*	**Chapter 3 Main Alternatives Considered** describes the evolution of the Project to date and demonstrates that minimising adverse effects on important landscape elements and features, including ancient woodland through sensitive routeing, siting and design in accordance with the Holford Rules (Ref 7.1) and Horlock Rules (Ref 7.3) was a major consideration during its development and will continue in the future design evolution of the Project. Effects on veteran trees and ancient woodland will be considered and assessed as part of the landscape and visual; and historic environment assessments and reported in the PEI Report and ES. **Appendix 8C Arboricultural Strategy** outlines how veteran trees and ancient woodland will be assessed.
Grimsby West Housing Allocation	We would agree that in landscaping terms and of the options assessed, the siting area GW5 offers the greatest opportunity to take advantage of existing screening provided by vegetation and is located immediately adjacent to the existing NPG 132 kV and NGET 400 kV infrastructure. Nevertheless, any proposed	Mitigation measures will be considered as the Project develops to reduce landscape and visual effects. This will take into account how the substation will relate to the Grimsby West Masterplan.

Stakeholder	Summary of response	Consideration in the Scoping Report
	substation in this area, should also be accompanied with a comprehensive and robust strategic landscaping assessment and mitigation scheme to ensure that it takes into account not only existing views but also how the substation will eventually relate to the Grimsby West Masterplan.	
Natural England	We advise that further details on the design and siting of sealing end compounds should be provided, and that the potential effects of sealing end compounds on the LWAONB should be included within the scope of the LVIA.	No Sealing End Compounds are currently proposed as part of the Project.

7.4 Study Area

7.4.1 The extent of the study area is determined by the potential visibility of the Project in the surrounding landscape and is proportionate to the size and scale of the Project and nature of the surrounding landscape. Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Ref 7.7) states that the study area should include '*the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner'*.

7.4.2 Based on the type of overhead line (OHL) infrastructure and experience of assessments of 400 kV OHL (the tallest element of the Project), the visibility of individual pylons approximately 50 m tall is assumed to be a maximum distance of 10 km. Beyond this distance the perceptibility of pylons approximately 50 m tall diminishes considerably in most instances, and in all but the clearest of viewing conditions.

7.4.3 At distances greater than 5 km, effects on visual amenity are unlikely to be significant. This is because at a 5 km distance, when viewed at arm's length, a 50 m tall pylon will appear to be approximately 0.61 cm high. This is known as the apparent height of the pylon. If a pylon is seen on the skyline in very clear conditions, or a pair of pylons are seen close together at this distance, perceptibility may increase slightly, but this is still unlikely to trigger significant effects.

7.4.4 Initial field survey within the proposed 5 km study area has determined that, where visible at distances between 1 km and 3 km, existing pylons are typically noticeable, but not prominent. The focus of the assessment will therefore be visual receptors within 3 km as this is where significant effects are most likely to occur.

7.4.5 Where visible within 1 km, pylons typically occupy more of the view, depending on the amount of screening or backgrounding afforded by landform, vegetation and built development.

7.4.6 Based on these observations, the proposed study area is 5 km from the edge of the Project as shown on **Figure 7.1 Proposed Visual Study Area**. Until a route alignment is defined this will be taken as 5 km from the edge of the Scoping Boundary. The emphasis of the assessment will, however, be based on receptors lying within 3 km as beyond this distance significant visual effects are highly unlikely to arise.

7.4.7 To support the assessment, Zone of Theoretical Visibility (ZTV) maps will be produced up to a 10 km distance surrounding the Project (see **Appendix 7A Visual Assessment Methodology** for more details). These will help to determine the area over which the proposed 400 kV OHL could theoretically be visible. The reason the ZTV maps will be prepared over a 10 km distance is to inform the assessment of cumulative visual impacts with other proposed developments and to ensure that likely significant effects on distant but very sensitive receptors are identified.

7.4.8 These distances will continue to be reviewed and if necessary, amended as the design of the Project progresses.

7.5 Baseline Conditions

Data Sources

7.5.1 The known or predicated current and future baseline environment described in this section has been informed by the following data sources:

- North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (Ref 7.11);
- Lincolnshire Historic Landscape Characterisation Project (Ref 7.12);
- East Lindsey District Landscape Character Assessment (Ref 7.13);
- Landscape Character Assessment of Boston Borough (Ref 7.14);
- Strategic Landscape Capacity Study for South Holland District Council (Ref 7.15);
- Boston Town and Rural Historic Environment Baseline (Ref 7.16);
- Fenland District Council - Wind Turbine Development Policy Guidance (**Error! Reference source not found.**);
- Fenland District Council – Fenland Draft Local Plan 2021-2040 (**Error! Reference source not found.**);
- Kings Lynn and West Norfolk Landscape Character Assessment (Ref 7.19);
- Natural England National Character Area Profiles (Ref 7.20);
- East Midlands Region Landscape Character Assessment (**Error! Reference source not found.**);
- Lincolnshire Wolds Landscape - Countryside Commission (Ref 7.22);
- The Lincolnshire Wolds AONB Landscape Management Plan 2018 – 2023 (Ref 7.23);
- West Lindsey Landscape Character Assessment (Ref 7.24); and

7.5.2 These sources will continue to be used to inform the design and assessment process. Neighbourhood Plans and Village Design Statements (or their equivalent) will also be reviewed.

Baseline

7.5.3 Given the large geographical extent of the Project, the study area has been subdivided into seven distinct sections from north to south, as shown on **Figure 7.1 Proposed Visual Study Area** and are described below:

- Section 1 - Grimsby West Substation;
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A;
- Section 3 - Lincolnshire Connection Substation A and B (including the overhead line between them);
- Section 4 - Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation;
- Section 5 - Weston Marsh Substation;
- Section 6 - Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to Walpole B Substation); and
- Section 7- Walpole B Substation.

7.5.4 A description of these sections is provided in **Chapter 4 Description of the Project**.

Sensitive Visual Receptors

7.5.5 Sensitive visual receptors include people[1] living in the many communities across the area and people engaged in recreational activities or using recognised scenic routes.

7.5.6 In accordance with industry guidance, the assessment will focus on public views experienced by those groups of people who are likely to be most sensitive to the construction, operation and maintenance of the Project. This comprises local communities where views contribute to the landscape setting enjoyed by residents in the area and people using recreational routes, features and attractions. It also includes people experiencing the view from protected viewpoints. These are viewpoints, panoramas and viewing corridors that have been designated by county councils, local authorities or other stakeholders, the locations of which will be identified as the assessment progresses. For the purposes of the assessment, views identified in Neighbourhood Plans and Village Design Statements are also categorised as protected views.

7.5.7 Occupants of residential properties likely to be affected by the Project are mainly located around the edges of the settlements and at the many dispersed properties and farmsteads close to the Project. Views from settlement edges are typically filtered and framed by intervening garden and field boundary vegetation, but there are some

[1] It is important to note that it is the people who would be experiencing the view from the viewpoint that are the receptor, not the viewpoint itself. The location affords the view to the recipient, and whilst the location cannot change, the opinion of the viewer can be variable. These people will generally have different responses to a change in view depending on their location, the activity they are engaged in and other factors, including the weather and the time of day/year.

locations, where there are long views out across the low-lying farmland. In places, the views include existing 400 kV and 275 kV pylons.

7.5.8 The study area offers a range of formal and informal recreational and leisure opportunities which will be identified and presented in the Preliminary Environmental Information Report (PEIR) and Environmental Statement. These include the following nationally designated and regionally promoted recreational routes shown on **Figure 7.2 Visual Constraints**:

- National Cycle Network (NCN) Route 1 – Dover to Scotland;
- NCN Route 110 – Cleethorpes to Beelsby;
- Lindsey Trail – Bridleway through the Lincolnshire Wolds;
- King Charles III England Coast Path along the Lincolnshire Coast;
- Trent Valley Way – Trent Valley through Nottinghamshire and Lincolnshire;
- Lincolnshire Wolds Way – Lincolnshire Wolds;
- Greenwich Meridian Trail – Withernsea to Newhaven through Louth and Boston;
- Cross Britian Way – Lincolnshire coast to Barmouth, Wales;
- The Wanderlust Way – Lincolnshire Wolds;
- Lindsey Loop – Lincolnshire Wolds;
- Macmillan Way – Boston, Lincolnshire to Abbotsbury, Dorset; and
- Nene Way – Badby, Northamptonshire to Sutton Bridge, Lincolnshire.

7.5.9 Views from the above routes vary depending on the local landscape. In some locations, views out will be fully or partially obscured by intervening landform or by vegetation.

Overview of Current Visual Amenity

7.5.10 A broad overview of the visual amenity based on Natural England's National Character Area Profiles (Ref 7.20) is provided below. The NCA boundaries are shown on **Figure 6.3 National Character Area**.

NCA Profile 41: Humber Estuary

7.5.11 The Humber Estuary NCA comprises a narrow coastal strip within the northern part of the Study Area to the east of the A180. It lies to the south of the River Humber is at the point where it opens up into a wide expanse of open water before joining the North Sea beyond Spurn Point. The estuary is a very busy waterway, with both passenger and commercial traffic accessing the many ports both within the estuary and upstream.

7.5.12 Along the coast the industrial complexes with their oil and gas refineries, warehouses, towers, chimneys and lighting columns are a major and distinctive feature of the estuary, especially on the south bank around Immingham and towards Grimsby.

7.5.13 The elevated rolling hills of the Yorkshire Wolds to the north and the Lincolnshire Wolds to the south are clearly visible from the low-lying land within the NCA, while also providing expansive views out over the estuary.

NCA Profile 42: Lincolnshire Coast and Marshes

7.5.14 The northern part of the study area between Grimsby and Skegness lies within this NCA. The area is bordered by the North Sea to the east and the rising land of the Lincolnshire Wolds to the west. The plain incorporates three distinctively different but closely interconnected areas which run broadly parallel to the eastern edge of the Lincolnshire Wolds. To the west is the Middle Marsh which comprises a softly undulating arable landscape with a higher coverage of woodlands and hedgerows than the other areas. To the east lies the Outmarsh, an open landscape of arable farmland and pastures divided by narrow dykes. Beyond this is the coast with its everchanging pattern of intertidal salt marsh, coastal dune and wetland habitat.

7.5.15 Whilst some western parts of this Section close to the Lincolnshire Wolds display a relatively high level of tree and woodland cover, including ancient woodland, woodland cover across the Section is typically sparse. Hedgerows are also largely absent, giving visual prominence to the trees found along roadsides, in geometric shelterbelts around the isolated farm complexes and clustering on the fringes of villages. Many otherwise expansive views are foreshortened by these tree belts, which overlap to merge in views at ground level. Rural areas display a mix of nucleated villages which are found mainly in the Middle Marsh and dispersed and often isolated farm complexes, most of which have expanded substantially from their original size. Rural settlements and market towns are strongly characterised by the use of brick and pantile with stone for churches and other high-status buildings.

7.5.16 The larger settlements are concentrated along the coast and include the port of Grimsby with its iconic landmark dock tower and Immingham, as well as resort towns such as Cleethorpes, Mablethorpe and Skegness. Industrial areas are located in parts of the coastal strip, and there are many large holiday resorts and caravan parks. In places offshore and onshore wind turbines are present and distinctive on the skyline.

7.5.17 There are long, wide coastal views across this NCA, and also out to adjoining areas. For example, the North Norfolk coast can be seen from the south of the NCA, and in the north there are views across the Humber Estuary to Spurn Head. Inland, the NCA rises to the dip slope of the Lincolnshire Wolds, from where there are long, open views over the coastal plain and marshes. Looking inland, the Wolds forms the backdrop to many views. The Lincolnshire Wolds National Landscape covers 3 per cent of the Lincolnshire Coast and Marshes NCA and, while most of this designated landscape falls within the adjacent Lincolnshire Wolds NCA, there are very strong visual, recreational and access links with the coast and marshes.

NCA Profile 43: Lincolnshire Wolds

7.5.18 The Lincolnshire Wolds NCA occupies the western part of the Study Area. comprises a long, narrow band of rolling agricultural land dominated by a west-facing chalk escarpment approximately 50 m high. Situated on the highest land in Lincolnshire, it affords long views and strong visual links with adjacent NCAs. To the east there are views across the Lincolnshire Coast and Marshes NCA towards the coast and out to sea. To the north the Wolds slope down to the Humber Estuary and to the south are the low lying Fens.

7.5.19 The Wolds display a rolling landscape of open, rural character. Whilst the west side of the Wolds ends in a distinctive chalk escarpment, the east side is masked by clay tills which creates more undulating and rounded landforms as the Wolds descend gently into the Middle Marsh.

7.5.20 Steep-sided dry valleys, open plateau hilltops, long, open views and planted beech woods also contribute strongly to the distinctive sense of place. Much of the NCA forms part of the Lincolnshire Wolds National Landscape (AONB) because of its natural beauty. This is an important food producing landscape and the rural economy is mainly based on arable farming with large cereal units together with some pasture.

7.5.21 The area is characterised by a range of varied yet unified features including open, arable plateau hill tops, chalk escarpments, deep dry valleys with sinuous beech woods and isolated ash trees punctuating the skyline. The area is sparsely settled with many villages hidden within the folds of the landscape and modest country houses and farmsteads. There are no major urban areas within the Wolds, but a series of small market towns lie at the foot of the hills. The largest of these is Louth which is often referred to as the 'Capital of the Wolds'. The remains of the Cistercian abbey at Louth Park just east of the town was founded in 1139 and is now a scheduled monument. Louth is home to St. James' Church, a medieval perpendicular church with crocketted spire which at 87m is one of the tallest spires in the country and is a prominent landmark visible over a wide area.

7.5.22 Despite the overall cohesive character of the Wolds, variation in the underlying geology has led to some distinct subdivisions within the landscape. In relation to the study area the chalk ridge is masked by clay till which creates more rounded forms as the Wolds drop away to the Middle Marsh around Alford. Ancient oak and ash woodlands give this area a distinctive feel.

7.5.23 Although the NCA is generally unwooded in character, there are some substantial areas of woodland, particularly on the lower-lying clay soils overlapping with the adjacent Lincolnshire Coast and Marshes NCA. These create areas of localised enclosure and restrict longer views.

7.5.24 Generally, the NCA has a very open character with extensive outward views both eastwards to the coast and westwards across the Central Lincolnshire Vale. The views within the NCA are equally dramatic and are shaped by the open rolling hills, hidden valleys and continually changing patterns of farming. The ridge-top locations provided by the Bluestone Heath Road and the west-east drovers roads provide some of the area's best known and most frequented locations and afford panoramic views out across the study area.

NCA Profile 46: The Fens

7.5.25 The Fens NCA is a distinctive, historic and human-influenced wetland landscape lying to the west of the Wash estuary, which is the largest estuarine system in Britain and supports an extensive habitat mosaic of salt marshes, intertidal banks of sand and mud, shallow waters and deep channels. The area is notable for its large-scale, flat, open landscape with extensive vistas to level horizons. The level, open topography creates the impression of big skies which convey a strong sense of place, tranquillity and isolation.

7.5.26 Elevations rarely pass the 10 m contour, and typically vary by little more than 1 m or 2 m over long distances. Much of the land is below sea level, relying on pumped drainage and the control of sluices at high and low tides to maintain its agricultural viability.

7.5.27 Water from much of the East Midlands drains eastwards across the Fens into the Wash through four major rivers: the Witham, Welland, Nene and Great Ouse. These rivers are characterised by artificial canalised courses that run straight for long distances and are bounded by high banks to contain the watercourse from the lower adjacent fields. In

some locations ‘roddons’, sinuous silt banks that are fossilised remnants of tidal creek systems, are elevated up to 2 to 3 m above the dark peat soils which have subsequently denuded because of continuous cultivation, drainage and wind erosion of the peat.

7.5.28 There are some marked variations and graduations in the Fens landscape. The ‘settled inland fens’, run in a broad arc inland from the Wash between King’s Lynn and Boston and form an ancient, small-scale landscape of sinuous lanes and relative intimacy with a higher density of settlements, some notable churches and remnant grasslands. The extensive ‘peaty fens’ or ‘black fens’, which were finally comprehensively drained in the 17th to 19th centuries, comprise broad rectilinear fields and straight roads. The only consistent source of relief to the level landform are the notches of the drainage ditches and the raised berms and banks of the artificial drainage channels.

7.5.29 The rich peaty soils support large-scale cultivation of arable and horticultural crops. Holdings of more than 100 ha make up over 70 per cent of farmed land. Open fields, bounded by a network of drains and rivers (some embanked), create a strongly geometric/rectilinear landscape pattern, which is not always discernible at ground level. The structures create local enclosure and a slightly raised landform, which is mirrored in the road network that largely follows the edges of the system of large fields.

7.5.30 Overall, woodland cover is sparse, notably a few small woodland blocks, occasional avenues alongside roads, isolated field trees and shelterbelts of poplar, willow and occasionally leylandii hedges around farmsteads, and numerous orchards around Wisbech. Various alders, notably grey alder, are also used in shelterbelts and roadside avenues.

7.5.31 The settlement pattern follows the historical development of the area. The settled inland fens or ‘townlands’ comprise medium to large settlement clusters around Boston, Spalding, Holbeach and Wisbech, with many villages having medieval churches, such as West Walton. The medieval pattern of north–south drove lines, between settlements on the coast and fen edge respectively, was crossed in the 19th century by the A17 and A47. Since then, the settlements in these townlands have spread along these principal routes to create ribbon developments of smallholdings, modern bungalows, farmsteads with large agricultural barns, and food processing buildings, such as Sutton Bridge. The ‘peaty fens’ inland are, by contrast, very sparsely settled with isolated farmsteads and houses on local areas of raised land being the only built elements for long distances. Linear shelterbelts of poplar, willow and tall Leyland cypress hedges are often found around the isolated farmsteads. Many fenland buildings are now derelict, while the linear roads have likewise suffered showing significant undulations.

7.5.32 Around Boston there is a higher density of settlement and more urban views associated with the coalescence of settlements along the south western side of the town and expansion of road, retail and housing development along the A16 and other arterial roads. At 83m tall, the iconic octagonal medieval tower of St Botolph's Church in Boston, known as the ‘Boston Stump’ is a prominent and widely visible skyline feature.

7.5.33 Extensive views to level horizons and huge skies are characteristic of the Fens and provide a strong sense of rural remoteness and tranquillity. Changing weather patterns have a strong influence on the observer. Wind turbines and pylons are prominent, but do not detract from the sense of isolation and tranquillity, created by the level horizons and the scale of the landscape.

7.5.34 Long straight roads and rail lines are often situated on elevated banks and interrupt views across the fen plain. Industrial and residential development locally impact on

views, and light pollution associated with transport networks has become increasingly prevalent.

Neighbourhood Plans and Village Design Statements

7.5.35 As noted above, existing and emerging Neighbourhood Plans and Village Design Statements (or their equivalent) will be used to inform the baseline visual assessment and the assessment of effects on the landscape and views in each parish council area within the Scoping Boundary, which will be presented in the ES.

Future Baseline

7.5.36 Landscape change and its consequences for visual amenity is an ongoing and inevitable process and will continue across the study area irrespective of whether the Project goes ahead. Change can arise through natural processes (e.g., the maturity of woodlands) and natural systems (e.g., river erosion) or, as is often the case, occurs due to human activity, land use, management, or neglect.

7.5.37 There are continued pressures on the landscape brought about by loss of existing features such as hedgerows, introduction of new features such as new housing, wind turbines, overhead lines, quarries, roads etc and decline in quality or state of repair of features such as dereliction of the urban fringe; neglect of hedgerows; scrub invasion leading to loss of a smooth rolling topography; and introduction of standardised suburban housing styles to a previously architecturally diverse settlement.

7.5.38 Climate change is increasingly acknowledged as a key driver of future landscape change. The low-lying landscapes along the Lincolnshire Coast are particularly vulnerable to sea level change. Changing weather patterns and increased storms also pose risks to agriculture, tourism, and local infrastructure.

7.5.39 Future baseline is also related to consented proposals which are not yet present in the landscape but are expected to be constructed. This includes other high voltage electricity infrastructure, and wind and solar farm developments.

7.5.40 Ash trees (Fraxinus excelsior) within the study area may be affected by ash dieback. This is a disease of ash trees caused by a fungus of Asian origin called Hymenoscyphus fraxineus (formerly called Chalara fraxinea). The disease causes leaf loss and crown dieback in affected trees and is usually fatal. The future baseline therefore assumes that there would be loss of ash trees in the long term across the study area, but that other tree species would occupy gaps created in the short term, and overall levels of vegetation would remain similar to existing. An Arboricultural Impact Assessment will record incidents of ash dieback during site surveys as explained in **Appendix 8C Arboricultural Strategy**).

7.6 Design and Control Measures

Design Measures

7.6.1 The Project has avoided sensitive visual receptors as far as possible. This is in accordance with the Holford Rules (Ref 7.1) and Horlock Rules (Ref 7.3), which will continue to be used to inform the routeing, siting, and design process in order to minimise potential effects on views and visual amenity.

7.6.2 The visual assessment will inform modifications and refinements to the detailed design of the Project, including consideration of individual pylon locations during the design and assessment process, and the identification of any further appropriate mitigation measures to reduce potential residual effects.

7.6.3 Notwithstanding the application of the principles outlined in the Holford Rules (Ref 7.1) and Horlock Rules (Ref 7.3), given the intrinsic characteristics of overhead line infrastructure, some significant adverse visual effects are likely to be unavoidable. That a new overhead line can give rise to adverse visual impacts is acknowledged in EN-5 (paragraph 2.9.7) (Ref 7.2). Paragraph 2.9.9 of EN-5 (Ref 7.2) goes on to state that new substations, sealing end compounds (including terminal towers), and other above-ground installations that serve as connection, switching, and voltage transformation points on the electricity network may also give rise to adverse landscape and visual impacts.

Control and Management Measures

7.6.4 An Initial Outline Code of Construction (CoCP) is provided in **Appendix 4A Initial Outline CoCP**. Measures relevant to the control and management of impacts that could affect the visual assessment are:

- LV01: The contractor(s) will retain vegetation where practicable. Where vegetation is lost and trees cannot be replaced in situ due to the restrictions associated with land rights required for operational safety, native shrub planting approved by National Grid will be used as a replacement, in accordance with the outline vegetation reinstatement plans included within the outline Landscape Environmental Management Plan (LEMP). Replacement vegetation will be planted as close by as practicable and will complement landscape character and be sympathetic to the local habitat type in order to provide a high biodiversity value.
- LV02: The contractor(s) will apply the relevant protective principles set out in British Standard (BS) 5837:2012: Trees in relation to Design, Demolition and Construction – Recommendations (Ref 7.25) This will be applied to trees within the Order Limits which will be preserved through the construction phase, and to trees outside of the Order Limits where such measures do not hinder or prevent the use of the relevant working width for construction. All works to high grade trees, including trees under Tree Preservation Orders and veteran trees, will be undertaken or supervised by a suitably qualified arboriculturist.
- LV03: A five-year aftercare period will be established for all reinstatement and mitigation planting.
- LV04: Construction lighting will be directional and minimised where possible.
- B07: Where the works require the crossing or removal of hedgerows, the gap will be reduced to a width required for safe working. New hedgerow planting will contain native, woody species of local provenance.

7.6.5 The Project has also committed to producing an Outline LEMP (commitment GG03), which will set out the measures to protect existing vegetation and details regarding the reinstatement and additional planting. This will also account for biodiversity net gain targets (see **Chapter 8 Ecology and Biodiversity**).

7.7 Potential for Significant Effects

7.7.1 This section identifies the potential for the Project to give rise to significant effects taking into account the design and control measures identified in Section 7.6.

7.7.2 **Table 7.2** sets out the potential sources and impacts resulting from the construction and maintenance and/or operational activities associated with the Project, whether these impacts are likely to give risk to significant effects, receptors identified with the Study Area and whether the receptors are scoped in or scoped out of the assessment.

7.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage, the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Potential sources of impacts

Sources of construction impacts

7.7.4 Construction activities including:

- site clearance, tree felling and boundary/hedgerow removal;
- topsoil stripping and earthworks particularly associated with construction compounds and site accesses;
- undergrounding of third-party services;
- construction, presence of and removal of construction compounds, parking and laydown areas;
- movement of construction related traffic including delivery and removal of material to and from site, off-site road traffic including workers travelling to and from site;
- movement of vehicles along temporary access tracks;
- construction, presence and removal of temporary site accesses and access routes, including bellmouths;
- construction, presence and removal of temporary bailey bridges and culverts.
- erection, presence and removal of temporary scaffolding;
- presence of temporary hoardings and/or security fencing or signage;
- construction of substations including foundations;
- assembly and erection of the OHL including foundations;
- construction and removal of temporary pylons and overhead line required for construction;
- construction site lighting particularly during the winter months.
- Part decommissioning of the existing Grimsby West substation.

Sources of operational impacts

- The introduction of a new 400 kV OHL into the landscape;
- The introduction of new substations into the landscape;
- Effects of mitigation measures proposed by other topics, particularly re-contoured landform and new planting in relation to the mitigation of ecological and/or visual effects;
- Localised widening of public highways; and
- Operations lighting at substations.

Sources of maintenance impacts

- Periodic vehicle access for routine maintenance and emergency repairs;
- General maintenance activities including cutting back of vegetation along wayleave corridor to ensure safety clearances;
- Maintenance of Biodiversity Net Gain (BNG) and other planted areas; and
- Annual inspection by drone/helicopter.

Table 7.2: Impacts, receptors and potential for significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Activities associated with construction.	Perceptual effects on views and wider visual amenity from construction including vegetation removal, site preparation, OHL and substation construction, and presence of compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel	Receptors further than 10 km from the Scoping Boundary and outside the ZTV (based on operational ZTV).	No – the effects of the project on visual receptors that are located wholly outside the ZTV (which illustrates a worst-case scenario using bare earth without intervening buildings and vegetation) will not be assessed as there would be no likelihood for any visual effects on these receptors.	Scoped out
			Key views to and from the Lincolnshire Wolds National Landscape (AONB).	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			People living and moving around communities and engaging in recreational activities including people using PRoW and waterways (within 3 km of the Scoping Boundary).	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			People using National Trails and regionally	**Yes** – potential for indirect effects on	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			promoted routes (within 3 km)	composition and character of views.	
			People living and moving around communities and engaging in recreational activities including people using local roads, PRoW and waterways (beyond 3 km of the Project).	No – the construction activities are unlikely to be perceptible beyond 3 km. If they are, the short term and temporary nature of the works is highly unlikely to result in significant effects.	Scoped out
			People using National Trails and regionally promoted routes (beyond 3 km).	No – the construction activities are unlikely to be perceptible beyond 3 km. If they are, the short term and temporary nature of the works is highly unlikely to result in significant effects.	Scoped out
			Main road and rail users (unless recognised as a scenic or tourist route).	No – people travelling by road or rail are not anticipated to experience significant effects because of the glimpsed nature of the views and the temporary nature of the construction works.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			People at their place of work whose attention is on their surroundings and where the setting is important to their quality of working life.	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			People at protected viewpoints, panoramas and promoted viewing corridors.	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			Occupants of individual properties.	**Yes** – but only if there is the potential for Residential Visual Amenity Effects. All other residential receptors are covered under communities above.	**Scoped in**
Construction	Nighttime lighting of construction activities.	Perceptual effects on views and visual amenity from nighttime lighting of construction activities.	All visual receptor groups.	**Yes** – there may be a requirement for nighttime lighting of the substations, construction compounds and site access points throughout the route.	**Scoped in**
Construction	Effects of mitigation measures proposed by other topics, particularly re-contoured landform, and	Perceptual effects on views and visual amenity from changes to landform	All visual receptor groups listed above as scoped into the assessment.	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
	new planting in relation to the mitigation of ecological and/or visual effects.	and introduction of landscape elements such as trees and hedgerows.			
Construction	Localised widening of public highways.	Perceptual effects on views and visual amenity from temporary loss of roadside vegetation.	All visual receptor groups listed above as scoped into the assessment.	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
Operation	The introduction of the operational 400 kV OHL and substations into the landscape.	Perceptual effects on views and visual amenity from long-term loss of landscape elements and features, and introduction of new OHL and substations.	Receptors further than 10 km from the scoping boundary and outside the ZTV.	No – the effects of the project on visual receptors that are located wholly outside the ZTV (which illustrates a worst-case scenario using bare earth without intervening buildings and vegetation) will not be assessed as there would be no likelihood for any visual effects on these receptors.	Scoped out
			Key views to and from the Lincolnshire Wolds National Landscape (AONB).	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			People living and moving around communities and engaging in recreational	**Yes** – potential for indirect effects on	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			activities including people using local roads, PRoW and waterways (within 3 km of the Project).	composition and character of views.	
			People using National Trails and regionally promoted routes (within 3 km)	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			People living and moving around communities and engaging in recreational activities including people using PRoW and waterways (beyond 3 km of the Project).	No – beyond 3 km, views of the new infrastructure are highly unlikely to give rise to significant effects.	Scoped out
			Main road and rail users (unless a scenic or tourist route)	No – people travelling by road or rail are not anticipated to experience significant effects because of the glimpsed nature of the views.	Scoped out
Operation	The introduction of the operational 400 kV OHL and substations into the landscape.	Perceptual effects on views and visual amenity from long-term loss of landscape elements and features, and introduction of new OHL and substations.	People at their place of work whose attention is on their surroundings and where the setting is important to their quality of working life.	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
			People at protected viewpoints, panoramas	**Yes** – potential for indirect effects on	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			and promoted viewing corridors.	composition and character of views.	
Operation	Nighttime lighting of substations.	Effects on views and visual amenity from operational nighttime lighting.	All visual receptor groups listed above as scoped into the assessment.	**Yes** – there may be a requirement for 24/7 security lighting.	**Scoped in**
Operation	Effects of mitigation measures proposed by other topics, particularly re-contoured landform, and new planting in relation to the mitigation of ecological and/or visual effects.	Perceptual effects on views and visual amenity from changes to landform and introduction of landscape elements such as trees and hedgerows.	All visual receptor groups listed above as scoped into the assessment.	**Yes** – potential for indirect effects on composition and character of views.	**Scoped in**
Operation	Localised widening of public highways.	Perceptual effects on views and visual amenity from permanent loss of roadside vegetation.	All visual receptor groups listed above as scoped into the assessment.	No – Any roadside vegetation lost during widening works would be reinstated like for like and therefore unlikely to result in significant visual effects	Scoped out
Maintenance	Periodic vehicle/helicopter/drone access for routine maintenance and emergency repairs.	Perceptual effects on views and visual amenity from routine maintenance activities including temporary access tracks, storage compounds, vehicle	All visual receptor groups listed above as scoped into the assessment.	No – Maintenance activities would be temporary, short term and unlikely to result in significant effects.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		and personnel movements.			
Maintenance	General maintenance activities including cutting back of vegetation along wayleave corridor to ensure safety clearances.	Perceptual effects on views and visual amenity from general maintenance activities including cutting back of vegetation.	All visual receptor groups listed above as scoped into the assessment.	No – Vegetation management is unlikely to have ongoing significant effects, the main effect would be from the initial loss during construction and the effects of this are covered under construction above.	Scoped out

7.8 Proposed Assessment Methodology

Proposed Data Sources

7.8.1 In addition to the published landscape character assessments listed in Section 7.5, it is proposed to use the following data sources to inform the visual assessment:

- Ordnance Survey (OS) 1:10,000, 1:25,000, 1:50,000 and 1:250,000 base mapping;
- OS Terrain® 50 mid-resolution and LIDAR Composite 2017 – 50 cm (DTM);
- Google Earth Pro aerial photography, and Google Maps Street View;
- Base mapping from ArcGIS Map Service;
- Open source Geographic Information System (GIS) data; and
- National, regional, and local landscape character assessments listed in Section 7.5 of this chapter.

Technical Guidance

7.8.2 The visual assessment will be undertaken in accordance with the following good practice and guidance documents:

- The Holford Rules – Guideline for the Routeing of New High Voltage Overhead Transmission Lines (Ref 7.1);
- The Horlock Rules – Guidelines on the Siting and Design of National Grid Substations (Ref 7.3);
- Landscape Institute and Institute for Environmental Management and Assessment (IEMA) (2013) Guidelines for Landscape and Visual Impact Assessment – 3rd Edition (GLVIA3) (Ref 7.14);
- Landscape Institute (2023) Notes and Clarifications on aspects of the 3rd Edition Guidelines on Landscape and Visual Impact Assessment (GLVIA3) – Consultation (Ref 7.26);
- Landscape Institute (2021) Technical Guidance Note 02/21 Assessing Landscape Value Outside National Designations (Ref 7.27);
- Landscape Institute (2019) Technical Guidance Note 02/19 Residential Visual Amenity Assessment (RVAA) (Ref 7.28);
- Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals (Ref 7.29);
- Natural England (2014) An Approach to Landscape Character Assessment (**Error! Reference source not found.**);
- Natural England (2019) An Approach to Landscape Sensitivity Assessment – to inform spatial planning and land management (Ref 7.31); and
- Planning Inspectorate (2019); Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects (AN17) (Ref 7.32).

Proposed Assessment Methodology

7.8.3 The following text summarises the methodology proposed to be used for the visual assessment. This builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology** and is explained more fully in **Appendix 7A Visual Assessment Methodology**.

7.8.4 The methodology for undertaking the visual assessment is based on principles set out in GLVIA3 (Ref 7.7) and associated draft clarifications (Ref 7.27).

7.8.5 GLVIA3 (Ref 7.7) is the established good practice guidance for landscape and visual impact assessment and complies with the requirements of EN-5 (Ref 7.2). GVIA3 advocates that the assessment should reflect the scale and complexity of the development which is being assessed and should focus on the 'likely' significant effects, rather than every conceivable effect. This approach provides greater opportunity to scope out receptors where it can be justified that significant effects would be unlikely to arise.

7.8.6 As explained in **Appendix 7A Visual Assessment Methodology**, the assessment will focus on public views experienced by those groups of people who are likely to be most sensitive to the construction and operation of the Project. This comprises local communities where views contribute to the landscape setting enjoyed by residents in the area and people using recreational routes, features, and attractions.

7.8.7 A Residential Visual Amenity Assessment (RVAA) will be undertaken from any properties where the occupants are likely to experience major adverse visual effects in accordance with the methodology in **Appendix 7A Visual Assessment Methodology**. The study area for RVAA will be 400m, however effects are most likely to lie within 150 m of the Project.

7.8.8 Where relevant, the assessment will consider any inter-relationship of baseline information and impacts from the project between different aspects of the environment.

7.8.9 For example, the outputs of **Chapter 8 Ecology and Biodiversity** will provide information on existing vegetation and species including ancient woodland and veteran trees, **Chapter 9 Historic Environment** will be cross-referenced in relation to historic assets including historic landscapes and registered parks and gardens from where there may be important views.

7.8.10 Information contained in the Arboriculture Impact Assessment will be referenced to inform the assessment and mitigation proposals as explained in **Appendix 8C Arboricultural Strategy**.

Zone of Theoretical Visibility

7.8.11 ZTV maps will be produced to inform the assessment. These will illustrate theoretical visibility during the operational phase.

7.8.12 The ZTVs will be generated in GIS using an Ordnance Survey Terrain 5 Digital Terrain Model and available Lidar data. Firstly, a 'bare earth' ZTV will be produced which takes no account of the screening effects of buildings and vegetation, which may in reality preclude visibility from certain areas. It therefore provides the 'worst case' scenario (largest geographical area) from which the Project may be visible. If data is available, a second ZTV will be produced using Lidar data which will take account of screening from buildings and vegetation.

7.8.13 The ZTV will be refined and updated as the assessment progresses.

7.8.14 As the ZTVs are theoretical, fieldwork will be undertaken to consider local screening elements within the landscape and confirm locations from where the different elements of the project would be visible (i.e. a more realistic scenario). The results of the fieldwork will inform the assessment.

Site-Based Assessment

7.8.15 The findings of the desk-based study will be supplemented with a programme of site surveys. These will include a selection of representative public viewpoints for a variety of receptor types and at a range of distances from the Project. Viewpoints will be agreed with key stakeholders. Surveys will include viewpoint photography to assist in the creation of wireframes and for photomontages as explained in **Appendix 7A Visual Assessment Methodology**. Winter surveys will be undertaken at year 1 to show the Project at its most visible. Summer surveys will be undertaken at year 15, to take account of the growth of any planted areas associated with the Project.

7.8.16 The main purpose of these viewpoint surveys will be to obtain baseline photographs, but the site visits will also provide the opportunity to gain an understanding and appreciation of the visual character of the study area.

7.8.17 Viewpoints will be selected to represent the different groups of people likely to be affected by the Project. The selection of viewpoints will be informed by the ZTV analysis, site visits, desk-based research on access and recreation (including footpaths, bridleways and public land), including protected viewpoints, panoramas and view corridors, and by the distribution of the different groups of visual receptors.

7.8.18 Viewpoints will then be examined in detail to determine the value of the view and the magnitude of change that would be likely to arise from the project during construction, operation in Year 1 and operation in Year 15. The value of a view and magnitude of change does not change depending on the receptor and can therefore be reported on by viewpoint.

7.8.19 The visual assessment will focus on the wider visual amenity of people living and moving around settlements or aggregated groups of dispersed properties. Wherever possible, viewpoints will be selected to represent several different receptor groups, for example on the edge of a settlement, on a promoted PRoW, at a trig point or near to a cluster of properties.

7.8.20 Because each viewpoint will typically represent more than one receptor group, the level of effect will vary depending on the sensitivity of a receptor. The overall significance of effect will therefore be based on the most sensitive receptor group (typically residents) at each viewpoint. This information will then be used to summarise the geographical effects of the Project on visual receptors across the study area.

7.8.21 Each viewpoint will include baseline photography and wireline visualisations. A selection of viewpoints will be illustrated with photomontage visualisations to provide a photorealistic illustration of the change in views.

Sensitivity

7.8.22 As explained in **Appendix 7A Visual Assessment Methodology**, the sensitivity of visual receptors will be determined through separate consideration of the value of the view experienced (which is established and reported as part of the baseline) and the susceptibility of the visual receptor to change arising from the Project, which will be determined through informed professional judgement guided by the indicative criteria

set out in Tables 7A.1, and 7A.2 of **Appendix 7A Visual Assessment Methodology**. In subdividing sensitivity into the two components of value and susceptibility, the approach differs slightly from the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology.** It does however accord with guidance in GLVIA3 (Ref 7.7) and the associated clarifications (Ref 7.27).

7.8.23 Judgements on the value attached to a view are unrelated to the nature of the development being proposed, whilst judgements on susceptibility may vary depending on the type of visual receptor and the level of interest they may have in their surroundings.

7.8.24 Judgements on value and susceptibility will be recorded as either very high, high, medium or low.

Magnitude

7.8.25 As explained in **Appendix 7A Visual Assessment Methodology**, the magnitude of change will be determined through consideration of the likely size and scale of the change, which will be determined through informed professional judgement guided by the indicative criteria set out in **Appendix 7A Visual Assessment Methodology**. Judgements will be recorded as either large, medium, small or negligible. Consideration of the duration and reversibility of effect will be used to further inform the final judgements.

Significance of effects

7.8.26 As explained in **Appendix 7A Visual Assessment Methodology**, an 'overall profile' approach will be adopted whereby, '*all the judgements against the individual criteria are arranged in a table to provide an overall profile of each identified effect*' (GLVIA3 Page 92, para 5.55 (Ref 7.7)). This determination requires the application of professional judgement and experience to balance the different variables.

7.8.27 In accordance with GLVIA3 (Ref 7.7), the use of an overly mechanistic approach through reliance upon a matrix will be avoided. Instead, judgements will be supported by clear and accessible narrative explanations of the rationale underlying the assessment made for each visual receptor. Reference will be made to the relevant viewpoints to support and explain the rationale.

7.8.28 Significance will be recorded as major, moderate, minor or negligible and the direction of change will be categorised as beneficial or adverse. Effects judged to be moderate or major are considered significant.

7.8.29 Once the significance of effect likely to be experienced by each visual receptor has been predicted, a separate description of the geographical distribution of significant effects across the study area will be provided in the visual assessment summary.

7.9 Assumptions and Limitations

7.9.1 The assessment will be undertaken based upon the design which will indicate the maximum extent and indicative locations of temporary construction and storage areas, access tracks, the location, number and heights of pylons and any other temporary or permanent infrastructure required to facilitate the Project.

7.9.2 To take account of the flexibility allowed for in the draft DCO, consideration will be given to the potential for effects to be of greater significance should any of the permanent or

temporary infrastructure elements be moved within the Limits of Deviation (LOD) or Order Limits. The assumptions made regarding the use of flexibility for the main assessment, and any alternative assumptions, are set out in **Chapter 4 Description of the Project**.

7.9.3 The operational assessment will assume that the works to relocate lower voltage overhead lines as part of the Project has been undertaken.

7.9.4 Assessment, site work, and photography will be undertaken from publicly accessible locations, such as the public highway and PRoW. The assessment will be based on views from the ground (therefore not taking into consideration private views from upper storeys of buildings).

7.9.5 It is not proposed to prepare a ZTV for the construction phase of the Project as there is a great degree of variability in the extent and timeframes of visibility of construction activity. Also, tall construction plant (for example tower cranes and piling rigs) rarely gives rise to significant visual effects as it is present at each pylon location for a short period of time. Tall construction plant will, however, be considered in the assessment of construction effects on visual receptors.

7.9.6 The visibility of the Project will not remain constant throughout the year, and as such the assessment will be based on winter views with commentary provided on the likely difference in the view in summer when the vegetation is in full leaf.

7.10 Conclusion

Summary

7.10.1 The proposed scope, as set out in this chapter, is intended to focus the attention of the visual assessment on likely significant effects and to avoid assessing the same impact twice.

7.10.2 There are many visual receptors that would be affected by the Project including people living and moving through the study area, people accessing recreational resources such as the local PRoW, national trails, promoted recreational routes and recreational receptors on the waterways including rivers and canals. Views to and from the Lincolnshire Wolds AONB would also be interrupted.

7.10.3 It is likely that significant effects will arise when the Project is seen in close proximity (typically within 1 km), and these will diminish with distance. Significant effects beyond 3 km are highly unlikely.

7.10.4 No significant visual effects are anticipated during maintenance operations.

Proposed Scope of the Assessment

7.10.5 A summary of the proposed scope of the assessment is provided in **Table 7.3**.

Table 7.3: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Receptors outside the ZTV	No	Construction, operation and maintenance	Scoped out
Key Views to and from the Lincolnshire Wolds National Landscape (AONB)	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
People living and moving around communities and engaging in recreational activities including people using Public Rights of Way (PRoW) and waterways (within 3 km of the Project).	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
People using National Trails and regionally promoted routes (within 3 km of the Project).	**Yes**	Construction and operation	**Scoped in**
People living and moving around communities and engaging in recreational activities including people using PRoW and waterways (beyond 3 km of the Project).	No	Construction, operation and maintenance	Scoped out
People using National Trails and regionally promoted routes (beyond 3 km of the Project).	No	Construction, operation and maintenance	Scoped out
Occupants of individual selected properties within 400 m (assessed under RVAA guidelines).	**Yes**	Operation	**Scoped in**
	No	Construction and maintenance	Scoped out
Occupants of individual properties beyond 150 m.	No	Construction, operation and maintenance	Scoped out
Road and rail users	No	Construction, operation and maintenance	Scoped out
People at their place of work whose attention is on their surroundings and where the setting is important to their quality of working life.	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
People at protected viewpoints, panoramas and viewing corridors.	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Perceptual effects on visual receptors from night-time lighting.	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Effects of mitigation measures proposed by other topics, particularly re-contoured landform, and new planting in relation to the mitigation of ecological and/or visual effects.	**Yes**	Construction and operation	**Scoped in**
	No	Maintenance	Scoped out
Localised widening of public highways.	**Yes**	Construction	**Scoped in**
	No	Operation and maintenance	Scoped out
Periodic vehicle/helicopter/drone access for routine maintenance and emergency repairs.	No	Maintenance	Scoped out
General maintenance activities including cutting back of vegetation along wayleave corridor to ensure safety clearances.	No	Maintenance	Scoped out

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8. Ecology and Biodiversity

nationalgrid

Contents

8.1 Introduction

8.1.1 This chapter presents how the ecology and biodiversity assessment will consider the potentially significant effects on ecological features that may arise from the construction, operation, and maintenance of the Project (as described in **Chapter 4 Description of the Project**). It describes the methodology and datasets to be used within the assessment, presents an overview of the baseline conditions, and identifies the potential significant effects to be considered within the assessment, and how the potential significant effects will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the only element of the Project that will involve decommissioning in all or part, is the existing Grimsby West Substation. There are currently no specific plans to decommission the Project as a whole. With the exception of the Grimsby West Substation, decommissioning of the Project has, therefore, been scoped out of the environmental assessment.

8.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

8.1.3 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 3 Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology**.

8.1.4 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 6 Landscape** and **Chapter 7 Visual** provides detail of essential mitigation and compensation that includes habitat creation, such as woodland planting, that are also of benefit to ecological features;
- **Chapter 10 Water Environment** includes details of the location of sensitive features, including water framework directive (WFD) waterbodies, and the associated mitigation that will also be required to address potential impacts upon important ecological features, such as wetland Priority Habitats and aquatic fauna;
- **Chapter 14 Air Quality** includes detail of the potential impacts of altered air quality upon sensitive ecological features, such as designated sites and ancient woodland; and
- **Chapter 15 Noise and Vibration** includes detail of the potential impacts of noise upon sensitive ecological features.

8.1.5 These chapters provide information on the project design, the assessment of impacts and mitigation from other environmental disciplines that are also of particular relevance to ecological features.

8.1.6 This chapter is supported by the following figures and appendices:

- **Figure 8.1 Statutory Designated Sites for Nature Conservation Within 10 km**;
- **Figure 8.2 Statutory Designated Sites for Nature Conservation Within 5 km**;

- **Figure 8.3 Non-Statutory Designated Sites for Nature Conservation Within 2 km**;
- **Figure 8.4 Other Ecological Designations Within 2 km**;
- **Appendix 8A Habitats Regulations Assessment Methodology**;
- **Appendix 8B Ecology Survey Strategy**; and
- **Appendix 8C Aboricultural Survey Strategy**.

8.2 Legislation, Policy and Guidance

8.2.1 **Chapter 2 Regulatory and Planning Policy Context** describes the overall regulatory and planning policy context for the Project. Key legislation, policy, and planning guidance relevant to the assessment of potential effects on ecology and biodiversity associated with the construction, operation, and maintenance of the Project is provided in **Chapter 2 Regulatory and Planning Policy Context. Appendix 2A Key Legislation, Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy**.

Biodiversity Net Gain

8.2.2 The Environment Act 2021 (Ref 8.1) includes provisions to make Biodiversity Net Gain (BNG) a mandatory requirement within the planning system in England requiring all relevant developments to achieve a minimum 10 per cent net gain in biodiversity units relative to the site baseline biodiversity value. It is anticipated the secondary legislation mandating the need for 10 per cent net gain for Development Consent Order (DCO) projects will be in place by late 2025.

8.2.3 As detailed in **Chapter 1 Introduction**, National Grid has committed to 10 per cent net gain in environmental value including as a minimum 10 per cent BNG across all its construction projects, in line with the Environment Act 2021. This commitment is underpinned by the delivery of quantifiable enhancements for biodiversity measures from a baseline using the Department of Environment, Food and Rural Affairs (DEFRA) Statutory Biodiversity Metric (Ref 8.2) with actions formalised and secured by long term management arrangements with external organisations and partners.

8.3 Consultation and Engagement

8.3.1 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities, Environment Agency, National Trust, Natural England, Royal Society for the Protection of Birds (RSPB), the Wildlife Trusts, Woodland Trust, and local groups. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

8.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024.

8.3.3 Pre-scoping engagement has been undertaken with Natural England in February and March 2024, which included comments on the proposed cope of ecological baseline survey work (**Appendix 8B Ecology Survey Strategy**), the approach to ornithological survey taking account of existing baseline data, the use of great crested newt District

Level Licencing for the Project and the application of non-standard approach to water vole survey.

8.3.4 The principal feedback received from both Non-Statutory Consultation and pre-scoping consultation with Natural England of relevance to this scoping chapter is included in **Table 8.1** together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 8.1: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
Natural England	The potential for impacts to designated features within the boundary of the European sites and also Functionally Linked Land should be assessed within a Habitats Regulation Assessment (HRA). Natural England's response identified a 10km area of consideration around each of the Humber Estuary SPA, SAC & Ramsar, The Wash SPA, SAC & Ramsar, Gibraltar Point SPA, Ramsar and Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC. Wintering and passage bird survey results should be considered as part of the HRA If the development is demonstrated to lead to loss of functionally linked land for designated bird species, then the suitability of proposed mitigation should also be assessed in the HRA. The potential for noise and visual disturbance and bird collision risk should be addressed within the HRA. Potential visual disturbance to birds may arise due to changes in site lighting, or perception of the pylons acting as potential predator perch points.	The assessment of the Project shall include a HRA. This shall comprise a Test of Likely Significant Effects and, where required, a Statement to Inform Appropriate Assessment in line with Planning Inspectorate Advice Note 10 (Ref 8.3). An Evidence Plan will be produced to document the evidence requirements for the Appropriate Assessment, including the suitability of any mitigation. The HRA shall be informed by wintering and passage bird surveys, the scope of which is set out in **Table 8.5**. The scope of surveys consider functionally linked land with reference to Natural England's Impact Risk Zones around Habitat Sites. Those sites to be considered as part of the HRA are defined in **Table 8.3** and include the Humber Estuary SPA, SAC & Ramsar, The Wash SPA, SAC & Ramsar, Gibraltar Point SPA, Ramsar and Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC, Nene Washes SPA, SAC & Ramsar and Ouse Washes SPA, SAC & Ramsar. The HRA shall consider the potential impact pathways upon qualifying features of the Habitat Sites. Including and Functionally Linked Land, including the direct loss of habitat and disturbance.
Natural England	The HRA should consider potential impacts upon migrating river and sea lamprey within the designated site and also on connected watercourses that may	The HRA shall be informed by the scope of aquatic surveys as set out in **Table 8.5**. Where qualifying species, including river and sea lamprey, are present, the HRA will consider the

Stakeholder	Summary of response	Consideration in the Scoping Report
	represent functionally linked land. Potential impacts include habitat loss, vegetation damage, vibration and pollution.	potential for watercourses to represent functionally linked land where they are linked to the Humber Estuary SAC and evaluate potential impacts.
Natural England	Otter are a qualifying feature of The Wash SAC and a mobile species. Otter survey results should be considered and impacts upon functionally linked land and any necessary mitigation assessed as part of the HRA.	The HRA shall be informed by the scope of otter surveys as set out in **Table 8.5**. Where otter are present within the area of consideration, the HRA will consider any potential impact upon habitat that represents functionally linked land.
Natural England	A SSSI impact assessment will be required to provide an assessment of the impacts to features which are only notified as part of the SSSI, as well as the assessment of those which are also designated as European site features. The impact pathways to be considered within this assessment are the same as stated above for the international designations.	The Study Areas for designated sites, including SSSIs, are set out in **Table 8.2**. The designated sites and potential for significant effects upon interest features that are scoped into the assessment are presented in **Table 8.2**. also sets out the potential direct and indirect impact pathways from the Project that will be considered in the assessment. These sites, interest features and impact pathways will inform the SSSI impact assessment.
Natural England	The potential air quality impacts upon designated sites due to road traffic during the construction phase will need to be considered. This should include consideration of potential changes in nitrogen deposition from NO_x and ammonia. When undertaking the assessment there will need to be clarification provided on which roads will be used to access the development site, and the number of predicted vehicle movements. Designated sites within 200m of a road which will experience a significant increase in traffic movements should be assessed for impacts due to air pollution from traffic. Any construction activity within 200m of Bratoft Meadows SSSI will need to review air pollution	**Chapter 14 Air Quality** includes detail of the potential impacts of altered air quality upon sensitive ecological features from potential changes in nitrogen deposition from NO_x and ammonia. As detailed in **Table 8.7** where designated sites, ancient woodland and veteran trees occur within 200m of the affected road network, the impact assessment will consider the potential for significant effects upon these features as a result of altered air quality during construction activities. Air quality effects from maintenance have been scoped out of the assessment as set out in **Chapter 14 Air Quality**.

Stakeholder	Summary of response	Consideration in the Scoping Report
	impacts to the site including from dust and NOx from increased traffic movements during construction and any maintenance activities once operational.	
Natural England	Natural England would welcome two years' non-breeding bird surveys, for particularly sensitive locations. Two years would be the minimum we recommend informing the HRA. We would recommend two surveys a month in areas of higher risk. Nocturnal surveys for lapwing and golden plover are recommended if there is suitable habitat that might be affected by the proposal. Where arable land is affected by the project and is potentially functionally linked, knowing the previous cropping regime is key to understanding how often it might provide suitable habitat for SPA species.	The scope of the non-breeding bird surveys are set out in **Table 8.5**. The scope of survey work will include two years survey non-breeding data and will include nocturnal surveys for lapwing and golden plover. The assessment of impacts will include consideration of all relevant data, including review of historical cropping regimes (where this is available).
Natural England	If a main badger sett is required to be damaged or destroyed, then bait marking surveys are likely to be required as part of the licence application to ensure the best placement for any artificial setts proposed.	Where other field signs, including sett distribution and the location of latrines, are not considered sufficient to evaluate the likely territory size the consideration will be given to the requirement for bait marking for the purpose of informing design development and as part of any badger licence to permit impacts upon main badger setts.
Natural England	In relation to the scope of water vole surveys Natural England referred to standing advice and the Water Vole Mitigation Handbook (Ref 8.4). Natural England would provide further comment on the approach to survey once a detailed mitigation approach has been designed.	The Applicant shall continue to engage with Natural England on the scope of water vole surveys and the approach to water vole mitigation as the Project design develops.
Natural England Environment Agency	Natural England would welcome any commitment to delivering 10% Biodiversity Net Gain through the project and would recommend the	As detailed in **Chapter 1 Introduction**, The Applicant has committed to 10 per cent net gain in environmental value including as a minimum 10 per cent BNG across all its construction

Stakeholder	Summary of response	Consideration in the Scoping Report
Norfolk County Council	use of the latest Biodiversity Metric. The applicant should consider opportunities in the emerging Greater Lincolnshire Local Nature Recovery Strategies (LNRS), any mitigation measures listed for the affected waterbodies under Water Framework Directive (WFD) and contribute to the delivery of the River Basin Management Plans.	projects, in line with the requirement proposed by the Environment Act 2021. The BNG assessment shall be undertaken using the Statutory Biodiversity Metric. in accordance with the accompanying guidance and best practice principles. Available opportunities to achieve BNG will be considered wherever possible.
Natural England Woodland Trust Norfolk County Council	Overarching National Policy Statement for Energy (EN-1) notes ancient woodland is a valuable biodiversity resource for its diversity of species and for its longevity as woodland. Ancient and veteran trees found outside ancient woodland are also particularly valuable. Natural England maintains the Ancient Woodland Inventory which can help identify ancient woodland. Natural England and the Forestry Commission have produced standing advice in relation to ancient woodland and ancient and veteran trees. It should be taken into account when determining impacts to these habitats and species. Ancient woodland and veteran trees are irreplaceable habitats. Any development resulting in the loss or deterioration of ancient woodland must consider all possible measures to ensure avoidance of adverse impact	Ancient woodland from the Ancient Woodland Inventory is present within the Scoping Boundary and has been scoped into the assessment (**Table 8.4**). The assessment of potential impacts upon ancient woodland, ancient and veteran trees and other types of irreplaceable habitat will be informed by a desk study and field surveys. Design development will progress with a view to avoiding these areas as far as practicable. The potential impacts to be considered in the assessment are set out in **Table 8.7**.
Natural England	Where it is considered by the developer that a licence is likely to be required from NE, we can provide a Pre-Submission Screening Service, whereby we can assess a draft licence application and provide a LoNI (Letter of No Impediment) where we consider there to be no reason that a licence would not be granted post DCO consent.	The scope of surveys set out in **Table 8.5** will inform any protected species mitigation licences (where required) prepared in draft for advisory comment from Natural England, further details will be provided as part of the DCO application for the Project.

Stakeholder	Summary of response	Consideration in the Scoping Report
Natural England	The possibility of using the District Level Licencing (DLL) approach for Great Crested Newts has been discussed with the applicant. Natural England's DLL team have communicated that a Lincolnshire District Level Licencing Scheme is likely to go live where capacity allows in 2024/25, however we are unable to confirm an exact date for this at present. If this is the case, and the DCO submission is not due until 2027, then National Grid can wait for the scheme to be launched and submit a formal enquiry through the normal route.	The Applicant shall continue to engage with Natural England over the potential use of species licencing for great crested newts, including the use of District Level Licencing.
Environment Agency	The HRA should consider inland sites, such as the Nene Washes SPA, SAC & Ramsar and Ouse Washes SPA, SAC & Ramsar.	**Table 8.2** defines the Study Areas for Habitats Sites, and those sites to be considered as part of the HRA are defined in **Table 8.3** and include the Humber Estuary SPA, SAC & Ramsar, The Wash SPA, SAC & Ramsar, Gibraltar Point SPA, Ramsar and Saltfleetby – Theddlethorpe Dunes & Gibraltar Point SAC, Nene Washes SPA, SAC & Ramsar and Ouse Washes SPA, SAC & Ramsar.
Environment Agency Norfolk County Council	The assessment should consider potential impacts upon designated sites, including non-statutory designated sites, and also protected species outside the boundary of designated sites. Protected biodiversity that should be considered are ornithological (breeding birds and overwintering migratory birds), bats, great crested newts, arboricultural, reptile, otter, vascular and non-vascular plants and hazel dormouse. Baseline surveys should also consider fish species, invertebrates, water voles, badgers other protected or notable species, depending on the specific circumstances and plans (such as if in-channel works are required).	Study Area for designated sites are defined in **Table 8.2**, and the statutory designated sites, non-statutory designated sites, notable habitats and protected and notable habitats and species considered in the assessment are set out in **Table 8.3**. The scope of field surveys to inform the assessment is provided in **Table 8.5**. As set out in Section 8.5 hazel dormouse surveys are scoped out of further assessment as they are unlikely to occur in the Scoping Boundary. The scope of arboricultural surveys is provided in **Appendix 8C Arboricultural Strategy.**

Stakeholder	Summary of response	Consideration in the Scoping Report
Environment Agency	Records of invasive non-native species and biosecurity measures should be considered in future plans.	As described in Section 8.6, the Project commitment to invasive species is set out in B04 of **Appendix 4A Initial Outline Code of Construction Practice.**
Lincolnshire County Council	The impact assessment should consider of EMF upon flora and fauna.	The Project will be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN5 including the International Commission on Non-Ionizing Radiation Protection guidelines for electric and magnetic fields (EMFs) and associated precautionary policy. An EMF report will be prepared as part of the Project. This is separate to the EIA process.
National Trust Lincolnshire County Council	Areas of the east coast in proximity to the Project are seeking designation as a UNESCO site of international importance (East Atlantic Flyway: England East Coast Wetlands) for migratory birds. The East Coast Wetlands are a nationally and internationally recognised habitat for waterbird populations, with 29 species found in internationally important numbers across 21 existing Special Protection Areas (SPAs) including, in Lincolnshire; The Humber Estuary, The Wash and Gibraltar Point.	The assessment of impacts will include consideration of the designated sites and species that contribute to the proposed site of international importance (East Atlantic Flyway: England East Coast Wetlands), where they fall within the Study Area.
Norfolk County Council	The Project should adhere to the ecological mitigation hierarchy and avoid impacts in the first instance. Where impacts cannot be avoided, mitigation measures will need to be identified, and compensation provided.	Mitigation and compensation shall be developed as part of the Project design development in accordance with the mitigation hierarchy. The commitment to mitigation measures is set out in the Initial Outline Code of Construction Practice provided in **Appendix 4A Initial Outline Code of Construction Practice.** Additional mitigation and compensation measures will be identified to address significant effects within the ES.
National Farmers Union	Additional land will be needed to meet the requirement of delivering Biodiversity Net Gain (BNG). The	As detailed in **Chapter 1 Introduction**, National Grid has committed to 10 per cent net gain in environmental value

Stakeholder	Summary of response	Consideration in the Scoping Report
	NFU understands that the National Planning Policy Statement for Energy EN-1 states that developers like NGET should show how a project has taken advantage of opportunities to conserve and enhance biodiversity interests. It states in the Corridor Preliminary Routeing and Siting Study how developments will soon have to have a mandatory 10% BNG and where land may be available and or suitable to support with BNG requirements this is subject to collaboration with landowners and Local Nature Partnerships. Further, it states that the consideration of BNG will form part of the later stages of the Project. Although we are pleased that the document highlights that this would have to be in collaboration with landowners and Local Nature Partnerships, the NFU would not want to see any land being compulsorily purchased to deliver this gain, and that the additional land should be purchased purely through voluntary negotiation. The NFU would want to see discussions with landowners/farmers to ensure that any mitigation or BNG can be in areas that may be less productive or has the least impact on agricultural operations.	including as a minimum 10 per cent BNG across all its construction projects, in line with the requirement proposed by the Environment Act 2021 Section 8.6 describes steps that are included within the design process to avoid the loss of biodiversity. Where avoidance is unlikely to be possible, steps are described to reduce biodiversity impacts, in line with the biodiversity gain hierarchy. The extent of land required to deliver habitat creation/ restoration for BNG, beyond that required for EIA purposes (mitigation, compensation and enhancement in relation to significant effects), will be determined on the basis of later design stages informed by the Defra statutory biodiversity metric. The mechanisms for securing land for BNG do not form part of the scope of the Scoping Report. Where additional land is required to deliver BNG, the preference would be to consult with landowners/ farmers and environmental stakeholders to identify and agree opportunities through voluntary negotiation. Where opportunities are identified, the aim would be to co-design habitat creation and restoration projects with the landowner, taking into account the impacts upon agricultural operations and best and most versatile agricultural land.

8.4 Study Area

8.4.1 The Study Area for the ecological assessment includes the land within the Scoping Boundary and appropriate buffer zones, as described in **Table 8.2** and illustrated in **Figure 8.1 Statutory Designated Sites for Nature Conservation within 10 km**, **Figure 8.2 Statutory Designated Sites for Nature Conservation within 5 km** and **Figure 8.3 Non-Statutory Designated Sites for Nature Conservation within 2 km**.

8.4.2 The boundaries and zones for the ecology Study Area reflect standard industry good practice and the scoping distances that statutory consultees would typically expect to be considered for identification of features external to the Project that could be affected.

These have been informed by published guidance and professional judgement. A 'zone of potential influence' representing the areas within which effects could occur from the Project and associated activities will be refined for the assessment The Study Area will be reviewed and, as appropriate, refined for the assessment presented in the Preliminary Environmental Information (PEI) Report and Environmental Statement (ES).

Table 8.2: Study Areas for different ecological features

Study Area (distance from Scoping Boundary)	Feature
30 km	Special Areas of Conservation (SAC) and Special Protection Areas (SPA) where (respectively) bats or bird species with large foraging ranges are noted as, or one of, the qualifying features.
10 km	Statutory designated sites of international nature conservation importance e.g. SAC, SPA and Ramsar sites (as well as proposed or potential sites).
5 km	Statutory designated sites of national and local nature conservation importance e.g. Sites of Special Scientific Interest (SSSI) (also referencing Natural England Impact Risk Zones for SSSIs on the 'Multi-Agency Geographic Information for the Countryside' (MAGIC) website (Ref 8.5), National Nature Reserves (NNR) and Local Nature Reserves (LNRs))[1]. Ornithological records for specific records and data for wetland birds from the British Trust for Ornithology (BTO) Wetland Birds Survey (WeBS).
2 km	Non-statutory designated sites of nature conservation value e.g. Local Wildlife Sites (LWS), Roadside Nature Reserves (RNR) (Lincolnshire and Norfolk), Protected Road Verges (Cambridgeshire), ancient woodland and other notable habitats (e.g. habitats of principal importance (Ref 8.6)). Records of protected and notable species received from Local Environmental Records Centres (LRC). Ornithological records for general species records.

8.4.3 The known or predicted current and future baseline environment described in section 8.5 has been informed by the following data sources:

- Following on from the data collected for the routeing and siting stage of the Project, LRCs were contacted in March 2024 to gain information on pre-existing ecological data (i.e. locations of non-statutory sites designated for nature conservation, existing records of protected, notable and invasive non-native species (INNS). Data is reported in Section 8.5, with descriptions provided of the records including the direction and distance from the Scoping Boundary. The data received has been

[1] There is often spatial overlap between SSSIs/SPAs and qualifying ornithological features of SSSIs in some cases might forage over relatively large distances outside of the designated site. Therefore, the Study Area for SSSIs with qualifying ornithological features is extended to 10 km.

considered when determining the assessment scope. The LRCs that were contacted are:

  - Cambridgeshire & Peterborough Environmental Records Centre (CPERC);
  - Greater Lincolnshire Nature Partnership (GLNP); and,
  - Norfolk Biodiversity Information Service (NBIS);

- Online data resources that were reviewed include:
  - the Natural England website (Ref 8.7) for information on statutory designated sites of nature conservation interest and to confirm reasons for designation and their condition;
  - the MAGIC website (Ref 8.5) to identify the location (and details) of statutorily designated sites, ancient woodland, Priority Habitats (including Priority River Habitat) and for any granted European Protected Species (EPS) Licence applications;
  - the Joint Nature Conservation Committee (JNCC) website (Ref 8.8) for site information and designation details of SACs, SPAs and Ramsar Sites;
  - aerial imagery (Google Maps);
  - Environment Agency Ecology and Fish Data for species records of fish, macroinvertebrate and macrophytes species (Ref 8.9); and
  - Environment Agency Catchment Data Explorer for data on WFD water bodies and water catchments (Ref 8.10).

8.5 Baseline Conditions

8.5.1 The following section summarises the known or predicted ecological baseline conditions that have been established during the scoping stage. The section includes a summary of the designated sites present across the Study Area and a high level description of the habitats present in each section within the Scoping Boundary.

Statutory sites

8.5.2 The location of internationally designated sites for nature conservation within the Study Area are illustrated in **Figure 8.1 Statutory Designated Sites for Nature Conservation within 10 km**. There are no internationally designated nature conservation sites with bats listed as a qualifying feature located within the 30 km Study Area. There are ten separate internationally designated nature conservation sites within the 30 km Study Area with birds that are listed as qualifying features (**Table 8.3)**. This includes qualifying bird species that have long-flying distances (including some geese, in particular pink-footed goose (*Anser Brachyrhynchus*[2]) The Study Area applied covers the area that may be used by these long-flying bird species and has been considered in both the potential for significant effects in Section 8.7 and the design of field surveys detailed in Section 8.8.

[2] Although the Humber Estuary is not designated as an SPA for pink-footed geese, it is of international importance for the species (Brides et al., Ref 8.11) However there are no other international designated sites for which this species is a qualifying feature within 30 km of the Scoping Boundary.

Table 8.3: Internationally Designated Nature Conservation Sites

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
Humber Estuary, [UK0030170], 36,657.15	SAC	Annex I habitats • 1110 Sandbanks which are slightly covered by sea water all the time. • 1130 Estuaries • 1140 Mudflats and sandflats not covered by seawater at low tide • 1150 Coastal lagoons • 1310 Salicornia and other annuals colonizing mud and sand • 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • 2110 Embryonic shifting dunes • 2120Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes • 2130Fixed coastal dunes with herbaceous vegetation (grey dunes) • 2160 Dunes with *Hippopha rhamnoides* Annex II species • 1095 Sea lamprey (*Petromyzon marinus*) • 1099 River lamprey (*Lampetra* fluviatilis*)* • 1364 Grey seal Halichoerus grypus	3.5 km north east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
Humber Estuary, [UK9006111], 37,630.24	SPA	Annex I and / or migratory species • Great bittern (*Botaurus stellaris*) Non-breeding and nreeding; • Common shelduck (*Tadorna tadorna*) non-breeding • Eurasian marsh harrier (*Circus aeruginosus*) breeding • Hen harrier (*Circus cyaneus*) non-breeding • Pied avocet *Recurvirostra avosetta*) breeding and non-breeding • European golden plover *(Pluvialis apricaria*) non-breeding • Red knot (*Calidris canutus*) non-breeding • Dunlin *Calidris* (*alpina alpina*) non-breeding • Ruff *(Philomachus pugnax*) non-breeding • Black-tailed godwit (*Limosa limosa islandica*) non-breeding • Bar-tailed godwit (*Limosa lapponica*) non-breeding • Common redshank (*Tringa arquata*) non-breeding • Little tern (*Sterna albifrons*) breeding • Waterbird assemblage	3.5 km north east
Humber Estuary	Ramsar	Criterion 1 – Near-natural estuary	3.5 km north east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		Criterion 3 – Breeding colony of grey seals (*Halichoerus grypus)* and natterjack toad (*Bufo calaita*) Criterion 5 – Internationally important, non-breeding waterfowl population Criterion 6 – Internationally important population of: • Common shelduck (*Tadorna tadorna*) • European golden plover (*Pluvialis apricaria*) • Red knot (*Calidris canutus*) • Dunlin (*Calidris alpina alpina*) • Black-tailed godwit (*Limosa limosa islandica*) • Bar-tailed godwit (*Limosa lapponica*) • Common redshank (*Tringa Arquata*)	
Saltfleetby-Theddlethorpe Dunes & Gibralter Point, [UK0030270], 967.66	SAC	Annex I habitats • Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) • Fixed coastal dunes with herbaceous vegetation (grey dunes) • Dunes with *Hippopha rhamnoides* • Humid dune slacks	5.3 km east
Gibralter Point	SPA	Annex I and /or migratory species: • Grey plover (*Pluvialis squatarola*) (non-breeding)	5.3 km east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		• Sanderling *Calidris alba* (non-breeding) • Bar-tailed godwit (*Limosa lapponica*) (non-breeding) • Little tern (*Sterna albifrons*) (breeding)	
Gibralter Point	Ramsar	Criterion 1 – dune and saltmarsh habitats Criterion 2 – assemblage of wetland invertebrates Criterion 5 – waterfowl assemblage Criterion 6 – Internationally important assemblage of: • Grey plover (*Pluvialis squatarola*) • Sanderling (*Calidris alba*) • Bar-tailed godwit (*Limosa lapponica*) • Dark-bellied brent goose (*Branta bernicla bernicla*)	5.3 km east
The Wash & North Norfolk Coast [UK0017075], 107,719.95 ha	SAC	Annex I habitats • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Large shallow inlets and bays • Reefs • Salicornia and other annuals colonizing mud and sand	4.5 km east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		• Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi)* Annex II species • Otter *Lutra lutra* • Harbour seal *Phoca vitulina*	
The Wash	SPA	Annex I and/or migratory species: • Bewick's swan (*Cygnus columbianus bewickii*) (non-breeding) • Pink-footed goose *Arquat brachyrhynchus* (Non-breeding) • Dark-bellied brent goose (*Branta bernicla*) (non-breeding) • Common shelduck (*Tadorna tadorna*) (non-breeding) • Eurasian wigeon (*Anas Arquata*) (non-breeding) • Gadwall (*Anas strepera*) (non-breeding) • Northern pintail (*Anas acuta*) (non-breeding) • Black (common) scoter (*Melanitta nigra*) (non-breeding) • Common goldeneye (*Bucephala clangula*) (non-breeding)	4.5 km east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		• Eurasian oystercatcher (*Haematopus ostralegus)* (non-breeding) • Grey plover (*Pluvialis squatarola*) (non-breeding) • Red knot (*Calidris canutus*) (non-breeding) • Sanderling (*Calidris alba*) (non-breeding) • Dunlin (*Calidris alpina*) (non-breeding) • Black-tailed godwit (*Limosa islandica*) (non-breeding) • Bar-tailed godwit (*Limosa lapponica*) (non-breeding) • Eurasian curlew (*Numenius Arquata*) (non-breeding) • Common redshank (*Tringa tetanus*) (non-breeding) • Ruddy turnstone (*Arenaria interpres*) (non-breeding) • Common tern (*Sterna hirundo*) (breeding) • Little tern (*Sterna albifrons*) (breeding) Waterbird assemblage	
The Wash	Ramsar	Criterion 1 – Extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels. Criterion 3 – Interrelationship of component habitats	4.5 km east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		Criterion 5 – Waterfowl assemblage Criterion 6 – Internationally important population of: • Pink-footed goose (Arquat brachyrhynchus) • Dark-bellied brent goose (Branta bernicla) • Common shelduck (Tadorna tadorna) • Northern pintail (Anas acuta) • Eurasian oystercatcher (Haematopus ostralegus) • Grey plover (Pluvialis squatarola) • Red knot (Calidris canutus) • Sanderling (Calidris alba) • Dunlin (Calidris alpina alpina) • Bar-tailed godwit (Limosa lapponica) • Eurasian curlew (Numenius arquata) • Common redshank (Tringa tetanus) • Ruddy turnstone (Arenaria interpres)	
Nene Washes	SPA	Annex I and/or migratory species: • Bewick's swan (*Cygnus columbianus bewickii*) (non-breeding) • Eurasian wigeon (*Anas penelope)* (non-breeding)	10.2 km south

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		• Gadwall (Anas strepera) (breeding and non-breeding) • Eurasian teal (Anas crecca) (non-breeding) • Northern pintail (Anas acuta) (non-breeding) • Garganey Anas querquedula (Breeding) • Northern shoveler Anas clypeata (Breeding and Non-breeding) • Black-tailed godwit *Limosa limosa* (Breeding)	
Nene Washes	Ramsar	Criterion 2 – assemblage of rare breeding birds, nationally scarce plants and Red Data Book invertebrates Criterion 6 – internationally important populations of: • Bewick's swan (*Cygnus columbianus bewickii)*	10.2 km south
Ouse Washes	SPA	Annex I and/or migratory species: • Bewick's swan (Cygnus columbianus bewickii) (non-breeding) • Whooper swan (Cygnus cygnus) (non-breeding) • Eurasian wigeon (Anas Penelope) (non-breeding) • Gadwall (Anas strepera) (breeding) • Eurasian teal (Anas crecca) (non-breeding) • Northern pintail (*Anas acuta*) (non-breeding) • Garganey (Anas querquedula) (breeding)	15.2 km south east

Site name [site code] and size (ha)	Designation	Qualifying Features	Distance and direction from the closest point of the Scoping Boundary
		• Northern shoveler (Anas clypeata) (breeding and non-breeding) • Hen harrier (Circus cyaneus) (non-breeding) • Ruff (Philomachus pugnax) (breeding) • Black-tailed godwit (*Limosa limosa*) (breeding) Waterbird assemblage Breeding bird assemblage	
Ouse Washes	Ramsar	Criterion 1 - Seasonally flooded washlands Criterion 2 - Nationally scarce plants, Red Data Book invertebrates and rare breeding waterfowl Criterion 5 – winter assemblage of waterfowl Criterion 6 – internationally important populations of: • Bewick's swan (Cygnus columbianus bewickii) • Whooper swan (Cygnus cygnus) • Eurasian wigeon (Anas penelope) • Gadwall (Anas strepera) • Eurasian teal (Anas crecca) • Northern pintail (Anas acuta) • Northern shoveler (*Anas clypeat*)	

8.5.3 There are 28 other statutory designated sites within the 5 km Study Area, comprising 21 SSSI and seven LNR. Of these, three SSSI are associated with the boundary of international designated sites; Humber Estuary SSSI, Gibraltar Point SSSI and The Wash SSSI. The following SSSIs are located within the 5 km Study Area and are not associated with international designated sites:

- Bratoft Meadows SSSI;
- Tetney Blow Wells SSSI;
- Willoughby Meadow SSSI;
- Calceby Marsh SSSI;
- Sea Bank Clay Pits SSSI;
- Surfleet Lows SSSI;
- Muckton Wood SSSI;
- Swaby Valley SSSI;
- Hoplands Wood SSSI;
- Jenkins Carr SSSI;
- Willoughby Wood SSSI;
- Keal Carr SSSI;
- Claxby Chalk Pit SSSI;
- Skendleby Psalter Banks SSSI;
- Candlesby Hill SSSI;
- Swallow Wold SSSI;
- Cowbit Wash SSSI; and
- Chapel Point to Wolla Bank.

8.5.4 The closest of these sites are Bratoft Meadows SSSI, which located approximately 1.1 km east of the Scoping Boundary near Burgh le Marsh and comprises an area of species-rich neutral grassland, and Tetney Blow Wells SSSI, an area of wetland habitat located approximately 1.8 km east of the Scoping Boundary near Tetney. All other SSSIs are located over 2 km from the Scoping Boundary.

8.5.5 An additional three SSSI's (total of 14 sites) within 10km of the Study Area were recorded as having qualifying ornithological features. Sites overlapping with the SPA/Ramsar sites detailed within the section above were excluded. The remaining additional sites and distance from the Scoping Boundary are listed below:

- Islington Heronry SSSI (approximately 7.3 km east);
- Mavis Enderby Valley SSSI (approximately 6 km north); and
- Tattershall Carrs SSSI (approximately 8.7 km north west).

8.5.6 The closest LNR is Bradley and Dixon Woods LNR, which is located immediately adjacent to the north of the Scoping Boundary near Grimsby and Willougby Branch Line

LNR, which is located 100 m west of the Scoping Boundary near Farlesthorpe. All remaining LNR are located over 1 km from the Scoping Boundary.

8.5.7 There are no NNR within the 5 km Study Area.

Non-statutory Sites

8.5.8 There are 92 non-statutory sites designated for nature conservation identified within the 2 km Study Area. The sites are shown on **Figure 8.3 Non-Statutory Designated Sites for Nature Conservation within 2 km.** These sites have been designated as Local Wildlife Sites (LWS) in Lincolnshire or County Wildlife Sites (CWS) in Cambridgeshire and Norfolk for their biodiversity value at a local level. They are known to have supporting value to a wide variety of protected and ecologically important species and, or habitats. Of these sites, 21 are located within the Scoping Boundary.

8.5.9 In addition, Lincolnshire has a series of protected road verges that are not designated as LWS but are afforded their own protection and management; Roadside Nature Reserves (RNR). There are five RNR located within the 2 km Study Area, one of which is located within the Scoping Boundary.

Habitats

8.5.10 A review of the MAGIC website (Ref 8.5) and data from CPRC, NBIS and GLNP indicates that the following Priority Habitats under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (Ref 8.12) are present, or likely to be present (where determination by further survey is required), on land within the Scoping Boundary;

- coastal and floodplain grazing marsh;
- coastal saltmarsh;
- deciduous woodland;
- hedgerows;
- lowland calcareous grassland;
- lowland fens;
- lowland meadows;
- intertidal mudflats;
- ponds;
- reedbed;
- river;
- traditional orchard;
- wet woodland; and
- wood-pasture and parkland.

8.5.11 In addition to those habitats listed above, GLNP data indicates that open mosaic on previously developed land Priority Habitat is also present within the 2 km Study Area

8.5.12 There are three areas of ancient woodland present within the Scoping Boundary. These are the ancient and semi-natural and ancient replanted ancient woodland of Hornby / Mother Wood and the ancient and semi-natural ancient woodland of Withern Wood. There are also areas of ancient woodland located within the 2 km Study Area, including ancient and semi-natural woodland and ancient replanted woodland (**Figure 8.4 Other Ecological Designations**).

8.5.13 The following provides a high-level description of the habitats located in the separate Scoping Boundary sections and associated Study Area.

Section 1: Grimsby West Substation

8.5.14 The proposed Grimsby West Substation will be situated north of the villages of Aylesby and Laceby. The majority of land within this Section compromises of arable fields with boundary hedgerows and ditches.

8.5.15 There are no non-statutory designated sites within the Scoping Boundary in Section 1. There are three Local Wildlife Sites (LWSs) within the 2 km Study Area that are closest to Section 1.

8.5.16 There are no areas of designated ancient woodland within Section 1. Deciduous woodland Priority Habitat is scattered across Section 1.

Section 2: Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A (LCS-A)

8.5.17 This Section will cover a distance of approximately 34.5 km from Laceby Beck just south of Grimsby West Substation, running in a south-easterly direction to the village of Withern. The habitats across this area are dominated by managed farmland, including arable fields and pasture, with scattered areas of woodland. Section 2 intersects a number of watercourses and numerous ditches and boundary hedgerows.

8.5.18 There are 22 non-statutory LWS within the 2 km Study Area that are located closest to this Section. Eight of these non-statutory sites are located within this Section; Brackenborough Road Verge LWS, Bradley and Dixon's Woods LWS, Great Eau LWS, Laceby Beck North LWS, Laceby Carr Plantation and Pond LWS, Withern Ings LWS, River Freshney Headwaters LWS and Waithe Beck East LWS.

8.5.19 There are no areas of designated ancient woodland within this Section. Deciduous woodland and coastal and floodplain grazing marsh Priority Habitat are scattered across the Section. There is also River Priority Habitat associated with the main rivers in Section 2.

Section 3: LCS-A and LCS-B (including the overhead line between them)

8.5.20 LCS-A and LCS-B are located north west and north east of Alford, respectively. The emerging preferred route corridor in this Section covers a distance of approximately 9.5 km. The habitats here are dominated by arable fields with boundary hedgerows and ditches.

8.5.21 There are 17 non-statutory LWS within the 2 km Study Area that are located closest to this Section. Four non-statutory LWS are located within this Section: Grange Plantation, Aby LWS; Mother and Greenfield Woods LWS; The Browse LWS and Withern Wood LWS.

8.5.22 The ancient and semi-natural and ancient replanted ancient woodland of Hornby / Mother Wood and the ancient and semi-natural ancient woodland of Withern Wood are located within this Section. All represent deciduous woodland Priority Habitat and are associated with non-statutory sites in the proposed siting area of LCS-A. Small areas of woodland Priority Habitat are also located within the eastern area of this Section around the location of LCS-B.

Section 4: Overhead line from Lincolnshire Substation B to Weston Marsh Substation

8.5.23 This Section covers approximately 64 km from the LCS-B to the Weston Marsh Substation between the B1449 and Burgh le Marsh. The emerging preferred route corridor travels southwards over an area that is dominated by arable farmland, with boundary hedgerows and ditches, areas of pasture and scattered trees. The emerging preferred route corridor then diverges westwards, passing over Steeping River and Hobhole Drain, where the habitats continue to be dominated by arable farmland with some isolated areas of woodland. The emerging preferred route corridor moves south and west around the margins of Boston, passing over arable farmland, a series of drains and the River Witham. Between South Forty Foot Drain and the River Welland arable fields continue to dominate, with drains and watercourses flowing towards the Humber Estuary and some scattered areas of woodland.

8.5.24 There are 29 non-statutory LWS within the 2 km Study Area that are located closest to this Section. Seven non-statutory LWS are located within this Section; Hobhole Drain, Boston Corporation Farm to Station Cottages LWS, Surfleet Bank LWS, Risegate Eau LWS, The Lymn LWS, Sloothby Low Lane LWS, Sloothby Meadows LWS and South Forty Foot Drain LWS.

8.5.25 There are no areas of ancient woodland within or nearby Section 4. There are areas of calcareous grassland and lowland meadow Priority Habitat associated with Sloothby Meadows LWS at the north end of this Section. Coastal floodplain grazing marsh is present across the Section, with a concentration of this habitat located in the area south of Burgh-le-Marsh where it is associated with lowland meadow Priority Habitat. Small blocks of deciduous woodland are also present at discrete locations across the section. Intertidal mudflats and coastal saltmarsh are associated with the margins of the River Welland.

Section 5: Weston Marsh Substation

8.5.26 The Weston Marsh Substation is proposed to be located in an area of arable farmland located south of the River Welland. The habitats comprise open arable fields with boundary ditches and roads, with scattered blocks of woodland.

8.5.27 There are six non-statutory LWS located within the 2 km Study Area closest to this Section. Only Surfleet Seas End Saltmarshes LWS falls within the Section, being located on the eastern boundary.

8.5.28 There are no areas of ancient woodland within or nearby this Section. There are several areas of deciduous woodland Priority Habitat within this Section. The River Welland represents river Priority Habitat and is associated with areas of intertidal mudflats Priority Habitat.

Section 6: Overhead line from Weston Marsh Substation to Walpole B Substation

8.5.29 Section 6 will cover approximately 26 km of the emerging preferred route corridor from the proposed Weston Marsh Substation to the proposed Walpole B Substation. This Section is also dominated by large, open arable fields with boundary ditches, watercourses and roads. Within this Section is the River Nene and some large drains, including South Holland Main Drain and North Level Main Drain.

8.5.30 There are 14 non-statutory LWS or CWS located within the 2 km Study Area closest to this Section. Two non-statutory CWS are located within the Scoping Boundary; River Nene CWS and Honington House Farm CWS.

8.5.31 Coastal floodplain grazing marsh and lowland deciduous woodland Priority Habitats are scattered across this Section. Lowland meadow Priority Habitat is present south of the B1165 in the central area of the Section. There are lengths of lowland fen Priority Habitat associated with the margins of North Level Main Drain. The River Nene supports mudflat Priority Habitat, and lowland meadow and lowland calcareous grassland areas.

Section 7: Walpole B Substation

8.5.32 The location of the proposed Walpole B Substation is dominated by arable farmland with boundary hedgerows, ditches and watercourses. There are scattered trees associated with the urban habitats of Ingleborough and Mill Road that are located centrally in this Section.

8.5.33 There are no areas of ancient woodland within or nearby this Section. There are areas of deciduous woodland Priority Habitat within this Section that are located adjacent to Mill Road.

Species

8.5.34 Protected and notable species comprise those listed under Schedules 1, 5 and 8 of the Wildlife and Countryside Act (WCA) 1981 (as amended) (Ref 8.13); Schedules 2, 4 and 5 of the Habitat Regulations (Ref 8.14); and species and habitats of principal importance for nature conservation in England listed pursuant to Section 41 of the (NERC) Act 2006 (Ref 8.12). Records of other species are also considered and have been assessed e.g. those included in national, regional or local Red Data Books and Lists but not protected by legislation.

8.5.35 INNS include those which are listed under Schedule 9 of the WCA 1981 (as amended) (Ref 8.13) and the Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 8.15).

Amphibians

8.5.36 Great crested newts are known to be present within the Scoping Boundary to the west of Laceby, between Brigsley and Holton le Clay, east of Louth, between Claythorpe and Huttoft, west of Addlethorpe and at Burgh le Marsh.

8.5.37 There are eight granted great crested newt (*Triturus cristatus*) licences within the 2 km Study Area. None of these lie within the Scoping Boundary (the closest is just under 150 m from the Scoping Boundary, south of Burgh le Marsh).

8.5.38 There are also records of priority species including common toad (*Bufo bufo*) and palmate newt (*Lisotriton helveticus*) within the 2 km Study Area.

Badger

8.5.39 There are numerous records for badgers across the whole Scoping Boundary. Badger records are confidential to protect this species from persecution and therefore have not been included here.

Bats

8.5.40 The following bat species have been recorded within the Scoping Boundary:

- Unknown bat species;
- Brown long-eared bat (*Plecotus auratus*);
- Common pipistrelle (*Pipistrellus pipistrellus*);
- Daubenton's bat (*Myotidaubentoniidii*);
- Long-eared bat (*Myotis septentrionalis*);
- Myotis bat;
- Nathusius pipistrelle (*Pipistrellus nathusii*);
- Natterer's bat (*Myotis nattereri*);
- Noctule (*Nyctalus noctua*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*); and
- Whiskered / Brandt's bat (*Mytois mystacinus / brandtii*).

8.5.41 There were also records for Leisler's bat (*Nyctalus leisleri*) and the Annex II bat Weston barbastelle (*Barbastella barbastellus*) within the 2 km Study Area. The records of Western barbastelle were located near Wainfleet near Section 4, Pinchbeck near Section 6 and Terrington St John near Section 7 of the Scoping Boundary.

8.5.42 There are no previous European Protected Species licences for bats within the Scoping Boundary. There are three granted bat licences within the 2 km Study Area, which cover the following species; brown long-eared (*Plecotus auratusi*), common pipistrelle (*Pipistrellus pipistrellus)* and soprano pipistrelle (*Pipistrellus pygmaeus*).

Birds

8.5.43 The data search (combined from GNLP, CPRC and NBIS) returned numerous records of protected and notable bird species within the 2 km Study Area. These records include a total of 142 bird species, consisting mostly of waterbirds (approximately 51% of records). Records further include 40 Section 41 species and 18 qualifying bird species of the adjacent SPA/Ramsar sites (as defined within **Table 8.3** for each site).

8.5.44 All returned records of birds are concentrated within proximity to Sections 2 to 4 of the Scoping Boundary, with records of birds that represent qualifying species of Habitat Sites (SPA, Ramsar sites) predominantly concentrated around Section 2. Records of qualifying bird species are largely contributed by records of redshank, goldeneye and curlew.

8.5.45 When focussing on the abundance of selected key species and their distribution across the Scoping Boundary (under certain thresholds), the following trends were noted:

- Bewick's (or tundra) swan records (abundance >10) – Small number of records distributed around Sections 2, 4, 5 and 6, with a peak count of 80 recorded at Holbeach St Johns.
- Whooper swan (abundance >50) – High number of records evenly distributed between Sections 2 to 6 (between the Scoping Boundary and the coastline), with a peak count of 244 recorded at Middlemarsh Farm (Skegness).
- Barnacle goose (abundance >10) – Small number of records distributed around Sections 2 and 4 with a peak count of 121 recorded at Tetney.
- Dark-bellied brent goose (abundance >500) – Small number of records distributed around Section 4 (predominantly around Boston), with a peak count of 3,000 recorded at Kirton and Wainfleet All Saints.
- European white-fronted goose (*Anser albifrons)* (abundance >1) – Small number of records distributed around sections 2 and 4, with a peak count of 29 recorded at Middlemarsh Farm. A single record of Greenland white-fronted goose (*A. albifrons flavirostris*) was also recorded at Tetney.
- Greylag goose (*Anser anser)* (abundance >500) – Records are distributed around Section 2 with a peak count of 3,430 recorded at Covenham Reservoir.
- Lapwing (*Vanellus vanellus*) (abundance >200) – High number of records evenly distributed across/within proximity to the Scoping Boundary, with a peak count of 7,000 recorded at Tetney.
- Curlew (abundance >200) – High number of records distributed around Section 2 and 4, with a peak count of 2692 recorded at Wainfleet All Saints.

Hazel Dormouse

8.5.46 There are no records of hazel dormouse within the 2 km Study Area.

8.5.47 The Scoping Boundary lies beyond the known distribution of hazel dormouse. Given this and the lack of local records it is considered likely that this hazel dormouse is absent and this species is scoped out of further assessment.

Invertebrate

8.5.48 Within the 2 km Study Area the records include 73 priority species of terrestrial invertebrate. Of these, the following are located within the Scoping Boundary; 27 priority species of butterflies and moths, two priority species of beetle and two priority species of hymenopteran.

8.5.49 There are records of notable aquatic invertebrates within the 2 km Study Area, including *Riolus subviolaceus*, *Stagnicola palustris/fuscus/corvus*, *Limnephilus hirsutus*, *Limnephilus binotatus*, *Pisidium henslowanum*, swan mussel *Anodonta cygnea*, *Sphaerium rivicola*, *Anacaena limbate*, *Nephrotoma analis*, common darter *Sympetrum striolatum*, white-barred soldier fly *Oxycera morrisii*, pygmy backswimmer *Plea minutissima*, Lister's river snail *Viviparus contectus* and *Noterus crassicornis*;

8.5.50 Within the Scoping Boundary, the invertebrates records include the fully protected butterfly species; swallowtail (*Papilio machaon*), high brown fritillary (*Fabriciana adippe*), pearl-bordered fritillary (*Boloria euphrosyne*) and marsh fritillary (*Euphydryas aurinia*). With the exception of swallowtail each of these records are over 80 years old and considered unlikely to still be present and are scoped out of further assessment.

Otter

8.5.51 Otter records are located across the Scoping Boundary in association with the rivers, drains and ditches. There are no records of confirmed natal holts within the 2 km Study Area.

Reptile

8.5.52 There are numerous records for grass snake (*Natrix Helvetica*) across the Scoping Boundary, and also discrete records of common lizard (*Zootoca vivipara*) and slow worm (*Anguis fragilis*). These species are also present in the 2km Study Area.

Water vole

8.5.53 There are numerous records of water vole (*Arvicola amphibus*) across the Scoping Boundary that are associated with the majority of rivers and drains and also some of their tributaries.

Fish

8.5.54 Seven notable fish species have been recorded in the 2 km Study Area including brown/sea trout (*Salmo trutta*), bullhead (*Cottus gobio*), European eel (*Anguilla anguilla)*, lamprey (*Pteromyontidae* sp), brook lamprey (*Lampetra planeri*), spined loach (*Cobitis taeniaII)* and grayling (*Thymallus thymallusI)*.

Invasive and non-native species

8.5.55 There are records of 39 INNS withing the 2 km Study Area. These include species listed on Schedule 9 of the WCA 1981 (as amended), such as Japanese knotweed (*Fallopia japonica*).

Bird Surveys Completed

8.5.56 Winter bird surveys have been undertaken over the winter of 2022/2023 at targeted locations based on an emerging route corridor. As agreed with Natural England the following three survey methods were undertaken:

- Vantage Point (VP) surveys were planned initially at 20 locations recording species in a 180-degree view arc. Surveyors were paired on each VP, with each surveyor recording in opposite directions, resulting in effectively 40 VP surveys. VP surveys surveyed the land out to 2 km recording all waterbirds. VP surveys were undertaken monthly from November 2022 to March 2023, although the survey coverage and duration across this period for each location varied due to some access limitations.

- The emerging route corridor was surveyed using a driven transect in January 2023 and March 2023. All waterbirds were recorded along the driven transect, as well as habitat and crop type where applicable.

- At each of the initial 20 VP locations, a driven / walked transect was undertaken recording all birds along the transect route and out to approximately 2 km from the VP location. Transects were undertaken at the same time of month and year as the VP surveys.

8.5.57 Surveys primarily targeted waterbirds as these could be associated with nearby international sites.

8.5.58 At the time of writing this Chapter, the results of the winter bird surveys are being fully analysed. Baseline data collected from the winter bird surveys indicated that during the survey period pink-footed geese (*Anser brachyrhynchus*), brent geese (*Branta bernicla*) and Bewick's swans (*Cygnus columbianus bewickii*) did not use the Survey Area in notably large aggregations to feed or roost .

8.5.59 Large numbers of pink-footed geese were recorded but were mostly flying high above the maximum electricity pylon height. A peak count of 350 pink-footed geese (*Anser brachyrhynchus*) landed in fields west of Boston in mid-January 2023 (recorded from vantage point surveys at vantage point 7), within Section 4 of the Scoping Boundary. The second largest count was of 182 pink-footed geese (*Anser brachyrhynchus*) in December 2022 in the centre of the Scoping Boundary within Section 4 (recorded from transect surveys at transect 11). Other counts on the ground were infrequent and less than 100 individuals.

8.5.60 In November 2022, 12 brent geese (*Branta bernicla*) were recorded feeding in fields south of Cumberworth, outside the emerging preferred route corridor (Section 4 of the Scoping Boundary). There were no other records of brent geese (*Branta bernicla*) on the ground from surveys. There were limited records of whooper swan (*Cygnus cygnus*) and Bewick's swan (*Cygnus columbianus bewickii*) on the ground: four whooper swans in January 2023, north of New Leake, foraging in a cereal crop. In December 2022, seven whooper swans (*Cygnus cygnus*) landed in the area of Ludborough.

8.5.61 Some large flocks of curlew (*Numenius Arquata*), golden plover (*Numenius arquata*), and lapwing (*Vanellus vanellus*) were recorded, both overflying and foraging in fields along the emerging preferred route corridor. The majority of flying curlew (*Numenius Arquata*), golden plover (*Numenius arquata*) and lapwing (*Vanellus vanellus*) were recorded at altitudes between 10 m and 60 m, thereby presenting a potential collision risk with any future electricity pylons. It appears that the most favourable habitat is around the centre of the emerging preferred route corridor at Sections 3 and 4, where marshy grassland and standing water have been encouraged through active management.

8.5.62 There were some differences between the coverage of surveys and the current Scoping Boundary. These differences were focused at the southern extent of the Survey Area between Weston Marsh and Walpole. At the time of surveys in winter 2022/23 the location of the emerging corridor in this area was still evolving and hence the VP locations do not directly align with the emerging preferred corridor and Scoping Boundary in this location. The scope of future winter bird surveys will close the data gaps in this southern area of the Project, providing two winters of survey data. Although data would therefore be gathered across three winters, this is not considered to constrain the final evaluation as the assessment can be informed by comparison against national and regional data and the application of professional judgement.

8.5.63 Nature Scot guidance (2020) (Ref 8.16) and Band *et al.* (2007) (Ref 8.17) set out a method of quantifying bird mortality arising from mid-flight collisions with operational wind turbines, by means of a mathematical collision risk model (CRM). However, an equivalent model to quantify collisions with static infrastructure such as guyed anemometer masts and overhead power lines (OHL) is not available, and therefore a quantified assessment of collision risk cannot be applied for the purposes of the Project.

8.5.64 The potential pathway of bird mortality resulting from in-flight collisions with the emerging preferred route corridor will be assessed qualitatively and a risk level derived for each of the Scoping Boundary sections, and for any other locations along the Scoping Boundary that are identified as being of relatively high risk by virtue of the proximity of designated sites and habitats that provide important or regularly used roosting and feeding resources and where potentially significant flyways are identified. A collision risk index based on observed flight activity will be derived for each sensitive location based on the observed number and height of bird passes (for relevant species[3]) across the emerging preferred route corridor.

8.5.65 The above surveys and assessment of collision risk will be reported within the ES along with the surveys detailed in Section 8.7.

Future Baseline

8.5.66 Relative to the current baseline, the value of ecological features present is not expected to change significantly by the end of the construction period. Management of the habitats is unlikely to change over this period, and consequently no significant degradation or improvement of habitat condition is expected. Due to development pressure year on year within the wider landscape, protected and notable species and habitats are likely

[3] "Relevant Species" would be determined for each location where this exercise is undertaken, but would as minimum include all species that are qualifying features of national and international statutory designated sites and any other species of principal importance that are known to be vulnerable to collision with overhead infrastructure, identified on a case by case basis.

to remain priorities for conservation within future baseline scenarios. Large parts of land within the Scoping Boundary are located on agricultural land and current agricultural practices are likely to be maintained.

8.6 Design and Control Measures

Design Measures

8.6.1 The emerging preferred route corridor on which the Scoping Boundary is based has been routed to avoid designated sites and sensitive receptors as far as possible. This is in accordance with the Planning Inspectorate's Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects, Version 9 (November 2022) (**Error! Reference source not found.**), the Habitats Regulations 2017 (Ref 8.14), the Holford Rules (Ref 8.18) and relevant legislation and policies outlined in **Appendices 2A** to **2C.**

8.6.2 **Chapter 3 Main Alternatives Considered** and the Corridor and Preliminary Routeing and Siting Study (CPRSS) (Ref 8.19) detail the evolution of the Project to avoid some of the known major constraints, including proximity to the international sites of nature conservation importance. A small number of designated sites, areas of ancient woodland and areas of Priority Habitats lie within the Scoping Boundary. The design development will progress with a view to avoid these areas as far as practicable as the route corridor and Order Limits are defined.

8.6.3 Further design measures will be developed as the Project design evolves, such as micro-siting of individual pylons and access routes to avoid direct and indirect impacts on receptors, protected habitats and species where possible. Oversailing may be used to avoid direct effects on receptors, including: the River Freshney Headwaters LWS, Wintern Ings LWS, Sloothby Low Lane LWS, South Forty Foot Drain LWS and River Nene CWS. Other measures may include applying appropriate buffers to designated sites and Priority Habitats (including ancient woodland and ancient and veteran trees) to avoid direct effects, combined with standard control measures to avoid indirect effects on such sites and habitats.

8.6.4 At sensitive crossing locations (e.g. rivers), existing access routes would be used as far as possible and the width of any required working area reduced as far as practicable. If access upgrades are required, temporary bridges will be used in preference to culverts. Where culverts are unavoidable, these will either be arch culverts, leaving the natural bed undisturbed, or they would be installed with the invert set below the natural bed level for a semi-natural bed to establish within the culvert.

8.6.5 Micro-siting of pylons would take into account the swing of the OHL to avoid or minimise loss from notable habitats, including woodland and trees.

8.6.6 Vegetation would be retained where possible. In order to avoid destruction of active bird nests, where practicable, in any areas where vegetation clearance is required, such works would be undertaken outside the breeding bird season (outside March-August) unless clear reasons to take an alternative approach have been identified following review of the baseline data (for e.g. where there are risks to sensitive or ecologically important roosting or feeding birds during the non-breeding season at locations where breeding birds are unlikely to occur). Where this is not possible, vegetation removal would be undertaken under supervision of an appropriately qualified ecologist and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods would also be used to ensure vegetation with potential to

support other legally protected species (for e.g. reptiles) is removed sensitively and in compliance with legal requirements.

8.6.7 An environmental gain (BNG) equivalent to a minimum 10 per cent uplift above the current baseline situation will be built into the Project through the design process, in line with the Environment Act 2021. It is anticipated the legislation mandating the need for 10 per cent net gain for DCO projects will be in place by 2025. As detailed in **Chapter 1 Introduction**, National Grid has committed to 10 per cent Net Gain in environmental value including as a minimum 10 per cent BNG across all its construction projects (Ref 8.20).

8.6.8 Areas of temporary habitat loss would be reinstated, wherever practicable, following the completion of construction in each section. Wherever possible, reinstatement would be back to the type of habitat affected or improved / enhanced. Areas of permanent habitat loss would be considered during the siting of environmental gain from BNG, as described above.

Control and Management Measures

8.6.9 An Initial Outline Code of Construction Practice is provided in **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could affect the ecology and biodiversity assessment are:

- GG01: The Project will be run in compliance with all relevant legislation, consents and permits.
- GG03: A Construction Environmental Management Plan (CEMP), a Landscape and Ecological Management Plan (LEMP), a Construction Traffic Management Plan (CTMP), and a Site Waste Management Plan (SWMP) will be produced prior to construction. These are collectively referred to as 'the Management Plans'.
- GG04: The CEMP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans. The Main Works Contractor shall undertake daily site inspections to check conformance with the Management Plans.
- GG05: A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced Environmental Clerk of Works (ECoW) will be available during the construction phase to advise, provide a watching brief and to report on the delivery of the mitigation methods and controls outlined in the CEMP. The Environmental Clerk of Works will monitor that the works proceed in accordance with relevant environmental DCO requirements and adhere to the required good practice and mitigation measures. The Environmental Clerk of Works will be supported as necessary by appropriate specialists, including the ECoW and arboriculturists.
- GG07: A record of condition will be carried out (photographic and descriptive) of the working areas that may be affected by the construction activities, prior to works commencing. This record will be available for comparison following reinstatement after the works have been completed to ensure that the standard of reinstatement at least meets that recorded in the pre-condition survey.
- GG08: Land used temporarily will be reinstated where practicable to its pre-construction condition and use. Hedgerows, fences and walls (including associated

earthworks and boundary features) will be reinstated to a similar style and quality to those that were removed, unless otherwise agreed.

- GG09: Where sensitive features are to be retained within or immediately adjacent to the Order Limits, an appropriate protective area will be established using appropriate fencing and signage and will be inspected, repaired and replaced as necessary. The protective areas will be shown on the Retention and Reinstatement Plans contained within the LEMP.
- GG11: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG15: Fuels, oils and chemicals will be stored responsibly, away from sensitive water receptors. Where practicable, they will be stored >15 m from watercourses, ponds and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a >15 m distance, additional measures will be identified. All refuelling, oiling and greasing of construction plant and equipment will take place above drip trays and also away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potentially hazardous materials used during construction will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby.
- GG16: Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency).
- GG17: Wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps.
- GG19: Earthworks and stockpiled soil will be protected by covering, seeding or using water suppression where appropriate.
- GG21: Construction lighting will be of the lowest luminosity necessary to safely perform each task. It will be designed, positioned and directed to reduce the intrusion into adjacent properties, protected species and habitats.
- B01: The contractor(s) will comply with relevant protected species legislation. Appropriate licences will be obtained where necessary from Natural England or the Environment Agency for all works affecting protected species as identified by the Environmental Statement and through pre-construction surveys. All applicable works will be undertaken in accordance with the relevant requirements and conditions set out in those licences.
- B02: In the event that vegetation or any other feature with the potential to support breeding birds is required to be removed during the main breeding bird season (01 March to 31 August) or, in the case of Schedule 1 birds (e.g. barn owl), is likely to be disturbed, then works will be undertaken in the presence or supervised by an

Environmental Clerk of Works. Appropriate protection measures will be put in place should active nests be found. These will include exclusion zones around active nests until chicks fledge or nests become inactive as determined by monitoring by the Environmental Clerk of Works. Active nests of wild birds are protected at all times and therefore the same measures will be put in place if an active nest is identified at any time of year.

- B03: Where there will be a risk of animal entrapment, a means of escape will be installed into all excavations left open overnight.
- B04: To control the spread of invasive weeds in accordance with the Wildlife and Countryside Act 1981, any plant or machinery that has been used in areas contaminated or infested with invasive species (both terrestrial and aquatic), such as Japanese knotweed and Himalayan balsam, will be thoroughly cleaned. Water used to clean vehicles will be discharged or emptied into the contaminated area controlled to prevent the spread of the plant (through plant propagules, e.g. seeds, rhizomes, fragments, etc.). The area will be cordoned off to prevent any inadvertent spreading. Any plant material or soil contaminated with plant propagules if removed from a site is classified as controlled waste and should be disposed of in a suitably licensed landfill site, accompanied by appropriate Waste Transfer documentation, and must comply with Section 34 of the Environmental Protection Act 1990.
- B05: Where appropriate, suitable habitat for common reptiles will be subject to two-stage habitat manipulation that will take place between mid-March and mid-October. Firstly, vegetation will be cut to approximately 150 mm (with the arisings removed) under the supervision of an Environmental Clerk of Works and the site left for a minimum of two days to allow reptiles to naturally disperse from the area. Secondly, vegetation will be cleared down to ground level under the supervision of an ECoW. Vegetation will be cleared using appropriate equipment based on the type of vegetation to be removed, the area affected, and the risk of mortality or injuring reptiles. Construction works could commence immediately after completion of the second stage. Reptile hibernacula will be retained and protected during construction where practicable. If unavoidable, the removal of vegetation and groundworks at hibernacula will be timed to avoid the hibernation season (late October to early March). Replacement hibernacula and refugia will be provided.
- B06: Alternative roost structures (bat boxes) will be provided (with landowner consent) on retained trees within the Order Limits or areas outside of the Order Limits agreed with landowners. Unless specified otherwise by the provisions of any protected species licence for bats, two boxes will be provided for each tree to be felled where Potential Roost Features (PRF) on that tree are classified as PRF-I bat roost potential. Five boxes will be provided for each tree with PRF-M bat roost potential to be felled.
- BO7: Alternative barn owl breeding sites (barn owl boxes) will be provided (with landowner consent) on retained trees or poles within the Order Limits or areas outside of the Order Limits agreed with landowners. Two boxes will be provided for each breeding site impacted.
- B08: Where the works require the crossing or removal of hedgerows, the gap will be reduced to a width required for safe working. Where hedge removals are necessary, ‘dead hedging’ should be used, where practicable, in the interim periods to retain connectivity during construction. Dead hedging can comprise vegetation arisings or artificial provision, such as willow screening panels or Heras

fencing covered in camouflage netting. New hedgerow planting will contain native, woody species of local provenance.

- BO9: Habitat translocation or any species translocation (if required) that is not covered by protected species licences will be undertaken in accordance with a strict method statement. The method statement will be specific to the habitat type or species affected and will detail the appropriate construction methods, timing, management, receptor site preparation and post-construction habitat management and monitoring. The receptor site will be clearly identified and prepared in advance of translocation.

8.6.10 The CEMP will include other standard measures relating to ecology such as:

- Pre-construction surveys to validate and, where necessary, update the baseline survey findings. The purpose of these pre-construction surveys would be to ensure mitigation during the construction phase is based on the latest protected species information. This would also be required for any protected species licensing.
- Reasonable avoidance measures, including appropriate buffers around identified active badger setts (if present), or trees with bat roost suitability where possible throughout the site.

8.7 Potential for Significant Effects

8.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 8.6.

8.7.2 Table 8.4: Impacts, receptors and potential for significant effects sets out the receptors identified within the Study Area, the potential impacts as a result of construction, maintenance and/or operation activities associated with the Project, whether these impacts are likely to give to rise to significant effects, and whether the receptor is scoped in or scoped out of the assessment.

8.7.3 The potential sources of impact that have been considered in the assessment are as follow:

- Habitat loss
- Habitat deterioration through alterations in air quality, hydrology and pollution
- Fragmentation through the severing of ecological connections
- Disturbance of ecological features through increased noise, vibration, light, pollution, electromotive force or increased human presence

8.7.4 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Table 8.4: Impacts, receptors and potential for significant effects

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
All	Site clearance Construction activities (increased human presence, noise, lighting, pollution) Operational activities (increased noise and lighting)	Permanent habitat loss. Temporary habitat loss, disturbance and fragmentation Indirect impacts.	Statutory and non-statutory designated sites (without mobile qualifying criteria) located greater than 2 km from the Scoping Boundary.	No – the distance separating these sites from the Project is sufficient to reduce any risk of biophysical change to negligible.	Scoped out
Construction and maintenance	Site clearance Construction activities (increased human presence, noise, lighting, pollution)	Permanent habitat loss. Temporary habitat loss, disturbance and fragmentation	Statutory designated sites: Humber Estuary SAC / SPA / Ramsar / SSSI Gibraltar Point SPA / Ramsar The Wash and North Norfolk Cost SAC The Wash SPA / Ramsar Bratoft Meadows SSSI Tetney Blow Holes SSSI	**Yes** – there will be no direct loss of habitat from statutory designated sites. It is however possible that habitats utilised by birds or other species associated with nearby designated sites (i.e. functionally linked land) such as the Humber Estuary SPA/SAC/Ramsar could be lost. Surveys will investigate use of these habitats by such species and inform any requirement for mitigation or necessity for design adjustments.	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only).

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
	Site clearance Construction activities (increased human presence, noise, lighting, pollution)	Permanent habitat loss. Temporary habitat loss, disturbance and fragmentation	Non-statutory designated sites; LWS RNRs (Lincolnshire)	**Yes** – the overhead line infrastructure, supporting structures, and associated tracks have the potential for direct habitat loss within non-statutory designated sites. Until the route corridor and working methods are confirmed this impact pathway will be included as a possibility. Permanent habitat loss of a non-statutory designated site could occur as a result of the overhead line infrastructure such as the siting of a pylon, or the required clearance below the OHL/conductors.	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only).
	Site clearance Construction activities (increased human presence, noise, lighting, pollution)	Permanent habitat loss. Temporary habitat loss disturbance and fragmentation	Priority and notable habitats Ancient woodland and ancient and veteran trees	**Yes** – semi-natural woodland (if present), hedgerows, lowland meadow, coastal and floodplain grazing marsh, arable field margins, and other notable habitats could be impacted by pylon locations, supporting structures and access routes. Permanent habitat loss of notable habitats could occur as a result of the overhead line infrastructure such as the siting of a pylon, or the required clearance below the OHL/conductors. However, a combination of routeing, micro-siting, and habitat re-instatement and replacement will be employed	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only)

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
				as mitigation and reduce these impacts, where possible.	
	Site clearance Construction activities (increased human presence, noise, lighting, pollution)	Permanent habitat loss. Temporary habitat loss, disturbance and fragmentation	Protected and notable species: Invertebrates GCN Reptiles Non-breeding birds (terrestrial) Breeding birds Bats Badger Otter Water vole Other mammals (including only brown hare, hedgehog, polecat) Fish Aquatic macroinvertebrates and macrophytes	**Yes** – habitats with potential to support protected and notable species to be potentially impacted by overhead line infrastructure, supporting structures, and associated access tracks. Permanent habitat losses may reduce the extent of habitat available to protected or notable species. Mitigation measures will include habitat avoidance, reinstatement and compensation. Habitat connectivity may be impacted in the short term but will be minimised where possible to avoid key habitats. Where unavoidable fragmentation or habitat degradation is unavoidable this will be a temporary effect until habitat re-instatement is established.	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only).

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
	Site clearance	Incidental mortality of protected or notable species	Invertebrates	No – it is unlikely that notable population assemblages will be significantly affected by direct mortality once mitigation measures are in place, as such populations will be linked to habitat.	Scoped out for all phases
	Site clearance	Incidental mortality of protected or notable species	GCN Reptiles Breeding birds Non-breeding birds Bats Badger Other mammals (including only brown hare, hedgehog, polecat)	**Yes** – potential exists for unmitigated works to impact protected and notable species which may be relatively isolated along the route corridor depending on the access routes (haul road) and result in direct mortalities. If the route corridor cannot avoid suitable habitat, mitigation options include a works Ecological Method Statement or Natural England mitigation licence to avoid direct mortalities.	**Scoped in** for all during construction and maintenance
	Site clearance	Incidental mortality of protected or notable species	Riparian mammals (otter and water vole) and other aquatic species	**Yes** – Increased levels of incidental mortality may undermine the conservation status of protected or notable species. It is expected that direct impacts on watercourses (and therefore water vole, otter and other aquatic species) can be avoided through appropriate design and routing of access requirements. However, until routing and design can be confirmed, there is a potential requirement for mitigation	**Scoped in** for all during construction and maintenance

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
				and these receptors remain scoped in.	
	Construction activities (increased human presence, noise, lighting, pollution)	Disturbance to protected or notable species (noise/ vibration, visual, lighting)	GCN Non-breeding birds (intertidal) Non-breeding birds (terrestrial) Breeding birds Bats Badger Otter Water vole Fish	**Yes** – trees, hedgerows and other habitats within the Scoping Boundary may be suitable for protected or notable species. Disturbance above a tolerable threshold may affect the extent of habitat that is available to protected or notable species. If the route corridor cannot avoid disturbance impacts, then mitigation (i.e. works under an Ecological Method Statement or Natural England mitigation licence) could be required.	**Scoped in** for all during construction and maintenance
	Construction activities (altered traffic and associated changes in air quality)	Changes in air quality, negatively impacting protected or otherwise notable habitats within 200 m of the affected road network.	Designated sites and notable habitats (ancient woodland and ancient and veteran trees) within 200 m of roads that may be affected by the Project.	**Yes** – should screening of construction traffic flows show vehicle trips exceed the Institute of Air Quality Management (IAQM) criteria then habitat degradation can occur. Changes in air quality during maintenance are not predicted to lead to significant effects upon ecological receptors (**Chapter 14 Air Quality**) and therefore are scoped out.	**Scoped** in for construction

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
		Pollution impacts (dust deposition water)	Designated sites and notable habitats	**Yes** – potential for pollution or other indirect impacts during construction resulting in degradation of habitats, including those used by protected and notable species. This will be mitigated though implementation of the CEMP. Changes in water quality (**Chapter 10 Water Environment**) and dust (**Chapter 14 Air Quality**) during maintenance are not predicted to lead to significant effects upon ecological receptors and therefore are scoped out.	**Scoped in** for all during construction Scoped out for maintenance
	Site clearance Construction activities (increased human presence)	Introduction of invasive non-native species leading to degradation of existing habitat quality and reduction in native species due to being outcompeted.	Designated sites and protected and notable habitats and species	**Yes** – potential for spread of invasive non-native species during works and movement around the site. Introduction of INNS can be detrimental to native habitats and species present.	**Scoped in** for all during construction and maintenance
	Construction activities (altered water quantity and quality)	Loss/ reduction in habitat quality for protected and notable species due to changes in ground water	Designated sites and protected and notable habitats and species.	**Yes** – potential for degradation of existing habitat quality, which could impact designated or otherwise notable habitat and protected and notable species.	**Scoped in** during construction and maintenance

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
		levels or altered water quality			
Operation	Birds colliding with infrastructure	Collision mortality due to permanent structures/ barriers.	Breeding and non-breeding birds	**Yes** – potential exists for the OHL to affect breeding and non-breeding birds through collision risk.	**Scoped in** for breeding and non-breeding birds
	Artificial lighting of permanent infrastructure	Light pollution spilling onto surrounding habitats, resulting in disturbance impacts to protected or notable species	Protected and notable species	**Yes** – in the absence of mitigation and appropriate design, there is potential for operational lighting to result in the accidental disturbance of protected or notable species, limited to substations.	**Scoped in** for substation locations only
	Placement of permanent infrastructure	Habitat fragmentation through the development creating a barrier to species dispersal.	Protected and notable species	**Yes** – infrastructure could result in a degree of habitat fragmentation to terrestrial and potentially aquatic habitat.	**Scoped in** for protected and notable species
	Creation of permanent infrastructure	Habitat gains for nesting birds, created by proposed pylons.	Nesting birds (kestrel, hobby and peregrine)	**Yes** –pylons could provide additional nesting habitat for species where this was not previously available, with a beneficial effect on local or regional populations for these species. Hobby and peregrine are rare breeding birds in the UK[4].	**Scoped out,** while some beneficial effects may occur these would be localised and are unlikely to be significant

[4] As per their inclusion on the list of native species monitored by the Rare Breeding Birds Panel (RBBP) [online]. Available at: https://rbbp.org.uk/list-of-species-currently-reported-on-by-rbbp/. (Accessed 31 May 2024).

Project Phase	Impact Source	Impact	Receptor	Potential for significant effects	Proposed to be scoped in/out
	Creation of permanent infrastructure	Increased predation of birds arising from potential increased population of predatory bird species nesting and roosting on proposed pylons	Statutory designated sites: Humber Estuary SPA / Ramsar / SSSI The Wash SPA / Ramsar Non-breeding birds[5]	**Yes** – increased occurrences of nesting corvids, kestrel, hobby and peregrine may increase predation rates of birds across the route. However, this is only likely to be significant for designated sites; this would be expected to occur only where the distance between proposed pylons and designated site(s) with ornithological qualifying features is less than the foraging range of the predatory species in question.	**Scoped in** (for designated sites only)

[5] This potential effect is listed for "non-breeding" birds, because the duration and timing of breeding seasons varies for each species. Therefore, the breeding season of one species might overlap the non- breeding period of another species.

8.8 Proposed Assessment Methodology

Proposed Data Sources

8.8.1 In addition to the data sources listed in Section 8.4, the following data sources are proposed to be used to inform the ecology and biodiversity assessment:

- Woodland Trust Ancient Tree Inventory (Ref 8.21) for records of veteran and ancient trees;
- Environment Agency Ecology and Fish Data for species records of fish, macroinvertebrate and macrophytes species (Ref 8.9);
- Environment Agency Catchment Data Explorer for data on WFD water bodies and water catchments (Ref 8.10);
- National Biodiversity Network (NBN) Gateway for open-source records of protected and, or notable species recorded within 2 km of the Project Boundary (Ref 8.22);
- data held by the relevant councils, and local groups and organisations, where not already accessed through the LRCs;
- The British Trust for Ornithology (BTO) Wetland Birds Survey (WeBS);
- The BTO data report (all species);
- avifauna and bird reports at a regional, county or local level, collected by regional volunteer wildlife conservation and recording groups;
- data held by the RSPB; and
- Humber Nature Partnership data.

Technical Guidance

8.8.2 The ecology and biodiversity assessment will be undertaken in accordance with the following good practice and guidance documents. Please refer to chapters such as **Chapter 10 Water Environment**, **Chapter 14 Air Quality** and **Chapter 15 Noise and Vibration** for relevant guidance in relation to assessments undertaken that this chapter may use to inform the ecology and biodiversity assessment:

- Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Costal and Marine (Ref 8.23);
- Natural England and Department for Environment, Food and Rural Affairs (Defra) Standing Advice (protected species) (Ref 8.24);
- Birds of Conservation Concern (BoCC) (Ref 8.25);
- The International Union for Conservation of Nature Red List of Threatened Species (Ref 8.26);
- The Statutory Biodiversity Metric including Calculation Tool, User Guide, and Technical Annex 1: Condition Assessment Sheets and Methodology (Ref 8.2);
- Biodiversity Net Gain: Good Practice Principles for Development, A Practical Guide (Ref 8.27);

- The UK Habitat Classification System (Ref 8.28);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (Ref 8.29);
- Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*) (Ref 8.30);
- The Great Crested Newt Mitigation Guidelines (Ref 8.31)
- Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation (Ref 8.32);
- The Mammal Society Surveying Badgers (Ref 8.33).
- The Water Vole Mitigation Handbook (**Error! Reference source not found.**);
- The Water Vole Conservation Handbook (Ref 8.34);
- Ecology of the European Otter (Ref 8.35);
- British Standards Institution (2006) BS EN 149622006, BS 6068-5.402006: Water quality – Guidance and selection of fish sampling methods. London BSI. (Ref 8.36);
- Freshwater macro-invertebrate analysis of riverine samples (Ref 8.37);
- Freshwater macro-invertebrate sampling in rivers (Ref 8.38);
- UKTAG River Assessment Method Macrophytes and Phytobenthos: Macrophytes (River LEAFPACS2) (Ref 8.39);
- NatureScot (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms (Ref 8.40);
- Bird Survey and Assessment Steering Group. (2022). Bird Survey Guidelines for assessing ecological impacts (Ref 8.41);
- RSPB Bird Monitoring Methods (1998) (Ref 8.42);
- British Trust for Ornithology Common Birds Census Instructions (1983) (Ref 8.43);
- British Trust for Ornithology (BTO) WeBS methods[6] (Ref 8.44); and
- Species – specific methods for raptors (Hardey *et al.*, 2013) (Ref 8.45) and barn owl (Shawyer, 2012) (Ref 8.46).

Expected Survey Requirements

8.8.3 Review of the baseline detailed in Section 8.5 identified the requirements for the following surveys to support the ecology and biodiversity assessment where they are appropriate:

- UKHab habitat survey;
- Detailed habitat/vegetation surveys; National Vegetation Classification (NVC) surveys and hedgerow surveys;
- Badger surveys;

[6] Published on the BTO WeBS webpage: https://www.bto.org/our-science/projects/wetland-bird-survey/taking-part/counter-resources, accessed 07/12/23

- GCN Habitat Suitability Index (HSI) surveys;
- GCN Environmental DNA (eDNA);
- Preliminary bat roost appraisal of trees/woodland, buildings and structures, which may identify requirements for bat emergence and / or re-entry survey;
- Bat activity surveys, supplemented with automated (static) bat detectors;
- Riparian mammal surveys (otter and water vole);
- Reptile presence/absence surveys;
- Terrestrial invertebrate surveys;
- Potential for other aquatic species survey requirements (macroinvertebrates, macrophytes, and fish);
- VP surveys for birds;
- Breeding bird walkover surveys;
- Wintering bird walkover surveys; and
- Species – specific surveys for birds.

8.8.4 The surveys undertaken will inform any protected species mitigation licences (where required) prepared in draft for advisory comment from Natural England, all of which will form part of the DCO application for the Project.

8.8.5 A habitat condition assessment will also be undertaken on affected land within the Order Limits, where required, to inform a BNG assessment. The baseline information gathered from this, and other surveys, will be used to develop an appropriate strategy.

8.8.6 All ecological surveys will be targeted to be undertaken within the appropriate seasons, where possible, and will follow best-practice methodologies. Any limitations to this will be documented accordingly. Due to the variability of species, the distance at which the Project could affect each species can be different and therefore the Study Areas used for specific ecological surveys will differ dependent on the species and these will be assessed and updated using appropriate guidelines. The Study Areas that will be used can be found in **Table 8.5**.

Table 8.5: Study Areas and methods to be used during further ecological surveys

Ecological Survey	Study Area and survey methodology reference
Fixed Wing Flyover Survey	Within and up to 50 m of the Scoping Boundary, to provide an indication of the habitats present, prior to the Phase 1 habitat survey being undertaken on the ground. This will be used to anticipate and pre digitise the habitat survey results to assist in the design process.
UKHab Habitat Survey	Within and up to 50m from the Order Limits. Survey of selected areas to inform the design process where potential habitats present may have greater influence on the Project (Ref 8.28).
Habitat Condition Assessments (HCA)	Within affected land within the Order Limits, where required, in accordance with the most up-to-date guidance (Ref 8.28) at the time the surveys are conducted.

Ecological Survey	Study Area and survey methodology reference
Detailed Habitat/Vegetation Surveys (NVC)	Affected locations within the Order Limits where UKHab habitat survey identifies habitat as being particularly species diverse and/or sensitive and/or a type restricted in the UK / region. The survey would be undertaken in accordance with the JNCC NVC Users' Handbook (Ref 8.47). NVC surveys may be required of Priority Habitats such as lowland meadow, fens and woodlands that would unavoidably have a pylon or access track located within them, or otherwise be affected.
Detailed Habitat/Vegetation Surveys (Hedgerows)	Affected locations within the Order Limits where the UKHab habitat survey identifies hedges as being particularly species diverse and / or more than thirty years old, and potentially 'Important' under the Hedgerow Regulations 1997. The survey would be undertaken in accordance with the Hedgerow Survey Handbook (Ref 8.48).
Badger surveys	Targeted survey of suitable habitat within and up to 30 m of the Order Limits (Ref 8.33).
GCN HSI Survey	Within and up to 500 m of the Order Limits, in accordance with Oldham et al., 2000 (Ref 8.30).
GCN eDNA surveys (if required)	Within and up to 500 m of the Order Limits, in accordance with Biggs et al. (2014) (Ref 8.49).
Bat activity surveys supplemented with automated (static) bat detector surveys.	Bat activity transects and static detector monitoring at substation sites where permanent habitat loss is expected. Static detector survey at selected locations along the preferred route corridor of the overhead line.
Preliminary bat roost assessment of trees/woodland, buildings and structures. Ground-based tree assessment. Bat roost survey.	Daytime bat walk-over to evaluate the suitability of features for roosting bats within and up to 50 m from the Order Limits, where required/affected. Bat roost surveys to be undertaken at targeted locations where direct impacts cannot be avoided and it is considered that additional measures for roost replacement may be required above those that are set out in the Outline Code of Construction Practice (**Appendix 4A Initial Outline Code of Construction Practice**). Bat surveys to be undertaken in accordance with the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Ref 8.29).
Otter	Otter holt sites will be identified through targeted survey of watercourses / ditches and associated areas of terrestrial habitat up to 200 m from the point of impact, in accordance with standard guidance (Ref 8.35). Where holt sites are present consideration will be given to the monitoring these locations to characterise their use by otter.
Water vole survey	A proportionate strategy for water vole surveys will be developed through on-going consultation with Natural England. This will take account of the suitability of habitat, the approach to mitigation in the Project design and the location and extent of impacts to suitable habitat. Targeted survey would be undertaken of sections of watercourses / ditches that cross the Order Limits and up to 500 m

Ecological Survey	Study Area and survey methodology reference
	adjacent in accordance with standard guidance (**Error! Reference source not found.**, Ref 8.34 and Ref 8.35).
Reptile presence/absence surveys	Affected and unavoidable locations within the Order Limits where habitat survey identifies habitat as being particularly suitable habitat for reptiles. Professional judgement based on the habitat and Froglife's Advice Sheet 10 for Reptile Surveys (Ref 8.32).
Terrestrial invertebrate surveys	Affected and unavoidable locations within the Order Limits where the habitat survey identifies habitat as being potential significant habitat for terrestrial invertebrates. The survey methodology would be dependent on the target species.
Wintering bird surveys	A second year of winter data will be collected using VP surveys undertaken at strategic locations across the Order Limits (Ref 8.40). A ground-truthing visit will be undertaken to locate suitable locations for VP surveys, and desk-based work is ongoing to determine the short list of VP surveys that will be taken forward to the final survey design. It is proposed that each VP viewshed will be observed for a minimum of 6 hours per month over from October to March, inclusive. The survey corridor will extend 500 m either side of the Order Limits where possible. Transects and habitat surveys will be undertaken where birds, especially those that are qualifying features of designated sites, are likely to feed or roost and the areas potentially affected by the Project on a monthly basis between October and March, inclusive. Consideration will be given to completing two surveys per month in areas where risks to over-wintering birds are greater. Nocturnal surveys will be undertaken in strategic locations, which overlap with the Impact Risk Zone (IRZ) of international sites, targeting primarily golden plover and lapwing. These methods are subject to change dependant on data requirements to inform the HRA and assessment of potential impacts of the Project.
Breeding bird surveys	Breeding bird survey transects are being undertaken at 16 locations along the route corridor from late March to early July 2024. The transects are focussing on representative areas, focused upon locations of the emerging preferred substation siting zones, waterbody crossings, wetlands, and habitats which may support a range of breeding birds based upon aerial imagery. Transects have been undertaken in accordance with Bird Survey Guidelines methodology.
Aquatic walk-over survey	Initial walkover surveys will be completed on all watercourses within the Order Limits that may be impacted by the Project to scope the aquatic quality and therefore survey requirements. Surveys will be completed over a representable 100 m stretch between Spring and Autumn. However, where weather and flow conditions are suitable, these can be completed all year round.

Ecological Survey	Study Area and survey methodology reference
	These surveys will identify the suitability for aquatic receptors (fish, macro-invertebrates and macro-phytes) by measuring physical (i.e. water depth, flow, barriers to migration) and chemical (i.e. temperature, dissolved oxygen, pH. parameters with the results informing the survey requirements for specific receptors.
Fish	Where the walk-over survey determines that watercourses that are suitable for fish, surveys will be completed at targeted locations at crossing points and locations of proposed instream works (i.e. locations of temporary / permanent outfalls and river crossings) within the Order Limits. Surveys will be completed over a representable 100 m stretch between 16 June and 1 October and follow British and European Standards (Ref 8.50). Specific methodologies will depend on the watercourse characteristics (primarily width and depth of the watercourse) but it is expected that electric fishing will represent the primary method. This will follow industry guidance (Ref 8.51) and compliant with British and European Standards (Ref 8.52).
Aquatic macro-invertebrate	Where the walk-over survey determines that watercourses that are suitable for macroinvertebrates, surveys will be completed at targeted locations at crossing points and locations of proposed instream works (i.e. locations of temporary/permit outfalls and river crossings) within the Order Limits. Two separate surveys will be completed over the same representable 100 m stretch in Spring (March - May) and Autumn (September – November) according to industry guidance (Ref 8.53) and compliant with British and European Standards (Ref 8.54). Macroinvertebrate samples will be processed to mixed taxon level (also known as RIVPACS taxonomic-level TL5) following industry guidance (Ref 8.54).
Aquatic macrophyte	Where the walk-over survey determines that watercourses that are suitable for macrophytes, surveys will be completed at targeted locations at crossing points and locations of proposed instream works (i.e. locations of temporary/permit outfalls and river crossings) within the Order Limits. Surveys will be completed over a representable 100 m stretch in summer (May – September) following standard industry guidance (Ref 8.56 and Ref 8.57), which conforms to British and European Standards (0).

Proposed Assessment Methodology

8.8.7 The following section summarises the methodology proposed to be used for the ecology and biodiversity assessment which builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology.**

8.8.8 The impact assessment will be undertaken in accordance with best practice guidance for Ecological Impact Assessment (EcIA), issued by CIEEM entitled ‘Guidelines for

Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Costal and Marine' (Ref 8.23) as summarised below.

8.8.9 The principal steps involved in the CIEEM approach can be summarised as:

- Ecological features that are both present and might be affected by the Project are identified (both those likely to be present at the time works begin and those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions.
- The importance of the identified ecological features is evaluated, placing their relative biodiversity and nature conservation value into geographic context, which is then used to define the relevant ecological features that need to be considered further.
- The changes or perturbations predicted to result as a consequence of the Project (i.e. the potential impacts) and which could potentially affect relevant ecological features are identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account.
- The likely significant effects (beneficial or adverse) on relevant ecological features are then assessed, and where possible quantified.
- Measures to avoid or reduce any likely significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines) and if necessary, measures to compensate for likely significant effects on features of nature conservation importance are also included.
- The residual effects of the Project are reported.
- Scope for ecological enhancement is considered.

Sensitivity/value of ecological feature

8.8.10 The CIEEM guidelines (Ref 8.23) make clear that there is no need to *"carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable"*. Therefore, it is not necessary for the assessment to address all habitats and species with potential to occur in the relevant Study Area and instead the focus is on those that are "relevant" i.e. ecological features that are considered to be important and potentially affected by the Project. This does not mean that efforts will not be made to safeguard wider biodiversity.

8.8.11 To support a focussed assessment, there is a need to determine the scale of importance of the relevant ecological features identified through the desk studies and field surveys undertaken for the Project. The importance of each relevant ecological feature has been defined with reference to the geographical level at which it matters.

8.8.12 The frames of reference that will be used for the assessment, based on Section 4.7 of the CIEEM guidelines (Ref 8.23) are:

- International (i.e. Ramsar Sites, SACs and SPAs) (normally within the geographic area of Europe);

- UK or national (Great Britain, but considering the potential for certain ecological features to be more notable (of higher value) in England, with context relative to Great Britain as a whole);
- Regional (East Midlands and East Anglia);
- County (Cambridgeshire, Lincolnshire and Norfolk);
- District (town or parish area e.g. Bilsby, Holland Fen with Brothertoft);
- Local (ecological features that do not meet criteria for valuation at a District or higher level, but that have sufficient value to merit retention or mitigation); and
- Negligible (common and widespread ecological features of such low priority that they do not require retention or mitigation at the relevant location to otherwise maintain a favourable nature conservation status).

8.8.13 The importance of species populations is determined on the basis of their size, recognised status (such as recognised through published lists of species of conservation concern and designation of local Biodiversity Action Plan (BAP) status and legal protection. For example, bird populations exceeding 1 per cent of published information on biogeographic populations are considered to be of international importance, those exceeding 1 per cent of published data for national populations are considered to be of national importance.

8.8.14 In assigning importance to species populations, while the status of the species in terms of any legal protection is considered, it is also important to consider other factors such as its distribution, rarity, population trends and the size of the population which would be affected. For example, whilst GCN are afforded protection under the relevant legislation and therefore conservation of the species is of significance at the international level, this does not mean that every great crested newt population is internationally important. It is important to consider the particular population in its context. The assessments of importance rely on the professional opinion and judgment of suitably experienced ecologists.

8.8.15 Plant communities will be assessed both in terms of their intrinsic importance and as habitat for protected species whose habitat is also specifically protected and for species of nature conservation concern which are particularly associated with them.

8.8.16 Due regard will also be paid to the legal protection afforded to species during the development of mitigation and compensation measures to be implemented for the Project. For European Protected Species there is a requirement that the Project should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

8.8.17 Assessing the value of features requires consideration of both existing and future predicted baseline conditions. Therefore, the description and valuation of ecological features takes account of any likely changes, such as trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other proposed developments or land use changes.

8.8.18 All ecological features of local importance and above, where there is the potential for the Project to impact them directly or indirectly, will be taken forward to impact assessment and will be the ‘relevant ecological features’ for the purposes of EcIA.

8.8.19 In line with Section 1.21 of the CIEEM guidelines (Ref 8.23), the terminology used within the EcIA draws a clear distinction between the terms ‘impact’ and ‘effect’. For the purposes of this EcIA these terms are defined as follows:

- impact – actions resulting in changes to an ecological feature. For example, construction activities of a development removing a hedgerow; and
- effect – outcome resulting from impact acting upon the conservation status or structure and function of an ecological feature, e.g. the effects on a population of bats as a result of the loss of a bat roost.

8.8.20 When describing potential impacts (and where relevant the resultant effects) consideration is given to the following characteristics likely to influence this:

- positive or negative (beneficial or adverse) – i.e. is the change likely to be in accordance with nature conservation objectives and policy and is that change:
  - positive (beneficial) – a change that improves the quality of the environment, or halts or slows an existing decline in quality e.g. increasing the extent of a habitat of conservation value; or
  - negative (adverse) – a change that reduces the quality of the environment e.g. destruction of habitat.
- spatial extent – the spatial or geographical area or distance over which the impact or effect may occur under a suitably representative range of conditions;
- magnitude – the ‘size’, ‘amount’ or ‘intensity’ and ‘volume’ of an impact – this is described on a quantitative basis where possible;
- duration – the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. Consideration has been given to how this duration relates to relevant ecological characteristics such as a species’ lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact;
- timing and frequency – i.e. consideration of the point at which the impact occurs in relation to critical life-stages or seasons; and
- reversibility – i.e. is the impact temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable. A permanent effect is one from which recovery is either not possible or cannot be achieved within a reasonable timescale (in the context of the feature being assessed).

8.8.21 Cumulative effects result from the combined impacts of multiple developments on a receptor, as well as ‘in-combination’ multiple in-scheme impacts, for example, combined noise and lighting impacts on the same sensitive receptor.

Significance of effects

8.8.22 For each ecological feature only those characteristics relevant to understanding the ecological effect of the Project and determining the significance are described. The determination of the significance of effects will be made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

- not significant – no effect on structure and function, or conservation status; and
- significant – structure and function, or conservation status is affected.

8.8.23 Sections 5.24 to 5.28 of the CIEEM guidelines (Ref 8.23) state that effects should be determined as being significant when "*an effect either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national / local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local. A significant effect is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)*".

8.8.24 Using this information and judgment, it is determined whether the effects will be significant or not on the structure and integrity (of site or ecosystems) or conservation status (of habitats and or species) of each ecological feature and the effect significance is determined at the appropriate geographical scale.

8.8.25 There are a number of approaches for determining the significance of effects on ecological features. Whilst the CIEEM guidelines (Ref 8.23) recommends the avoidance of the use of the matrix approach for categorisation (major, moderate and minor), in order to provide consistency of terminology within the Environmental Statement, as presented in **Chapter 5 EIA Approach and Methodology**, the findings of the CIEEM assessment will be translated into the classification of effects scale, as outlined in **Table 8.6**, but still remain consistent with the CIEEM guidelines. As a rule, major and moderate effects are considered to be significant, whilst minor and neutral/negligible effects are considered to be not significant. However, professional judgement will also be applied when concluding whether an effect is significant or not, including taking account of whether the effect is permanent or temporary, its duration and frequency, whether it is reversible, and/or its likelihood of occurrence.

Table 8.6: Relating CIEEM assessment terms to those used in Chapter 5 EIA Approach and Methodology

Effect classification terminology used in Chapter 5 EIA Approach and Methodology	Equivalent CIEEM assessment
Major beneficial	Beneficial effect on structure/function or conservation status at regional, national or international level.
Moderate beneficial	Beneficial effect on structure/function or conservation status at county and district level.
Minor beneficial	Beneficial effect on structure/function or conservation status at local level.
Neutral/negligible	No effect on structure/function or conservation status.

Effect classification terminology used in Chapter 5 EIA Approach and Methodology	Equivalent CIEEM assessment
Minor adverse	Adverse effect on structure/function or conservation status at local level.
Moderate adverse	Adverse effect on structure/function or conservation status at county and district level.
Major adverse	Adverse effect on structure/function or conservation status at regional, national or international level.

Supporting Assessments

8.8.26 The Ecology and Biodiversity Chapter of the PEI Report and ES will be supported by the following assessments. The scope of these assessments will be agreed with the relevant stakeholders.

Habitat Regulations Assessment

8.8.27 A HRA, commencing with a Stage 1: Test of Likely Significant Effects and including, if required, a Stage 2: Statement to Inform Appropriate Assessment will also be produced in line with Planning Inspectorate Advice Note 10 (**Error! Reference source not found.**). An Evidence Plan will be produced to document the evidence requirements for the Appropriate Assessment.

Biodiversity Net Gain

8.8.28 A BNG assessment will be undertaken using the Statutory Biodiversity Metric (Ref 8.2) in accordance with the accompanying guidance and best practice principles. The UKHab classification and habitat condition scoring, including the results of watercourse condition surveys, will inform the assessment of the BNG baseline within the Metric.

8.9 Assumptions and Limitations

8.9.1 In the absence of data, a precautionary approach has been taken and professional judgement, based on experience of similar linear schemes, has been used where required to inform the scope of the assessment.

8.9.2 Where possible, nationally recognised standard survey methodologies will be used to reduce limitations for ecological evaluation and impact assessment.

8.9.3 Land access for baseline surveys may be limited, in which case a precautionary approach will be taken to predicting the most likely habitats to be present and any protected/notable species they support, on the basis of existing desk study data and aerial imagery. Specific limitations for each survey type will be detailed in the relevant baseline report.

8.9.4 Baseline ornithological surveys commenced in priority areas in 2022 and will continue as required. The remaining ecology field surveys have commenced in winter 2023 and will continue through 2024/2025 as required to determine the baseline ecological conditions. The surveys may highlight new important ecological features with potential to be significantly affected which have not been identified (or considered not to be significant) at this stage of the assessment. These would be discussed on a case-by-

case basis with the local authorities and Natural England as appropriate, and the assessment scope may be modified accordingly to take account of these.

8.9.5 An assumption has been made that the following habitats will be retained as part of the Project where possible: Priority Habitats, woodlands, ponds, watercourses (assuming watercourses are not lost as a whole and that overhead lines will cross over watercourses) and the majority of hedgerows (assuming hedgerows are not lost as a whole, but some individual hedgerows could require either a temporary or permanent gap through to facilitate the haul road, which would be minimised to smallest necessary).

8.9.6 It is assumed that works within the boundaries of designated sites and areas of ancient woodland will be avoided as far as possible.

8.9.7 It is currently assumed that should there be the requirement for the potential mitigation of ecological features, suitable on-site areas will be made available to deliver the required outcomes.

8.10 Conclusion

Summary

8.10.1 From the review of data undertaken as part of the desk-based study to inform this chapter, a number of statutory and non-statutory designated sites, as well as protected or notable habitats and species have been identified within and immediately adjacent to the Scoping Boundary and associated Study Areas.

8.10.2 Project construction, maintenance and operation activities have the potential to impact on important ecological features through the installation of new infrastructure, construction traffic movement, pollution, changes in groundwater, and the spread of INNS. These activities could potentially result in habitat loss/disturbance/fragmentation (temporary or permanent), incidental species mortality and disturbance of protected or notable species.

8.10.3 As a result, an ecology and biodiversity assessment will be undertaken, following the method outlined in this Chapter and will be reported in the PEI Report and ES. The HRA process may result in the recommendation of design adjustments, which will be fed into the final ES / DCO application.

Proposed Scope of the Assessment

8.10.4 A summary of the proposed scope of the assessment is provided in **Table 8.7.**

Table 8.7: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Statutory designated sites (without mobile qualifying criteria) located greater than 2 km from the Scoping Boundary	No	N/A	Scoped out

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Statutory designated sites (within 2 km of the Scoping Boundary)	Potential for permanent habitat loss, fragmentation/modification (including functionally linked habitat). Temporary habitat loss, fragmentation and disturbance (including functionally-linked habitat). Changes in air quality, negatively impacting protected or otherwise notable habitats within 200 m of the affected road network. Indirect pollution impacts (dust deposition, water) and changes to lighting. Introduction of invasive non-native species leading to degradation of existing habitat quality and reduction in native species due to being outcompeted. Loss/reduction in habitat quality for protected and notable species due to changes in ground water levels. Displacement of birds that forage within land distant from the designated site (functionally linked land). Increased predation of qualifying features by predatory birds afforded additional nesting or roosting habitat by proposed pylons. Collision mortality due to permanent structures/barriers (operation only), affecting qualifying features.	Construction, operation and maintenance	**Scoped in** for construction (all impacts excluding bird collision), operation (bird collision, habitat fragmentation and predation only) and maintenance (temporary habitat loss, disturbance and fragmentation only).
Statutory designated sites (with mobile qualifying	Displacement of qualifying species that utilise land distant from the	Construction, and operation	**Scoped in** for construction (displacement,

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
criteria) located up to 10 km[7] from the Scoping Boundary.	designated site (functionally linked land). Increased predation of qualifying features by predatory birds afforded additional nesting or roosting habitat by proposed pylons. Collision mortality due to permanent structures/barriers (operation only), affecting qualifying features.		operation (mortality and bird collision)
Non-statutory designated sites (within and up to 2 km of the Scoping Boundary)	Potential for permanent habitat loss, fragmentation/modification. Temporary habitat Loss, fragmentation and disturbance. Changes in air quality, negatively impacting protected or otherwise notable habitats within 200 m of the affected road network. Indirect pollution impacts (dust deposition, water) and changes to lighting. Introduction of invasive non-native species leading to degradation of existing habitat quality and reduction in native species due to being outcompeted. Loss/ reduction in habitat quality for protected and notable species due to changes in ground water levels.	Construction, operation, and maintenance	**Scoped in** for construction (all impacts), operation (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only)
Non-statutory designated sites (greater than 2 km of the Scoping Boundary)	No	Construction, operation, and maintenance	Scoped out

[7] Extended to up to 30 km for SPA and Ramsar Sites supporting qualifying ornithological features with large foraging ranges.

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Impacts to ancient woodland, Priority Habitats or habitats otherwise of biodiversity importance within the Scoping Boundary.	Potential for permanent habitat loss, fragmentation/modification. Temporary habitat loss, fragmentation and disturbance. Changes in air quality, negatively impacting protected or otherwise notable habitats within 200 m of the affected road network. Indirect pollution impacts (dust deposition, water) and changes to lighting. Introduction of invasive non-native species leading to degradation of existing habitat quality and reduction in native species due to being outcompeted. Loss/reduction in habitat quality for protected and notable species due to changes in ground water levels.	Construction, operation, and maintenance	**Scoped in** for construction (all impacts), operation (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only).
Impacts to common and widespread habitats of low sensitivity and/or conservation interest	No	N/A	Scoped out
Breeding birds	Collision mortality due to permanent structures/barriers (operation only). Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise/ vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts excluding bird collision), operation (bird collision, lighting and fragmentation only) and maintenance (temporary habitat loss, disturbance and fragmentation only).

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Wintering birds[8]	Collision mortality due to permanent structures/barriers (operation only). Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise/vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts excluding bird collision and predation), operation (bird collision, lighting and habitat fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Bats (roosting)	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise/vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Bats (foraging/commuting)	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise/vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and

[8] The term ‘wintering’ is used as a catch-all for any period when birds are not engaged in breeding activity

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
			fragmentation only).
Otter	Yes – if watercourses or terrestrial habitat impacted. Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise/vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation (lighting at potential sealing end compound and/or tunnel head house locations only) and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Water Vole	Yes – if watercourses impacted. Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise / vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Badger	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise / vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
GCN	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise / vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Other amphibians	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise / vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Reptiles	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise / vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Dormouse	Species is unlikely to occur within the Study Area	Construction, operation	**Scoped out**

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
		and maintenance	
Other mammals (including only brown hare, hedgehog, polecat)	Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise / vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).
Aquatic invertebrates/fish/macropytes	Yes – if watercourses impacted. Incidental mortality of protected or notable species. Disturbance to protected or notable species (noise/ vibration, visual, lighting). Permanent habitat loss. Temporary habitat loss and fragmentation.	Construction, operation and maintenance	**Scoped in** for construction (all impacts), operation (lighting and fragmentation only) and maintenance (incidental mortality, temporary habitat loss, disturbance and fragmentation only).

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9. Cultural Heritage

nationalgrid

Contents

9.1 Introduction

9.1.1 This chapter presents how the historic environment assessment will consider the potentially significant effects on historic environment receptors that may arise from the construction, operation, and maintenance of the Project (as described in **Chapter 4 Description of the Project**). It describes the methodology and datasets to be used within the historic environment assessment, presents an overview of the baseline conditions, and identifies the potential likely significant effects to be considered within the assessment, and how these will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the only element of the Project that will involve decommissioning in all or part, is the existing Grimsby West Substation. There are currently no specific plans to decommission the Project as a whole. With the exception of the Grimsby West Substation, decommissioning of the Project has, therefore, been scoped out of the environmental assessment.

9.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

9.1.3 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2: Regulatory and Planning Policy Context;**
- **Chapter 3: Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology**.

9.1.4 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 6 Landscape** – changes to the landscape of the Project may result in changes to the setting and value of heritage assets resulting in significant effects;
- **Chapter 7 Visual** – the visual imposition and visibility of the Project within the landscape may result in changes to the setting and value of heritage assets resulting in significant effects; and
- **Chapter 15 Noise and Vibration** – noise and vibration impacts arising from the Project may result in changes to the setting and value of heritage assets resulting in significant effects.

9.1.5 This chapter is supported by the following figures and appendices.

- **Figure 9.1 Designated Heritage Assets**;
- **Figure 9.2 Non-designated Heritage Assets - Monuments**;
- **Appendix 9A Designated and Non-designated Assets;** and
- **Appendix 9B Cultural Heritage Survey Strategy.**

9.2 Legislation, Policy and Guidance

9.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context**, **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Planning Policy**, **and Appendix 2C Local Policy.**

Technical Guidance

9.2.2 The historic environment assessment will be undertaken in accordance with the following good practice and guidance documents:

- Planning Practice Guidance: Historic Environment (Ref 9.1);
- Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment. Historic England (Ref 9.2);
- Historic Environment Good Practice Advice in Planning Note 3. The Setting of Heritage Assets. Historic England (2nd edition, 2017) (Ref 9.3);
- Historic Environment Statement of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12. Historic England (Ref 9.4);
- Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment (Ref 9.5);
- CIfA Code of Conduct: professional ethics in archaeology (Ref 9.6); and
- Institute of Environmental Management and Assessment (IEMA), the Institute of Historic Building Conservation (IHBC) and the Chartered Institute for Archaeologists (CIfA), Principles of Cultural Heritage Impact Assessment in the UK (Ref 9.7).

9.3 Consultation and engagement

9.3.1 The EIA will be informed by consultation and engagement with stakeholders, including Historic England and historic environment officers from North East Lincolnshire, Lincolnshire, Cambridge and Norfolk County Councils and local authority conservation officers as required to ensure that specialist local views and expertise can be considered as part of the EIA.

9.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024 and following pre-scoping engagement undertaken with Historic England in February 2024, which included comments on the proposed Cultural Heritage Survey Strategy (**Appendix 9B Cultural Heritage Survey Strategy**).

9.3.3 The principal feedback received from both Non-Statutory Consultation and pre-scoping consultation with Historic England of relevance to this scoping chapter is included in Table 9.1, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 9.1: Engagement with Stakeholders

Stakeholder	Summary of Response	Consideration in the Scoping Report
Fenland District Council	It is understood that the development as proposed will impact on a number of undesignated heritage assets in Fenland. The corridor passes through an area of fen crossed by a number of	The impact assessment will be supported by a comprehensive baseline appendix, informed by a number of sources including those set out at Section 9.8 of

Stakeholder	Summary of Response	Consideration in the Scoping Report
	roddons, areas of raised ground which were historically exploited. In Tydd St. Giles this is particularly notable with medieval salt workings utilising the fen, shown from find spots of medieval artefacts found along the fen edge and major roddons crossing the area (e.g., Cambridgeshire Historic Environment Record reference. MCB24468, 03825, 10921 and 03826).	this Chapter. This will include data for all non-designated heritage assets within the Study Area held by Cambridgeshire Historic Environment Records. This data has been used to inform the baseline conditions reported at Section 9.5 of this Chapter.
Fenland District Council	The application in its current form does not contain information regarding the archaeological potential of the corridor route through Fenland and therefore it is not possible to understand the impact on designated and undesignated heritage assets at this time. An assessment of these impacts would be expected to be provided for consideration under any future statutory consultation.	The methods for undertaking the impact assessment are set out at Section 9.8 of this Chapter. The baseline appendix prepared to support the impact assessment will consider all designated and non-designated heritage assets within the Study Area and will assess the archaeological potential of the emerging preferred route corridor. The assessment of those assets that have potential to be impacted by the Project will be presented in the Preliminary Environment Information Report at Statutory Consultation.
Grimsby West Housing Scheme	In terms of the high level heritage assets assessment conducted by National Grid of impact of area GW5, we would agree that due to the distance of Church Of St Nicolas Grade I listed building, and Two Moated sites at Healing Hall Scheduled Monument, and the presence of intervening vegetation, as well as the existing Grimsby West substation, and the existing properties along Carr Lane, the potential impacts on the setting of these assets from the new Grimsby West substation in this location could be materially reduced.	All designated heritage assets within the Study Area, and their settings will be considered during the impact assessment and any potential impacts and mitigation measures reported. The preliminary assessment will be presented in the Preliminary Environment Information Report at Statutory Consultation.
Norfolk County Council	In terms of impacts in Norfolk, we note the location of the proposed project is approximately 3 km south of the existing Walpole Bank substation and the scheme aligns closely with the	The Applicant will fully engage with the Norfolk County Council's historic environment officers during preparation of the impact assessment to ensure that all

Stakeholder	Summary of Response	Consideration in the Scoping Report
	Eastern Green Links 3 and 4 projects. We recommend that the promoters of the Grimsby to Walpole and the Eastern Green Links 3 and 4, along with their archaeological advisors, engage directly with us in expert topic group meetings at the earliest opportunity.	heritage assets and cumulative impacts are considered. Engagement will also be undertaken with the promoters and archaeological advisors to the Eastern Green Links 3 and 4 project to ensure that information regarding heritage assets and technical approaches are shared, and where possible, archaeological evaluation/surveys are planned in a coordinated manner and the results shared between the projects. This will, where appropriate, include joint meetings with Norfolk County Council's historic environment officers.
Historic England	With regard to the minimisation of impacts and their mitigation by the Project, Historic England consider it crucial that the environmental assessment process captures not just the impacts at substation and pylon sites, but also associated haul roads, laydown yards and works compounds.	The impact assessment for historic environment will consider all aspects of the Project including both permanent elements such as pylon and substations and temporary construction works such as haul roads, laydown yards and works compounds. The preliminaryl appraisal will be presented in the Preliminary Environment Information Report at Statutory Consultation.
Historic England	With regards to study areas for the assessment, whilst study areas are necessary to a structured approach to the consideration of assets and impacts, it is important that professional judgement is deployed to ensure that assets whose significance rests heavily upon structured view and vistas – whether designed or consequential on their location are assessed appropriately, this may mean including some assets at greater range from the pylons and substations in the assessment.	The Study Areas for the impact assessment proposed at Section 9.8 of this Chapter have been defined to allow a consistent and proportionate assessment to be applied along the whole route of the Project, and to enable consideration of all designated heritage assets up to 3 km, and designated assets of the highest significance, up to 5 km from the Scoping Boundary. The Study Area for non-designated heritage assets will extend 1 km from the Scoping Boundary. It is recognised that the impact assessment will need to draw on professional judgment informed

Stakeholder	Summary of Response	Consideration in the Scoping Report
		by the Project's Zone of Theoretical Visibility to identify heritage assets located beyond the Study Area with the potential to be affected by the Project. The contribution made by setting, designed views and vistas make to the value (heritage significance) of each heritage asset potentially affected will be included in the impact assessment.
Historic England	When assessing the value (heritage significance) of heritage assets, professional judgement should again be exercised and should, depending on their merits, take into account that some unlisted buildings and grade II listed buildings may deserve treating in the same band as higher grade (grade II and grade II* listed buildings respectively). In addition, it was noted that some non-designated monuments are of demonstrably equivalent importance to scheduled sites (e.g. medieval earthwork sites).	The impact assessment methodology presented at Section 9.8 of this Chapter includes criteria for defining the value (heritage significance). Professional judgement and the results of consultation will be used to inform assessment of the value of individual heritage assets, particularly grade II listed buildings, unlisted buildings and some non-designated heritage assets, to ensure that regional variations and individual qualities are considered where appropriate.
Historic England	In addition to the proposed list of sources included in the Cultural Heritage Survey Strategy **(Appendix 9B Cultural Heritage Survey Strategy**), Historic England recommended that a more extensive range of resources such as (but not limited to) the Fenland Survey volumes (published in the East Anglian Archaeology series) are consulted.	These additional sources have been included in the list of sources to be consulted during the baseline data gathering to inform the impact assessment in Section 9.8 of this Chapter.
Historic England	With regard to assessing archaeological potential of the emerging preferred corridor, it was noted that the landscapes crossed by the emerging preferred corridor can appear relatively 'blank' (e.g. in the Fens), but this is a function of a lack of previous investigation rather than an absence of archaeology. A failure	The impact assessment will be informed by a comprehensive baseline appendix which will draw on a wide range of sources and the results of site walkovers, setting assessments, non-intrusive and intrusive archaeological surveys (see Section 9.8 of this Chapter). The

Stakeholder	Summary of Response	Consideration in the Scoping Report
	to adequately investigate could result in significant discoveries only being encountered at a point when mitigation options are restricted due to the lateness at which they are encountered, which may result in delays to project timescales and increased costs.	point regarding 'blank' areas is well made and the archaeological surveys will be informed by the assessment of archaeological potential within the Scoping Boundary and will target both 'blank' areas and areas of know archaeological potential.
Historic England	The project will traverse through areas of areas of high paleoenvironmental potential were highlighted and it is recommended that the Project develops a preliminary desk-based deposit model as part of the desk-based assessment to characterise Fen areas where geophysics would be a challenge, archaeological sensitivity could be mapped and areas of archaeological potential highlighted.	It is proposed that a preliminary desk-based assessment is carried out and provision for a geoarchaeological deposit model and monitoring during ground investigation works is included in the list of surveys to inform the impact assessment in Section 9.8 of this Chapter.
National Trust	The Trust highlighted two of their properties that it was felt should be included in the assessment of the impacts arising from the Project; Gunby Hall and Tattersall Castle located to the west of the Project.	The two assets have been noted. Gunby Hall is located within the 5 km wider Study Area and will be included in the impact assessment. Tattershall Castle is located approximately at 8 km from the Scoping Boundary, and beyond the Study Area. However, possible impacts to the setting of Tattershall Castle will be considered using professional judgement informed by the Zone of Theoretical Visibility (ZTV) for the Project (see Section 9.8 regarding the Study Area selected for the impact assessment).

9.4 Study Area

9.4.1 The study area is the geographical extent within which heritage assets may experience effects as a result of the Project. Effects to heritage assets may arise during construction or operation. Effects to heritage assets may arise as a result of physical impacts to their fabric or through changes to their setting.

9.4.2 For the purpose of this Scoping Report, the Study Area includes the land within the Scoping Boundary and a buffer of 1 km from the Scoping Boundary for all designated

and non-designated heritage assets. For higher graded assets (i.e. World Heritage Sites, scheduled monuments, grade I and II* listed buildings, grade I and II* Registered Parks and Gardens (RPG) and registered battlefields) the Study Area has been extended to 3 km from the Scoping Boundary in recognition that high value assets have a greater potential for setting and the resulting contribution to significance to extend over a larger area.

9.4.3 For the EIA, which requires a more granular study area to adequately assess all potential impacts, the Study Area will be defined according to the significance of the asset and the potential impacts of the Project, following further assessment and design work to identify a proposed alignment. The Study Area for the EIA is set out in Section 9.8.

9.5 Baseline Conditions

9.5.1 The following section provides a summary of the baseline environmental conditions within the Study Area.

Data Sources

9.5.2 The currently known baseline historic environment resource described in this section has been informed by the following data sources:

- Historic England's National Heritage List for England (NHLE) (Ref 9.8);
- The North East Lincolnshire, Lincolnshire, Cambridgeshire and Norfolk Historic Environment Records (HER);
- British Geological Survey geology viewer (Ref 9.9); and
- Other readily available online sources.

Baseline

Overview

9.5.3 The locations of heritage assets within the Scoping Boundary and surrounding Study Areas are provided on **Figure 9.1 Designated Heritage Assets**, in relation to the Scoping Boundary, 1 km and 3 km Study Areas, and **Figure 9.2 Non-designated Heritage Assets** in relation to the Scoping Boundary and 1 km Study Area.

9.5.4 The heritage assets discussed within this chapter, including designated and non-designated heritage assets, are identified by their unique identification number assigned by the NHLE for designated assets (e.g. NHLE 1003669) and by the Historic Environment Records for North East Lincolnshire (prefixed MNLI), Lincolnshire (prefixed MLI), Cambridgeshire (prefixed MCB) and Norfolk (prefixed MNF) for non-designated heritage assets.

9.5.5 There are no World Heritage Sites (Cultural), registered historic battlefields, or protected wrecks within the Scoping Boundary or within 3 km of it.

9.5.6 There are 29 designated assets within the Scoping Boundary. These comprise two scheduled monuments (The site of St Mary's Priory, Greenfield, NHLE 1008687; and the Churchyard cross, St Margaret's churchyard, Saleby, NHLE 1014426), one grade I listed building (the Church of St Martin, Waithe, NHLE 1359965), one grade II* listed building (The Church of St Helen, Brigsley, NHLE 1103490), and 25 grade II listed

buildings. A total of 23 scheduled monuments, 27 grade I listed buildings, 26 grade II* listed buildings, ten conservation areas and 213 grade II listed buildings are located within 1 km of the Scoping Boundary. Of these, seven scheduled monuments and ten listed buildings are less than 100 m from the Scoping Boundary. This includes the scheduled monuments of:

- Deserted Village at Brackenthorpe (NHLE 1003616);
- Louth Abbey (NHLE 1005002);
- Moated site immediately west of Hall Farm (NHLE 1019070);
- Castle Hill motte and bailey castle, Castle Carlton (NHLE 1016783);
- Toot Hill motte and bailey castle (NHLE 1016782);
- Markby Priory (NHLE 1004987); and
- Butterbump round barrow cemetery (NHLE 1003615).

9.5.7 Beyond 1 km, but within 3 km of the Scoping Boundary, there are another 45 scheduled monuments, 36 grade I listed buildings, 60 grade II* listed buildings and 2 grade II registered park and gardens.

9.5.8 The majority of the listed buildings within the 1 km and 3 km Study Area are located within the surrounding settlements with concentrations in Great Coates, Laceby, Luborough, Louth, Manby, Alford, Burgh le Marsh, Spalding, Moulton and Tydd St Giles. Listed buildings within the 1 km and 3 km Study Areas are generally of post-medieval to modern date, although a few, mainly churches, are of medieval date.

9.5.9 A total of 2,733 non-designated heritage assets have been identified by the HERs. Of these, 542 are located within the Scoping Boundary and the remaining 2,191 assets are situated within the surrounding 1 km Study Area.

9.5.10 Full lists of designated and non-designated heritage assets are provided in the gazetteers in **Appendix 9A Designated and Non-designated Heritage Assets**, with key heritage assets highlighted in the Section summarises below.

Geology

9.5.11 The Project extends north to south across varying geologies from the Lincolnshire coast and marshes, before entering the Lincolnshire Fens, continuing across the major drainage catchment south of The Wash through Cambridgeshire and into Norfolk. The Scoping Boundary and Sections are shown on **Figure 1.1 Scoping Boundary**. The following provides a high-level description of the solid bedrock and superficial geology formations recorded by the British Geological Survey in each section, both within the Scoping Boundary and surrounding Study Area].

Section 1: Grimsby West Substation

9.5.12 The geology of Section 1 comprises Cretaceous chalk bedrock of the Burnham Chalk Formation which formed between 93.9 and 83.6 million years ago, overlain by superficial deposits comprising Devensian Till with pockets of Lacustrine deposits, Alluvium comprising clay, silt, sand and sand and gravel Devensian glaciofluvial deposits (Ref 9.9).

Section 2: Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A

9.5.13 Section 2 extends for a distance of 34.5 km across the Lincolnshire Marshes. The bedrock is predominantly formed from Cretaceous chalk of the Burnham and Welton Chalk Formations and Sandstone of the Carstone Formation. Recorded superficial deposits predominantly comprise Devensian Glacial Till with pockets of sand and gravel glaciofluvial deposits. Lacustrine deposits are present in isolated pockets within the north of the Study Area, with Holocene alluvium comprised of clay, silt, sand and gravels present where the Project crosses Laceby Beck. At the southern end of the Section superficial deposits are more variable as the emerging preferred route corridor crosses the River Great Eau with bands of clay, silt, sand and gravel alluvium, glaciofluvial sand and gravels. Isolated pockets of sand and gravel River Terrace Deposits and Tidal Flat deposits are also recorded alongside the river as it drains eastwards into the North Sea.

Section 3: Lincolnshire Connection Substation A and B (including the overhead line between them)

9.5.14 The bedrock of Section 3 comprises the Cretaceous Chalk of the Burnham and Welton Formations to the north east of the Scoping Boundary, Ferriby Chalk Formation in the west, overlain by superficial deposits of Devensian Till with pockets of glaciofluvial sand and gravel formed between 116 and 11.8 thousand years ago during the Quaternary period. Localised superficial clay and silt Tidal Flat deposits are also recorded where the emerging preferred route corridor crosses watercourses draining eastward into the North Sea including Holme Fen, Fen Drain, Wold Drift Drain and Boy Grift Drain.

Section 4: Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation

9.5.15 Section 4 extends further southwards before turning south west around the northern side of The Wash and continuing to the west of Boston. In the northern part of this section the bedrock is recorded as being Cretaceous chalk of the Welton Chalk Formation, overlain by superficial deposits of Devensian Till and localised pockets of Devensian glaciofluvial deposits. Tidal Flat deposits of clay and silt are also recorded within the northern third of the Section 4 Scoping Boundary infilling the drainage channels and watercourses flowing eastwards to the North Sea. The emerging preferred route corridor enters the Fens just west of Listoft at which point the bedrock changes to the Ferriby Chalk Formation formed between 100.5 and 93.9 million years ago. East of Burgh le Marsh the bedrock becomes more variable with areas of Cretaceous sandstone of the Carstone Formation formed between 113 and 100.5 million years ago, and mudstones and interbedded limestone of the Claxby Ironstone Formation, Tealby Formation and Roach Formation formed between 139.4 and 126.3 million years ago. As the emerging preferred route corridor turns westwards, it crosses areas of Spilsby Sandstone Formation formed between 152.1 and 133.9 million years ago during the Jurassic and Cretaceous periods, and Jurassic mudstone of the Kimmeridge Clay Formation formed between 157.3 and 152.1 million years ago.

9.5.16 East of Gipsey Bridge the bedrock again changes to mudstone of the Ampthill Clay Formation formed between 163.5 and 157.3 million years ago during the Jurassic period. The emerging preferred route corridor then crosses Jurassic mudstone and siltstone of the West Walton Formation (formed 163.5 and 157.3 million years ago) in the vicinity of Wigtoft, south of which lies Jurassic mudstone of the Oxford Clay Oxford Clay Formation formed between 166.1 and 157.3 million years ago. Within the Fens, south of Spilsby, extensive superficial Tidal Flat deposits (formed between 116 and 11.8

thousand years ago), are recorded across the majority of Section 4 with the emerging preferred route corridor crossing a large area of peat superficial deposits mapped by between Thorpe Fen and Stickney (Ibid).

Section 5: Weston Marsh Substation

9.5.17 South of the River Welland the bedrock of Section 5 comprises mudstones of the Oxford Clay Formation (formed between 166.1 and 157.3 million years ago), overlain by superficial Tidal Flat deposits formed between 11.8 thousand years ago and the present.

Section 6: Overhead line from Weston Marsh Substation to Walpole B Substation

9.5.18 In Section 6 the bedrock changes to Jurassic mudstone and siltstone of the West Walton Formation (formed between 163.5 and 157.3 million years ago) in the area surrounding Moulton extending south east to Tydd St Giles Fen, before breaking to Ampthill Clay mudstone (formed between 163.5 and 157.3 million years ago), south of Sutton St James and continuing to the end of the route section at the River Nene north of Wisbech. Superficial deposits across Section 6 comprise clay and silt Tidal Flat deposits formed between 11.8 thousand years ago and the present.

Section 7: Walpole B Substation

9.5.19 The bedrock of Section 7 comprises Jurassic mudstone of the Ampthill Clay Formation (formed between 163.5 and 157.3 million years ago), overlain by superficial Holocene Tidal Flat deposits formed between 11.8 thousand years ago and the present.

Archaeological and historical background

9.5.20 A review of non-designated assets recorded in the North East Lincolnshire, Lincolnshire, Cambridgeshire and Norfolk HERs has revealed extensive evidence of human occupation from the prehistoric period onwards within the Scoping Boundary and extending across the 1 km Study Area. The locations of non-designated heritage assets described below are shown on **Figure 9.2 Non-designated Heritage Assets - Monuments.**

Section 1- Grimsby West Substation

9.5.21 The North East Lincolnshire and Lincolnshire HERs record a total of 33 non-designated heritage assets within Section 1.

Prehistoric (c.500,000 BC to AD 43)

9.5.22 Evidence of Palaeolithic (500,000 to 10,000 BC) activity is rare nationally, with in situ remains particularly rare and the slightly more frequent findspots of stone tools providing most of the evidence for a human presence during the period. Across much of the Scoping Boundary glaciers of the Anglian Ice Age extended across Lincolnshire, scouring the landscape and depositing the superficial glacial till deposits across Sections 1 to 4.

9.5.23 There is no recorded evidence for Palaeolithic or Mesolithic (c. 8,000 to 4,000 BC) activity within Section 1, with limited evidence for later prehistoric settlement dating from the Neolithic to Iron Age (c. 4,000 BC to AD 43). Within the Scoping Boundary this includes the find spot of quern fragments and Neolithic flint scrapers (MNL818), undiagnostic worked flint generally dated as ‘prehistoric’ from Aylesby (MNL4760) and

(MNL3919) and evidence for Late Bronze Age - Iron Age settlement in the form of enclosure ditches (MNL4759). Within the 1 km Study Area an assemblage of Late Neolithic to Early Bronze Age worked flint tools (MLI52915) recovered at Riby Cross and a possible prehistoric routeway extending southwards to Lough known as Barton Street (MLI116141) are recorded to the west of the Scoping Boundary.

Roman (AD 43 to 410)

9.5.24 Evidence for Roman activity within Section 1 is limited. Within the Scoping Boundary a series of pits and postholes containing Roman pottery, animal bone and Roman tile were recorded during archaeological trial trench evaluation (MNL4758) suggesting settlement in this area. Within the 1 km Study Area a scatter of 3rd century Roman pottery (MLI52916) was recovered at Riby Cross.

Early medieval (AD 410 to 1066)

9.5.25 During the early medieval period there is likely to have been a reduction in rural settlement follow the collapse of the Roman administration in the region. By the 7th century, the kingdom of Lindsey was formed, eventually becoming part of Mercia following the Battle of the Trent in AD 679. A substantial Middle Saxon rural settlement, occupied from the 6th or 7th century to the mid-19th century, was recorded within the 1 km Study Area with numerous field and enclosure ditches, and elements of probable post-built and sunken featured buildings (MLI52885). A possible early medieval cemetery dating to the 7th century has also been recorded within the 1 km Study Area west of the Scoping Boundary at Riby Park.

Medieval (1066 to 1540)

9.5.26 Medieval settlement and associated agricultural landscapes are better represented both within the Scoping Boundary and surrounding 1 km Study Area. Numerous fields in which ridge and furrow cultivation has been recorded either as extant earthworks or from aerial photographs (MNL2225, MNL2232, MNL2233 and MNL2243), and a single findspot of medieval and post-medieval pottery (MNL124). Located approximately 620 m north of the Scoping Boundary, the two moated sites at Healing Hall scheduled monument (NHLE 1010947) represents a manorial site closely associated with the village of Healing and its medieval parish church, and forms part of remnant medieval landscape with ridge and furrow cultivation recorded in the surrounding fields (MNL2233).

Post-medieval (1540 to 1900)

9.5.27 The development of the rural landscape during the post-medieval period are evidenced within the Scoping Boundary by a number of post-medieval farmstead and buildings (MNL116, MNL115, MNL1307 and MNL117). Two areas of woodland, Wybers Wood (MNL1562) and Maud Hole Covert (MNL1563), are also recorded on 19th century maps together with two post-medieval roads Aylesby Lane (MNL3481) and Aylesby Road (MNL3482). Further post-medieval farmsteads are documented within the 1 km Study Area (MLI116743 and MLI116744). Within the 1 km Study Area to the west of the Scoping Boundary lie the surviving features of the non-designated post-medieval designed landscape of Riby Park (MLI92320).

Modern (1901 to the present)

9.5.28 No heritage assets of modern date are recorded in within the Scoping Boundary or within the 1 km Study Area of Section 1.

Undated

9.5.29 Undated cropmarks (MNL240) are recorded within the Scoping Boundary and within the 1 km Study Area (MLI50715).

Section 2- Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A

9.5.30 Section 2 extends for approximately 34.5 km southwards from the Grimsby West Substation crossing areas of glacial till that extended along the western side of the Lincolnshire Coast and Marshes. Within Section 2, the Lincolnshire HER records 706 non-designated heritage assets.

Prehistoric (c.500,000 BC to AD 43)

9.5.31 Prehistoric activity has been recorded throughout the 1 km Study Area and the Scoping Boundary and dates from the Palaeolithic period through to the Iron Age. Evidence of prehistoric activity largely comprises flint debitage, cropmarks, earthworks, and pottery sherds.

9.5.32 The earliest assets date to the Palaeolithic period comprising nine preserved tree rings (HER MNL305), and a single flint within a larger finds assemblage dating to between the medieval and post-medieval periods.

9.5.33 There is evidence of some Neolithic activity within the Scoping Boundary, which includes a Neolithic polished flint axe head (HER MLI41945), and several areas of likely occupation which included ring ditches, linear ditches, and pits (HER MNL3906, HER MNL3907, HER MNL3908, HER MNL3908, HER MNL3911, HER MNL3913, HER MNL4364, HER MNL4364).

9.5.34 Evidence for continuing prehistoric occupation and activity within Lincolnshire throughout the Bronze Age includes two Bronze Age cropmarks identified as possible barrows (HER MLI82175, HER MLI82192), both of these are located within the Scoping Boundary. Evidence of wider Bronze Age burial practices has been observed approximately 34 m east of the Scoping Boundary, with an earthwork approximately 30 m in diameter, 3 m high, with a wide, flat top (HER MLI87809). A possible cropmark round barrow cemetery (HER MLI88514) has also been identified 35 m west of the Scoping Boundary.

9.5.35 Several Iron Age sites have been identified within the 1 km Study Area, two of which are enclosures and field systems (HER MLI87670, HER MLI98689), identified though aerial photographic analysis and a further two identified as rectilinear extant earthworks (HER MNL3103, HER MNL3104).

9.5.36 Several other prehistoric cropmarks have been identified within the Scoping Boundary, these cropmarks show areas of potential ring ditches and enclosures (HER MLI116056, HER MLI87925, HER MLI87928, HER MLI88682).

Roman (AD 43 to 410)

9.5.37 Very few Roman assets have been identified within this area of Lincolnshire, with eight Roman assets identified within the 1 km Study Area and one asset recorded within the Scoping Boundary. Human remains were recorded at Pear Tree Lane Ludborough (MLI126146), comprising a skull without a lower jaw, two vertebrae and a clavicle; these were subjected to radiocarbon dating, which dated them to a mid-Roman date between AD 276-342. Within the 1 km Study Area, six Roman findspots comprising pottery dating to between the 1st and 4th century were identified. The closest pottery fragments (HER MLI41836) are located within the Scoping Boundary, with only a single sherd of Roman pottery (HER MNL3917) recorded. Within the wider 1 km Study Area coin hoards and a single post hole were also identified.

Early medieval (AD 410 to 1066)

9.5.38 Evidence of early medieval activity and occupation has been recorded throughout the 1 km Study Area, however, there are no early medieval heritage assets recorded within the Scoping Boundary. Lincolnshire was settled throughout the 5th, 6th and 7th centuries, with many smaller villages and hamlets established throughout this period. Archaeological evidence has identified eight of these small settlements within the 1 km Study Area; the closest of these are North Cockerington (MLI83365) located approximately 200 m east of the Scoping Boundary, Withern (MLI88311) approximately 60 m east of the Scoping Boundary and Ludborough (HER MLI43161), which is located approximately 40 m to the west of the Scoping Boundary.

9.5.39 Agricultural assets such as earthworks, ditches, field systems and enclosures are located across the 1 km Study Area, with earthworks identified at Legbourne (MLI98225), approximately 980 m west of the Scoping Boundary and at Covenham St Bartholomew (MLI127094), approximately 290 m east of the Scoping Boundary.

9.5.40 Several find spots comprised of pottery, jewellery and beads, have also been recorded sporadically across the 1 km Study Area, however, none have been identified within the Scoping Boundary.

Medieval (1066 to 1540)

9.5.41 Medieval activity within both the Scoping Boundary and the 1 km Study Area, largely comprises of medieval settlements (deserted, shrunken, and still inhabited), agricultural features such as enclosures, boundaries, and ridge and furrow, and smaller finds such as coins, pottery, metal objects, and domestic waste.

9.5.42 Throughout the medieval period, new settlements were established, and existing Anglo-Saxon settlements grew and expanded. Within the Scoping Boundary, the settlement of South Cockerington (MLI43243) has been identified. Some of these settlements fell into decline during the 14th and 15th centuries, with Waithe deserted medieval village (MLI41233), shrunken village of Stewton (MLI88733), and Castle Carlton deserted medieval village (MLI42503) have all been identified. Further deserted settlements within the 1 km Study Area have also been recorded, the closest of these include Tothill deserted medieval village (MLI42242), located approximately 60 m to the west of the Scoping Boundary, Brackenborough deserted medieval village (MLI43572), approximately 30 m west of the Scoping Boundary, and Gayton le Marsh deserted medieval village (MLI90913) located 10 m east of the Scoping Boundary.

9.5.43 Two deserted medieval villages designated as scheduled monuments are located within the 3 km Study Area and include: the Deserted Village of North Cadeby (site of) east of

Cadeby Hall (NHLE 1003611), located approximately 2.9 km west of the Scoping Boundary, and the Deserted Medieval Village (NHLE 1003616) located adjacent to the Scoping Boundary.

9.5.44 Throughout the medieval period, one of the primary industries across Lincolnshire was agricultural farming; this is reflected in the large amount of remnant field systems and ridge and furrow within the 1 km Study Area. In total, 29 field systems and fields with surviving ridge and furrow cultivation earthworks are located within the Scoping Boundary.

9.5.45 Several scheduled monument moated manor sites have been recorded within the 3 km Study Area, including Castle Hill: moated site with Civil War earthworks (NHLE 1019067) located approximately 270 m east of the Scoping Boundary, Moated site immediately west of Hall Farm (NHLE 1019070), located approximately 80 m west of the Scoping Boundary.

9.5.46 Three ecclesiastical scheduled monuments have been identified within 3 km of the Scoping Boundary including, Site of Gilbertine priory and post Dissolution house, moats, 18th century garden, medieval settlement and cultivation remains (NHLE 1010706), located approximately 2.6 km west of the Scoping Boundary, Site of Legbourne Priory (NHLE 1011455), located approximately 1.4 km west of the Scoping Boundary, and Louth Park Abbey (NHLE 1005002), located adjacent to the Scoping Boundary. Several further non-designated heritage assets have also been recorded within the 1 km Study Area including The Priory of St Mary at Alvingham (MLI41255), located approximately 430 m from the Scoping Boundary.

Post-medieval (1540 to 1900)

9.5.47 Agrarian farming continued to be one of the most important industries within Lincolnshire, moving into the 18th and 19th centuries. Evidence of its importance is clearly identifiable on the landscape with a high amount of farmsteads that are located across the 1 km Study Area. In total, 103 farmsteads and associated ancillary structures such as barns and outhouses are located within the 1 km Study Area.

9.5.48 Throughout the 19th century, areas of parkland were developed within Lincolnshire, and these are recorded on the First Edition Ordnance Survey (OS) maps, with Legbourne Grange Park (HER MLI91684), and Eastfield Farm Park (HER MLI91686), and Bowlings Park (HER MLI92236) located within the Scoping Boundary.

9.5.49 Within the 1 km Study Area, other heritage assets associated with the industrial expansion of Lincolnshire have been identified, including public houses, Wesleyan chapels, and granaries. A section of the Louth Navigation (HER MLI86587) is located within the Scoping Boundary, which was constructed in the 18th century and consists of sections of the River Lud.

Modern (1901 to the present)

9.5.50 Heritage assets dating to the modern period consist largely of World War II assets, with Lincolnshire being of strategic importance for the Royal Air Force (RAF) for much of the Second World War. RAF Manby (HER MLI43396) and RAF Waltham (HER MLI88745) are both located within the Scoping Boundary. Associated earthwork features of a possible search light battery (HER MLI98747), and several buildings (HER MNL3139, HER MNL3141) associated with RAF Waltham are also located within the Scoping Boundary. Further evidence of World War II activity within the Scoping Boundary includes the remains of a crashed Dornier aircraft (HER MLI125083).

Undated

9.5.51 Several undated features are within the 1 km Study Area and two are within the Scoping Boundary. These include a well (HER MLI43420), and an earthwork bank (HER MLI88309).

Section 3- Lincolnshire Connection Substation A and B (including the overhead line between them).

9.5.52 The Lincolnshire HER records 215 non-designated heritage assets within Section 3.

Prehistoric (c.500,000 BC to AD 43)

9.5.53 No evidence of prehistoric activity has been recorded within the Scoping Boundary, with only limited evidence recorded in the surrounding 1 km Study Area. The earliest example of prehistoric activity dates to the Neolithic period, with the findspot of three polished stone axes (MLI41481). Evidence of Bronze Age activity primarily comprises funerary monuments and associated find spots including a possible ploughed out early Bronze Age round barrow (MLI41476), a possible tumulus (MLI41469) and cropmarks that potentially represent former barrows (MLI82271 and MLI82272). No evidence of Iron Age occupation is recorded by the Lincolnshire HER within Section 3.

Roman (AD 43 to 410)

9.5.54 Evidence for Roman settlement has been recorded within Section 3, with cropmarks representing rural settlement enclosures and boundaries (MLI90878), a small cremation cemetery (MLI42526) and three find spots of Roman pottery (MLI41135, MLI41472, MLI42521). Within the 1 km Study Area Roman building material incorporated in the form of several fragments of Roman pavement, re-used in the construction of the early Bilsby Hall (MLI41482) and further find spots of Roman pottery (MLI41474 and MLI42545) are known.

Early medieval (AD 410 to 1066)

9.5.55 The only evidence of early medieval activity within Section 3 relates to three villages recorded during this period. Within the Scoping Boundary the settlement of Huttoft is recorded as originating in the early Anglo-Saxon period (MLI43299), while in the wider 1 km Study Area the settlement of Beesby in the Marsh (MLI115894) and Maltby le Marsh (MLI98561) are recorded as being of late Saxon origin.

Medieval (1066 to 1540)

9.5.56 The pattern of rural settlement continues to develop into the medieval period with many of the modern villages having medieval origins in addition to examples of deserted and shrunken medieval villages (MLI41479, MLI41486, MLI42527, MLI90886) within the Scoping Boundary, and a further seven former settlements evidenced by earthworks and cropmarks within the surrounding 1 km Study Area. Evidence for the medieval agricultural landscape surrounding these villages is also recorded with extensive records for extant and former ridge and furrow cultivation with the Scoping Boundary (MLI115896, MLI115897, MLI88742, MLI90885 and MLI98708) and woodland dating from the medieval period (MLI43035, MLI43037 and MLI43044). In addition to the historic medieval villages, moated manorial sites (MLI41476 and MLI42525) and fishponds (MLI90887) are also represented. The medieval landscape is evidenced across the 1 km boundary with 12 areas of ridge and furrow cultivation, evidence for

three medieval field boundaries or enclosures. The importance and power of religious houses within the Lincolnshire landscape is also evident with three scheduled monuments, these include the Priory of St Mary, Greenfield (NHLE 1008687), Markby Priory (NHLE 1004987) and Hagnaby Abbey (NHLE 1011454) all located within the 1 km Study Area.

Post-medieval (1540 to 1900)

9.5.57 The Lincolnshire HER records 137 heritage assets of post-medieval date, nine of these within the Scoping Boundary comprising the sites of six post-medieval farmsteads (MLI116611, MLI116617, MLI116896, MLI116908, MLI118491 and MLI118495), a pinfold (MLI88331) and the former Sutton on Sea to Alford tramway (MLI43675). The remaining 128 heritage assets are located within the 1 km Study Area with 62 demolished or partially demolished farmsteads, with farm buildings, mills and several moated sites recorded within the rural landscape. Numerous cottages, schools, public houses and methodist chapels are recorded in the villages serving an increasing population.

Modern (1901 to the present)

9.5.58 The mapped extent of RAF Strubby (MLI88710), the easternmost of Lincolnshire's Second World War airfields, extends into the Scoping Boundary.

9.5.59 Several undated assets are recorded within the Scoping Boundary and include a number of cropmark and earthwork features (MLI115898, MLI42523, MLI87954, MLI88101, MLI88511).

Section 4- Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation

9.5.60 Section 4 extends for approximately 64 km across Lincolnshire, from the glacial till in the northern part of the county into the Lincolnshire Fens. Within Section 4 the Lincolnshire HER records 1207 non-designated heritage assets.

Prehistoric (c.500,000 BC to AD 43)

9.5.61 The Palaeolithic and Mesolithic is relatively poorly represented in the 1 km Study Area, with only a few Mesolithic assets recorded within 1 km of the Scoping Boundary. Several flint scatters have been identified within the 1 km Study Area, at St Helen's Church (MLI81932), approximately 240 m east of the Scoping Boundary, and at Midville (MLI84488), located within the Scoping Boundary. A further temporary Mesolithic encampment was recorded at Burgh Le Marsh (MLI81410), approximately 940 m west of the Scoping Boundary.

9.5.62 The Neolithic period is better represented in the archaeological record and primarily takes the form of lithic findspots spread across the 1 km Study Area. Across the 1 km Study Area 53 Neolithic lithics have been recorded, 17 of these were recorded within the Scoping Boundary, and include several polished handaxes (MLI40591 and MLI40994) and flint scatters (MLI41088 and MLI41090). The only identified Neolithic site is the scheduled monument of Butterbump Round Barrow Cemetery (NHLE 1003615) located at Butterbump Farm, approximately 35 m west of the Scoping Boundary.

9.5.63 Bronze Age activity has been identified close to the settlement of Willoughby, with a Bronze Age barrow (MLI84134) and associated cropmarks (MLI90836), located within the Scoping Boundary in close proximity to Butterbump Farm barrows; there is evidence

of continual usage at Butterbump Farm into the Bronze Age. A further ring ditch (MLI97890), and cropmarks (MLI97957) were identified within the 1 km Study Area indicating that there is wider Bronze Age activity within the area. The Bronze Age scheduled monument, Round Barrow Cemetery with outlying barrow to the west of Tetney and north of the Waithe Beck (NHLE 1469975), is located approximately 500 m east of the Scoping Boundary and highlights a likely Bronze Age burial landscape close to Tetney. Six Bronze Age finds were recorded within 1 km of the Scoping Boundary, with a further three recorded within the Scoping Boundary including a palstaff (MLI41002), a barded arrowhead (MLI41086) and a Bronze Axe (MLI42251).

9.5.64 Iron Age activity is relatively localised to saltern sites within the 1 km Study Area, with six saltern sites recorded at Burgh Le Marsh (MLI41693, MLI41694, MLI41948, MLI41957, MLI43101, MLI43154). Four of these are located within the Scoping Boundary, with the others located between 200 m and 460 m from the Scoping Boundary. A further two salterns were recorded at Wyche Drain (MLI88785), within the Scoping Boundary and at Hildyke Drain (MLI88786) approximately 120 m east of the Scoping Boundary. A single, substantially sized Iron Age settlement which included pits, ditches, postholes and occupational evidence, has been recorded at Croft (MLI99129), within the Scoping Boundary.

Roman (AD 43 to 410)

9.5.65 Following the invasion of Britain by the Roman Empire in AD43, the British tribes in Lincolnshire were quickly subdued, with the Roman invaders establishing the Lindum Colonia at Lincoln as a military encampment; this developed into a large town throughout the 2nd and 3rd centuries. Several Roman settlements are known within the 1 km Study Area, including a settlement at Frampton (MLI12609 and MLI12613), and evidence of Roman farmsteads in this same locality (MLI12624). A second Roman settlement has been identified at Station Road, Sutterton (MLI13354), with fieldwalking close to this settlement identifying a large number of Roman finds including pottery and tile (MLI13336).

9.5.66 Several further areas of Roman occupation have been identified at Brothertoft, with two rectangular cropmarks identified as enclosures, and Roman domestic occupation features recorded at Addlethorpe (MLI90289), approximately 680 m and 750 m east of the Scoping Boundary, respectively. More widely, there are 52 small Roman finds located across the 1 km Study Area, these include Roman coins, belt buckles, pottery, tile and pin brooches. Several areas within the 1 km Study Area display denser findspot locations, including a spread of Roman pottery (MLI97967, MLI97999) located within the Scoping Boundary, and Roman coins (MLI41992) located approximately 300 m west of the Scoping Boundary. A dense spread of Roman artefacts, including pottery, tile, coins and brooch pins have been identified around Burgh Le Marsh, Kirton and Brothertoft, indicating that there may have been an as yet undiscovered Roman settlement located within this area. Several of these finds, including a terracotta head (MLI41049), a Romano-British jar (MLI12607), and sherds of Roman pottery (MLI12538) were identified within the Scoping Boundary. The continued usage of saltern sites from the Iron Age into the Roman period is evident, with several saltern sites recorded at Burgh Le Marsh. Three of these Saltern Sites have been recorded within the Scoping Boundary (MLI43102, MLI42843 and MLI43103), and a further three located between 90 m and 410 m east of the Scoping Boundary (MLI42845, MLI43104 and MLI43106).

Early medieval (AD 410 to 1066)

9.5.67 The move into the post-Roman period, is evidenced by several small settlements across Lincolnshire. The settlement of Mumby (MLI82080), was identified approximately 650 m east of the Scoping Boundary, with linear ditches and pits identified through aerial photography. The small settlement of Toynton St Peter (MLI41114) was identified approximately 990 m north of the Scoping Boundary, with a small shrunken settlement identified at Asperton (MLI13096), located within the Scoping Boundary. Further evidence of early medieval farming was identified through archaeological investigations at Burgh Le Marsh (MLI98786), approximately 690 m north west of the Scoping Boundary. Evidence of Anglo-Saxon occupation and burial has been previously identified at Cumberworth, approximately 280 m from the Scoping Boundary. St Helen's Church was built in the 12th century, however, previous archaeological investigations indicate this medieval church was built on the site of an earlier Anglo-Saxon church (MLI41986), with evidence of an Anglo-Saxon burial ground (MLI81931) and settlement features including sunken floored buildings (MLI81930) located surrounding the church. Six Anglo-Saxon finds, including pottery dating to between the 8th and 10th centuries, and bronze tweezers have been found within the 1 km Study Area. Three of these finds have been identified within the Scoping Boundary.

Medieval (1066 to 1540)

9.5.68 By the medieval period, many of the smaller Anglo-Saxon settlements had expanded, with a number of new settlements developed across Lincolnshire. Evidence of settlements have been identified at Wigtoft (MLI13092), approximately 480 m south east of the Scoping Boundary, and at Sloothby (MLI83297), Burgh Le Marsh (MLI41501), the settlement of Ashington (MLI88788) and Wyche (MLI88789), all within the Scoping Boundary. Throughout the medieval period, England suffered a period of population decline, due to several factors, including periods of war, crop failure and the impacts of the Black Death in the 14th century. Several settlements within this Section contracted in size or were abandoned completely. Several of these settlements are located within the 1 km Study Area, such as Armtree Deserted medieval village (MLI40657), located approximately 530 m from the Scoping Boundary, the shrunken medieval village of Firsby (MLI42192), located approximately 220 m north of the Scoping Boundary and the shrunken village of Farlesthorpe (MLI89119), located approximately 70 m west of the Scoping Boundary.

9.5.69 Throughout the medieval period, agricultural farming was one of the predominant industries across Lincolnshire, this is reflected in the large amount of agricultural remains such as ridge and furrow, ditches and banks, earthworks and field systems identified both within the 1 km Study Area and within the Scoping Boundary. Approximately 55 medieval agricultural assets are identified within the 1 km Study Area, with the most notable examples located at Thorpe-St-Peter. The remains include a group of enclosures (MLI90843-MLI90855), earthworks and field systems surrounding a small settlement located within the Scoping Boundary. Examples of ridge and furrow are commonplace across the 1 km Study Area with examples identified at Addlethorpe (MLI98704) approximately 240 m east of the Scoping Boundary, Burgh Le Marsh (MLI88852), approximately 750 m northwest of the Scoping Boundary, and Huttoft (MLI88746) within the Scoping Boundary.

9.5.70 The continuing industry of salt making and harvesting within the Lincolnshire Fens was still undertaken throughout the medieval period, with several saltern sites recorded within the 1 km Study Area, including salterns at Gosberton (MLI20137), approximately 225 m west of the Scoping Boundary, Bicker Haven (MLI22460), located approximately

360 m west of the Scoping Boundary, and at Quadring Eaudike (MLI23288), located approximately 560 m west of the Scoping Boundary.

9.5.71 The power of the Cistercian Monastic Order and other religious orders grew from the 12th century, with several granges used to farm and house the monks from these orders located across the 1 km Study Area including Stickney Grange (MLI41046), located approximately 650 m north west the Scoping Boundary, and Sutterton Grange (MLI13075) with its associated fishponds (MLI13074) located within the Scoping Boundary.

9.5.72 A large number of medieval finds have been recorded across the 1 km Study Area, indicating wide land usage of the area throughout the medieval period. In total, 56 medieval findspots have been identified within the 1 km Study Area, 10 of which were recorded within the Scoping Boundary. These comprise pottery, such as glazed wares and Cisternanian wares, coins, spindle whorls, pilgrim ampullae, blades and strap ends.

Post-medieval (1540 to 1900)

9.5.73 The agricultural industry continued into the 18th and 19th centuries across Lincolnshire. The predominant asset type identified within the 1 km Study Area are 19th century farmsteads. There are 737 farmsteads dating to the 19th century that have been identified within the 1 km Study Area. These are a mixture of partially demolished farmsteads, but predominantly still have surviving farmhouses and outbuildings associated with the farmsteads, and these would have served the agricultural landscape of Lincolnshire. These are recoded across the full breadth of the 1 km Study Area, with 86 of these farmsteads located within the Scoping Boundary. Evidence of agricultural enclosures have also been recorded within the 1 km Study Area, with earthwork enclosures recorded at Addlethorpe, approximately 400 m east of the Scoping Boundary and Hogsthorpe, approximately 460 m east the Scoping Boundary. Several enclosures were identified at Orby (MLI98628 and MLI98630), Burgh Le Marsh (MLI87794 and MLI87795), Willoughby (MLI84140) and Habbertoft (MLI84139), all located within the Scoping Boundary.

9.5.74 The late 18th and 19th centuries saw a marked increase in industrial activities with remains identified within the Scoping Boundary including Little Steeping Railway Station (MLI124883), the Firsby to Boston railway line (MLI124888), Wragg Marsh tramway (MLI22401), Mumby Railway Station (MLI43413). Other industrial assets identified within the 1 km Study Area include post-medieval bridges, brickworks, a smithy workshop, and turnpike roads.

9.5.75 Post-medieval finds are relatively localised to Burgh Le Marsh (MLI41526), located between 25 m and 600 m north west of the Scoping Boundary (MLI41555, MLI41719), and at Farlesthorpe (MLI42223), approximately 510 m west of the Scoping Boundary.

Modern (1901 to the present)

9.5.76 Heritage assets dating to the 20th century predominantly relate to the Second World War, with a large number of RAF command bases and airfields located in Lincolnshire, acting as an important and strategic location for the defensive and offensive operations. Two Second World War aircraft crash sites are located within the Scoping Boundary, including the protected crash site of an Avro Lancaster and war memorial at Sibsey Northlands (MLI116028) and the crash site of a German Luftwaffe Dornier Do 17 at Carrington (MLI125736).

9.5.77 The ground defence of Lincolnshire and the RAF airfields was comprised primarily of pillbox locations spread across Lincolnshire, twelve pillboxes are located within the 1 km Study Area, one of these (MLI43277), is located within the Scoping Boundary. Four aircraft earthwork obstructions were identified at Burgh Le Marsh (MLI87790-MLI87793), three of these are located between 150 m and 800 m to the west of the Scoping Boundary, with one identified within the Scoping Boundary. Further anti-aircraft earthworks have been identified in Orby, within the Scoping Boundary.

9.5.78 Four war memorials have been identified within the 1 km Study Area, at Suttterton (MLI125184), approximately 1 km from the Scoping Boundary, at Croft (MLI116052), approximately 375 m south east of the Scoping Boundary, at Thrithville (MLI125231), located 500 m east of the Scoping Boundary, and at Thorpe St Peter (MLI116232), located approximately 200 m south of the Scoping Boundary.

9.5.79 Several early 20th century parks have been identified within the 1 km Study Area, including Little Steeping Manor Park (MLI91675), located approximately 950 m north of the Scoping Boundary, Burgh Hall Park (MLI91676), located approximately 750 m north west of the Scoping Boundary, and Carrington Park (MLI92272), located approximately 800 m north west of the Scoping Boundary. Castle House Dyke Park (MLI92271) and an unnamed Park at Brothertoft (MLI92254) are both located within the Scoping Boundary.

Section 5- Weston Marsh Substation

9.5.80 Section 5 lies within the Lincolnshire Fens crossing the River Welland to the proposed Weston Marsh Substation. There are 27 non-designated heritage assets recorded by the Lincolnshire HER with no recorded remains dating to the prehistoric or Roman periods.

Medieval (1066 to 1540)

9.5.81 The earliest evidence of activity dated to the medieval period within the Scoping Boundary are the remains of the scheduled Wykeham Chapel (NHLE 1019096, NHLE 1064471). The chapel's standing remains (a Grade I Listed Building), and the adjoining graveyard lie at the centre of the moated grange and are included in the scheduling. The domestic chapel of St Nicholas was constructed in 1311 at Wykeham Hall as the country residence of the prior of Spalding Priory. The hall, chapel and grounds were moated, and traces of the moat and the scheduled ruins of the chapel remain. Evidence for management of the low-lying landscape is also recorded within the Scoping Boundary in the form of a medieval flood defence bank, likely constructed in the 12th or 13th century, and visible within LiDAR mapping. Two further medieval assets are recorded within the 1 km Study Area with an extensive salt making site (MLI23633) and boundary ditch (MLI125698) providing further evidence for the exploitation and management of the fen landscape.

Post-medieval (1540 to 1900)

9.5.82 There is evidence for the increasing agricultural importance of the landscape during the post-medieval period within the Scoping Boundary by six extant or demolished farmsteads (MLI122914, MLI122914, MLI122917, MLI122920, MLI122921 and MLI122922), while systematic fieldwalking surveys within the Scoping Boundary have recovered a range of artefacts including clay pipe, brick and pottery dated to the 18th to 19th century, which may be linked with contemporaneous reclamation and subsequent agricultural use of fields around Weston (HER MLI85278, HER MLI85279). OS mapping

recorded the line of the now disused Wragg Marsh tramway (HER MLI125699) within the Scoping Boundary. Within the 1 km Study Area evidence for post-medieval settlement comprise a further 11 recorded farmsteads, a drainage ditch and the Wesleyan Methodist Chapel in Surfleet Seas End (MLI97740).

Modern (1901 to the present)

9.5.83 No remains of modern date are recorded within the Scoping Boundary or within the 1 km Study Area of Section 5.

Undated

9.5.84 Archaeological investigations have recorded several undated archaeological features (MLI83167 and MLI125700) within the 1 km Study Area which may be related to medieval salt production.

Section 6- Overhead line from Weston Marsh Substation to Walpole B Substation

9.5.85 Section 6 extends southwards from the Weston Marsh Substation crossing the fens from Lincolnshire and into Cambridgeshire. The Lincolnshire and Cambridgeshire HER records a total of 379 non-designated heritage assets dating from the Roman to modern periods. No prehistoric remains or artefacts have been recorded within the Scoping Boundary or withing the 1 km Study Area surrounding Section 6.

Roman (AD 43 to 410)

9.5.86 The earliest evidence for settlement dates to the Roman period with eight areas of rural settlement evidenced from enclosures boundary ditches and droveways and domestic artefacts recorded either from cropmarks or archaeological investigation (MLI20380, MLI20382, MLI20446, MLI20449, MLI22207, MLI22249, MLI22253 and MLI92281). Archaeological trial trenching for the Weston Bypass (MLI92281) recorded Roman deposits including large volumes of imported finewares suggesting settlement of a moderately high status with connection to wider trade routes. Within the 1 km Study Area a further 24 assets of Roman date are recorded comprising a further nine possible settlement sites, two salt making sites, several field systems and six artefact scatters and findspots, including three coin hordes suggesting a fairly dense pattern of settlement within the landscape.

Early medieval (AD 410 to 1066)

9.5.87 Early medieval remains have been recorded within the 1 km Study Area; however, no assets are located within the Scoping Boundary. Two settlements originating in the early medieval period are recorded, the closest being the village of Weston (MLI20331) approximately 415 m east of the Scoping Boundary. Evidence for the drainage and cultivation of the landscape to the north of the village was recorded during archaeological trial trenching in advance of the Weston by-pass (MLI92282 and MLI92283). A second settlement site was recorded north east of Spalding (MLI88631) approximately 455 m west of the Scoping Boundary. Further evidence for drainage and land division is represented by several ditches recorded during archaeological investigations (MLI116278 and MLI88630), while possible evidence for settlement activity or the manuring of fields is demonstrated by artefact scatters and findspots of Saxon pottery (MLI23063, MLI23594, MLI80614, MLI83935 and MLI97563). Within Cambridgeshire, scatters of Early to Middle Saxon finds associated with dark soils

(MCB11774 and MCB10803) provide possible evidence for settlement in the area of Tydd St Giles on a slight rise/bank along the Old Eau, one of only two such sites recorded in the Cambridgeshire silt fen.

Medieval (1066 to 1540)

9.5.88 The Lincolnshire and Cambridgeshire HERs record 45 heritage assets of medieval date. Within the Scoping Boundary evidence for drainage and reclamation of the low-lying fens for settlement and agriculture is provided by a section of Sea bank known as the 'Roman Bank' near Newton (MCB16155) and the principal drain in South Holland, known as the South or Lady Nunn's Old Eau (MCB20854). Beyond the exiting villages evidence for rural settlement comprises the site of Guanock House, a monastic grange (MLI20505), a possible saltern site (MCB24468) and scatters of medieval pottery and animal bone, from the Tydd St Giles area (MCB18112 and MCB12829).

9.5.89 The King's Hall moated site scheduled monument (NHLE 1017217) is located approximately 150 m west of the Scoping Boundary. Originating in the late 12th century on land reclaimed from the Fen as part of the holdings of the Moulton family. The buildings were no longer standing by the 18th century and today the monument survives as a well-preserved moat containing water-logged deposits and associated earthworks. The village of Moulton (MLI20351) is said to have been established at the start of the 12th century by Thomas de Multon. Evidence for medieval settlement within the wider 1 km Study Area is represented by a further 33 non-designated heritage assets which include further evidence for the drainage and sea defences (MLI88632, MLI92285 and MLI98446). The use of reclaimed land for agriculture is evidenced by the monastic grange of Thornholm (MLI23570), and a field system (MLI22248) and medieval burgage plots (MLI116244) recorded in Fleet. While the sites of a watermill (MCB4832) and windmill (MCB4833) are recorded at Tydd St Giles. The importance of medieval salt production in the area is also evidence by nine separate saltern sites. Numerous artefact scatters and findspots are recorded associated with medieval villages such as Weston, Fleet, Newton and Tydd St Giles.

Post-medieval (1540 to 1900)

9.5.90 There are 211 non-designated heritage assets of post-medieval date recorded in Section 6. Of these, 154 comprise demolished or partially extent farmsteads, 17 of which lie within the Scoping Boundary. Draining and maintaining the low-lying fertile farmland which extends across the Scoping Boundary is evidenced by the North Level Drain, at Tydd St Giles (MCB27444) with the River Nene Navigation (MCB20859), constructed from 1713, also providing a transport route to Northampton. The Spalding to Holbeach Railway (MLI20232) also runs across the area within the Scoping Boundary. Within the wider 1 km Study Area in addition to the post-medieval farmsteads, the HERs record various farm buildings, barns and several mills. Several country houses (MLI90519 and/or halls are recorded, as is a single non-designated parkland, Fulney House Park, Spalding (MLI92290). The growing population during the post-medieval period is evidenced by numerous domestic houses recorded within the existing settlements across this Section, including six buildings locally listed by South Holland District Council, in addition to several schools, public houses and methodist chapels.

Modern (1901 to the present)

9.5.91 There are 12 non-designated heritage assets dated to the modern period, all of which are located within the 1 km Study Area. The majority of these assets relate to the

defensive structures or installation of the Second World War and comprise three pill boxes (MLI125205, MCB1522 and MCB29645), an anti-aircraft searchlight battery at Tydd St Giles (MCB29644), the Fulney Park prisoner of war camp (MLI90562) and the Holbeach St Johns War Memorial (MLI125247). In addition, the HERs record a number of houses, a school and a church in the villages of Newton, Moulton and the gardens of the Manor House, Tydd St Giles (MCB18508), once owned by Howard Carter.

Undated

9.5.92 There are 49 archaeological sites or features which it has not been possible to date. Nineteen of these undated heritage assets are recorded within the Scoping Boundary, including several areas of cropmarks, earthworks, and ditch features (MLI20467, MLI20500, MLI20502, MLI20507, MLI116097, MLI86087, MLI87291, MLI87292, MLI89081, MLI89822, MLI89823, MLI89824, MCB11585, MCB19614). Within the 1 km Study Area the remaining 30 undated heritage assets comprise a similar pattern of linear features and enclosures identified as cropmarks on aerial photographs and geophysical anomalies and archaeological features identified during archaeological investigations and which have no associated dating evidence.

Section 7- Walpole B Substation

9.5.93 Section 7 forms the southern end of the Project, crossing the River Nene from Cambridgeshire into Norfolk. The Cambridgeshire and Norfolk HERs record 170 non-designated heritage assets within the 1 km Study Area, of which 58 are located within the Scoping Boundary.

Prehistoric (c.500,000 BC to AD 43)

9.5.94 There is minimal prehistoric archaeology within the 1 km Study Area, and no examples within HER within the Scoping Boundary. The only example within the HER is a ditched enclosure and pits recorded through geophysical survey (HER MNF58809). Fieldwalking in this area also revealed surface scatters of Iron Age and Roman pottery.

Roman (AD 43 to 410)

9.5.95 Evidence for Roman settlement activity within the Scoping Boundary is limited with a single earthwork feature with associated Roman pottery (MNF18975) recorded in the centre of the Scoping Boundary and seven findspots of Roman pottery and Roman building material (MNF25853, MNF23523, MNF19864, MNF19049, MNF19048, MNF18978 and MNF18950). Within the 1 km Study Area an earthen bank or sea wall (also interpreted as a saltern mound - MNF19040) and 13 artefact scatters or findspots are recorded.

Early medieval (AD 410 to 1066)

9.5.96 There is evidence of early medieval settlement activity throughout Section 7. Within the Scoping Boundary two features are recorded comprising a roddon of an unknown date associated with a concentration of early medieval and medieval pottery sherds (MNF19041) and a probable Late Saxon and medieval earthen bank built as a sea defence and visible as an earthwork and a cropmark on 1946 RAF aerial photographs (MNF2187). Five findspots of early medieval pottery and scatters of artefacts including animal bone, shell and coins and metal objects have been recorded during fieldwalking and metal detector surveys within the Scoping Boundary (MNF18942, MNF18943, MNF18952, MNF18958 and MNF18964). Within the 1 km Study Area a possible Middle

Saxon settlement site is evidenced by substantial linear features and circular and sub-rectangular pits, fired clay and briquetage of Middle Saxon date, recorded during excavations at Rose Farm (MNF22145). A further four find spots of early medieval pottery are also recorded (MNF21325, MNF18650, MNF18648 and MNF19665).

Medieval (1066 to 1540)

9.5.97 The Norfolk HER records extensive evidence for medieval activity within Section 7, with entries for 95 non-designated heritage assets of medieval date. Thirty-three of these assets are located within the Scoping Boundary and include the earthwork remains of sea wall or saltern mounds (MNF18567, MNF18571, MNF19042 and MNF19805) and several roddons with associated fragments of medieval pottery (MNF18945 and MNF18946). Evidence for rural settlement is recorded in the form of the site of a moated enclosure which around AD1450 may have been the site of the Rochford mansion (MNF2207), a moated site recorded from cropmarks on aerial photographs (MNF18951) and a small rectilinear enclosure of possible medieval date recorded as a cropmark (MNF18948). The majority of the evidence comprises 23 findspots of medieval pottery and coins recorded during systematic fieldwalking as part of the Fenland project. Within the 1 km Study Area many of the villages have medieval origins. Beyond these, evidence for rural settlement is recorded in the form of a moated site at West Walton (MNF62220), the site of possible medieval tofts and paddocks (MNF18580), the site of Chapel of St Edmund/St Catherine, Walpole Highway (MNF14903), and a two possible manorial or moated sites represented by cropmarks or earthwork enclosures (MNF11959 and MNF19728). Evidence for the medieval land use includes a ditch and pit features associated with a nearby salt working site (MNF58508), possible saltern mounds (MNF19693 and MNF74666), the possible site of a medieval mill represented by an earthen mound (MNF16338) and a possible trackway (MNF20884). The predominant evidence comprises 48 recorded artefact scatters or findspots of medieval pottery, coins or metal objects.

Post-medieval (1540 to 1900)

9.5.98 Evidence for post-medieval activity is fairly limited with only three non-designated heritage assets recorded within the Scoping Boundary, comprising an undated mound attributed to the period and two findspots of post-medieval pottery. Within the 1 km Study Area the Norfolk HER records further remains including four intercutting drainage ditches dated to the 18th or 19th century (MNF43998), a pit of post-medieval/modern date (MNF73569) identified during archaeological investigations, and a number of straight linear anomalies corresponding with former late post-medieval field boundaries were recorded during geophysical survey (MNF77069). The former United Free Methodist Chapel in West Walton (MNF64486), the former West Walton National School (MNF63398), the site of St Paul's Church, West Walton Highway (now demolished (MNF42514)) and the Ferry Railway Station in Newton (MCB22496) are also recorded.

Modern (1901 to the present)

9.5.99 Only two heritage assets of modern date have been recorded, both within the Scoping Boundary. The first comprises the conjectured crash site of a Second World War bomber aircraft (MNF18977). The second is the site of an underground Cold War Royal Observer Corps post in use between 1960 - 1968, after which time it was partially demolished.

Undated

9.5.100 Fourteen undated heritage assets have been recorded, five of which are within the Scoping Boundary. These include several earthen or silt mounds (MNF18566, MNF18953, MNF19043) and a possible moot hill or navigation marker (MNF2201) and felled trees found buried in deep clay during installation of a gas main (MNF17294). Within the 1 km Study Area, three further undated mounds, undated cropmark enclosures and trackways and three archaeological investigations which revealed no archaeological evidence are also recorded.

Future Baseline

9.5.101 The historic environment chapter within the Environmental Statement (ES) will include an outline of the likely evolution of the baseline environment without the implementation of the Project as far as natural changes from the baseline scenario can be assessed.

9.6 Design and Control Measures

Design Measures

9.6.1 The Project design will avoid physical impacts to designated assets. As this design develops further and is better refined, additional mitigation measures will endeavour to include further design intervention to avoid direct and indirect impacts on both designated and non-designated heritage assets.

9.6.2 Potentially significant impacts on the setting of assets brought about by the Project may be lessened or avoided through consideration of the detailed design and micro-siting of the individual pylons.

Control and Management Measures

9.6.3 Where the Project will bring about physical impacts to heritage assets, these effects will be mitigated through measures to include (but not be limited to) detailed landscape/topographic survey, archaeological excavation and recording and archaeological monitoring/watching brief.

9.6.4 An Initial Outline Code of Construction Practice (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**. General project commitments relevant to the control and management of impacts that could affect the historic environment are:

- GG03: A Construction Environmental Management Plan (CEMP), a Landscape and Ecological Management Plan (LEMP), a Construction Traffic Management Plan (CTMP), and a Site Waste Management Plan (SWMP) will be produced prior to construction. These are collectively referred to as ‘the Management Plans’.
- GG05: A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced Environmental Clerk of Works will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CEMP. The Environmental Clerk of Works will monitor that the works proceed in accordance with relevant environmental DCO requirements and adhere to the required good practice and mitigation measures. The Environmental Clerk of Works will be supported as necessary by appropriate specialists, including archaeologists, ecologists and arboriculturists.

- GG06: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the project. Topics will include but not be limited to:
  - pollution prevention and pollution incident response;
  - dust management and control measures;
  - location and protection of sensitive environmental sites and features;
  - adherence to protected environmental areas around sensitive features;
  - working hours and noise and vibration reduction measures;
  - working with potentially contaminated materials;
  - waste management and storage;
  - flood risk response actions; and
  - agreed traffic routes, access points, etc.
- GG09: Where sensitive features are to be retained within or immediately adjacent to the Order Limits, an appropriate protective area will be established using appropriate fencing and signage and will be inspected, repaired, and replaced as necessary. The protective areas will be shown on the Retention and Reinstatement Plans contained within the LEMP.

9.6.5 In addition, measures that relate to the historic environment either directly or through measures applied for landscape and visual, and noise and vibration include:

- H01: Known heritage assets and locations known archaeological interest will have been identified by a programme of desk-based assessment and field evaluation prior to construction. Wherever possible identified heritage assets and archaeological remains will be avoided by the Project design. Where avoidance has not been possible, archaeological mitigation measures comprising the preservation of archaeological remains, or a programme of archaeological investigation will be implemented. Areas of archaeological preservation, or where archaeological work is planned, will be demarcated using appropriate fencing and signage to prevent unintentional damage. The fencing and condition of the areas will be inspected, repaired, and replaced as necessary. The areas of archaeological preservation or investigation will be identified on plans within the outline Written Scheme of Investigation (WSI) and CEMP.
- H02: Where a previously unknown heritage asset is discovered, or a known heritage asset proves to be more significant than foreseen at the time of application, the project will inform the local planning authority and will agree a solution that protects the significance of the new discovery, so far as is practicable, within the project parameters. An outline process for dealing with the unexpected discovery of archaeological remains including human remains and Treasure during construction will be set out in the outline WSI and detailed CEMP.
- H03: Where practicable, maintain elements within the landscape such as vegetation and hedgerows (including re-instating hedgerows and fences).
- LV04: Construction lighting will be directional and minimised where possible.

- NV01: Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise will be set out within the CEMP.

9.7 Potential for Significant Effects

9.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 9.6.

9.7.2 **Table 9.2** sets out the potential sources and impacts resulting from the construction, maintenance and/or operation activities associated with the Project, whether these impacts are likely to give to rise to significant effects, receptors identified within the core and extended Study Areas and whether the receptors are scoped in or scoped out of the assessment.

9.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage, the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Potential sources of impacts

Sources of construction impacts

- Activities relating to the construction of the Project (detailed in **Chapter 4 Description of the Project**), such as the installation of new substations and infrastructure, topsoil stripping and excavations for pylon foundations and where required underground cable trenches, the establishment of construction compounds, spoil storage areas, access tracks, bell mouths and temporary drainage, resulting in the truncation and/or removal of heritage assets.
- Decommissioning of part or all of the existing Grimsby West Substation to be undertaken during the construction phase of the project and may include demolition works and the removal of infrastructure that may result in the truncation and/or removal of heritage assets.
- The presence of temporary construction and satellite compounds, access tracks and fencing resulting in temporary changes to the setting of heritage assets.
- The presence of machinery and traffic as well as noise, dust, and light, resulting in temporary changes to the setting of heritage assets.

Sources of operational impacts

- Presence of the Project in the landscape resulting in permanent changes to the historic landscape and to the setting of heritage assets.
- Presence of new infrastructure resulting in permanent changes to the viability of heritage assets.

Sources of maintenance impacts

- The presence of temporary maintenance compounds, access tracks and scaffolds resulting in temporary changes to the setting of heritage assets.

- The presence of machinery and traffic as well as noise, dust, and light, resulting in temporary changes to the setting of heritage assets.

Potential impacts

9.7.4 There will be no physical impacts on the designated heritage assets within the Scoping Boundary as these will be avoided by the construction works. There is, however, the potential for impacts to the value (heritage significance) of designated assets as a result of changes to their setting.

9.7.5 There is the potential for the Project to give rise to significant effects on those non-designated assets that remain extant within the Scoping Boundary. A full list of non-designated assets within the Scoping Boundary is provided as **Appendix 9A Designated and Non-Designated Assets**.

9.7.6 The presence of the Project in the landscape could lead to significant effects through changes to the understanding and appreciation of the historic landscape.

Table 9.2: Impacts, receptors and potential significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Intrusive construction activities	Physical impacts on heritage assets.	Non-designated heritage assets Historic landscapes	**Yes** – the Project has the potential to result in a physical impact on heritage assets through their truncation, removal, or alteration.	**Scoped In**
Construction	Presence of construction facilities within the landscape	Temporary impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets	**Yes** – the Project has the potential to result in significant effects on designated and non-designated heritage assets.	**Scoped In**
Construction	Machinery, noise, dust, and light	Temporary impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets	**Yes** – the Project has the potential to result in significant effects on designated and non-designated heritage assets.	**Scoped In**
Operation	Presence of the Project in the landscape	Impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets	**Yes** – the Project has the potential to result in significant effects on designated, non-designated heritage assets and historic landscapes.	**Scoped In**
Operation	New infrastructure altering access and viable use.	Impacts to the access of heritage assets.	Designated heritage assets	No – given the scale and size of the footprint of individual pylons, there is limited potential for	Scoped Out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			Non-designated heritage assets Historic landscapes	significant effects to occur due to changes in access to heritage assets.	
Maintenance	Presence of maintenance structures within the landscape	Temporary impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets Historic landscapes	**Yes** – the Project has the potential to result in significant effects on designated and non-designated heritage assets.	**Scoped In**
Maintenance	Vehicular traffic and maintenance activities	Physical Impacts to heritage assets or impacts to heritage assets as a result of changes to their setting.	Designated Heritage Assets Non-designated Heritage Assets Historic landscapes	No –maintenance visits required for the Project would not constitute an impact of sufficient magnitude to cause significant effects to either designated or non-designated heritage assets.	Scoped Out

9.8 Proposed Assessment Methodology

9.8.1 The assessment methodology presented below builds upon, and takes into account, the Cultural Heritage Survey Strategy prepared for the Project (**Appendix 9B Cultural Heritage Survey Strategy**), and the response to the strategy received from Historic England during pre-scoping engagement.

Study area

9.8.2 The Historic Environment assessment will use a core Study Area extending 1 km from the Order limits of the Project for non-designated heritage assets. This is considered sufficient to provide a contextual baseline of known heritage assets and to inform on the likelihood of encountering previously unknown archaeology within the Order limits. It also considers the likelihood of impacts to the setting of heritage assets, considering the character of the surrounding landscape and the asset types.

9.8.3 An extended Study Area of up to 3 km from the Order limits will be used for designated heritage assets due to the greater potential for their setting to extend over a larger area and for which the wider landscape may form a key contributing factor to their significance. This will be used alongside a wider 5 km Study Area to identify any assets of the highest significance (scheduled monuments, grade I and II* listed buildings and grade I and II* registered parks and gardens) where setting is a key factor in their significance and where this setting extends over a large area.

9.8.4 Within the 5 km Study Area consideration of which designated heritage assets may be affected by the Project will be informed by the ZTV which will be developed in conjunction with the assessments undertaken for **Chapter 6 Landscape** and **Chapter 7 Visual**. This ZTV will define the theoretical visibility of the Project and present a theoretical zone of visual influence. This may not reflect what is visible on the ground nor can it be used to define the extent of setting of heritage assets. Assets which do not have intervisibility with the Project could still be impacted.

9.8.5 Designated heritage assets within the extended 3 km and 5 km Study Areas will be identified and assessed for their potential to be affected by the Project. Those assets that are identified to be potentially impacted will then be assessed further in the ES. Assessment will consider the significance of the asset, its setting and sensitivity to change. Through such an assessment, assets having a greater influence over the wider landscape may be taken through to assessment, whilst those having a lesser influence may be omitted. This staged approach is consistent with current Historic England guidance (Ref 9.3).

9.8.6 The core and extended Study Areas are proportionate to identify heritage assets that may be affected by the Project.

Proposed Data Sources

9.8.7 The following data sources are proposed to be used to inform the historic environment assessment:

- the National Heritage List for England (NHLE), held by Historic England, for designated assets;
- North East Lincolnshire, Lincolnshire, Cambridgeshire and Norfolk Historic Environment Records (HERs) for non-designated heritage assets;

- local authority conservation area appraisal and management documents and their mapping;
- historic landscape characterisation mapping undertaken by local planning authorities;
- aerial photographs held by Historic England, local authorities and other appropriate repositories and other readily available remote sensing results such as LiDAR data;
- geological mapping and borehole information as held by the British Geological Survey;
- documentary, cartographic and other resources as deposited within local studies libraries, county libraries and archives, including historic OS maps, tithe, estate and other maps, and other relevant primary sources held at the North East Lincolnshire Archives, Lincolnshire Archives, Cambridgeshire Archives and the Norfolk Record Office, together with local studies library information;
- the results, where relevant and available, of heritage assessments and archaeological evaluations undertaken for other projects that cross or fall within the Scoping Boundary and surrounding Study Area. This may include, but is not limited to, Triton Knoll, Outer Dowsing Onshore Project, Viking Link, Viking Carbon Capture Storage Pipeline and various solar projects;
- published regional studies and character assessments e.g. Historic England's Fenland Survey and the Fenland Project published in East Anglian Archaeology; and
- historic OS maps held by the National Library of Scotland.

9.8.8 A walkover survey will also be undertaken to assess known heritage assets/sites and their setting and to determine the potential for previously unrecorded heritage assets. This survey will focus on the emerging preferred route corridor and the emerging preferred substation siting zones, as well as any associated compounds, laydown areas, and above ground infrastructure.

9.8.9 In addition to the desk-based assessment it is proposed that the historic environment ES chapter is also informed by the results of:

- an aerial photographic and LiDAR assessment;
- geophysical surveys;
- geoarchaeological deposit modelling and monitoring; and
- where appropriate trial trench evaluation.

Proposed Assessment Methodology

9.8.10 The following section summarises the methodology proposed to be used for the historic environment assessment which builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology**.

Sensitivity

9.8.11 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic, or historic (National Planning Policy Framework Annex 2, Glossary) (Ref 9.10).

Each identified heritage asset can be assigned a value in accordance with the criteria set out in **Table 9.3.**

9.8.12 Using professional judgement and the results of consultation, heritage assets are also assessed on an individual basis and regional variations and individual qualities are considered where applicable.

Table 9.3: Criteria for assessing the value of heritage assets

Value/Sensitivity	General Criteria
High	World Heritage Sites
	Scheduled Monuments.
	Grade I and II* listed buildings.
	Registered battlefields.
	Grade I and II* registered parks and gardens.
	Conservation areas of demonstrable high value.
	Non-designated heritage assets (archaeological sites, historic buildings, monuments, parks, gardens, or landscapes), or Grade II listed buildings, that can be shown to have demonstrable national or international importance.
	Well preserved historic landscape character areas, exhibiting considerable coherence, time-depth, or other critical factor(s).
Medium	Grade II listed buildings.
	Grade II registered parks and gardens.
	Conservation areas.
	Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens, or landscapes), or locally listed buildings, that can be shown to have demonstrable regional importance.
	Averagely preserved historic landscape character areas, exhibiting reasonable coherence, time-depth, or other critical factor(s).
	Historic townscapes with historic integrity in that the assets that constitute their make-up are clearly legible.
Low	Locally listed buildings.
	Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens, or landscapes) that can be shown to have demonstrable local importance.
	Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade.
	Historic landscape character areas whose value is limited by poor preservation and/or poor survival of contextual associations.

Value/Sensitivity	General Criteria
Negligible	Assets identified on national or regional databases, but which have no archaeological, architectural, artistic, or historic value. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Landscape with no or little significant historical merit.

Magnitude

9.8.13 Having identified the value of the heritage asset, the next stage in the assessment is to identify the level and degree of impact to a heritage asset arising from the Project. Impacts may arise during construction, operation or maintenance and can be temporary or permanent. Impacts can affect the physical fabric of the asset or affect its setting.

9.8.14 The level and degree of impact (impact rating) is assigned with reference to a four-point scale as set out in **Table 9.4**. In respect of the historic environment an assessment of the level and degree of impact is made in consideration of any scheme design mitigation (embedded mitigation). If no impact on value is identified, no impact rating is given and no resulting effect reported.

Table 9.4: Factors influencing the assessment of magnitude of impacts

Magnitude	General Criteria
Large	Changes such that the heritage value of the asset is totally altered or destroyed. Comprehensive change to elements of setting that would result in harm to the asset and our ability to understand and appreciate its heritage significance.
Medium	Change such that the heritage value of the asset is significantly altered or modified. Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Small	Changes such that the heritage value of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Negligible	Changes to the asset that hardly affect heritage value. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the heritage value of the asset.

Significance of effects

9.8.15 An assessment to classify the effect, having taken into consideration any embedded mitigation, is determined using the matrix at **Table 9.5**, which takes account of the value of the asset (**Table 9.3**) and the magnitude of impact (**Table 9.4**). Effects can be neutral, adverse, or beneficial.

Table 9.5: Assessment of Effect

Magnitude of Impact	Value of Heritage Asset			
	High	**Medium**	**Low**	**Negligible**
Large	Major	Major	Moderate	Minor/Negligible
Medium	Major	Moderate	Minor	Negligible
Small	Moderate	Minor	Negligible	Negligible
Negligible	Minor/Negligible	Negligible	Negligible	Negligible

9.8.16 The ES reports on the significance of effect in accordance with EIA methodology. Major and moderate effects are considered to be significant, whilst minor and negligible effects are considered to be not significant. Professional judgement will be applied in reaching conclusions as to the significance of effects.

9.8.17 The National Policy Planning Framework (Ref 9.10) establishes the principle that impacts affecting the value of heritage assets are considered in terms of harm and there is a requirement for the decision maker to determine whether the level of harm amounts to 'substantial harm' or 'less than substantial harm'.

9.8.18 The Overarching National Policy Statement for Energy (EN-1) (Ref 9.11) maintains the concept of harm to the value of heritage assets within Section 5.9.28 directing the Secretary of State to give considerable importance and weight to the desirability of preserving all heritage assets. Any harm or loss of value (heritage significance) of a designated heritage asset (including as a result of development within its setting) should require clear and convincing justification. Section 5.9.36 states that, the Secretary of State should give appropriate weight to the desirability of preserving the setting of heritage assets and should treat favourably applications that preserve those elements of the setting that make a positive contribution to a heritage asset (or better reveal its significance).

9.8.19 There is no direct correlation between the significance of effect as reported in the final ES and the level of harm caused to heritage significance. A major (significant) effect on a heritage asset would, however, more often be the basis by which a decision maker would determine that the level of harm to the significance of the asset would be substantial. A moderate (significant) effect is unlikely to meet the test of substantial harm and would therefore more often be the basis by which a decision maker would determine that the level of harm to the significance of the asset would be less than substantial. A minor or negligible (not significant) effect would still amount to a less than substantial harm, which triggers the statutory presumptions against development within section 6 of the Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref 9.12); however, a neutral effect is classified as no harm. In all cases determining the level of harm to the

significance of the asset arising from development impact is one of professional judgement.

9.9 Assumptions and Limitations

9.9.1 This Scoping Report includes a high-level review of available data and presents a brief overview of the historic environment baseline. Given the scale of the Project, this chapter is only intended to identify potential pathways to significant effects for the purpose of defining a scope for the historic environment assessment as part of the ES. It does not present all known or previously unrecorded heritage receptors which will be presented in subsequent assessments.

9.9.2 Data supporting this report was obtained from third party sources and may include errors or omissions. All efforts were made to identify and rectify any such issues.

9.10 Conclusion

9.10.1 From the review of data undertaken as part of the scoping exercise, a number of designated and non-designated assets as well as sensitive historic landscapes have been identified within and immediately adjacent to the Project and its associated Study Area.

9.10.2 Project construction and operation activities have a potential to impact on designated and non-designated assets and to alter their setting as well as key characteristics and features of the historic landscape.

9.10.3 As a result, a historic environment (archaeology, built heritage and historic landscape) chapter will be submitted as part of the EIA.

Proposed Scope of the Assessment

9.10.4 A summary of the proposed scope of the historic environment assessment is provided in **Table 9.6**.

Table 9.6: Proposed scope of the assessment

Receptor	Potential for significant effect	Project Phase(s)	Proposed to be scoped in or out
Designated heritage assets	Potential for significant permanent adverse and beneficial effects from changes to setting resulting from any above ground infrastructure.	Construction Operation	**Scoped in**
	Potential for significant temporary adverse and beneficial effects from changes to setting.	Construction Maintenance	**Scoped in**
	Potential for significant temporary adverse and beneficial effects from	Construction	**Scoped in**

Receptor	Potential for significant effect	Project Phase(s)	Proposed to be scoped in or out
	changes to setting arising from machinery, noise, dust, and light.		
Non-designated heritage assets	Potential for significant permanent adverse effects arising from construction activities resulting in the partial or total loss of a heritage asset.	Construction	**Scoped in**
	Potential for significant permanent adverse and beneficial effects from changes to setting resulting from above ground infrastructure.	Construction Operation	**Scoped in**
	Potential for significant temporary adverse and beneficial effects from changes to setting.	Construction Maintenance	**Scoped in**
Historic landscapes	Potential for significant effects from the removal of key features of the historic landscape during construction.	Construction	**Scoped in**
	Potential for significant impacts to historic landscapes/historic landscape features as a result of changes to their setting or character and from the presence of above ground infrastructure during operation.	Construction Operation	**Scoped in**

9.11 References

Ref 9.1 Department for Levelling Up, Housing and Communities and Ministry for Housing Communities and Local Government (2019). Planning Practice Guidance, Historic Environment [online]. Available at: https://w7 ww.gov.uk/guidance/conserving-and-enhancing-the-historic-environment [Accessed 8 May 2024].

Ref 9.2 Historic England (2015). Historic Environment Good Practice Advice in Planning: 2, Managing Significance in Decision Taking in the Historic Environment [online]. Available at: http://historicengland.org.uk/images- books/publications/gpa2-managing-significance-in-decision-taking/. [Accessed 7 May 2024].

Ref 9.3 Historic England (2017). Historic Environment Good Practice Advice in Planning Note: 3, The Setting of Heritage Assets [online]. Available at: https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets/. [Accessed 7 May 2024].

Ref 9.4 Historic England (2019). Historic England Advice Note 12, Statements of Heritage Significance: Analysing Significance in Heritage Assets [online]. Available at: https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance/. [Accessed 7 May 2024].

Ref 9.5 Chartered Institute for Archaeologists (2020a). Standard and guidance for historic environment desk-based assessment. Chartered Institute for Archaeologists, Reading [online]. Available at: https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf [Accessed 7 May 2024].

Ref 9.6 Chartered Institute for Archaeologists (2022). Code of Conduct: professional ethics in archaeology. Chartered Institute for Archaeologists, Reading [online]. Available at: https://www.archaeologists.net/sites/default/files/Code%20of%20conduct%20revOct2022.pdf [Accessed 7 May 2024]

Ref 9.7 Institute of Environmental Management and Assessment (IEMA) (2021). Principles of Cultural Heritage Impact Assessment in the UK. Available at: https://www.archaeologists.net/sites/default/files/j30361_iema_principlesofchia_v8.pdf. [Accessed 7 May 2024].

Ref 9.8 Historic England's National Heritage List for England (NHLE) [online]. Available at: Search the List: Map Search | Historic England [Accessed 25 April 2024].

Ref 9.9 British Geological Survey geology viewer [online]. Available at: BGS Geology Viewer (BETA) [Accessed 7 May 2024].

Ref 9.10 Department for Levelling Up Homes and Communities (2023). National Planning Policy Framework [online]. Available at: https://www.gov.uk/guidance/national-planning-policy-framework [Accessed 7 May 2024]

Ref 9.11 Department for Energy and Net Zero (November 2023). Overarching National Policy Statement Energy (EN-1) [online]. Available at: https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf [Accessed 7 May 2024]

Ref 9.12 HMSO (1990) Planning (Listed Buildings and Conservation Areas) Act 1990.

10. Water Environment

nationalgrid

Contents

10.1 Introduction

10.1.1 This Chapter presents how the water environment assessment will consider the potentially significant effects on water environment receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4 Description of the Project**). This chapter will provide details of the methodology which will be used within the Environmental Impact Assessment (EIA) for Water Environment, the datasets to be used to inform the assessment, an overview of the baseline conditions, the likely significant effects to be considered within the assessment and how the significant effects will be assessed within the EIA. As detailed in **Chapter 4 Description of the Project**, the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

10.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary.**

10.1.3 This Chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context**;
- **Chapter 3 Main Alternatives Considered;**
- **Chapter 4 Description of the Project;** and
- **Chapter 5 EIA Approach and Methodology.**

10.1.4 There are interrelationships related to the potential effects on agriculture and soil and other environmental topics. Therefore, please also refer to the following chapters:

- **Chapter 8 Ecology and Biodiversity** – this chapter covers effects identified by the water environment assessment that may affect ecological receptors; and
- **Chapter 11 Geology and Hydrogeology** – this chapter considers effects on groundwater identified by the water environment assessment that may affect hydrological receptors.

10.1.5 This chapter is supported by the following figures:

- **Figure 10.1 Water Environment Receptors and Study Area;**
- **Figure 10.2 Floodplains and Flood Defences;**
- **Figure 10.3 Water Framework Directive River Water Body Catchments;** and
- **Figure 10.4 Location of Flow Gauging Stations.**

10.1.6 The assessment of potentially significant effects on groundwater receptors is presented in **Chapter 11 Geology and Hydrogeology.**

10.1.7 The water environment assessment will be supported by a Flood Risk Assessment (FRA) and a Water Framework Directive (WFD) Compliance Assessment. The scope of these assessments is not discussed in detail herein but will be agreed with the relevant stakeholders.

10.2 Legislation, Policy and Guidance

10.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context, Appendix 2A Key Legislation**, **Appendix 2B National and Regional Policies** and **Appendix 2C Local Policy.**

10.3 Consultation and Engagement

10.3.1 The EIA will be informed by consultation and engagement with stakeholders, including Environment Agency, Anglian Water, Lead Local Flood Authorities (LLFA) and Internal Drainage Boards (IDB). In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

10.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. No pre-scoping engagement has been undertaken for water environment in the preparation of this scoping chapter.

10.3.3 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 10.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 10.1: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
Environment Agency	**Flood Risk –** Large parts of the proposals are located within Flood Zone 2 and 3. Other parts are located within Flood Zone 1. As part of the preferred routes identified the cross areas where development is located within Flood Zone 3b (functional floodplain), essential infrastructure (such as power stations and sub stations etc) that has passed the Exception Test, and water-compatible uses, should be designed and constructed to: • remain operational and safe for users in times of flood; • result in no net loss of floodplain storage; and • not impede water flows and not increase flood risk elsewhere. The EA advise that the applicant scopes in flood risk when reviewing operation to ensure the proposed development is functional in times of a flood and remains safe. If there is any above ground construction that is in an undefended area, any increases in the footprint of the buildings will require floodplain compensation; the Flood Risk Assessment (FRA) needs to consider floodplain compensation on a level for level, volume	The water environment chapter in the PEI Report and ES will be supported by a Flood Risk Assessment (FRA), which will identify the level of flood risk associated with all elements of the Project during construction and operation and specify mitigation measures as appropriate. Flood risk mitigation (including flood plain compensation), where required, will be designed to be consistent with current statutory guidance, in order for the Project to be safe

Stakeholder	Summary of response	Consideration in the Scoping Report
	for volume basis. With regards to floodplain compensation, we would usually consider the 1 in 100 year plus allowance for climate change flood height as the 'design flood'. The allowance for climate change may differ in river catchments. In accordance with the NPPF (paragraph 170) the development will be safe for its lifetime, without increasing flood risk elsewhere, where possible reduce flood risk overall, this should be addressed in the FRA.	for its lifetime without increasing flood risk elsewhere.
Environment Agency	**Modelling and Data –** All rivers the corridor interacts with have been modelled by the EA to understand fluvial flood risk. Additionally, where the corridor is at risk of tidal flooding, breach and overtopping, modelling has been undertaken. Some model data is outdated and poses limitations. should modelling work be required in connection with the activities, it will be necessary to check that the data used represents current risk, uses the latest available datasets, complies with current modelling standards, is at a scale suitable for the assessment you're undertaking, captures the detail required for a site-specific assessment, makes use of current climate change allowances. This is emphasised within the guidance on Using Modelling for Flood Risk Assessments (December 2023) available online at Using modelling for flood risk assessments - GOV.UK (www.gov.uk). Additionally, the applicant should review fluvial and tidal hazard mapping to gain an understanding of the possible risks of a flood event and assess the necessary mitigation and protection needed.	Required watercourses will be identified and existing Environment Agency models will be reviewed to determine their limitations and whether any additional modelling is required to bring the model up to date. A review of fluvial and tidal hazard mapping will be undertaken and assessed in the PEI Report and ES.
Environment Agency	**Climate Change** - The Environment Agency has updated their guidance on how climate change could affect flood risk to new developments. When determining the climate change allowance which a development must assess and be made safe to the updated guidance places increased emphasis on flood risk vulnerability classification. The climate change allowance which must be used when assessing floodplain compensation has also changed. The appropriate allowance to assess off-site impacts and calculate floodplain storage compensation depends on the land uses in affected areas. More information on climate change	Where relevant, existing Environmental Agency models will be reviewed to determine their limitations and if any additional modelling is required to bring the model up to date using the latest climate change guidance. The requirement to

Stakeholder	Summary of response	Consideration in the Scoping Report
	allowances can be found here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.	provide floodplain compensation is noted and will be taken into account when developing flood mitigation measures, as required.
Environment Agency	**Assets –** The EA highlights to the applicant that they will need to: • Survey the pre- works and post-works condition of the assets they will be interacting with and remediate any defects identified. • Monitoring vibrations and identifying safe levels which don't adversely affect assets.	Possible interactions between the Project infrastructure and Environment Agency assets will be avoided as far as possible. Where interactions cannot be avoided, appropriate mitigation measures will be developed and agreed with the Environment Agency. A review will be undertaken to assess the potential interactions with EA assets and the Project. Potential impacts on buildings and structures due to construction vibration will be assessed as part of the PEI Report and ES, and potential areas of risk will be highlighted with reference to current guidance. Outline mitigation measures will also be provided where applicable. The contractor would conduct further detailed assessments based on the specific construction methods and determine specific mitigation measures on a case

Stakeholder	Summary of response	Consideration in the Scoping Report
		by case basis. This may include monitoring vibration levels during works, if appropriate.
Environment Agency	**Projects within the area -** The applicant should be aware there are some major projects happening within the proposed corridor and surrounding area. This is a new reservoir in South East Lincolnshire which is being undertaken by Anglian Water in partnership with the Environment Agency. Additionally, there are works to implement the Lower Witham embankment planned for 2025/26 which should also be taken into consideration. This would be a great opportunity to work together to provide maximum environmental enhancements and deliver great outcomes. Please contact for further information.	Further engagement with the Environment Agency will be undertaken to discuss these major projects.
Environment Agency	**Environmental permit -** If any of the works are likely to require a FRAP under the Environmental Permitting Regulations, the EA recommend the applicant consider early on whether they might consider the disapplication of the EPR and matters pertaining to FRAPs be considered as Protective Provisions under the DCO. For further guidance visit https://www.gov.uk/guidance/flood-risk-activitiesenvironmental-permits or contact National Customer Contact Centre on 03702 422 549. The applicant should not assume that a permit will automatically be forthcoming once planning permission has been granted, and the EA advise them to consult at the earliest opportunity.	The Applicant will engage with the Environment Agency to discuss the most appropriate approach to Flood Risk Assessment Permit (FRAP) for the Project, such as a Letter of No Impediment.
Environment Agency	**Water Quality -** Overall risks to water quality can be reduced, but eliminated entirely, if appropriate mitigation and best practice is followed. The risks which remain following mitigation include the risk of pollution inherent with construction sites and drainage from substation areas during operation. The following advice is given to help minimise the potential impacts from remaining risks to water quality: • Constraints were considered as part of the study. Water Framework Directive (WFD) surface waters and Internal Drainage Board (IDB) watercourses were included within the study, but this approach may risk a lack of understanding regarding the movement of	A full assessment of the effects on water quality will be undertaken and reported in the water environment chapter of the ES, including risks from both runoff and foul sewage pathways. Appropriate pollution prevention measures will be incorporated into drainage design for substations to

Stakeholder	Summary of response	Consideration in the Scoping Report
	any polluting discharge once it enters the water environment. Another useful consideration would be WFD catchments. • Although the emerging preferred corridor does not include underground cable sections, we would like to raise the point that the risks to water quality are higher during the construction of underground cables when compared to overhead cables. • The study does not appear to consider the risk of drainage from substations during operation. Drainage can provide a pathway for polluting material from spills or firewater within the substation compounds. It is worth considering these aspects as siting and design of each substation area and its drainage plans are developed further. • Similarly, it may also be worth considering the risks from sewage during both construction and operation as the design develops. Most of the emerging corridor and siting locations sit within SSSI discharge impact zones. Depending on the location of substations, they may be far away or near to public foul sewer. The fate of sewage during operation in particular will need to be considered during later stages of the design.	ensure that operational phase impacts on water quality are minimised. The ES will consider compliance with WFD (including the review of WFD catchments), as discussed further in Section 10.8. The design of the Project currently does not include any undergrounding cables, if undergrounding is considered, then this will be assessed.
Environment Agency	**Cable Corridor -** Risks to water quality from the overhead lines will occur largely during the construction phase. Constraints that should be considered further include: • The corridor will be near a large number of abstraction licences in the Northern and Central sections. These should be considered as the baseline environment within the cable corridor is established. • The Eastern cable options for the Grimsby West to Burgh le Marsh section may avoid running through as much of the Drinking Water Surface Water Safeguard Zone as the Western and Central options. • The Trusthorpe Pump Drain WFD catchment struggles with dissolved oxygen concentrations. This catchment may be avoided with Western and Central cable options along the Grimsby to Burgh le Marsh section.	Impacts on water quality and water resources arising from overhead line construction will be assessed in the water environment chapter of the ES. During the construction phase, the Construction Environmental Management Plan (CEMP) will incorporate appropriate measures to mitigate impacts on water quality. The constraints will be considered and assessed as part of

Stakeholder	Summary of response	Consideration in the Scoping Report
	• The Whaplode River WFD catchment has issues with phosphate and dissolved oxygen. This catchment may be avoided with Central and Southern cable options for the Weston marsh to Walpole section.	the PEI Report and ES.
Environment Agency	**Proposed Substation -** The following water quality constraints that should be considered during further siting and design development include: • Grimsby West Substation: The main water quality constraint within the search area is the Drinking Water Groundwater Safeguard Zone. Grimsby West (GW) GW1, GW2 and parts of GW3 fall into this zone. • Lincolnshire Connection Substations: Within the emerging preferred search locations there are a few abstraction licences which may be impacted by potential discharges to surrounding watercourses (the location of these can be requested from the Environment Agency). Aspects of the search area near Claythorpe may fall into the Great Eau (downstream of South Thoresby) Drinking Water Protection catchment. • West Marsh Substation: There are also a few licensed abstraction points within or close to the emerging preferred search location for this substation • Walpole Substation: There is an abstraction licence on the River Nene in near this location.	A full assessment of effects on water quality will be undertaken and reported in the water environment chapter of the ES, including risks from both runoff from substations and foul sewage pathways. Appropriate pollution prevention measures will be incorporated into drainage design for substations to ensure that operational phase impacts on water quality are minimised. The constraints will be considered and assessed as part of the PEI Report and ES.
Environment Agency	**River Basin Management Plans (RBMPs)** - We would highly recommend the applicant to complete a WFD assessment, to determine any impacts to the WFD status of the waterbodies. The Environment Agency holds data on River Basin Districts and WFD Status on the Catchment Data Explorer. Most of the works pass through the Anglian River Basin District, which includes the Witham Catchment Partnership and the Welland Valley Partnership. The most recent local plans for the Witham Catchment (Witham Catchment Partnership Plan 2022) and the Welland Catchment (Welland Valley Partnership Five Year Catchment Plan 2022- 2027) outline local issues and objectives. The EA advise that any biodiversity enhancements around waterbodies compliment the	The water environment chapter of the ES will consider compliance with WFD, as outlined in Section 10.8

Stakeholder	Summary of response	Consideration in the Scoping Report
	local environmental objectives and programmes of measures within the RBMP.	
Norfolk County Council	**Lead Local Flood Authority-** The LLFA will expect further appropriate details to be provided in future information. In addition, there will need to be the consideration of other ongoing NSIP schemes and major developments from outside of the energy sector and the cumulative impact on the flood risk. The applicant should consult at the earliest stage with the LLFA on any detailed plans. Further guidance on the information required by the LLFA from applicants can be found at https://www.norfolk.gov.uk/rubbish-recycling-and-planning/flood-and-water-management/information-for-developers	Further information and details will be provided at PEI Report and ES stage. The assessment of cumulative effects will form a key element of the EIA for this Project. The proposed scope and approach of the cumulative effects assessment is explained **Chapter 5 EIA Approach and Methodology.**
Lindsey Marsh Internal Drainage Board	The IDB require a minimum 9m stand off distance between pylons and the top bank of any Board maintained watercourse. The IDB also require clearance of min 10m+SWD above these watercourses and this distance should take into account any sag or sway on the cables. The cables need to be arranged in such a way that there are no working restrictions placed upon the Board when carrying out its statutory duties. Any culvert installations will be subject to Board consent in any watercourse within the Boards district or extended area.	Further information and details will be included at PEI Report and ES stage.
Witham and Humber Internal Drainage Board	Witham and Humber IDB have provided a map showing the North East Lindsey Drainage Board (NEL DB) managed watercourses and boundary with the National Grid working corridor. The IDB highlight this is limited to Team Gate Drain and possibly Little Beck. Under the terms of the Board's Byelaws, prior written consent is required for any proposed temporary or permanent works or structures in, under, over or within the byelaw 9 m distance of the top of the bank of a Board maintained watercourse.	Further information and details will be included at PEI Report and ES stage.

10.4 Study Area

10.4.1 The Study Area for the water environment assessment is proposed to include all land within the Scoping Boundary, and in addition, a buffer of 500 m from the Scoping Boundary. The Study Area, illustrated in **Figure 10.1 Water Environment Receptors and Study Area**, is considered appropriate based on technical knowledge of similar schemes and has been set following consideration of the distance over which likely significant effects can reasonably be expected to occur.

10.4.2 The FRA that will be prepared to inform the EIA may cover a larger Study Area where necessary, for example assessing the potential for changes to baseline flood risk at the local catchment scale or within a floodplain cell which may cover areas up to several kilometres squared (km^2).

10.4.3 The WFD Compliance Assessment will include a Study Area that is set at the water body scale and will include all WFD waterbodies which intersect with the Scoping Boundary, plus a 500 m buffer as they have the potential to be affected.

10.5 Baseline Conditions

Data Sources

10.5.1 This Chapter has been prepared predominantly through desk study exercises undertaken between December 2023 and May 2024.

10.5.2 The known or predicated current and future baseline environment described in this section has been informed by the following data sources listed in **Table 10.2.**

Table 10.2: Hydrology and flood risk – sources of information

Data topic	Sources of information
Climate	Met Office UK Climate averages at Manby (Ref 10.1)
Topography	Ordnance Survey Mapping (Ref 10.2)
Geology	British Geological Survey (BGS) Geology of Britain Viewer (Ref 10.3)
Soils and land use	Department for Environment, Food and Rural Affairs (DEFRA) 'Magic Map' online GIS portal (Ref 10.4); National Soil Research Institute Soilscapes map viewer (Ref 10.5)
Hydrology	Environment Agency Statutory Main River Map for England (Ref 10.6) Flood Estimation Handbook Web Service (Ref 10.7)
Flood risk	Environment Agency Flood Map for Planning (Ref 10.8) Environment Agency Risk of Flooding from Surface Water (RoFSW) (Ref 10.9) National Flood Risk Assessment (NAFRA) Dataset (Ref 10.10)

Data topic	Sources of information
	Environment Agency Risk of Flooding from Reservoirs (Ref 10.11) Environment Agency Flood Defence Asset database (Ref 10.12) National River Flow Archive (NRFA) (Ref 10.13)
Water quality and Water Framework Directive status	Catchment Data Explorer database (Ref 10.14) of Cycle 2 and 3 WFD information
Water abstractions	Data request to be made to the Environment Agency for all abstractions within 500 m of the Scoping Boundary.
Consented discharges	Data request to be made to the Environment Agency for all discharges within 500 m of the Scoping Boundary.

10.5.3 In addition, data requests will be made to the Environment Agency, LLFAs and IDBs to provide information on the following to support the water environment assessment:

- baseline flood risk data, including available modelled flood data for main rivers, and local flood risk data from commissioned studies;
- data on consented discharges to surface waters and licensed and exempted (private) abstractions from surface waters;
- specific watercourse characteristics (e.g. flow, control measures, maintenance regimes, Environment Agency flood defence assets) will be requested from IDBs for their districts; and
- information on local flood risk from LLFAs (e.g. specific watercourse characteristics, local flood history, Section 19 reports, flow, control measures, maintenance regimes, Environment Agency flood defence assets).

10.5.4 All of the further information received from stakeholders will be incorporated into the water environment assessment.

Baseline

10.5.5 This section describes the baseline environment providing details of the data sources that have been used and any other data gathering methods. This section also explains the future baseline including how that has been predicted and how it will be taken into account within the EIA.

10.5.6 This section will be split up into seven subsections with each subsection being a Section of the emerging preferred route corridor or one of the substation siting zones. Further details of the Sections are contained in **Chapter 4 Description of the Project**. The subsections are detailed in **Table 10.3.**

Table 10.3: Scoping Boundary Sections and the relevant local authority

Section	Location	Local Authority
1	Grimsby West Substation	North East Lincolnshire West Lindsey
2	Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A	North East Lincolnshire East Lindsey
3	Lincolnshire Connection Substation A and B (including the overhead line between them)	East Lindsey
4	Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation	East Lindsey Boston South Holland
5	Weston Marsh Substation	South Holland
6	Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation)	South Holland Fenland
7	Walpole B Substation	Kings Lynn and West Norfolk

10.5.7 A description of these Sections is provided in **Chapter 4 Description of the Project.** In the remainder of this section, an overview of hydrology and flood risk baseline will be provided first for the Scoping Boundary as a whole, and then with additional details being provided for each of the route Sections introduced above.

Study Area Overview

Climate

10.5.8 Average annual rainfall estimates for the period 1991-2020 were taken from the Met Office website (Ref 10.1). This demonstrates the average annual total rainfall in the locality of the Project was 635 mm, based on the Manby station record (NGR TF397869) located approximately 1 km from the Scoping Boundary (Ref 10.1). This is lower than the Eastern and North Eastern England regional average (1991-2020) of 793 mm.

10.5.9 The distribution of rainfall throughout the year varied based on the Manby 1991-2020 record. The highest monthly average precipitation was recorded during June (97 mm) followed by November (88 mm). The driest months were March (51 mm) and February (52 mm).

10.5.10 Average monthly maximum and minimum temperature estimates for the period of 1991-2020 demonstrate that the summer months (June - August) featured the highest monthly maximum temperatures, and the winter months (December - February) featured the lowest monthly minimum temperatures. The temperature profile is consistent with the range to be expected for the East of England.

Topography

10.5.11 Ordnance Survey (OS) mapping (Ref 10.2) indicates that the topography to the north of the Scoping Boundary in the vicinity of the Grimsby West Substation siting zone is relatively undulating to the east of the Lincolnshire Wolds National Landscape formally referred to as an Area of Outstanding Natural Beauty (AONB)).

10.5.12 The area ranges between 30 metres above ordnance datum (mAOD) and 15 mAOD and close to the Great Eau, the topography is approximately 10 mAOD. Further south towards the Lincolnshire Connection Substations A and B, the topography alters to around 5 mAOD in the vicinity of Wold Grift Drain. The Scoping Boundary continues south of the Lincolnshire Wolds National Landscape (formerly an AONB) where the topography generally stays below 5 mAOD to around 4 mAOD where it crosses the River Welland to the Weston Marsh Substation siting zone. The Scoping Boundary continues in a south easterly direction to Walpole crossing North Level Main Drain where the topography is approximately 1 mAOD. The Scoping Boundary then crosses the River Nene where the topography remains flat but increases in height slightly to 4 mAOD in the vicinity of the existing Walpole Substation.

Hydrology

10.5.13 The Scoping Boundary crosses the catchment of numerous watercourses and is located within both the Humber and Anglian River Basin Districts (RBDs). Some principal main rivers that could be affected by the Project include, from north to south, Laceby Beck, River Freshney, Louth Canal, Steeping River, River Lud, River Witham, River Welland and River Nene. Main rivers are illustrated in **Figure 10.1 Water Environment Receptors and Study Area**. In addition, a large number of ordinary watercourses and drainage ditches interact with the Scoping Boundary, which fall within the wider catchments of principal main river catchments noted above.

10.5.14 These water features have several attributes that could be affected, including water quality and flow conveyance. They also support several services, including water supply, receipt and dilution of wastewater discharges, navigation and amenity. The watercourses within the Scoping Boundary are generally heavily modified for drainage, flood defence and navigation purposes, particularly in areas around The Wash.

10.5.15 Other water features within the Scoping Boundary include numerous ponds. Sites designated for their nature conservation interest, where surface water plays a role in sustaining the designated interest features, are also important receptors. Assessments of effects on such sites will be undertaken in collaboration with ecology and groundwater specialists.

10.5.16 These features of the water environment are illustrated in **Figure 10.1 Water Environment Receptors and Study Area.**

10.5.17 The most northern flow gauge in the vicinity of the Scoping Boundary is on Waithe Beck and is located at Brigsley (NGR TA252016). There are also gauges on the River Lud, Great Eau, Lymn, Fulsby Lock and Leasingham Mill, Pointon in proximity to the Project. Summary data from these gauges are presented in **Table 10.4**.

Table 10.4: Summary of river flows (Ref 10.13 - Data from the UK National River Flow Archive)

Gauge Ref, Name and NGR	Watercourse	Catchment Area (km2)	Mean Flow (m3/s)	Q10* (m3/s)	Q95** (m3/s)	BFI***	Period of Record
29001: Waithe Beck at Brigsley, TA252016	Waithe Beck	108.3	0.303	0.677	0.062	0.85	1960-2022
29003: Lud at Louth, TF337879	River Lud	55.2	0.456	0.887	0.127	0.9	1968-2022
29002: Great Eau at Claythorpe Mill, TF416793	Great Eau	77.4	0.64	1.15	0.25	0.88	1962-2022
30004: Lymn at Partney Mill, TF401675	River Lymn	61.6	0.505	0.95	0.152	0.64	1962-2022
30003: Bain at Fulsby Lock, TF240609	River Bain	197.1	1.289	2.99	0.121	0.59	1962-2022
30006: Slea at Leasingham Mill, TF088484	River Slea	48.4	0.557	1.48	0	0.91	1974-2022
30014: Pointon Lode at Pointon, TF127312	South Forty Foot Drain	11.9	0.07	0.154	0.001	0.49	1972-2022

*Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.

**Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.

***BFI: the Base Flow Index (BFI) is a measure of the proportion of the river runoff that is derived from stored sources; the more permeable the rock, superficial deposits and soils in a catchment, the higher the baseflow and the more sustained the river's flow during periods of dry weather. Thus, the BFI is an effective means of indexing catchment geology.

10.5.18 A number of the gauges listed in **Table 10.4** have high baseflow indices, which are indicative of a major contribution to flow from groundwater sources. This includes Waithe Beck, River Lud, Great Eau and River Slea which flow off the underlying chalk catchment. Further south, the River Lymn, River Bain and South Forty Foot Drain are predominantly on less permeable strata. The locations of the flow gauging stations are illustrated on **Figure 10.4 Location of Flow Gauging Stations.**

Flood Risk

10.5.19 The Environment Agency's Flood Map for Planning (Ref 10.8) and Long Term Flood Risk mapping (Ref 10.9) were consulted to assess the flood risk along the Scoping Boundary.

10.5.20 The Environment Agency's Flood Map for Planning provides an indication of the likelihood of flooding from fluvial and tidal sources. Flood Zone extents are shown on **Figure 10.2 Floodplain and Flood Defences** (any area not highlighted on these maps is Flood Zone 1) and are defined as follows:

- Zone 1 (low probability) is assessed as having less than a 1 in 1,000 annual exceedance probability (AEP) of river or sea flooding (<0.1%);
- Zone 2 (medium probability) is assessed as having between a 1 in 100 and 1 in 1,000 AEP of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 AEP of sea flooding (0.5% – 0.1%); and
- Zone 3 (high probability) is assessed as having a 1 in 100 or greater AEP of river flooding (>1%), or a 1 in 200 or greater AEP of flooding from the sea (> 0.5%).

10.5.21 The approach to the siting of the proposed substations is compliant with the NPPF and Section 5.8 of National Policy Statement for Energy (EN-1) (Ref 10.15) in that the sequential approach has been taken to identify potential locations for the new infrastructure, which are preferentially located within Flood Zone 1.

10.5.22 Much of the northern part of the Scoping Boundary is located within Flood Zone 1 up to and around Bilsby and Woldgrift Drain. The most significant areas of Flood Zones 2 and 3 are concentrated in the central and southern parts of the Scoping Boundary.

10.5.23 The Environment Agency's Surface Water Flood Map for Planning (Ref 10.8) indicates that the Scoping Boundary predominantly has a very low risk of surface water flooding. The Environment Agency describes the surface water flood risk levels as follows:

- Very Low Risk – area having less than 0.1% AEP of flooding;
- Low Risk – area having between 0.1 and 1% AEP of flooding;
- Medium – area having between 1% and 3.3% AEP of flooding; and
- High – area having more than 3.3% AEP of flooding.

10.5.24 Flood risk from surface water runoff varies across the Scoping Boundary, with the majority of areas at very low risk from this source. Areas modelled at higher risk correlate with watercourse routes and local depressions.

10.5.25 There is a significant difference in the density of the drainage networks in the northernmost part of the Scoping Boundary (Sections 1 and 2, and the northernmost part of Section 3) compared with the remaining Sections. This is illustrated on **Figure 10.1 Water Environment Receptors.**

10.5.26 There is a significant change around the Woldgrift Drain and the town of Alford. To the north of this, channel network density is relatively sparse within the Scoping Boundary, and to the south, the channel network is much denser with a much stronger artificial character due to the geology.

10.5.27 The north of the Scoping Boundary is mostly underlain by till over chalk, which is relatively permeable. To the south of Woldgrift Drain the Scoping Boundary is underlain by superficial tidal flat deposits which are relatively impermeable, in addition to the flat topography. As a result, in the south there is a greater need for much denser artificial drainage networks to make the land useable for agriculture.

10.5.28 Flood defences are present along the coast and associated with the main rivers that cross the Scoping Boundary (Ref 10.8) in the form of embankments and natural high ground.

Tidal flood defences are present along the coast running approximately parallel with the Scoping Boundary. This is illustrated on **Figure 10.2 Flood Plain and Flood Defences**.

10.5.29 Given the rural land use in the majority of the Study Area, the land drainage regime is governed by the topography and the permeability of underlying soils and geology. Formal drainage systems include those serving existing roads and areas of urban development. Agricultural land is also expected to be served by piped and open drainage systems.

10.5.30 The Environment Agency's online mapping shows that the main rivers (Ref 10.6) could convey floodwater originating from the failure of upstream reservoirs. The reservoir flood risk map shows that the Study Area is at a potential risk of flooding from this source. Generally, the risk of flooding from reservoir extents is smaller than the fluvial flood zones along the river reaches. No risk of flooding from reservoir failure is identified within any of the emerging preferred substation siting zones.

10.5.31 North of Woldgrift Drain the Scoping Boundary is located mostly in Flood Zone 1, with narrow corridors of Flood Zone 2 and 3 immediately around the main watercourses. South of this, the Scoping Boundary is located in mostly Flood Zone 2 and 3 with pockets of Flood Zone 1 present. Given the Study Area's location along the eastern coast of England and in low lying areas around the Wash, there is a combined risk of flooding from fluvial and tidal sources.

10.5.32 Risk of flooding from sewers is not considered as a significant source of flooding due to the rural character of the Study Area.

Hydromorphology

10.5.33 Many of the watercourses within the Scoping Boundary have been subject to modifications for the purposes of land drainage and flood defence; and have hydromorphological designations as 'Heavily Modified' waterbodies (HMWB). The ordinary watercourses in the Scoping Boundary, particularly those within IDB districts, also serve a land drainage function and have a relatively low hydromorphological diversity.

Water Resources, Abstractions and Discharges

10.5.34 Two Drinking Water Protection Areas (Surface Water), two Drinking Water Safeguard Zones (Surface Water); and five Drinking Water Safeguard Zones (Groundwater) are present within the northern area of the Scoping Boundary which are detailed in **Chapter 11 Geology and Hydrogeology**. The surface water resources which are likely to interact with the Study Area are summarised in **Table 10.5.**

Table 10.5: Water resources protection designations intersecting with the Project

Name	Reference Number	Designation Type
Louth Canal	GB104029061990	Drinking Water Protection Area (SW)
Great Eau (downstream of South Thoresby)	GB105029061660	Drinking Water Protection Area (SW)
Louth Canal, Great Eau and Covenham Reservoir	SWSGZ1001	Drinking Water Safeguard Zones (SW)

Name	Reference Number	Designation Type
Louth Canal, Great Eau and Covenham Reservoir	SWSGZ1002	Drinking Water Safeguard Zones (SW)

10.5.35 Within the Scoping Boundary there are several Abstraction Licensing Strategies including the following:

- The Grimsby, Ancholme and Louth Abstraction Licensing Strategy (Ref 10.16) shows the water resource available less than 30% of the time;
- The Nene Catchment Abstraction Licensing Strategy (Ref 10.17) shows the water resource available at least 30% of the time;
- The Steeping, Great Eau and Long Eau Abstraction Licensing Strategy (Ref 10.18) shows the water resource available between at least 50% in the north and at least 95% of the time to the east;
- The Welland Catchment Abstraction Licensing Strategy (Ref 10.19) shows the water resource available at least 30% of the time; and
- The Witham Abstraction Licensing Strategy (Ref 10.20) shows the water resource available at least 30% of the time.

10.5.36 No information is available at this stage regarding specific licensed abstractions and discharges to/from the surface water environment, however, this will be requested from the Environment Agency.

Water Quality and Water Framework Directive Status

10.5.37 Within the Humber Anglian RBDs the Scoping Boundary passes through several management and operational catchments. Water bodies within these operational catchments generally achieve moderate ecological status and many have HMWBs hydromorphological designations.

10.5.38 Where the physical characteristics of a water body have been substantially altered by human activity, the water body may be designated as HMWB. HMWBs are required to meet Good Ecological 'Potential' (GEP) rather than Good Ecological 'Status' (GES). The ecological potential of a water body represents the degree to which the quality of the water body's aquatic ecosystem approaches the maximum it could achieve, given the heavily modified characteristics of the water body that are necessary for the use or for the protection of the wider environment.

10.5.39 Reasons for not achieving good status are shared by many of the water bodies and include pollution from rural areas and from wastewater discharges. Biological quality and poor physico-chemical quality are also limiting factors to achieving GES. The water bodies generally share a chemical status of 'fail' due to exceedance of priority hazardous substances, in particular mercury and its compounds, as well as polybrominated diphenyl ethers (PBDE).

10.5.40 Many of the watercourses within the Humber and Anglian RBDs receive discharges of wastewater from sewage treatment works and have several support abstractions to supply agricultural water uses. As noted above, further details of consented, licensed and private water discharges and abstractions will be collected to inform the Preliminary Environmental Information (PEI) Report and the Environmental Statement (ES).

10.5.41 The WFD water bodies that may potentially be affected in the Study Area are shown on **Figure 10.3 WFD River Water Body Catchments.** These have been identified on the basis of their direct hydrological connectively with the Scoping Boundary i.e. where any part of their catchment coincides with the Study Area, as defined in Section 10.3. Further information on the water body type, current ecological status or potential, and a summary of those elements of the overall status assessment that do not meet the requirements of GES/GEP will be detailed in the PEI Report and ES.

Additional Baseline Information Required

10.5.42 Additional baseline information will be gathered through engagement with the Environment Agency, North East Lincolnshire Council LLFA, Lincolnshire County Council LLFA, Cambridgeshire County Council LLFA and Norfolk County Council LLFA. Additionally, engagement will take place with the IDBs which include North East Lindsey IDB, Lindsey Marsh IDB, Witham Fourth District IDB, Black Sluice IDB, Welland and Deepings IDB, South Holland IDB, North Level IDB and King's Lynn IDB.

10.5.43 A data request will be submitted to the Environment Agency for details of licensed abstractions and discharges within 500 m of the Scoping Boundary and 'Product 7' modelling package data which includes Flood Zone extents; historical flooding, model files, output from flood model files and flood defence details.

10.5.44 Information on private surface water supplies and flood risk issues associated with surface water and non-IDB ordinary watercourses will be requested from the LLFAs.

10.5.45 A walkover survey will be undertaken to inform the understanding of the localised baseline hydrology including overland flow routes, land use and water quality considerations.

10.5.46 Currently, it is assumed that no hydrological monitoring of flows or sampling for water quality will be required to characterise the baseline hydrology further.

10.5.47 A description of the underlying geology and soil environment is provided in **Chapter 11 Geology and Hydrogeology** and **Chapter 12 Agriculture and Soils.**

Section 1: Grimsby West Substation

10.5.48 Section 1 of the Scoping Boundary comprises the Grimsby West Substation siting zone to land north of Laceby Beck. Section 1 is located across two local authorities; North East Lincolnshire Council (unitary authority) and West Lindsey District Council local authority boundary and is also located within the district of the North East Lindsey IDB. The emerging preferred substation siting zone is situated north of the villages of Aylesby and Laceby. The majority of land within this Section comprises arable fields, which is crossed by one main road, Aylesby Road and several land drains. The topography of Section 1 ranges from approximately 30 mAOD to 10 mAOD and has the highest ground levels along the whole Scoping Boundary.

Surface Water Features

10.5.49 Section 1 crosses the catchments of numerous watercourses and land drains. There are no Environment Agency main rivers within this Section. However, Laceby Beck is classified as a main river and flows just south of the Section boundary (in Section 2).

Water Quality and Water Framework Directive Status

10.5.50 Section 1 is located within the Humber RBD located within the Louth Grimsby and Ancholme Management Catchment and within the Becks Northern Operational Catchment. The water body within this Operational Catchment currently achieves poor ecological status and has a heavily modified hydromorphological designation.

10.5.51 Reasons for not achieving GES are shared by many of the waterbodies and include pollution from agriculture and industry. Biological quality and poor physico-chemical quality are also limiting factors to GES. The waterbodies generally share a chemical status of 'fail' due to exceedance of priority hazardous substances, in particular mercury and its compounds, as well as PBDE.

Flood Risk and Land Drainage

10.5.52 Section 1 is located within Flood Zone 1, indicating a low probability of flooding from rivers or the sea (less than 0.1% AEP). The northern boundary of the emerging preferred Grimsby West Substation siting zone has a surface water flow path flowing from north east to south west indicating there is a risk of flooding between 3.33% and 0.1% AEP event.

Section 2: Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A.

10.5.53 Section 2 of the Scoping Boundary continues from the emerging preferred Grimsby West Substation siting zone to the emerging preferred Lincolnshire Connection Substation A (LCS A) siting zone. Section 2 is located in the East Lindsey District Council and the Lindsey Marsh IDB district. From the emerging preferred Grimsby West Substation siting zone, this Section of the Scoping Boundary runs in a south easterly direction through arable fields crossing the A46, A16 and several watercourses. The topography of Section 2 ranges between approximately 25 mAOD falling to the south to approximately 3 mAOD in the vicinity of the emerging preferred LCS A Substation siting zone.

Surface Water Features

10.5.54 Section 2 is located within the Humber RBD in the north and within the Anglian RBD in central and southern parts. The Scoping Boundary crosses several main rivers including Laceby Beck, Waithe Beck, Old Fleet Drain, Black Leg Drain, Poulton Drain, Louth Canal, River Ludd, Greyfleet Drain, unnamed watercourse (flowing through Stewton), the Beck, Long Eau and Great Eau.

Water Quality and Water Framework Directive Status

10.5.55 Section 2 passes through the Witham Management Catchment and Steeping and Eaus Operational Catchment of the Anglian RBD.

10.5.56 Within the Steeping and Eaus Operational Catchment, surface waterbodies currently achieve moderate ecological status with many having artificial or heavily modified hydromorphological designations. Reasons for not achieving GES are shared by many of the waterbodies and include pollution and poor livestock and nutrient management. The waterbodies generally share a chemical status of fail due to exceedance of priority hazardous substances, in particular mercury and its compounds and PBDE.

10.5.57 Section 2 is located within a Drinking Water Safeguard Zone associated with the Louth Canal (surface water) with sporadic area located within Drinking Water Protected Areas (surface water).

Flood Risk and Land Drainage

10.5.58 The majority of Section 2 lies within Flood Zone 1. However, there are areas where the Scoping Boundary crosses into Flood Zone 2 and 3, associated with eleven watercourses flowing north east across this Section.

10.5.59 The majority of Section 2 is classified as being at low risk of surface water flooding, according to the Environment Agency's surface water flood risk mapping (Ref 10.9). There are a number of areas classed as being at high to low risk of surface water flooding within Section 2. These are generally associated with low lying areas or floodplains of main rivers, ordinary watercourses and other minor watercourses.

Section 3: Lincolnshire Connection Substations A and B

10.5.60 The proposed Lincolnshire Connection Substations A and B (LCS A and LCS B) are located within the East Lindsey local authority district. LCS-A is not located within an IDB boundary however, LCS-B is located within the Lindsey Marsh IDB district. LCS-A is located north west of Alford on arable land. Within the northern Section of the emerging preferred siting zone for LCS-A is an area of ancient woodland, Withern Wood. The B1373 passes through the northern Section of the emerging preferred substation siting zone.

10.5.61 The Scoping Boundary connecting LCS-A to LCS-B (4.5 km) is orientated in an easterly direction and crosses the A1104 and Wold Grift Drain which is classified as a main river.

Surface Water Features

10.5.62 The Environment Agency main rivers in Section 3 include the Great Eau and Wold Grift Drain. The main concentration of Lindsey Marsh IDB maintained watercourses are located around LCS B.

Water Quality and Water Framework Directive Status

10.5.63 Section 3 is located within the Anglian RBD, the Witham Management Catchment and the Steeping and Eaus Operational Catchment. From this Operational Catchment, Section 3 contains three surface waterbodies including Great Eau (downstream of South Thoresby), Woldgrift Drain and Boygrift Drain. Waterbodies within this operational catchment generally achieve moderate ecological status, however, Great Eau (downstream of South Thoresby) achieves poor ecological status or potential, largely attributed to the heavily modified hydromorphological designation.

10.5.64 Reasons for not achieving GES include pollution from rural areas from agriculture and rural land management. Biological quality and poor physico-chemical quality are also limiting factors to achieving GES. The water bodies all share a chemical status of 'fail' due to exceedance of priority hazardous substances, in particular mercury, its compounds and PBDE.

10.5.65 The northern part of Section 3 is located within a Drinking Water Safeguard Zone (surface water) associated with the Great Eau watercourse and a Drinking Water Protected Area (surface water).

Flood Risk and Drainage

10.5.66 The majority of Section 3 lies within Flood Zone 1. However, there are areas where the Scoping Boundary crosses into Flood Zones 2 and 3, associated with the Great Eau and Wold Grift Drain. The southern part of Section 3 is where the encroachment of tidal flooding into the Scoping Boundary begins. As a result, the Scoping Boundary from Section 3 to Section 7 crosses large extents of fluvial and tidal floodplain, as defined by the extents of Flood Zones 2 and 3 shown on **Figure 10.2 Floodplain and Flood Defences**.

10.5.67 The emerging preferred substation siting zone for LCS-A is mainly located within Flood Zone 1. The emerging preferred substation siting zone for LCS-B includes large extents of Flood Zone 2 and 3 to the east.

10.5.68 There are a number of areas at risk of surface water flooding within Section 3, according to the Environment Agency's RoFSW mapping. Areas of surface water accumulations/ponding are located in and around Mother Wood, Greenfield Wood and at low lying areas associated with small watercourses. Small areas of low risk ponding are located within the LCS-A and LCS-B Substation siting zones with some areas of high risk ponding (more than 3.3% chance each year) largely attributed to the land drains crossing the Scoping Boundary.

Section 4: Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation

10.5.69 Section 4 is approximately 70 km long. Initially from the emerging preferred substation siting zone for LCS-B, the Scoping Boundary continues south through mainly arable land towards the A158 crossing one main river named Willoughby High Drain. At this point the Scoping Boundary is located between Burgh le Marsh and Skegness. The Scoping Boundary continues in a south westerly direction towards the B1183 crossing four main rivers and the A16. Continuing south, the Scoping Boundary enters the Boston District and travels to the west of Boston crossing the River Witham.

10.5.70 The Scoping Boundary continues south towards the A17 intersecting Hammond Beck. The emerging preferred route corridor then travels in a south easterly direction passing into the South Holland District, crossing the River Welland before reaching Weston Marsh Substation.

10.5.71 Section 4 is located within four IDB districts including the Lindsey Marsh IDB, Witham Fourth District IDB, Black Sluice IDB and Welland and Deepings IDB. The topography is relatively flat ranging from 10 mAOD to 2 mAOD.

Surface Water Features

10.5.72 Environment Agency main rivers in this Section include Willoughby High Drain, Cowcroft Drain, the Lymn, Steeping River, East Fen Catchwater Drain, West Fen Catchwater Drain, River Witham, South Forty Foot Drain and River Welland. All watercourses within this Section drain to The Wash.

Water Quality and Water Framework Directive Status

10.5.73 Within the Anglian RBD, the preferred route corridor passes through the Witham and Welland Management Catchments and six Operational Catchments: Steeping and Eaus, Fens East and West, Witham Lower, South Forty Foot Drain, Wellend Lower and Glens. Waterbodies within these operational catchments achieve a mixture of ecological status

or potential, ranging from bad to moderate and many have heavily modified or artificial hydromorphological designations.

10.5.74 Reasons for not achieving GES are shared by many of the waterbodies and include pollution from agriculture and rural land management and continuous sewage discharge.

10.5.75 Poor biological physico-chemical quality are also limiting factors to GES. The water bodies share a chemical status of 'fail' as a result of exceedance of priority hazardous substances, in particular mercury and its compounds, perfluorooctane sulphonate (PFOS) and PBDE.

10.5.76 It is presumed many of the watercourses within the Anglian RBD receive discharges of wastewater from sewage treatment works and several support abstractions to supply agricultural water uses.

10.5.77 Section 4 is not located within a Drinking Water Safeguard Zone (surface water).

Flood Risk and Drainage

10.5.78 Almost the whole of Section 4 is located in Flood Zone 3 with small pockets of Flood Zone 1 in the north of the Section. This is attributed to this part of the Project crossing large extents of fluvial and tidal floodplain as shown in **Figure 10.2 Floodplain and Flood Defences**.

10.5.79 There are a number of areas at risk of surface water flooding along Section 4 of the Scoping Boundary. Some isolated areas are classified as being low, medium and high risk of flooding and are likely associated with small watercourses and localised topographic low points.

Section 5: Weston Marsh Substation

10.5.80 The emerging preferred siting zone for the Weston Marsh Substation is within the South Holland District and South Holland IDB. South Holland IDB drains (notably the Lord's drain) are concentrated to the east of the substation siting zone. The land within this Section predominately comprises arable fields. The emerging preferred substation siting zone is located south east of the River Welland, and north east from the town of Spalding. Section 5 topography is relatively flat with a level of approximately 4 mAOD at the emerging preferred substation zone.

Surface Water Features

10.5.81 Section 5 is located in the Anglian RBD. The River Welland main river flows in a north easterly direction to the west of the Section 5 boundary and is tidal in the vicinity of the Scoping Boundary. This watercourse drains into the Wash. It also supports several services, including water supply, receipt and dilution of wastewater discharges, navigation and amenity.

Water Quality and Water Framework Directive Status

10.5.82 Within the Anglian RBD, Section 5 passes through the Welland Lower Management catchment, the Welland Lower Operational Catchment and the Moulton River water body. This water body currently achieves moderate ecological status and has artificial hydromorphological designation. Reasons for not achieving good status includes pollution from poor nutrient management and private sewage treatment. This water body

has a chemical status of ‘fail’ due to exceedance of priority hazardous substances, in particular mercury and its compounds, as well as PBDE.

10.5.83 Section 5 is not located within a Drinking Water Safeguard Zone (surface water).

Flood Risk and Drainage

10.5.84 The whole of Section 5 which includes the emerging preferred siting zone for the Western Marsh Substation is located in Flood Zone 3. This is attributed to this part of the Scoping Boundary crossing large extents of fluvial and coastal floodplain as shown in **Figure 10.2 Floodplain and Flood Defences**.

10.5.85 There are a number of areas at risk of surface water flooding within Section 5. Some isolated areas are classified as low, medium and high and are likely associated with small watercourses and localised topographic low points.

Section 6: Overhead line from Weston Marsh Substation to Walpole B Substation

10.5.86 This Section of the Scoping Boundary is approximately 30 km in length and travels in a south westerly direction from the emerging preferred Weston Marsh Substation siting zone through predominately arable land towards the A151, located north east of Spalding. The Scoping Boundary continues in a south easterly direction towards the village of Holbeach St Johns, before continuing south east towards Poplar Tree Farm, located north west of the village of Gorefield, and into the Fenland District Council local authority boundary. From Poplar Tree Farm, the Scoping Boundary continues in a easterly direction until it reaches the emerging preferred Walpole B Substation siting zone intersecting the River Nene. The topography is relatively flat with an approximate maximum level of 4 mAOD.

10.5.87 Section 6 transects two local authority districts, including South Holland District and Fenland District, and two IDB districts, including the South Holland IDB and North Level District IDB. The greatest concentration of IDB drains is in the southern part of Section 6.

Surface Water Features

10.5.88 Section 6 crosses the catchment of numerous watercourses, including the River Nene which crosses through the Section from south to north at the eastern extent of Section 6. The River Nene drains towards the Wash.

Water Quality and Water Framework Directive Status

10.5.89 Within the Anglian RBD, Section 6 passes through the Welland, Nene and North West Norfolk Management Catchments and the Welland Lower, Nene Lower and North West Norfolk Rivers Operational Catchments. Water bodies within these operational catchments currently generally achieve moderate ecological status and many have artificial hydromorphological designations. Reasons for the water bodies not achieving GES includes pollution from physical modification from agriculture and rural land management.

10.5.90 The water bodies generally share a chemical status of ‘fail’ due to exceedance of priority hazardous substances, in particular mercury and its compounds, as well as PBDE.

Flood Risk and Drainage

10.5.91 Almost the whole of Section 6 is located in Flood Zones 2 and 3, although there are some pockets of Flood Zone 1 located in the South Holland District. This is attributed to this part of the Scoping Boundary crossing large extents of fluvial and tidal floodplain as shown in **Figure 10.2 Floodplain and Flood Defences.**

10.5.92 There are a number of areas at risk of surface water flooding along Section 6. Some isolated areas are classified as low, medium and high and are likely associated with small watercourses and localised topographic low points.

Section 7: Walpole B Substation

10.5.93 The emerging preferred siting zone for Walpole B Substation is located within the Borough Council of King's Lynn and West Norfolk and King's Lynn IDB district. The majority of the land within this Section comprises arable land with one main road, Mill Road, running through it. The emerging preferred siting zone of the Walpole B Substation is north of the villages of West Walton and Walton Highway.

10.5.94 The emerging preferred Walpole B Substation siting zone is located at an elevation of approximately 2 mAOD.

Surface Water Features

10.5.95 Although there are no main rivers located within Section 7, the River Nene runs directly west and flows into the Wash. Kings Lynn IDB drains to the west of the Section.

Water Quality and Water Framework Directive Status

10.5.96 Within the Anglian RBD, Section 7 is located within the Nene Management Catchment and one Operational Catchment. The waterbodies within this management catchment are concurrent with the characteristics described in Section 6 (paragraph 10.5.88).

Flood Risk and Drainage

10.5.97 Section 7 is predominantly located in Flood Zones 2 and 3 with pockets of Flood Zone 1. This is attributed to this part of the Scoping Boundary crossing large extents of fluvial and tidal floodplain as shown on **Figure 10.2 Floodplain and Flood Defences**. The emerging preferred Walpole B Substation siting zone is located within Flood Zone 3 and is also situated in a Flood Warning Area.

10.5.98 Small areas of low risk ponding are located within the emerging preferred substation siting zone with some areas of high risk ponding (more than 3.3% chance each year) largely attributed to the land drains crossing the substation siting zone.

Future Baseline

10.5.99 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project.

10.5.100 Climate change is likely to lead to significant changes in hydrological conditions within the Study Area over the lifetime of the Project. Outputs from UKCP18 (Ref 10.21) and the Future Flows and Groundwater Levels Project (Ref 10.22) will be used to assess likely changes in ambient conditions for the purposes of the future baseline. For the FRA, the impacts of climate change on future flood risk would be assessed in line with current Environment Agency guidance (Ref 10.8). Appropriate climate change allowances from

this guidance would be incorporated into assessments of future baseline flood risk. This would be factored into the design of flood resilience and mitigation measures and drainage systems for the proposed lifetime of the Project.

10.5.101 WFD legislation may drive future improvements in the ecological and chemical quality of water bodies. The effects of the implementation of future cycles of river basin management plans would therefore also be considered when assigning value to hydrology and land drainage resources.

10.5.102 The effects of known future development that share the same hydrological catchments as the Study Area would also be considered, in terms of the potential for these developments to impact on the status of water receptors as part of the cumulative effects assessment that will be reported in the PEI Report and the ES. **Chapter 5 EIA Approach and Methodology** sets out the approach to the cumulative effects assessment.

10.6 Design and Control Measures

Design Measures

10.6.1 As a starting principal routing and siting for the Project has sought to avoid designated sites and sensitive receptors as far as possible, as set out in as set out in the Corridor Preliminary Routing and Siting Study (Ref 10-30).

10.6.2 As the Project progresses further work will be done to identify sites designated for nature conservation, including those with a supporting water interest; avoiding as far as practicable reservoirs and large ponds; minimising disruption to small watercourses and ditches; and where possible crossing rivers and their floodplains at the narrowest point to reduce changes to hydromorphology.

10.6.3 In addition, the substation siting zones provide opportunity for siting a substation in areas of lowest flood risk as far as possible, considering the distribution of flood risk along the preferred route corridor, and taking into account other environmental and engineering constraints. Due to the extent of the tidal floodplain in the area, it may not be possible for the emerging preferred substation siting zones for Western Marsh and Walpole B to be located at an area of lower risk.

10.6.4 Further design measures will be developed as the Project design evolves. This includes a minimum set-back distance between pylons and watercourses, flood mitigation measures for those substations which must, through further design development, be located in higher flood risk areas due a lack of alternative lower flood risk sites, and drainage design for substations to ensure no increase in flood or pollution risk arising from site runoff. These measures will be developed in collaboration with the engineering design team, other environmental disciplines and in consultation with relevant stakeholders.

Control and Management Measures

10.6.5 An Initial Outline Code of Construction Practice (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could affect the water environment are:

- GG04: The Construction Environmental Management (CEMP) shall include measures to manage dust, waste, water, noise, vibration and soil during

construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans.

- GG06: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
  - pollution prevention and pollution incident response;
  - dust management and control measures;
  - location and protection of sensitive environmental sites and features;
  - adherence to protected environmental areas around sensitive features;
  - working hours and noise and vibration reduction measures;
  - working with potentially contaminated materials;
  - waste management and storage;
  - flood risk response actions; and
  - agreed traffic routes, access points, etc.
- GG08: Land used temporarily for construction will be reinstated where practicable to its pre-construction condition and use. Hedgerows, fences, and walls (including associated earthworks and boundary features) will be reinstated to a similar style and quality to those that were removed, unless otherwise agreed.
- GG15: Fuels, oils and chemicals will be stored responsibly, away from sensitive water receptors. Where practicable, they will be stored >15 m from watercourses, ponds and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a >15 m distance, additional measures will be identified. All refuelling, oiling and greasing of construction plant and equipment will take place above drip trays and also away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potentially hazardous materials used during construction will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby.
- GG16: Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of Site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency).
- GG17: Wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps.
- GG23: An Emergency Action Plan will be developed for the construction phase which will outline procedures to be implemented in case of unplanned events, including but not limited to site flooding and pollution incidents.

- W01: All works within main rivers or ordinary watercourses will be in accordance with a method approved under environmental permits issued under the Environmental Permitting Regulations 2016, the Land Drainage Act 1991, IDB Byelaws (where relevant) or the protective provisions of the DCO for the benefit of the Environment Agency, LLFAs and IDBs.
- W02: For open cut watercourse crossings and installation of vehicle crossing points, good practice measures will include but not be limited to, where practicable:
    - reducing the working width for open cut crossings of a main or ordinary watercourse whilst still providing safe working;
    - installation of a pollution boom downstream of open cut works;
    - the use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens as required;
    - have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident;
    - the use of all static plant such as pumps in appropriately sized spill trays;
    - prevent refuelling of any plant or vehicle within 15 m of a watercourse;
    - prevent storing of soil stockpiles within 15 m of a main river;
    - inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and
    - reinstating the riparian vegetation and natural bed of the watercourse, using the material removed when appropriate, on completion of the works and compacting as necessary. If additional material is required, appropriately sized material of similar composition will be used.
- W03: Riverbank and in-channel vegetation will be retained where not directly affected by installation works. As far as possible, natural substrate will be provided through temporary watercourse crossing culverts.
- W04: Where watercourses are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary spanned bridges. Once the temporary culvert is installed, the area above the temporary culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials, and people. Temporary culverts will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions and kept free from debris. Where used, temporary bridges will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross the bridge. Specific detailed designs for each watercourse crossing, consistent with these design principles, will be prepared by the construction contractor. These will be subject to the appropriate consent by the relevant drainage authority (Flood Risk Activities Permit from the Environment Agency for main rivers, Ordinary Watercourse Consent from the Lead Local Flood Authority or Internal Drainage Board for ordinary watercourses).
- W05: The contractor(s) will comply with all relevant consent conditions or DCO provisions regarding de-watering and other discharge activities. This will particularly be with regard to volumes and discharge rates and will include discharges to land, water bodies or third-party drains/sewers.

- W06: The Project will incorporate appropriate surface water drainage measures into its final design for the haul roads, access tracks, works compounds and laydown areas so that they do not lead to a significant increase in flood risk. Temporary haul routes within Flood Zone 3 and areas of high and medium risk of flooding from surface water will be removed at the end of the construction phase and the ground surface will be reinstated to pre-project levels.
- W07: The contractor(s) will subscribe to the Environment Agency's Floodline service, which provides advance warning of potential local flooding events, and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning information. The contractor(s) will implement a suitable flood risk action plan, which will include appropriate evacuation procedures should a flood occur or be forecast.
- W08: Active private water supplies will be identified with landowners through the landowner discussions. Appropriate measures will be considered during construction. In the event of a landowner or tenant reporting that installation activities have affected their private water supplies, an initial response will be provided within 24 hours. Where the installation works have affected a private water supply, an alternative water supply will be provided, as appropriate.
- W09: In the event of a significant spill during construction, all relevant landowners/tenants will be contacted within 24 hours, within 250 m of the spill, to determine if there are any private water supplies that might be affected; an assessment of the likelihood of groundwater contamination reaching identified private water supplies will be undertaken, and where a private water supply is judged likely to be affected, an alternative water supply will be provided, as appropriate.
- W10: Severance of existing land drainage routes, including agricultural field drainage systems would be managed during construction through provision of temporary alternative drainage routes, and these drainage systems would be permanently reinstated to ensure their existing function is maintained.
- W11: Appropriate control of runoff from working areas will be achieved through implementation of a Drainage Management Plan (DrMP) for the construction phase. The DrMP will use sustainable urban drainage systems (SuDS) principles, promoting infiltration of runoff wherever possible and specifying appropriate treatment and attenuation storage to ensure any discharges to watercourses are uncontaminated and limited to greenfield rates. The DrMP will cover all aspects of construction works and temporary infrastructure. Drainage measures will be phased to be completed before the commencement of earthwork operations, in a specific area, and will be retained until the drainage system of the completed Project is fully operational, or site restoration works are completed. This will include the temporary diversion of existing agricultural drainage around working areas, if required, followed by reinstatement on completion of works.

10.7 Potential for Significant Effects

10.7.1 This section identifies the potential for the Project to give rise to significant effects taking into account the design and control measures identified in Section 10.6.

10.7.2 **Table 10.6** sets out the receptors identified within the Study Area, the potential impacts as a result of construction, maintenance and/or operational activities associated with the

Project, where these impacts are likely to give risk to significant effects, and whether the receptor is scoped in or scoped out of the assessment.

10.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage, the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Potential Sources of Impacts

Sources of Construction Impacts

- Construction activities as detailed in **Chapter 4 Description of the Project**, including the following:
  - soil stripping, earthworks and excavations;
  - use and refuelling of plant and vehicles;
  - watercourse crossings for access (culverts and clear span bridges);
  - watercourse crossings for overhead lines (crossing protection scaffolds);
  - temporary works e.g. spoil storage, on the floodplain;
  - temporary drainage;
  - water use for concrete batching, dust suppression and welfare; and
  - foul arisings from welfare.

Sources of Operational Impacts

- Operational activities as detailed in **Chapter 4 Description of the Project**, including the following:
  - runoff from any impermeable surfaces, such as substations; and
  - loss of floodplain storage/disruption of flow paths.

Sources of Maintenance Impacts

- Maintenance activities as detailed in **Chapter 4 Description of the Project**, including the following:
  - use of machinery and vehicles for non-intrusive inspections and localised repairs.

Potential impacts

Construction Impacts

10.7.4 The control and management measures, described in Section 10.6, would reduce the risk of pollution of the water environment during construction by removing pathways between sources and receptors for many construction activities. However, potential for specific construction works to cause localised and temporary pollution effects would remain. This could impact the water quality from runoff arising from working areas with elevated levels

of suspended solids entering nearby watercourses, or for watercourses to be affected by accidental spillage of polluting substances (such as hydrocarbons) or leakage from plant.

10.7.5 During construction at substation locations there would be the potential for impacts on land drainage regimes and associated surface water flood risk, due to changes in land surface permeabilities or local topography, for example where vegetation cover is stripped and earthworks are undertaken, or where there is disruption to or severance of existing land drainage infrastructure.

10.7.6 During construction, access to the pylon locations would be made via temporary access tracks, working areas and new watercourse crossings. Construction activities have the potential to create blockages in watercourses (from debris falling into watercourses and/or from the accumulation of silt). Some infrastructure and working areas, including temporary storage of excavation arisings, may be located in Flood Zones 2 and 3 which could have the potential to affect flood plain storage or conveyance for the period over which they are installed.

10.7.7 Surface waterbodies (such as watercourses, ponds and lakes) could be impacted from change to flows or water levels in receptor water bodies resulting from changes to the infiltration characteristics of ground surface, disruption of sub-surface and surface drainage pathways and changes to channel conveyance from the installation of temporary or permanent watercourse crossings, pylon footings or temporary access tracks and pylon working areas.

10.7.8 Effects on springs and groundwater resources are addressed in **Chapter 11 Geology and Hydrogeology.**

10.7.9 Land within the construction working width would be reinstated following completion of the construction works.

Operational Impacts

10.7.10 Given the nature of the Project comprising new overhead line (OHL), there would be no permanent impacts on watercourse flow regimes or floodplains. There would be no new consumptive water uses, and the water quality of water receptors would not be degraded. Therefore, the potential for likely significant effects on existing water quality (surface water abstractions and discharges) and hydromorphology is negligible for OHL.

10.7.11 Regarding flood risk and land drainage, situating pylons at a minimum set back distance (to be agreed) from the banks of watercourses, where practicable, avoiding the floodplains of watercourses and incorporating appropriate post construction surface water management and land drainage systems would result in negligible effects.

10.7.12 It this therefore proposed that operational phase effects associated with OHL infrastructure are scoped out.

10.7.13 The proposed substations will have large areas of impermeable surfaces which have the potential to increase the volume of runoff in the area and increase flood risk to downstream receptors. This will be avoided through ensuring that appropriate drainage designs are in place which limit runoff rates to greenfield rates (or what alternative is agreed with the LLFA or IDB). Furthermore, drainage designs will incorporate the use of SuDS and other pollution control devices such as hydrocarbon separators to ensure that the water quality of runoff discharged from the substations is of good quality, thereby avoiding water quality impacts on receiving water bodies.

10.7.14 Out of the five proposed substations for the Project, two are proposed in floodplain areas (Weston Marsh and Walpole B), due to a lack of alternative locations at lower flood risk in the low-lying areas at the southern end of the preferred route corridor. Appropriate mitigation will be put in place as part of the design of these substation sites to ensure that they are safe from flooding for the proposed lifetime of the Project. This mitigation will be designed to ensure that it does not adversely affect flood risk to external receptors through displacement of flood storage or the reduction of flood conveyance.

Maintenance Impacts

10.7.15 Maintenance activities would generally be limited to non-intrusive inspections. Where repairs are necessary, the activities involved would be similar to those for construction, albeit over a much smaller area and scale. Maintenance would be undertaken in line with the Applicant's operational management procedures and given the nature of the Project; maintenance activities are considered to pose a low risk of causing likely significant effects on water environment receptors. It is proposed that all maintenance effects are scoped out.

Table 10.6: Impacts, receptors and potential for significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Soil stripping, earthworks and excavations, use and refuelling of plant.	Pollution from silt, hydrocarbons and other construction materials. Increase rates and volumes of rainfall runoff reduced channel flow capacity due to siltation and disruption to the land drainage regime.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Yes** – Although measures outlined in Section 10.6 would act to manage work site runoff to ensure watercourses are not polluted, nor their flow capacities reduced. The scale of the proposed works (especially at substation sites) means that the potential for a significant effect cannot be ruled out at this stage.	**Scoped in**
Construction	Watercourse crossings for access.	Physical disturbance and change to flow regime.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Yes –** the Project will cross numerous watercourses, with potential for temporary physical disturbance and impacts on flow regimes.	**Scoped in**
Construction	Temporary works, e.g. spoil storage, in the floodplain.	Increased flood risk to people, existing	People, existing property, and infrastructure.	**Yes –** due to the large swathes of floodplain within the	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		property and infrastructure.		Study Area, temporary works in floodplain cannot be avoided.	
Construction	Temporary works e.g construction discharges.	Impacts on flood risk and water quality in receiving watercourses.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Yes** – the Project will be surrounded by numerous watercourses which could be impacted by pollution or changes in flows arising from discharges of surface runoff or dewatered groundwater from construction areas.	**Scoped in**
Construction	Crossing protection scaffolds for large main rivers.	Impact on flood conveyance arising from scaffolding structures on river banks.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	No – installations will be temporary and managed through regulatory permitting process (FRAP will be required for any structures within 8 m – 16 m of main rivers). Effects on flood conveyance will be localised.	Scoped out
Construction	Temporary works impacting groundwater – surface water interactions.	Impact from any dewatering for substation construction.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water	**Yes –** northern Sections of the Project lie in chalk catchments which could be impacted by	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
			abstractions, standing water bodies.	pollution from nutrients through the groundwater – surface water interface, contaminating groundwater which is a source of baseflow.	
Operation	Operational runoff from impermeable surfaces associated with pylons.	Increased surface water flood risk.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	No – permanent surface areas associated with OHL infrastructure will be minimal.	Scoped out
Operation	Operational runoff from impermeable surfaces associated with pylons.	Increased pollution risk.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	No – there are no significant sources of potential pollution associated with OHL infrastructure once construction is complete.	Scoped out
Operation	Loss of floodplain storage/disruption to flow paths associated with overhead lines.	Increased flood risk.	People, property and infrastructure.	No – the minimal footprint of the pylons would not cause significant floodplain storage losses or disruption to floodplain flow paths.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Operation	Loss of floodplain storage/disruption to flow paths associated with substations.	Increased flood risk from rivers.	People, property and infrastructure.	**Yes** – the footprint of operational above ground substation infrastructure has the potential to cause significant floodplain storage losses or disruption to floodplain flow paths for those sites which must be in floodplain areas due to a lack of alternatives (Weston Marsh and Walpole B).	**Scoped in**
Operation	Increased pollution from storage of potential pollutants such as oil-filled transformers.	Increased surface water pollution.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Yes –** operational works have the potential to increase pollution. Drainage strategies will be required.	**Scoped in**
Operation	Increased runoff from impermeable surfaces associated with substations.	Increased surface water flood risk.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Yes** – the extent of new impermeable areas has the potential to increase runoff. Drainage strategies and flood mitigation would be required.	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Maintenance	Use of machinery and vehicles for non-intrusive inspections and localised repairs.	Pollution of watercourses and physical disturbance.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	No – the nature and scale of the maintenance activities would not cause pollution of the water environment and any physical disturbance would be highly localised.	Scoped out

10.8 Proposed Assessment Methodology

Proposed Data Sources

10.8.1 The scope of the assessment is based on a review of baseline information and will be confirmed through review of additional data sources, site visits and further consultation with relevant stakeholders.

10.8.2 In addition to the data sources used to inform this Chapter (Section 10.5), the following data sources are proposed to be used to inform the water environment assessment:

- long term flood risk map for England (Ref 10.23);
- data from Environment Agency flood models;
- drainage and flood data from Local Authority Surface Water Management Plans and Strategic Flood Risk Assessments;
- land drainage data and information from relevant IDBs;
- Humber River Basin Management Plan (Ref 10.24);
- Anglian River Basin Management Plan (Ref 10.25);
- Humber 2100+ Strategy (Ref 10.26); and
- data defining surface water catchment areas and hydrological properties (e.g. rainfall, slopes, and soil permeability) from the Flood Estimation Handbook webservice (CEH, 2008).

Technical Guidance

10.8.3 The assessment will be undertaken in accordance with the following good practice and guidance documents:

- Planning Inspectorate Advice Note 18: The Water Framework Directive (Ref 10.29);
- Local flood risk management guidelines published by the LLFAs (various dates);
- Construction Industry Research and Information Association (CIRIA) publications (various dates);
- National Highways Design Manual for Roads and Bridges (DMRB) LA113 (Ref 10.27);
- Environment Agency's 'Clearing the Waters for All" (Ref 10.28); and
- Guidance for Pollution Prevention series.

Proposed Assessment Methodology

10.8.4 This section presents the methodology that will be used to undertake the assessment of effects on hydrology and flood risk receptors. It presents the criteria used to delineate the sensitivity of these receptors and the magnitude of change that they may experience as a result of the Project. The general criteria listed are examples and provide a general overview of the framework. Receptor sensitivity and magnitude will be determined on

an individual basis. Collectively, the sensitivity and magnitude of change criteria provide for an assessment of the significance of effects on hydrology and flood risk receptors.

10.8.5 The assessment will partly be based on guidance set out in LA113 from the DMRB (Ref 10.27). Whilst primarily intended for use in assessing the impacts of highways projects on the water environment, the methodology is widely accepted as suitable for assessing the effects of other types of linear infrastructure. This promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the local water environment to change.

10.8.6 Given the size of the Project and the presence of areas of Flood Zone 3 within the Study Area, a FRA of the Project will be produced in accordance with the requirements of the Energy National Policy Statement EN-1 and EN-5 and local flood risk management guidelines published by the LLFAs and IDBs.

10.8.7 The FRA will consider flood risk from all relevant sources during both construction and operation, incorporating allowance for climate change in accordance with published guidance where applicable (Ref 10.28). It will also include details of the measures proposed to adhere to local drainage and flood risk planning policies. A WFD screening assessment will be produced for the Project at PEI Report stage guided by Planning Inspectorate Advice Note 18: The Water Framework Directive (Ref 10.29). The effects of the Project on the status of water bodies reported in the Humber and Anglian River Basin Management Plans (Ref 10.24 and Ref 10.25) and the waterbodies therein will be described, and the assessment will set out how the Project design has been developed to align with the requirements of the Regulations. A qualitative approach is proposed, and the assessment will identify how the Project design will avoid water body deterioration, as well as any other mitigation necessary. Furthermore, a WFD compliance assessment will be undertaken for the ES. The approach to WFD compliance assessment is discussed further under paragraph 10.8.14 onwards.

Assessment Criteria

10.8.8 The assessment methodology used in this chapter builds on and adapts the classification contained in LA 113 DMRB (Ref 10.27).

10.8.9 The above guidance was developed for assessing potential impacts that road projects may have on the water environment; however, provides a suitable framework and basis to develop a consistent classification of both magnitude of impact and sensitivity of potential water receptors and is generally considered as industry best practice.

10.8.10 This method will not be applied for the WFD assessment as it has a specific assessment methodology as described above. The WFD assessment would follow the methodology guidance set out in the Planning Inspectorate Advice Note 18: The Water Framework Directive (Ref 10.29).

Sensitivity

10.8.11 **Table 10.7** provides a summary of the methodology used to classify the sensitivity of water receptors that may be subject to potential effects. The assessment methodology used in this chapter builds on and adapts the classification contained in LA 113 DMRB (Ref 10.27).

Table 10.7: Criteria for assigning value (sensitivity) to water environment receptors

Value of resource or receptor	Criteria	Typical examples
Very high	Nationally significant attribute of high importance	Site protected/designated under European Commission (EC) or UK legislation (Special Area of Conservation (SAC), Special Protection Area (SPA), SSSI, Ramsar site). Watercourse having a WFD classification shown in a RBMP and a Q95 > 1.0 m^3/s. Watercourse in natural equilibrium exhibiting a range of morphological features (e.g. pools, riffles) that is free from any modification or human influence. Source for licensed abstraction for a major public water supply. Essential infrastructure or highly vulnerable development.
High	Locally significant attribute of high importance	Watercourse having a WFD classification shown in a RBMP and a Q95 <1.0 m^3/s. Very limited signs of modification or other human influences on morphology. Source for licensed abstraction for smaller public water supplies or major commercial, industrial and/or agricultural supply. More vulnerable development.
Medium	Of moderate quality and rarity	Watercourses not having a WFD classification shown in a RBMP and Q95 > 0.001 m^3/s. Watercourse showing signs of modifications and having a limited range of morphological features. Source for potable private water supply or licensed abstraction for moderate-sized commercial, industrial and/or agricultural supply. Less vulnerable development.
Low	Lower quality, common place	Watercourses not having a WFD classification in a RBMP and a Q95 flow <0.001 m^3/s. A highly modified watercourse, changed by human pressures. No morphological diversity. Source for minor non-potable private water supply (e.g. for agricultural use). Water compatible development.

Magnitude

10.8.12 The magnitude of change acting on water environment receptors is independent of the sensitivity of the feature. This is a largely qualitative assessment, which relies on professional judgement, although it may be informed by quantitative information and

analysis where data is available and where appropriate. The criteria considers the scale and extent of the predicted change and the nature and duration of the impact. **Table 10.8** defines the criteria for how the magnitude of impact will be determined and provides potential examples in relation to the water environment.

Table 10.8: Criteria for assigning impact magnitude

Magnitude of impact	Criteria	Typical examples
Large adverse	Results in loss of attribute and/or quality and integrity of the attribute	Loss or extensive change to a fishery. Loss or extensive change to a designated nature conservation site. Reduction in waterbody WFD classification. Major, long-term pollution or depletion of yield of an abstraction source leading to complete loss of supply. Extensive change to channel planform, replacement of large extent of natural bed/bans with artificial material. Increase in peak flood level (1% annual exceedance probability) of >100 mm.
Medium adverse	Results in effect on integrity of attribute, or loss of part of attribute	Partial loss in productivity of a fishery. Contribution to reduction in waterbody WFD classification. Moderate long-term pollution or depletion of yield of an abstraction source leading to a reduction in supply or increased treatment requirements. Replacement of natural bed material or banks with artificial material over more than 3% of the water body's total length. Increase in peak flood level (1% annual exceedance probability) of >50 mm.
Small adverse	Results in some measurable change in attribute quality or vulnerability	Minor and short-term temporary change from baseline hydromorphological conditions. Minor and short-term temporary effects on water resource quality or availability. Increase in peak flood level >10 mm.
Negligible	Results in effect on attribute of insufficient magnitude to affect the use or integrity	Negligible change in peak flood level (<10 mm). No measurable impact on WFD waterbodies or river channel planform. No measurable change in water resource quality or availability.
Small beneficial	Results in some positive effect on an attribute or a reduced risk of negative effect occurring	Creation of flood storage and reduction in peak flood level (1% AEP) >10 mm.

Magnitude of impact	Criteria	Typical examples
Medium beneficial	Results in moderate improvement of attribute quality	Contribution to improvement waterbody WFD classification. Improvements to morphological diversity at the local scale. Creation of flood storage and reduction in peak flood level (1% AEP) >50 mm.
Large beneficial	Results in major improvement of attribute quality	Removal of existing polluting discharge or removing likelihood of polluting discharges to a watercourse. Major improvement to morphological diversity at reach scale e.g. through culvert removal. Improvement in waterbody WFD classification. Creation of flood storage and reduction in peak flood level (1% AEP) >100 mm.
No change	No change, either beneficial or detrimental, to attribute quality.	

Significance of Effects

10.8.13 The EIA Regulations require that a final judgement is made about whether or not each effect is likely to be significant. The significance of potential and residual effects is derived by considering both the sensitivity of the feature and the magnitude of change. In this assessment, effects are considered to be Significant or Not Significant according to the matrix in **Table 10.9.** With 'Major' and 'Moderate' effects taken to be 'Significant' and 'Minor' and 'Negligible' taken to be 'Not Significant'.

Table 10.9: Significance matrix

Magnitude of Change	Sensitivity of Receptor			
	Very High	High	Medium	Low
High	Major (Significant)	Major (Significant)	Moderate (Potentially Significant)	Minor (Not Significant)
Medium	Major (Significant)	Moderate (Potentially Significant)	Minor (Not Significant)	Minor (Not Significant)
Low	Moderate (Potentially Significant)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)
Very Low	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

Approach to Assessment of WFD Compliance

10.8.14 An integrated WFD assessment will be prepared to support the ES. It will assess potential impacts of the proposed works on WFD status of surface water and groundwater bodies intersecting the Study Area. The advice and guidance provided within the Environment Agency's 'Clearing the Waters for All (Ref 10.28) and the Planning Inspectorate 'Advice Note 18' (Ref 10.29) will be followed.

10.8.15 The WFD assessment will consider the likely significant effects on the biological, physico-chemical, chemical, and hydromorphological quality elements of surface water features within the Study Area.

10.8.16 The groundwater WFD assessment will assess potential effects upon the chemical quality, flow and levels of groundwater features within the Study Area.

10.8.17 The geomorphology assessment of potential effects will follow standard industry best practice guidance and professional judgement. Professional judgement will also be used to inform design and appropriate mitigation to deliver the objectives of the Project.

10.8.18 The geomorphological investigation will be used to inform the assessment of the WFD hydromorphological quality elements.

10.8.19 It is a possibility that a River Condition Assessments (RCA) will be undertaken to inform the Biodiversity Net Gain Assessment. The RCA methodology has been developed to deliver the river component of a national Biodiversity Metric to measure and account for losses and gains in river biodiversity as a result of development (Gurnell et al., 2020). The RCA methodology has been adopted across the UK to assess baseline river condition, estimate potential impacts from developments and monitor change post-construction. The RCA surveys may be undertaken on the watercourses within the Scoping Boundary, as discussed in Section 10.5 and minor watercourses and ditches within the Scoping Boundary.

10.9 Assumptions and Limitations

10.9.1 To ensure transparency within the assessment, the following limitations and assumptions have been identified:

- it is assumed that there is insufficient data from the Environment Agency, LLFAs and IDBs to fully characterise all aspects of flood risk to the Project. As a consequence, hydraulic models may need to be updated and/or created to inform the FRA;
- it is assumed there is sufficient data from the Environment Agency to define the current condition and standards of protection provided by existing flood defences, and that no baseline condition surveys will be required;
- following the precedent set by the National Grid Yorkshire GREEN project, which has recently received its DCO, it is assumed that the WFD assessment can be incorporated into the main water environment ES chapter, without the need for extensive supporting appendices;
- it is possible that RCAs may be needed for watercourses affected by the Project; and
- no water quality sampling and analysis is proposed as it is considered that sufficient baseline data is available to generally characterise the water quality of surface water receptors.

10.10 Conclusion

Summary

10.10.1 Water environment receptors within the Study Area include a number of principal main rivers which cross the preferred route corridor, including Laceby Beck, River Freshney, Louth Canal, Steeping River, River Lud, River Witham, River Welland and River Nene.

10.10.2 In addition, a number of smaller tributaries and drainage ditches also interact with the Project, particularly in the lower-lying areas in the southern part of the preferred route corridor.

10.10.3 These watercourses generally share WFD moderate ecological status and fail with regard to chemical status.

10.10.4 There are extensive floodplains areas, particularly in the lower-lying southern part of the Scoping Boundary. In these areas flood risk is from a combination of fluvial and tidal sources, and flood defences are often present. Two of the emerging preferred substations siting zones (Weston Marsh and Walpole B) are located in areas of higher flood risk (Flood Zone 3), due to a lack of alternative locations at lower flood risk.

10.10.5 The greatest potential for effects on hydrology and flood risk arises during the construction phase of the Project. Higher risk project activities include watercourse crossings for access and any potential underground cable sections and disruption to the land drainage regime and risk of pollution associated with soil stripping, earthworks and excavations. However, a suite of design, control and management measures, secured through the DCO, would prevent or reduce source pathway linkages, and control and manage effects on water quality, hydromorphology, flood risk and drainage.

10.10.6 The greatest potential for effects during the operational phase of the Project is associated with the substation siting zones, where extensive new impermeable areas could give rise to flood risk and water quality effects, although these should be effectively mitigated through appropriate drainage design. In addition, flood risk mitigation will need to be designed for those proposed substations which need to be in higher flood risk areas; it should be ensured that these mitigation measures are effective for the lifetime of the Project (accounting for climate change) and do not give rise to increased flood risk for external receptors. The potential for effects arising from the operation and maintenance of OHL infrastructure is considered to be minimal.

Proposed Scope of the Assessment

10.10.7 A summary of the proposed scope of the assessment is provided in **Table 10.10**.

Table 10.10: Proposed scope of assessment

Receptor	Potential for significant effects	Project phase	Proposed to be scoped in/out
Watercourses and water bodies; water resources	Pollution from silt, hydrocarbons and other construction materials. Increased rates and volumes of rainfall runoff, discharge of dewatered groundwater from	Construction	**Scoped in**

Receptor	Potential for significant effects	Project phase	Proposed to be scoped in/out
	excavations, reduced channel flow capacity due to siltation and disruption to the land drainage regime and groundwater and surface water interactions.		
Watercourses and water bodies; water resources.	Pollution and localised changes to hydromorphology at watercourse crossings for access.	Construction	**Scoped in**
Floodplains, landowners and infrastructure	Increased flood risk due to temporary loss of floodplain storage and changes in floodplain flow conveyance routes from overhead line construction.	Construction	**Scoped in**
Floodplains, landowners and infrastructure	Increased flood risk due to loss of floodplain storage and changes in floodplain flow conveyance routes from substation construction and operation.	Construction	**Scoped in**
		Operation	**Scoped in**
	Increased rates and volumes of rainfall runoff, disruption to the land drainage regime from substation construction and operation.	Construction	**Scoped in**
		Operation	**Scoped in**
Watercourses and water bodies; water resources.	Increased pollution from storage of potential pollutants such as oil-filled transformers.	Operation	**Scoped in**
Watercourses and water bodies. Water resources. Floodplains, landowners and infrastructure	The potential for hydromorphology, water quality and flood risk effects arising from the permanent presence of OHL infrastructure is considered minimal.	Operation	Scoped out
Watercourses and water bodies, water resources	Pollution of watercourses and physical disturbance.	Maintenance	Scoped out

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11. Geology and Hydrogeology

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Contents

11.1 Introduction

11.1.1 This Chapter of presents how the geology and hydrogeology assessment will consider potentially significant effects relating to land contamination, groundwater and designated geological sites, along with ground instability receptors (human health and structures) that may arise as a result of the construction, operation and maintenance of the Project (as described in **Chapter 4 Description of the Project**). This chapter will provide details of the methodology which will be used within the Environmental Impact Assessment (EIA) for Geology and Hydrogeology, the datasets to be used to inform the assessment, an overview of the baseline conditions, the likely significant effects to be considered within the assessment and how the significant effects will be assessed within the EIA. As detailed in **Chapter 4 Description of the Project**, the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

11.1.2 This Chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 3 Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology.**

11.1.3 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 8 Ecology and Biodiversity** – this chapter covers effects identified by the geology and hydrogeology assessment that may affect ecological receptors;
- **Chapter 10 Water Environment** – this chapter considers effects on groundwater identified by the geology and hydrogeology assessment that may affect hydrological receptors; and
- **Chapter 12 Agriculture and Soils** – this chapter covers the temporary and permanent loss of soils and soil functions.

11.1.4 This chapter is supported by the following figures:

- **Figure 1.1 Scoping Boundary;**
- **Figure 11.1 Geology & Hydrogeology Study Area Location Plan;**
- **Figure 11.2 Substation Location Plan with Geology & Hydrogeology Study Areas - Grimsby; and**
- **Figure 11.3 Source Protection Zones and Groundwater Dependent Terrestrial Ecosystems.**

11.2 Legislation, Policy, and Guidance

11.2.1 Legislation and policy relevant to the Proposed Project is outlined in Chapter 2 Regulatory and Planning Context, Appendix 2A Key Legislation, Appendix 2B National and Regional Planning Policies and Appendix 2C Local Policy.

Technical Guidance

11.2.2 Relevant guidance and standards that have informed the scoping process are provided below in **Table 11.1**.

Table 11.1: Technical guidance relevant to geology and hydrogeology

Technical Guidance Document	Context	Section considered
Land Contamination Risk Management (Ref 11.8)	Overarching technical guidance for land contamination risk assessments.	Proposed methodology in Section 11.8 accords with the guidance, including assessment via a risk-based source-pathway-receptor approach that considers suitability for the proposed end use.
Assessing risks posed by hazardous ground gases to buildings (CIRIA publication 665) (Ref 11.9)	Technical guidance on ground gas risk assessment.	Proposed approach in Section 11.8 accords with the guidance i.e. desk study to assess ground gas risks, which will then inform future monitoring and mitigation requirements.
Geological Conservation – A guide to good practice (Ref 11.10)	Explains the key factors to be considered when assessing geological conservation sites.	Section 11.8 explains the approach in relation to geological conservation.
Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA publication 552) (Ref 11.11)	Guidance on land contamination risk assessment principles.	The risk-based assessment system in Section 11.8 is an application of the guidance in CIRIA 552.
Environment Agency Groundwater Protection guidance (Ref 11.12)	Collection of guidance documents covering groundwater permissions, risk assessments and controls.	Section 11.6 and Section 11.8, which includes a risk assessment methodology.

11.3 Consultation and Engagement

11.3.1 The EIA will be informed by consultation and engagement with stakeholders, including the Environment Agency, Local Authorities and County Councils. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

11.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. No pre-scoping engagement has been undertaken for geology and hydrogeology, which is considered to be an appropriate approach and normal practice for this discipline.

11.3.3 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 11.2**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 11.2: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
Environment Agency	Historic landfills are present along parts of the route. There is the potential for contamination to be present in other areas of the site, for instance, in the areas of the proposed new substations. Land contamination will have to be considered in future design choices for the scheme. Where the placement of these cables takes place in land that may be affected by contamination the management of the waste material will need to be carefully managed. Whilst the report suggests that the historic landfills will be avoided it is possible that a foundation works risk assessment for the scheme will be undertaken to ensure that pathways for the migration of contaminants are not created.	The geology and hydrogeology ES Chapter will include an assessment of potential contamination along the route which could be disturbed as part of the Project, including consideration of potential effects on human health, groundwater aquifers, groundwater abstractions and structures. The Design and Control Measures relevant to this discipline are discussed within Section 11.6, which details the potential requirement for a Foundation Works Risk Assessment and protection measures for construction works as appropriate.
Environment Agency	We have reviewed relevant sections of the Corridor Preliminary Routeing and Siting Study (CPRSS) and Strategic Options Report from the perspective of controlled water protection. There is no mention in the report of consideration of foundations for the infrastructure in relation to groundwater, specifically the Source Protection Zones (SPZ) that are present along the emerging preferred route. This should be included in future assessments. Paragraph 10.2.55 states that in relation to some of the siting zones where areas of SPZ1 and 2 cannot be avoided, “additional mitigation would be required to limit risks of impacting groundwater as far as practicable”. We welcome this approach but note that the report places a strong emphasis on source protection zones and adapting the scheme and design around these vulnerable areas. However, there	The assessment will consider the effects of construction works, including foundations for new structures, on protected groundwater resources, including Source Protection Zones and private groundwater abstractions.

Stakeholder	Summary of response	Consideration in the Scoping Report
	has been no mention of private water supplies. This is a rural area where such supplies are likely to be present. Impacts on these receptors should be considered as the scheme design evolves and avoidance of them where possible is recommended.	
Environment Agency	We have looked at the 11 sections (as displayed in 'Key Plan and Section Plan figures' document) and identified where the emerging preferred route encroaches on groundwater source protection zones. Avoidance of the highly sensitive SPZ1 and SPZ2 would be preferable, but where they cannot be avoided careful consideration of groundwater protection must be included in the Environmental Statement.	The geology and hydrogeology chapter of the ES will assess the physical and chemical effects on groundwater aquifers and groundwater abstractions. An assessment of the potential effects of the Project on any SPZ zones will be undertaken, including instances where SPZ1 and SPZ2 cannot be avoided. This will allow determination of any required mitigation measures for groundwater protection which will be reported in the PEI Report and ES.

11.4 Study Area

11.4.1 The Project Scoping Boundary is shown on **Figure 1.1 Scoping Boundary**.

11.4.2 For the purposes of this assessment, a general Study Area of the Scoping Boundary plus a 250 m buffer for geological receptors and a 500 m buffer for hydrogeological receptors has been applied. This is considered to be a proportionate and suitable approach for the assessment. Hydrogeological receptors further from the Study Area are more susceptible to effects from the Project due to the mobile nature of groundwater and corresponding potential for the Project to affect receptors at a greater distance.

11.4.3 The Study Area will be refined throughout the development of the Project, ultimately comprising the land within the Order Limits defined in the Development Consent Order (DCO) application, plus the buffer zones defined above.

11.5 Baseline Conditions

11.5.1 This section of the chapter comprises an overview of the baseline conditions for Geology and Hydrogeology, to establish the type and nature of potentially significant effects.

Data Sources

11.5.2 An initial overview of baseline information undertaken to support scoping has been undertaken through a review of publicly available geological information, including:

- British Geological Survey (BGS) 1:50,000 scale geological mapping, available online at the BGS GeoIndex (Ref 11.13);
- Scans of historical boreholes available from the BGS;
- Multi-Agency Geographic Information for the Countryside (MAGIC) interactive Map (Ref 11.14);
- Historical landfill records, available online (UK government website) (Ref 11.15);
- Source Protection Zones data, available under Open Government License (Ref 11.19);
- Environment Agency Catchment Data Explorer records on groundwater quality (Ref 11.20);
- Information about designated geological sites within local planning policy documents; and
- Satellite Imagery.

11.5.3 The initial overview of the baseline conditions provided in this chapter of the Scoping Report is intended only to establish the scope of effects that require assessment, so is focused only on key datasets and should not be considered exhaustive. More detailed information will be obtained and reported in the Preliminary Environmental Information Report (PEI Report) and Environmental Statement (ES). Details of the proposed additional data gathering are provided in Section 11.8.

Baseline

11.5.4 The Study Area measures approximately 140 km in length and runs generally north to south following the shape of the eastern coastline of the United Kingdom, beginning south of Grimsby and ending broadly to the north of Wisbech. The geology of the Study Area can be broadly summarised as being predominantly chalk in the north, gradually progressing into sandstones, mudstones and siltstones moving southwards, with variable superficial deposits present along the entire length of the Study Area.

11.5.5 The Project has been divided into seven sections as detailed in **Chapter 4 Description of the Project.** The sections are split from north to south by the geographical alignment of the Scoping Boundary and are detailed as follows in this chapter:

- Section 1 - Grimsby West Substation;
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A;
- Section 3 - Lincolnshire Connection Substation A and B (including the overhead line between them);
- Section 4 - Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation;
- Section 5 - Weston Marsh Substation;

- Section 6 - Overhead line from Weston Marsh Substation to new Walpole Substation (herein referred to as Walpole B Substation); and
- Section 7 – Walpole B Substation.

11.5.6 The geological and hydrogeological setting for each of the Sections is discussed below.

Section 1: Grimsby West Substation

11.5.7 This Section covers the proposed Grimsby West Substation, located to the west of Grimsby and north east of the villages of Laceby and Aylesby. The land within Section 1 appears to be primarily used for agricultural purposes, with some grassland and wooded areas, existing electrical infrastructure in the north and wind turbines in the centre. Field boundaries are generally lined with trees, hedges and roads. The land across Section 1 appears to be relatively flat lying, at highest elevation in the west and sloping gently towards the east.

11.5.8 The published geology within the Study Area in Section 1 is recorded to comprise the following:

- Superficial deposits, present across the entire Section:
  - Devensian Glacial Till generally described as heterogeneous clay, sand, gravel and boulders, present across the majority of the Study Area within this Section;
  - Lacustrine deposits comprising sand, silt and clay, present in isolated pockets across the Study Area within this Section;
  - Alluvium comprising clay, silt, sand, and gravel, associated with the Laceby Beck and its tributaries, along the southern boundary of the Study Area within this Section; and
  - Devensian Glaciofluvial Sheet Deposits comprising sand and gravel, present in isolated pockets across the Study Area within this Section and alongside the Alluvium deposits.
- Bedrock is recorded to comprise chalk of the Burnham Chalk Formation, generally described as thinly bedded chalk with common and discontinuous flint bands.
- No Made Ground deposits are recorded within the Study Area in Section 1, although are likely to be present adjacent to roads, tracks and existing properties/structures.

11.5.9 There are no recorded authorised landfill sites, sewage treatment works, waste sites (general), existing (operational) waste sites or recorded historical landfills within the Study Area in Section 1. The closest historical landfill is located approximately 350 m to the southwest of the Scoping Boundary, which has no records of accepted waste types and first accepted waste in 1952.

11.5.10 The superficial deposits within the Study Area in Section 1 are designated as Secondary Aquifers (Secondary A, B or Undifferentiated). Secondary A Aquifers are described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Secondary B Aquifers are lower permeability layers which may store or yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. Secondary Undifferentiated Aquifers are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow, and when neither Secondary A or B aquifer designation can be applied.

11.5.11 The underlying chalk solid strata are designated as a Principal Aquifer (layers of rock that have high intergranular and/or fracture permeability and a high level of water storage, they may support water supply and/or river base flow on a strategic scale). The Study Area within this Section lies entirely within the 'North Lincolnshire Chalk Unit' groundwater body, which is monitored as part of the Water Framework Directive (WFD) and has been classified by the Environment Agency (EA) as having 'Poor' status in 2019, due to poor nutrient management from agriculture and groundwater abstractions.

11.5.12 The Study Area within Section 1 lies fully within an inner Source Protection Zone (SPZI, with SPZ II (outer zone) and III (total catchment) present across the Study Area within this Section, the central area lying within SPZ III and the north/north west and east within SPZ II. Two drinking water safeguard zones for groundwater are present across the Study Area within this Section, GWSGZ0015 and GWSGZ0283 both designated for nitrate. The Study Area within this Section also crosses three nitrate vulnerable zones (NVZ); Lincolnshire Chalk, North Beck Drain and Laceby Beck / River Freshney Catchment (to N Sea).

Section 2: Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A

11.5.13 The Study Area within Section 2 comprises approximately 34.5 km of the emerging preferred route corridor and runs north west to south east between the substations for Grimsby West and Lincolnshire Connection Substation A (LCS-A), parallel to the coastline.

11.5.14 The emerging preferred route corridor within Section 2 crosses areas of varying land use, including predominantly arable land with some grassland and wooded areas, crossings of major roads (including A46, A16, A157, B1203, B1202, B1200), three notable rivers and the Lincolnshire Wolds Railway (to the east of North Thoresby).

11.5.15 The published geology within the Study Area in Section 2 is recorded to comprise:

- Superficial deposits, present across the entire Study Area in Section 2:
  - Devensian Glacial Till present across the majority of Section 2 of Study Area;
  - Lacustrine deposits present in isolated pockets, within the north of the Study Area in Section 2;
  - Alluvium present along the traces of rivers entering/crossing the Study Area from the east, but not widespread across the Study Area in Section 2;
  - Devensian Glaciofluvial deposits present in isolated pockets across the Study Area in Section 2; and
  - River Terrace Deposits comprising isolated pockets of sand and gravel, adjacent to rivers.
- Bedrock is recorded to comprise:
  - Chalk of the Burnham Chalk Formation in the north;
  - Chalk of the Welton Chalk Formation in the centre, east and south of the Study Area in Section 2, generally described as massive or thickly bedded chalk with common flint nodules;

- Chalk of the Hunstanton Formation, located in the south west along the Study Area boundary, generally described as rubbly to massive chalks with marl bands;
- Sandstone of the Carstone Formation in the south west along the Study Area boundary, generally described as coarse grained, cross-bedded, oolitic, ferruginous sandstone.

- No Made Ground deposits are recorded within the Study Area in Section 2, although are likely to be present adjacent to roads, tracks and existing properties/structures.

11.5.16 There are a number of Local Geological Sites within the East Lindsey District, but none within the Study Area in Section 2.

11.5.17 There are no recorded authorised landfill sites or waste sites within the Study Area in Section 2. One recorded historical landfill enters the boundary of the Study Area, to the west of Ludborough, although the majority of the recorded extent is outside of the Scoping Boundary. This landfill is recorded to have accepted inert waste and the licence was surrendered in 1993.

11.5.18 The glacial till deposits are designated as a Secondary Undifferentiated Aquifer and the localised deposits, including alluvium, are designated as Secondary A Aquifers. The lacustrine deposits present in isolated areas in the north of the Study Area in Section 2 are designated as Secondary B Aquifers. The bedrock units beneath the Study Area in Section 2 are designated entirely as Principal Aquifers.

11.5.19 The Study Area in Section 2 contains two WFD groundwater bodies. The northern half (from Grimsby West to Louth) of the Study Area is located within the North Lincolnshire Chalk Unit groundwater body. The southern half of the Study Area (southeast of Louth) is located within the South Lincolnshire Chalk Unit groundwater body, monitored by the Environment Agency under the WFD, which was classified as having an overall ‘Poor’ status for 2019, due to poor nutrient management from agriculture.

11.5.20 The Study Area in Section 2 contains several SPZs, including three areas of SPZ I (adjacent to Barnoldby le Beck, Fulstow and Withern). Surrounding these, the northern half of the Study Area in this Section lies entirely within SPZ II or SPZ III, whereas much of the southern half of the Study Area lies outside of SPZ areas. The far south east of the Study Area contains SPZ III and II designations, adjacent to the SPZ I west of Withern. The northern third of the Study Area in Section 2 lies within several drinking water safeguard zones (GWSGZ0015, GWSGZ0282, GWSGZ0288 and GWSGZ0285) all designated for nitrate. There are no further drinking water safeguard zones within the Study Area in Section 2. There are multiple NVZs within the Study Area in Section 2.

Section 3: Lincolnshire Connection Substation A and B (including the overhead line between them)

11.5.21 The Study Area in Section 3 covers the two Lincolnshire Connection Substations (LCS) A and B and the preferred emerging route corridorbetween them, covering approximately 9.5 km north and east of Alford. The Study Area in Section 3 has varying land uses including agriculture, small villages/residential dwellings, several major roads including the A1104 and A1111 and a large area of woodland called Mother Wood.

11.5.22 The published geology beneath the Study Area in Section 3 is recorded to comprise:

- Superficial deposits, present across the entirety of the Study Area:

- Devensian Glacial Till present across the majority of the Study Area;
- Alluvium present along the traces of rivers entering/crossing the Study Area in the centre and northwest, but not widespread across the Study Area in Section 3;
- Devensian Glaciofluvial deposits present in isolated pockets across the Study Area in Section 3, generally alongside the alluvium deposits;
- River Terrace Deposits just entering the northwest boundary of the Study Area in Section 3, comprising sand and gravel, adjacent to rivers; and
- Tidal Flat Deposits present in the east of the Study Area in Section 3, associated with the coastline present to the north east of the Study Area.

- Bedrock is recorded to comprise:
  - Chalk of the Burnham Chalk Formation in the north east;
  - Chalk of the Welton Chalk Formation in the north and east;
  - Chalk of the Ferriby Chalk Formation in the west and centre – generally described as soft, flint-free chalk with thin marl seams; and
  - Chalk of the Hunstanton Formation in the southwest along the Scoping Boundary.
- No Made Ground deposits are recorded within the Study Area in Section 3, although are likely to be present adjacent to roads, tracks, and existing properties/structures.

11.5.23 There are no authorised landfill sites or waste sites within the Study Area in Section 3. One recorded historical landfill is present within the Study Area in Section 3, located adjacent to the southern Scoping Boundary just north of the village of Bilsby. This landfill has no recorded input dates but is recorded to have accepted household waste.

11.5.24 The superficial deposits present beneath the Study Area in Section 3 are designated as Secondary A and Secondary Undifferentiated aquifers, with the exception of the Tidal Flat deposits which are designated as unproductive strata. The solid strata (chalk) recorded in the Study Area in Section 3 are designated as Principal Aquifers.

11.5.25 The Study Area in Section 3 lies entirely within the South Lincolnshire Chalk Unit groundwater body, with a 'Poor' overall status as part of the Environment Agency's WFD classification data set, as discussed above for Section 2.

11.5.26 The Study Area in Section 3 lies entirely within SPZ III, with areas in the south east falling within SPZ II and SPZ I, surrounding the proposed LCS B substation. The Study Area in Section 3 also contains three NVZs (Lincolnshire Chalk, Great Eau (downstream of South Thoresby), and Woldgrift Drain). The Study Area in this Section does not sit within any drinking water safeguard zones for groundwater.

Section 4: Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation

11.5.27 Section 4 is the longest Section of the Scoping Boundary, comprising approximately 64 km of the preferred emerging route corridor running generally south between the Lincolnshire Connection Substation B and Weston Marsh Substations. The Scoping

Boundary in this Section generally follows the shape of the coastline, running south along the west of the towns of Skegness and Boston.

11.5.28 The Scoping Boundary within Section 4 crosses several major roads, including the A158, A16, A1121, A52 and A16. The Study Area in Section 4 generally contains a variety of land uses, including agricultural land with some grassland and wooded areas, residential properties, and villages (although these are generally excluded from the Scoping Boundary), roads and a railway leading northeast and west from Boston.

11.5.29 The published geology beneath the Study Area in Section 4 is recorded to comprise:

- Superficial deposits, present across the entirety of the Study Area:
  - Devensian Glacial Till present in isolated areas in the north of the Study Area in this Section;
  - Devensian Glaciofluvial deposits present in isolated areas in the north of the Study Area in this Section;
  - Tidal Flat Deposits present beneath the majority of the northern third of the Study Area in this Section, associated with the coastline present to the east of this Section, and then also appearing within the Scoping Boundary to the south of Spilsby and covering the remainder of the Study Area in Section 4 to its southern boundary with Section 5; and
  - Peat, which generally comprises decomposed vegetation under waterlogged conditions and is spongy in texture. These deposits are recorded to be present across one large area in the centre of Section 4, south of Spilsby and extending to land east of Stickney. These deposits are surrounded by Tidal Flat Deposits within the Study Area to the north and south.
- Bedrock is recorded to comprise:
  - Chalk of the Welton Chalk Formation in the far north of the Study Area in this Section;
  - Chalk of the Ferriby Chalk Formation in the north of the Study Area in this Section;
  - Sandstone of the Carstone Formation – a localised unit south of the Ferriby Chalk Formation in the north of Section 4, generally described as cross-bedded oolitic ferruginous sandstone;
  - Mudstone and Limestone of the Claxby Ironstone Formation, Tealby Formation and Roach Formation – present to the east and south of Burgh le Marsh;
  - Sandstone of the Spilsby Sandstone Formation – a localised deposit between the interbedded mudstone and limestone to the north and the Kimmeridge Clay Formation to the south, generally described as coarse-grained pebble sandstone with iron ooliths;
  - Mudstone of the Kimmeridge Clay Formation – beneath the full Section 4 Study Area between Thorpe Culvert and Frithville;
  - Mudstone of the Ampthill Clay Formation – generally comprising mudstones with limestone nodules, from Frithville to Fenhouses as the Scoping Boundary (and corresponding Study Area) runs south to the west of Boston;

- Mudstone and siltstone of the West Walton Formation – generally comprising calcareous mudstone, silty mudstone and siltstone with fine-grained sandstones and limestone or siltstone nodules, present from Fenhouses to Burtoft; and
- Mudstone of the Oxford Clay Formation – generally recorded to comprise silicate mudstone, present in the far south of the Study Area in Section 4, up to Weston Marsh Substation.

- No made Ground deposits are recorded within the Study Area in Section 4, although are likely to be present adjacent to roads, tracks, railway lines and existing properties/structures.

11.5.30 There are no recorded authorised landfill sites or waste sites within the Study Area in Section 4. The closest (Middlemarsh Landfill) is located approximately 1.3 km east of the Scoping Boundary, to the west of Skegness. There are no recorded historical landfills within the Study Area in Section 4. One historical landfill is located approximately 250 m south west of the Scoping Boundary in the far south of Section 4, adjacent to the A16, and is recorded to have been licensed between 1993 and 2006, accepting inert waste.

11.5.31 The glaciofluvial and glacial till deposits present in the north of the Study Area in Section 4 are designated as Secondary A or Secondary Undifferentiated Aquifers. The tidal flat deposits and peat in the southern half of the Study Area in Section 4 are designated as unproductive strata.

11.5.32 The majority of bedrock in the northern part of the Study Area in Section 4 is designated as a Principal Aquifer, with the mudstone and limestone of the Claxby Ironstone Formation, Tealby Formation and Roach Formation designated as Secondary B Aquifers. All units from the Kimmeridge Clay Formation and below in the list above are designated as unproductive strata.

11.5.33 The chalk units within the northern half of the Study Area in Section 4 lie within the South Lincolnshire Chalk Unit groundwater body, with a ‘Poor’ overall status as part of the Environment Agency’s WFD classification data set (as discussed previously in relation to Section 2). The isolated sandstone of the Spilsby Sandstone Formation lies within the Spilsby Sandstone Unit groundwater body, classified by the Environment Agency as having an overall ‘Poor’ status for 2019. There are no published reasons why good status has not been achieved for this groundwater body.

11.5.34 Two SPZ I areas are present in the far north of the Study Area in Section 4, overlapping from Section 3, with small SPZ II areas surrounding them. The north of the Study Area in Section 4 otherwise lies within SPZ III until the east of Burgh le Marsh and a small area just north of Thorpe Culvert. The remainder of the Study Area in Section 4 does not lie within any SPZ areas. There are also no recorded drinking water safeguard zones within the Study Area in Section 4. With the exception of the very north of this Section, the Study Area lies almost entirely within several NVZs which span beyond the Scoping Boundary to all surrounding land.

Section 5: Weston Marsh Substation

11.5.35 Section 5 includes the emerging preferred siting zone for Weston Marsh Substation, located north east of Spalding and east of the River Welland. The land within the Study Area in this Section generally consists of agricultural land with access tracks and roads, with existing overhead lines running through the centre from north west to south east.

11.5.36 The published geology beneath the Study Area in Section 5 is recorded to comprise:

- Superficial deposits consisting of Tidal Flat Deposits comprising clay and silt, present across the entirety of the Study Area in Section 5;
- Bedrock is recorded to consist of mudstones of the Oxford Clay Formation – present across the entirety of the Study Area in Section 5; and
- Made Ground deposits are not recorded beneath the Study Area in this Section but are likely to be present in isolated areas surrounding roads, access tracks and existing properties/structures.

11.5.37 There are no authorised landfill sites or waste sites or recorded historical landfills within the Study Area in Section 5.

11.5.38 Both the superficial deposits and solid strata within the Study Area in Section 5 are classified as Unproductive Strata. As a result, there are not understood to be aquifers which require monitoring by the Environment Agency under the WFD. The Study Area in Section 5 does not lie within any SPZ areas, drinking water safeguard zones for groundwater or NVZs.

Section 6: Overhead line from Weston Marsh Substation to Walpole B Substation

11.5.39 This Section runs between Weston Marsh Substation and Walpole B Substation, comprising approximately 26 km of the preferred emerging route corridor, running south between Spalding and Holbeach, before running south west towards Wisbech and curving round the north of Newton-in-the-Isle before the emerging preferred substation siting zone.

11.5.40 The land within the Study Area in Section 6 comprises predominantly agricultural land and crosses several main roads, including the A151 and A1101, and many local roads and access tracks. Existing 132 kV overhead lines are present in the south west of Section 6, running south west to north east through the Section. A second set of overhead lines is present in the north west of Section 6, running north east to south west towards Spalding.

11.5.41 The published geology beneath the Study Area in Section 6 is recorded to comprise:

- Superficial deposits, present across the entire of the Study Area in this Section:
  - Tidal Flat Deposits comprising clay and silt, widespread across the Study Area in this Section; and
  - Tidal Flat Deposits comprising sand and silt, present in isolated areas in the south of the Study Area, to the south of Tydd St Giles.
- Bedrock is recorded to comprise:
  - Oxford Clay Formation present in the north west of the Study Area in Section 6, to the south of the Weston Marsh Substation;
  - West Walton Formation, comprising mudstone and siltstone, present in the area surrounding Moulton and south east up to Tydd St Giles; and
  - Ampthill Clay Formation, comprising mudstone, present from Tydd St Giles to the end of this Section in the east.
- Made Ground deposits are not recorded but are likely to be present in isolated areas surrounding roads, access tracks and existing properties/structures.

11.5.42 There are no authorised landfill sites or waste sites within the Study Area in Section 6. There is one historical landfill recorded within the Scoping Boundary, located adjacent to Lutton Gate Road in the centre of Section 6, recorded to have accepted inert waste between 1988 and 1990. Three others are present directly adjacent to or in close proximity to the Scoping Boundary, two of which are recorded to have accepted household waste and the other with no recorded details.

11.5.43 The tidal flat deposits comprising clay and silt across the majority of the Study Area in this Section are designated as Unproductive Strata and the isolated sand and silt Tidal Flat Deposits are designated as Secondary Undifferentiated Aquifers. All three bedrock units recorded beneath the Study Area in Section 6 are recorded as Unproductive Strata. As such, it is understood that there are no groundwater bodies within Section 6 that are monitored by the Environment Agency under the WFD.

11.5.44 The Study Area in Section 6 does not lie within any SPZs, drinking water safeguard zones for groundwater or NVZs.

Section 7: Walpole B Substation

11.5.45 The Study Area in this Section covers the emerging preferred siting zone for Walpole B Substation. The Study Area comprises agricultural land and is dissected in the west by Mill Road, which runs north to south through the Study Area passing through Ingleborough and Old Grange Farm.

11.5.46 The published geology beneath the Study Area in Section 7 is recorded to comprise:

- Superficial deposits, present across the entirety of the Study Area, consisting of Tidal Flat Deposits comprising clay and silt;
- Bedrock is recorded to comprise mudstone of the Ampthill Clay Formation, present beneath the entirety of the Study Area; and
- Made Ground deposits are not recorded but are likely to be present in isolated areas surrounding roads, access tracks and existing properties/structures, for example in the west along and adjacent to Mill Road.

11.5.47 There are no recorded historical landfills, authorised landfill sites or waste sites within the Study Area in Section 7.

11.5.48 Both the superficial deposits and solid strata underlying the Study Area in this Section are designated as Unproductive Strata. As such, it is understood that there are no groundwater bodies in Section 7 that are monitored by the Environment Agency under the WFD. The Study Area in Section 7 does not lie within any SPZs, drinking water safeguard zones for groundwater or NVZs.

Future Baseline

11.5.49 To assess the potential effects of the Project, it is required to predict how the baseline conditions recorded within this chapter may change from the time of baseline data collection to the commencement of development and during the construction, operation and maintenance of the Project.

11.5.50 It is currently anticipated that, subject to gaining development consent in 2028, construction works would begin in 2029 and be completed by 2033. Up to and including that period, it is not expected that ground conditions, with respect to land contamination and geology, would change significantly. This assumes that any future activities

undertaken within the Study Area would be permitted or controlled in accordance with current contaminated land legislation.

11.5.51 Hydrogeological conditions are more susceptible to change and therefore may be affected by the following factors:

- Climate change – changes in rainfall can affect aquifer recharge, groundwater levels and flow gradients.
- Future developments, including housing – increases in housing within the areas surrounding the Study Area have the potential to affect recharge to the underlying aquifers. Increased demand for drinking water associated with these can also affect future water resources and groundwater levels in aquifers, including the SPZs present especially within the northern sections of the Project.
- Changes in wastewater infrastructure and water supply – leaking wastewater infrastructure represents a potential diffuse source of nutrients (nitrogen and phosphorus), other contaminants (e.g. heavy metals) and coliform bacteria to groundwater. Leakage of new water supply infrastructure has potential to input higher concentrations of nitrate where baseline levels are lower.

11.5.52 It is not considered likely at this stage that any change in baseline conditions would be likely to significantly influence the assessment of effects. However, this will be reviewed during the EIA and consideration given to any instances where the future baseline requires more detailed specific consideration, on a case-by-case basis. This will include consideration of changes in baseline conditions that could result from any nearby allocated / proposed future development sites, which will be considered in the Geology and Hydrogeology assessment and / or cumulative effects assessment as appropriate.

11.6 Design and Control Measures

Design Measures

11.6.1 The Project has, where possible, been routed to avoid potentially contaminated land, geologically designated sites and sensitive receptors. considering both overhead line routeing and substation sites, as set out in the Corridor Preliminary Routing and Siting Study (Ref 11.22).

11.6.2 Vehicle parking, fuel storage, de-icer storage, rock salt storage, and washout/cleaning of ready-mix concrete vehicles and equipment will be sited outside SPZ1, where possible. For the purposes of assessing the effects of the Project it has been assumed that the design of the Project will incorporate suitable consideration of the ground conditions, and therefore that any risks from ground instability, or from the chemical aggressivity of the ground towards construction materials, would be considered within the engineering design of the new infrastructure in accordance with best practice. This will mean that the Project will be built with any required design and construction mitigation in place. As this is a fundamental engineering requirement it is considered to be the equivalent to an embedded measure.

11.6.3 Further design measures will be developed as the Project design evolves.

Control and Management Measures

11.6.4 An initial outline Code of Construction Practice (CoCP) has been prepared for this project, provided in **Appendix 4A Initial Outline Code of Construction Practice**. The control and management measures included within this document which are relevant to geology and hydrogeology include:

- GH01 - Intrusive ground investigations and assessment will be undertaken prior to construction which will inform appropriate geotechnical design in relation to the Study Area/structure specific ground conditions including ground instability/adverse ground conditions.
- GH02 - Construction methods such as appropriate piling techniques (if required) to minimise the risk of mixing of aquifer bodies through the creation of new pathways. This includes the provision of a Foundation Works Risk Assessment (FWRA), which would be undertaken once the proposed foundation solutions are known, in accordance with EA guidance 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination' (EA, 2001) (Ref 11.16).
- GH03 - Use of appropriate occupational health and safety measures e.g., Personal Protective Equipment (PPE), and statutory health and safety compliance (e.g., compliance with the Confined Spaces Regulations, 1997 in relation to ground gas from working in confined spaces/trenches) to minimise the risks associated with anticipated/unexpected contamination. This will be based on risk assessment and informed by site specific information.
- GH04 - Appropriate training of construction and maintenance workers in the handling and use of potentially hazardous substances and the associated risks.
- GH05 - All use and storage of chemicals to be undertaken in accordance with The Control of Pollution (Oil Storage) Regulations 2001 and Environment Agency guidance 'Protect groundwater and prevent groundwater pollution'. Construction workers will be appropriately trained in the use and handling of chemicals and general construction site good environmental and waste management procedures should be utilised (e.g. regular vehicle checks, use of spill kits, correct waste storage and disposal).
- GH06 - The control of earthworks or materials movement (including any re-use of materials) will be achieved under appropriate Environmental Permits, exemptions or CL:AIRE 'The definition of Waste: The development industry Code of Practice (2011).
- GH07 - Any temporary dewatering activities during construction will be undertaken in accordance with Environment Agency guidance, and if required, an Abstraction Licence and Environmental Permit (for the discharge) and will be limited to the depth and time required to facilitate construction activities.
- GH08 - A protocol for dealing with any unexpected contamination will be included in the Construction Environmental Management Plan (CEMP).
- GH09: General good contamination avoidance and waste management procedures for construction sites (e.g. regular vehicle checks, use of spill kits, correct waste storage and disposal).
- GH10: If required (e.g. for maintenance during the operational phase), herbicides to be used in accordance with relevant DEFRA guidance.

- GH11: Application of salt grit (for example, to prevent access tracks freezing) to comply with recommended rates in CIRIA 648 ‘Control of water pollution from linear construction projects (C648)’ (Ref 11.17), with control of run-off during any application in SPZs.
- All water discharges will have appropriate pre-treatment (e.g. de-silting) where required.

11.7 Potential for Significant Effects

11.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 11.6.

11.7.2 **Table 11.3** sets out the receptors identified within the Study Area, the potential impacts as a result of construction, maintenance and/or operation activities associated with the Project, whether these impacts are likely to give to rise to significant effects, and whether the receptor is scoped in or scoped out of the assessment.

11.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Table 11.3: Impacts, receptors and potential for significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Disturbance of ground during construction that is affected by pre-existing contamination	Harm to human health through exposure to contamination, including dust and vapours	Adjacent land users, construction workers	**Yes** - initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted.	**Scoped in**
		Deterioration in chemical quality of the land and aquifers	Groundwater aquifers Groundwater abstractions		
		Deterioration in chemical quality of the land and aquifers	Groundwater aquifers Groundwater abstractions		**Scoped in**
Construction	Dewatering activities (e.g. during excavations for foundations for new structures)	Physical effects on aquifers, such as depletion of the aquifer and increased solids / turbidity	Groundwater aquifers Groundwater abstractions	**Yes** - due to the nature of the Project and the potential for shallow groundwater, there is likely to be some level of dewatering required, so the effect is scoped in for further consideration/assessment.	**Scoped in**
Construction	Discharge of groundwater from dewatering activities	Physical and chemical effects on groundwater as a result of the discharge of groundwater	Groundwater aquifers Groundwater abstractions	**Yes** – Some level of dewatering activity is likely to be required, generating water that will require either discharge or disposal.	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		arising from dewatering or surface water control			
Construction	Release of contamination by construction activities (e.g. loss of fuels to an aquifer)	Deterioration in chemical quality of the land and aquifers	Soil / land quality Groundwater aquifers Groundwater abstractions	**Yes** – Some level of risk of inadvertent release of contamination is inherent in the construction activities associated with the Project. However, environmental controls should be such that any accidental leaks / spills are minimised as far as reasonably possible.	**Scoped in**
Construction	Ingress and accumulation of ground gas within buildings or other confined spaces	Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures	Adjacent land users, construction workers Structures	**Yes** - potential for localised areas of gas generating soils cannot be discounted, so the effect should be given consideration on a precautionary basis.	**Scoped in**
Construction	Disturbance of unstable ground by construction activities	Unstable ground and damage to buildings or property	Adjacent land users, construction workers Structures	**Yes** – potential for localised areas of unstable ground / local steep slopes cannot be discounted, so the effect should be given consideration on a precautionary basis.	**Scoped in**
Construction	Dissolution of soluble rocks due to changed patterns of groundwater flow /	Deterioration in chemical quality of the land and aquifers	Soil / land quality (only aspects related to land contamination; other effects for these receptors fall	**Yes** - initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted. There is also a risk that	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
	discharges caused by construction activities		under **Chapter 12 Agriculture and Soils**) Groundwater within aquifers – the Study Area contains several different aquifers along its length of differing sensitivities, including Principal Aquifers and groundwater Source Protection Zones.	construction activities could introduce contamination.	
Construction	Any construction activity involving ground disturbance	Damage to a designated geological conservation site	Geological conservation sites	No – at present no such sites have been identified within the Study Area.	Scoped out See Note [1]
Construction	Disturbance of unstable ground from historical coal mining	Harm to human health and structures through ground instability effects from historical coal mining	Adjacent land users, construction workers	No – the Study Area is not located within a recorded Coal Mining Reporting Area, so there are no potential effects associated with this to assess.	Scoped out
Operation	Presence of residual soil contamination	Harm to human health through exposure to	Future land users, adjacent land users	No - it is considered that best practice measures included in the CoCP (**Appendix 4A Initial**	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
	from construction activities (e.g. if soils containing elevated contaminant levels were excavated during construction and then redeposited at shallow depths in areas of temporary land take that were then returned to agriculture)	contamination, including dust and vapours Deterioration in chemical quality of the land and aquifers		**Outline CoCP**) (e.g. GH03 and GH06) would prevent any significant effect during this Project.	
Operation	Presence of impermeable surfaces (in relation to infiltration)	Changes to infiltration and corresponding effects on groundwater levels as a result of the presence of new structures and surfaces	Groundwater aquifers	**Yes** – in particularly in relation to substations due to the relatively larger area of impermeable surfacing and presence of engineered drainage. Effects on flows and levels from other aspects of the Project, such as pylon foundations and permanent accesses, are not expected to be significant, but this should be verified through assessment.	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Operation	Dewatering activities during the operational phase	Physical effects on aquifers, such as depletion of the aquifer and increased solids / turbidity	Groundwater aquifers Groundwater abstractions	No – there are not expected to be any excavations required as part of the operational phase of the Project	Scoped out
Operation	Unstable or chemically aggressive ground conditions	Structural damage caused by aggressive ground conditions.	Proposed Structures	No – this is considered to be a matter of engineering design (i.e. addressed as an 'embedded engineering measure' as previously described) and is not to be considered further within the EIA process. This effect is effectively designed out as part of standard engineering design procedures.	Scoped out
Operation	Ingress and accumulation of ground gas within substation buildings,	Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures	Workers (i.e. manual access to carry out operational activities). Structures	**Yes** – the potential for localised gas generating ground in proximity of proposed substations cannot be discounted at present.	**Scoped in**
Maintenance	Disturbance of ground that is affected by pre-existing contamination for maintenance purposes	Harm to human health through exposure to contamination, including dust and vapours	Maintenance workers, future land users, adjacent land users	**Yes** - initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted.	**Scoped in**
		Deterioration in chemical quality	Soil / land quality Groundwater aquifers		**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		of the land and aquifers	Groundwater abstractions		
Maintenance	Manual access to operate / maintain the substations (e.g. in relation to gas risk)	Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures	Maintenance workers, future land users Structures	**Yes** – the potential for localised gas generating ground in proximity of proposed substations cannot be discounted at present.	**Scoped in**
Maintenance	Disturbance of ground that is affected by pre-existing contamination for maintenance purposes	Deterioration in chemical quality of the land and aquifers through disturbance of ground that is affected by pre-existing contamination for maintenance purposes	Soil / land quality Groundwater aquifers Groundwater abstractions	**No –** it has been assumed that this will not result in a significant effect given the nature of the Project and in consideration of best practice measures (GH03 and GH06).	Scoped out

[1] - Note that this is provisional and is subject to confirmation of the absence of locally designated sites in the Study Area, which will be carried out as part of further baseline characterisation to support the EIA. Therefore, the proposed assessment methodology in Section 11.7 includes a methodology for how effects on geological conservation receptor effects would be assessed, should it be necessary to scope this effect back into the assessment following further baseline characterisation.

11.7.4 Additionally, the following effects will not be covered in this chapter. It is emphasised that these effects are **not scoped out**, and will be addressed in full as described below:

- Effects on Groundwater Dependant Terrestrial Ecosystems (GWDTE). These are ecological receptors and will be considered in **Chapter 8 Ecology and Biodiversity**. This assessment will consider any effects on groundwater levels or quality identified by the Geology and Hydrogeology assessment and how these may in turn affect these ecosystem receptors.
- Effects on surface water receptors. These are a hydrological receptor and will be considered in **Chapter 10 Water Environment**. This assessment will consider any effects on groundwater levels or quality identified by the Geology and Hydrogeology assessment and how these may in turn affect these hydrological receptors.
- Mineral safeguarding. This matter will be addressed through a stand-alone Minerals Sterilisation Report. This will identify all safeguarded minerals and provide an appraisal of the effects of the Project against relevant minerals policy. This report will not form part of the EIA but will be submitted as a separate document as part of the DCO application. This approach is considered to present a proportionate way of assessing minerals sterilisation in a manner that is familiar to relevant consultees (i.e. a conventional minerals planning report), allowing transparent appraisal of the Project against relevant policy requirements.
- Risk of damage to structures from vibrations caused by piling, should this be required for the proposed structures. If required, this is a matter of consideration for a structural engineer, so is outside the scope of the geology and hydrogeology assessment.

11.8 Proposed Assessment Methodology

Proposed Assessment Methodology

11.8.1 For this Project, there is a proposed generic project-wide approach to the assessment methodology, which is set out in **Chapter 5 EIA Approach and Methodology**. The following sections set out how this project-wide approach will be applied specifically to the Geology and Hydrogeology assessment.

Proposed Data Sources

11.8.2 To prepare the EIA, a comprehensive data gathering exercise will be undertaken. This will build upon the initial appraisal of baseline conditions provided within this Scoping Report and will include a review of the following information sources:

- Published historical mapping to identify potentially contaminative former land uses;
- UK Health Security Agency radon mapping (Ref 11.18);
- Geological mapping published by the BGS (1:50,000 scale) (Ref 11.13);
- Historical borehole records held by the BGS (Ref 11.13);
- Groundwater abstraction details (public and private), discharge consents, historical pollution incident records, and historical and authorised landfills, as available from

the Environment Agency and Local Planning Authorities and to be obtained through formal data requests;

- Hazard mapping for naturally occurring geohazards.
- DEFRA groundwater aquifer information, provided through MAGIC (Ref 11.14);
- Source Protection Zones data, available under Open Government License (Ref 11.19);
- Environment Agency Catchment Data Explorer records on groundwater quality (Ref 11.20);
- Natural England designated Sites, i.e. Geological SSSIs (Ref 11.14);
- Environment Agency Report SC040016/R 'New Groundwater Vulnerability Mapping Methodology in England, and Wales' (Ref 11.21);
- Any relevant information regarding historical ground contamination that is available from the local planning authorities. This would be obtained through formal data requests to the Environment Protection departments (or equivalent) of each authority; and
- Records on locally designated geological sites, including a review of relevant local planning documentation and any readily available local geo-conservation documents.

Proposed Assessment Methodology

11.8.3 The data collection outlined above will enable the baseline conditions to be considered, which will then be used to identify potential source-pathway-receptor linkages and inform a risk-based assessment of the effects of the Project. This approach follows published guidance (e.g. Land Contamination Risk Management, Ref 11.1) and will be placed into an EIA classification as follows. For each potential effect, the receptor sensitivity and magnitude of effect will be assigned using **Table 11.4** and **Table 11.5** which will then be combined to give an output in **Table 11.6**.

11.8.4 The output of the assessment will be the level of effect determined from **Table 11.7**. This will classify each potential effect as either negligible, minor, moderate or major. However, it should be noted that, when considering effects relating to contamination, the output of the assessment is a risk classification, rather than a predicted effect. For example, minor 'effects' in relation to health risks from exposure to soil contamination would reflect an assessment that there is a low/very low risk of significant effects occurring, rather than indicating that there is a predicted adverse effect that would be of a minor nature.

11.8.5 This approach integrates the topic-specific requirement for effects to be assessed via a risk-based approach into the EIA methodology and is an application of the methodology provided within Construction Industry Research and Information Association (CIRIA) C552 (Ref 11.1), which recommends considering potential effects as a function of 'consequence' and the probability of the effect occurring.

11.8.6 Where the outcome of the assessment is a moderate or major effect/risk, then the effect/risk will be considered significant and mitigation would be required. Where the outcome is a minor or negligible effect/risk, then the effect/risk will be considered non-significant and mitigation would not ordinarily be required.

11.8.7 The potential effects will be assessed for the construction, operational and maintenance phases of the Project. Whilst the assessment approach will be based on **Table 11.4**, **Table 11.5** and **Table 11.6**, all assessment outcomes will be subject to review using qualitative professional judgement, with flexibility to amend the outcomes on this basis with supporting evidence and justification.

11.8.8 Given the size and length of the Study Area and to provide a comprehensive but proportionate assessment, when considering the potential effects relating to the risk of encountering and mobilising pre-existing ground or groundwater contamination, it is proposed to first undertake a preliminary screening assessment. The previous land uses/potential sources within the Study Area will be identified and classified into risk levels by type in accordance with **Table 11.4.** The sources / areas with a moderate, high or very high potential risk of notable contamination being present will be taken forward for further assessment within the EIA. Where a low, very low or negligible risk of notable contamination being present is identified, these sites/areas will not be taken further for the EIA assessment on the basis that significant effects are unlikely.

Table 11.4: Initial Contamination Screening Assessment

Risk Classification	Potential for Generating Contamination
Very Low	Contamination that could be of note in the context of an electricity infrastructure construction project is very unlikely – e.g. residential, retail or offices, agriculture.
Low	Some potential for contamination, but previous and current uses are of low risk and unlikely to be of note in the context of an electricity infrastructure construction project e.g. low risk commercial uses, such as depots or warehouses.
Moderate	Some potential for contamination, with previous and current processes that are considered a risk of generating widespread slightly elevated contamination levels and/or more localised areas of more severe contamination – e.g. railways, railway yards, collieries, scrap yards, inert landfills.
High	Previous and current uses that are commonly associated with widespread elevated contamination potential – e.g. major industry, non-hazardous landfills.
Very High	Previous and current uses that are associated with the highest risk of elevated contamination – e.g. hazardous landfills, gas works, chemical works.

11.8.9 Each potential effect of moderate or greater risk of contamination as per **Table 11.4** above will then be carried forward for assessment in the EIA using **Table 11.5** and **Table 11.6**, to give an assessment of the effect in **Table 11.7**.

Table 11.5: Receptor Sensitivity

Sensitivity	Land Contamination, Geological Conservation and Ground Instability Criteria	Hydrogeological Criteria
High	Human health risk, where receptor characteristics promote exposure and/or vulnerability to soil contamination or ground gas. Structures of high susceptibility to ground instability and/or high importance. Geological conservation: very rare or rare and of either international or national importance with little or potential for replacement (e.g. United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Sites, UNESCO Global Geoparks, GCR sites where citations indicate features of international importance, geological SSSI, ASSI). Geology meeting international or national designation citation criteria which is not designated as such.	Groundwater that is used for human consumption, and/or is within geological units that display a high level of water storage and may support water supply and/or river base flow on a strategic scale. Includes all Principal Aquifers and SPZ.
Medium	Human health risk, where receptor characteristics limit exposure and/or vulnerability to soil contamination and ground gas. Soil/land: crops, livestock or plants in managed planting/landscaping schemes (parks/verges) etc. Agricultural assets whose quality may be affected by exposure to contamination. Structures of medium susceptibility to ground instability and/or medium importance. Geological Conservation: geology of regional importance with limited potential for replacement (e.g. Regionally Important Geological Sites). Geology meeting regional designation citation criteria which is not designated as such.	Groundwater that is not currently used for human consumption, but which is within Secondary A Aquifers. Groundwater that is currently used for agricultural purposes (e.g. field irrigation).
Low	Human health risk, where receptor characteristics significantly minimise exposure and/or vulnerability to soil contamination and ground gas.	Groundwater that is not currently used for human consumption but is within Secondary B Aquifers.

Sensitivity	Land Contamination, Geological Conservation and Ground Instability Criteria	Hydrogeological Criteria
	Structures of low susceptibility to ground instability and low importance.	Groundwater that is abstracted for low sensitivity industrial purposes (e.g. cooling water).
Negligible	Land/soil: Phytotoxic effects on non-agricultural plants that are not part of managed planting/landscaping schemes. Geological Conservation: no designated sites or geology of known recorded local interest.	Groundwater that does not contribute meaningfully towards river base flow and is not used, and does not have a potential to be used, for drinking water supply.

Table 11.6: Magnitude of Effect

Magnitude	Land Contamination and Ground Instability Criteria[1]	Hydrogeological Criteria[2]
High	Risk assessment indicates that contaminant levels may present an unacceptable acute health risk or a substantial chronic health risk. Ground instability resulting in direct harm to health (for example, severe injury or death), and/or resulting in severe structural damage to, or immediate collapse of, buildings or infrastructure. Geological conservation: loss of geological features/ designation and/or quality and integrity, severe damage to key characteristics, features or elements.	Release of Priority Hazardous Substances or substances regulated under 'The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015' 'Ref 11.3) of the 'Water Supply (Water Quality) Regulations 2016' (Ref 11.4) at concentrations that may present a direct/imminent risk to abstractions. Physical or chemical effects on an aquifer (i.e. changes in groundwater levels, flows, yield or quality) that substantively restrict its viability as an abstractable resource and/or its WFD status.
Medium	Risk assessment indicates that contaminant levels may be elevated, potentially resulting in a chronic health risk that, whilst likely to be low or moderate, may require action (e.g. typically contaminant concentrations slightly or	Release of contamination at concentrations that may lead to substantial localised degradation in groundwater quality, but not present a direct / imminent risk to abstractions.

Magnitude	Land Contamination and Ground Instability Criteria[1]	Hydrogeological Criteria[2]
	moderately above precautionary screening criteria). Death or major health effects on livestock or significant direct damage to crops or plants in a managed planting /landscaping scheme that is directly attributable to soil contamination. Ground instability that may cause structural damage gradually over time. Geological conservation: partial loss of geological feature/designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.	Physical or chemical effects on an aquifer (i.e. changes in groundwater levels, flows, yield or quality) that limit its effectiveness as a resource and may affect its status.
Low	Minor damage to crops or plants in a managed planting /landscaping scheme that is directly attributable to soil contamination. Geological conservation: minor measurable change in geological feature/designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.	Minor localised changes to groundwater quality, flow, levels or yields. Changes are localised, with little effect on the use or status of the groundwater resource and present no significant risk to abstractions.
Negligible	Risk assessment indicates that there is no significant potential for adverse human health effects. No damage to crops, livestock or plants. No damage to structures from ground instability. Geology: very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature/designation. Overall integrity of resource not affected.	No/minimal measurable effect on groundwater levels, quantities, flows or chemical quality, or on the use or status of a groundwater resource.

[1] The contamination assessments will be based on desk-study information, using a reasonable worst case assessment of the likely presence and severity of contamination.

[2] The hydrogeological criteria do not include the magnitude of effect that may be caused to GWDTE or surface water receptors as a result of changes to groundwater that feeds these receptors. This is because effects on these receptors are considered in **Chapter 8 Ecology and Biodiversity** and **Chapter 10 Water Environment**, respectively.

Table 11.7: Matrix to determine the level of effect on receptors

		Magnitude of Effect			
		High	**Medium**	**Low**	**Negligible**
Receptor Sensitivity	**High**	Major	Major	Moderate	Negligible
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

Water Framework Directive Assessment

11.8.10 A Water Framework Directive (WFD) Compliance Assessment will be undertaken for the Project. As stated in **Chapter 10 Water Environment**, the scope of the assessment will be agreed with relevant stakeholders.

11.9 Assumption and Limitations

11.9.1 The following assumptions and limitations apply to this chapter of the Scoping Report:

- A comprehensive baseline data gathering exercise is yet to be undertaken and will be completed as part of the EIA and reported in the ES. Whilst this is essential to inform the assessment of effects, it is considered unlikely that the findings will substantively alter the scope of, or approach to, the assessment described in this chapter.
- The proposed assessment approach in this chapter is based on desk study information. 'Reasonable worst case' assumptions regarding the likely ground conditions will be made when assessing effects in the EIA, determined from the desk study information. It is not proposed to undertake site inspections or ground investigation to support the EIA unless specific high-risk circumstances are identified from desk study information that warrant this.
- The scope of assessment and likely significant effects described in this chapter are based on the current Scoping Boundary and the Project description provided in **Chapter 4 Description of the Project**. It is anticipated that these details of the development will be subject to refinement as the Project progresses and subsequent reports will be based on more detailed design information. The approach to data gathering and assessment provided within this chapter is intended to be flexible and is expected to remain applicable as the design develops.

11.10 Conclusion

Summary

11.10.1 This chapter of the scoping report has provided a preliminary review of the baseline conditions for the Study Area from a range of information sources and has identified a

number of potentially significant effects with respect to Geology and Hydrogeology which will be taken forward for consideration within the EIA.

Proposed Scope of the Assessment

11.10.2 A summary of the proposed scope of the assessment is shown in **Table 11.8**.

Table 11.8: Proposed scope of assessment

Receptor	Potential for Significant Effects	Project Phase	Proposed to be Scoped In / Out
Human health	Exposure to soil contamination, including dust and vapours Asphyxiation from ingress and accumulation of ground gas	Construction	**Scoped in**
Land quality	Deterioration in chemical quality, caused by either the mobilisation of pre-existing contamination or the release of contamination by construction activities.	Construction	**Scoped in**
Groundwater quality	Mobilisation of pre-existing contamination or the release of contamination by construction activities.	Construction	**Scoped in**
Physical effects on groundwater	Depletion of an aquifer, increased solids / turbidity, or changes in levels and flows due to dewatering and/or discharge	Construction	**Scoped in**
Structures	Explosion from ingress and accumulation of ground gas	Construction	**Scoped in**
Ground instability and corresponding damage to existing property, infrastructure or people	Result of construction activities destabilising slopes or causing increases/changes in the natural dissolution of soluble rocks	Construction	**Scoped in**
Human health	Exposure to residual soil contamination	Operation	Scoped out
Changes to groundwater flows, levels and quality within aquifers	Changes to infiltration, for example due to the presence of impermeable surfaces and engineered drainage at substation site	Operation	**Scoped in**

Receptor	Potential for Significant Effects	Project Phase	Proposed to be Scoped In / Out
Proposed Structures / Human health	Explosion / asphyxiation due to accumulation of ground gas within permanent structures	Operation	**Scoped in**
Changes to groundwater aquifers as a result of dewatering	Changes to groundwater flows, levels and quality within aquifers as a result of dewatering. There is not expected to be any dewatering as part of the operational phase of the Project.	Operation	Scoped out
Proposed Structures	Damage to proposed structures that will be built as part of the Project from unstable or chemically aggressive ground. This effect is effectively designed out as part of standard engineering design procedures.	Operation	Scoped out
Human health	Maintenance work that involves ground disturbance, resulting in exposure to soil contamination, dust or vapours	Maintenance	Scoped out
Human health	Asphyxiation due to accumulation of ground gases within permanent structures	Maintenance	**Scoped in**
Proposed Structures	Explosion from ingress and accumulation of ground gas	Maintenance	**Scoped in**
Structures and Human health	Harm to human health and damage to structures associated with ground instability effects relating to historical coal mining. The Study Area is not located within a recorded Coal Mining Reporting Area, so there are no potential effects associated with this to assess.	Construction, Operation and Maintenance	Scoped out
Geological conservation sites	Effects on designated geological conservation sites.	Construction, Operation and Maintenance	Scoped out (Provisional, subject to review following further baseline characterisation).

11.11 References

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Ref 11.2 Defra, 2009.The Environmental Damage (Prevention and Remediation) Regulations.

Ref 11.3 Water Resources, England and Wales, 2017. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

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Ref 11.5 Department for Energy Security & Net Zero, 2023. Overarching National Policy Statement for Energy (EN-1).

Ref 11.6 Department for Energy Security & Net Zero, 2023. National Policy Statement for Electricity Networks Infrastructure (EN-5).

Ref 11.7 Department for Levelling Up, Housing and Communities, 2023. National Planning Policy Framework.

Ref 11.8 Environment Agency, 2020 (updated July 2023). Land Contamination: risk management. [online] Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm (accessed 20 May 2024).

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Ref 11.10 English Nature, 2006. Geological Conservation – A guide to good practice.

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Ref 11.12 Environment Agency, 2017. Groundwater Protection. [online] Available at: https://www.gov.uk/government/collections/groundwater-protection (Accessed 17 May 2024).

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Ref 11.14 Department for Environment, Food and Rural Affairs, 2024. MAGIC Interactive Map. [online] Available at: Magic Map Application (defra.gov.uk) (Accessed 20 May 2024).

Ref 11.15 Environment Agency, 2024. Permitted Waste Sites Authorised Landfill Site Boundaries Dataset. [online] Available at https://www.data.gov.uk/dataset/ad695596-d71d-4cbb-8e32-99108371c0ee/permitted-waste-sites-authorised-landfill-site-boundaries (Accessed 20 May 2024).

Ref 11.16 Environment Agency, 2001. Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination.

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Ref 11.18 UK Health Security Agency, 2024. UK maps of Radon [online]. Available at: UKradon - UK maps of radon (Accessed 20 May 2024).

Ref 11.19 Environment Agency, 2024. Source Protection Zones Dataset [online]. Available at: Source Protection Zones [Merged] - data.gov.uk (Accessed 20 May 2024).

Ref 11.20 Environment Agency, 2024. Catchment Data Explorer Database [online]. Available at: England | Catchment Data Explorer (Accessed 20 May 2024).

Ref 11.21 Environment Agency, 2017. New groundwater vulnerability mapping methodology in England and Wales, report reference SC040016/R.

Ref 11.22 Grimsby to Walpole Corridor Preliminary Routeing and Siting Study. January 2024 [online]. Available at: https://www.nationalgrid.com/electricity-transmission/document/152621/download [Accessed 4 June 2024].

12. Agriculture and Soils

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Contents

12.1 Introduction

12.1.1 This chapter presents how the agriculture and soil assessment will consider the potentially significant effects on agriculture and soil receptors that may arise from the construction, operation, and maintenance of the Project (as described in **Chapter 4 Description of the Project**). These receptors broadly comprise the best agricultural land (referred to as best and most versatile (BMV)) land), soils and agricultural operations. It describes the methodology and datasets to be used within the agriculture and soil assessment, presents an overview of the baseline conditions, and identifies the potential likely significant effects to be considered within the assessment and how these will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

12.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

12.1.3 This chapter should be read in conjunction with:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 3 Main Alternatives Considered;**
- **Chapter 4 Description of the Project;** and
- **Chapter 5 EIA Approach and Methodology**.

12.1.4 There are interrelationships related to the potential effects on agriculture and soil and other environmental topics. Therefore, please also refer to the following chapters:

- **Chapter 6 Landscape:** the role soils play in supporting important landscapes and the soil requirements for landscape planting;
- **Chapter 8 Ecology and Biodiversity**: the role soils play in supporting important habitats and the biodiversity they contain, and the soil requirements associated with habitat creation proposals;
- **Chapter 10 Water Environment**: the role soils play in the hydrological cycle and the link between drainage and agriculture;
- **Chapter 11 Geology and Hydrogeology:** the importance of geology in the characteristics of soils and the role soils play in the hydrogeological cycle; and
- **Chapter 17 Health and Wellbeing:** the role of soils in supporting green spaces and landscapes important to communities and their health and wellbeing.

12.1.5 This chapter is supported by the following figures and appendix:

- **Figure 12.1 Landis National Soil Soilscape Map**;
- **Figure 12.2 Provisional Agricultural Land Classification Mapping**;
- **Figure 12.3 Detailed Agricultural Land Classification Mapping**;
- **Figure 12.4 Agri-environment Schemes**;
- **Figure 12.5 Woodland and Forestry Schemes;** and
- **Appendix 12A Agriculture and Soils Survey Strategy**.

12.2 Legislation, Policy and Guidance

12.2.1 Legislation and policy relevant to the Project and this chapter are outlined in **Chapter 2 Regulatory and Planning Policy Context**, **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Planning Policies** and **Appendix 2C Local Policy**.

12.2.2 Relevant guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- Safeguarding our Soils. A strategy for England (Ref 12.1).
- Guide to Assessing Development Proposals on Agricultural Land: Natural England, 2021 (Ref 12.2) (taking into account Technical Information Note 049. Agricultural Land Classification (ALC) Protecting the Best and Most Versatile Agricultural Land: Natural England 2012) (Ref 12.3).
- Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction: The British Society of Soil Science 2022 (Ref 12.4).
- Specification for topsoil (BS3882:2015): British Standards Institute 2015 (Ref 12.5).
- Agricultural Land Classification of England and Wales, Revised Criteria and Guidelines for Grading the Quality of Agricultural Land: Ministry of Agriculture, Fisheries and Food 1988 (Ref 12.6).
- Environmental Improvement Plan, Department of Environment, Food & Rural Affairs 2023 (Ref 12.7).
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites: Defra 2009 (Ref 12.8).
- Good Practice Guide for Handling Soils in Mineral Workings: Institute of Quarrying 2021 (Ref 12.9).
- Good Practice Guide for Handling Soils: Ministry of Agriculture, Fisheries and Food 2020 (taking into account Good Practice Guide for Handling Soils in Mineral Workings (Ref 12.10).
- A New Perspective on Land and Soil in Environmental Impact Assessment: Institute of Environmental Management and Assessment, 2022 (Ref 12.11).
- Soil Survey Field Handbook: Describing and Sampling Soil Profiles: Hodgson, J.M. 2022 (Ref 12.12).
- The Design Manual for Roads and Bridges (DMRB) LA112: National Highways 2020 (Ref 12.19).

12.3 Consultation and Engagement

12.3.1 The EIA will be informed by consultation and engagement with stakeholders, including Natural England and Lincolnshire County Council in relation to agriculture and soils.

12.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024 and following pre-scoping engagement undertaken with Natural England in May 2024, which

included comments on the proposed Soils Survey Strategy provided in **Appendix 12A Agriculture and Soils Survey Strategy.**

12.3.3 The principal feedback received from both Non-Statutory Consultation and pre-scoping consultation with Natural England and Lincolnshire County Council of relevance to this scoping chapter is included in **Table 12.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable**.**

Table 12.1: Engagement with Stakeholders

Stakeholder	Summary of Response	Consideration in the Scoping Report
Lincolnshire County Council	The loss of best and most versatile agricultural land which is critical to national food security has also been given no consideration.	The agriculture and soils chapter in the PEI Report and ES will assess the baseline and potential impacts on agricultural land, BMV land and soils. The assessment will make reference to soil management good practice and specifically the Defra Code (Ref 12.7), along with other relevant guidance.
Natural England	**Soils and Best and Most Versatile Agricultural Land** Natural England are a statutory consultee on developments that are likely to permanently impact over 20ha of Best and Most Versatile (BMV) Agricultural Land. Any BMV land affected by the development should be returned to the Agricultural Land Classification (ALC) in which it was found. The soil structure and functional processes should also be managed to ensure there are no impacts from construction or operation of the development. Discussions have been had with Natural England regarding the possible loss of BMV land and impacts to structure and function of soil as a result of the development. An outline Soil Management Plan (SMP) will be developed. Guidance on soil protection is available in the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, and we recommend its use in the design and construction of development. We advise that the developer uses an appropriately experienced soil specialist to	The agriculture and soils chapter in the PEI Report and ES will assess the baseline and potential impacts on agricultural land, BMV land and soils. The assessment will make reference to soil management good practice and specifically the Defra Code (Ref 12.7), along with other relevant guidance as detailed in Section 12.2. Soils management measures will also be set out within a Soil Management Plan (SMP). **Appendix 4A Initial Outline Code of Construction Practice** outlines how affected BMV will be managed.

Stakeholder	Summary of Response	Consideration in the Scoping Report
	advise on, and supervise soil handling, including identifying when soils are dry enough to be handled and how to make the best use of soils on site.	
Natural England	Survey scope: A meeting was held with Natural England in May 2024 and a response received to the Agriculture and Soils Survey Strategy provided in **Appendix 12A Agriculture and Soils Survey Strategy** with the following key comments: • Natural England welcome the use of all available ALC information, including that from other National Grid projects; the proposed survey density of 1 auger per hectare; and the phased approach to the survey. They requested confirmation that hand texturing will be backed up by some laboratory analyses to confirm the textures and some soil profile pits. • Agreement in principle that ALC surveys can be scoped out where agricultural land will not be disturbed or where there are Health & Safety concerns with an intrusive survey. • Where an elevated unexploded ordnance (UXO) risk is identified, efforts should be made to coordinate the ALC surveys with UXO checks to minimise the extent of any survey gaps. • If any soil contamination or UXO risks are identified which do not allow ALC surveys to be undertaken, a mitigation strategy will be put in place which will explore the use of predictive modelling if required; and • Upon collection of ALC survey data, further engagement with Natural England and Local Planning Authorities will take place to ensure the data is sufficient and in accordance with relevant guidelines.	The following activities will be undertaken, in respect of the comments on **Appendix 12A Agriculture and Soils Survey Strategy**: • Hand texturing during the survey will be backed up by laboratory analysis of samples taken from representative profiles. • Further assessment will be undertaken in relation to UXO risk and potential contamination and where practicable mitigation put in place to enable surveys to be undertaken. • Any use of predictive ALC mapping will be discussed with Natural England in advance. • Further consultation will be undertaken with Natural England once the survey data is available.

Stakeholder	Summary of Response	Consideration in the Scoping Report
National Farmers Union (NFU)	The NFU feels strongly that the route should seek to have minimal impact on agricultural land and agricultural businesses which are essential for food production and our domestic food resilience Some landowners have raised that they were being impacted by multiple schemes, which they felt were not working together sufficiently, and were therefore causing significant disruption to their businesses and agricultural activities The NFU expect to see National Grid working closely with the operators of other projects along the proposed route to share any relevant survey details, such as archaeological or environmental data, in order to reduce the cumulative impact of those affected by multiple projects. The NFU would like National Grid to confirm what survey data they can use from other schemes that has already been carried out. The NFU is expecting NGET to negotiate on a voluntary basis, non- intrusive and intrusive licences to undertake surveys with landowners and occupiers.	The impact on agricultural land, in terms of the land grade (according to the ALC system), the soils which underpin this, and agricultural operations will be fully assessed. Where impacts are identified, mitigation measures will be set out to minimise the effects. There will be full coordination with the EGL3 & 4 projects, in particular in relation to survey planning, access requests and data sharing. As part of the assessment of impacts in relation to agriculture and soils, a full desk study is being undertaken to collate and review existing available information, in particular ALC surveys which have been undertaken for other projects. Data sources will be clearly set out in the assessment. This information will be used to both support the impact assessment and inform where surveys will be required to fill gaps in available data. All access to land for surveys will be undertaken under the appropriate licence.
NFU	The NFU also state that additional land will be needed to meet the requirement of delivering Biodiversity Net Gain (BNG). The NFU understands that the National Planning Policy Statement for Energy – EN – 1 states that developers like National Grid should show how a project has taken advantage of opportunities to conserve and enhance biodiversity interests. It states in the Corridor Preliminary Routeing	The Scoping Report confirms the project's commitment to deliver a minimum 10% BNG. The Scoping Report describes steps that are included within the design process to avoid the loss of biodiversity. Where avoidance is unlikely to be possible, steps are described

Stakeholder	Summary of Response	Consideration in the Scoping Report
	and Siting Study how developments will soon have to have a mandatory 10% BNG and where land may be available and or suitable to support with BNG requirements this is subject to collaboration with landowners and Local Nature Partnerships. Further, it states that the consideration of BNG will form part of the later stages of the Project. Although we are pleased that the document highlights that this would have to be in collaboration with landowners and Local Nature Partnerships, the NFU would not want to see any land being compulsorily purchased to deliver this gain, and that the additional land should be purchased purely through voluntary negotiation. The NFU would want to see discussions with landowners/farmers to ensure that any mitigation or BNG can be in areas that may be less productive or has the least impact on agricultural operations.	to reduce biodiversity impacts, in line with the biodiversity gain hierarchy. The extent of land required to deliver habitat creation/restoration for BNG, beyond that required for EIA purposes (mitigation, compensation and enhancement in relation to significant effects), will be determined on the basis of later design stages informed by the Defra statutory biodiversity metric. The mechanisms for securing land for BNG do not form part of the scope of the Scoping Report. Where additional land is required to deliver BNG, the preference would be to consult with landowners/farmers and environmental stakeholders to identify and agree opportunities through voluntary negotiation. Where opportunities are identified, the aim would be to co-design habitat creation and restoration projects with the landowner, taking into account the impacts upon agricultural operations and best and most versatile agricultural land.

12.4 Study Area

12.4.1 For the purpose of this Scoping Report, the Study Area has been defined as the Scoping Boundary as this is represents the area in which the Project elements will be located. This is considered an appropriate Study Area based on professional judgement and knowledge of similar projects.

12.4.2 The identified receptors in relation to agriculture and soils within the Study Area are:

- Agricultural landholdings;

- Agricultural land quality (as defined by the ALC system); and
- Soils.

12.4.3 The Study Area is presented in **Figures 12.1** to **12.5**, which display Soil Association, Provisional and Detailed ALC mapping, along with Agri-environmental and Woodland and Forestry Schemes within the Scoping Boundary. As the iterative design process continues, the Scoping Boundary will be refined to comprise the proposed Order Limits within the Environmental Statement (ES).

12.5 Baseline Conditions

Data Sources

12.5.1 The known or predicated current and future baseline environment described in this section has been informed by the following data sources:

- British Geological Survey (BGS) Geology Viewer (Ref 12.13);
- Ordnance Survey (OS) mapping and aerial photography (Ref 12.14);
- Agricultural Land Classification – Provisional (England) (Ref 12.15);
- Post-1988 Agricultural Land Classification (England) (Ref 12.15);
- National Soil Soilscape Map of East Midlands and Eastern England and soil data from National Soils Resources Institute at Cranfield university (Ref 12.16);
- Likelihood of BMV Agricultural Land map (Ref 12.17);
- Relevant agriculture and soils data from other projects which overlap with the Study Area; and
- Climate data sets for ALC assessment (Ref 12.18).

Data Gathering Methodology

12.5.2 The EIA assessment will be supported by an initial collation and review of available baseline data from the sources listed above.

12.5.3 Field data collection will be undertaken through a soil and ALC survey, following the Survey Strategy provided in **Appendix 12A Agriculture and Soils Survey Strategy**, which details the approach to agricultural and soils field surveys. The strategy seeks to integrate the avoidance of permanent loss of BMV land and the avoidance of peat into the Project design where practicable. It states that the survey data gathered will be used to inform the development of an outline Soil Management Plan, to minimise the risk of damage to soils and ensure their appropriate reinstatement or re-use. Alongside, an initial outline Code of Construction Practise (CoCP), provided in **Appendix 4A Initial Outline Code of Construction Practice,** has been developed to minimise the risk of impacts on the quality of agricultural land and soil, particularly during construction.

12.5.4 The soil and ALC survey and assessment will be undertaken in accordance with the Soil Survey Field Handbook (Ref 12.12) and the ALC guidelines (Ref 12.6) (to provide a survey coverage of at least 1 auger per hectare where possible) and will characterise soil properties based on an examination of soil profiles, from which agricultural land grade as well as soil resilience can be calculated and assessed.

Baseline

12.5.5 The Project has been divided into seven sections as detailed in **Chapter 4 Description of the Project.** The sections are split from north to south by the geographical alignment of the Scoping Boundary and are included as per the following in this chapter:

- Section 1 - Grimsby West Substation.
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A.
- Section 3 - Lincolnshire Connection Substation A and B (including the overhead line between them).
- Section 4 - Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation.
- Section 5 - Weston Marsh Substation.
- Section 6 - Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation).
- Section 7- Walpole B Substation.

12.5.6 The agriculture and soils baseline for each section is set out below.

Section 1: Grimsby West Substation

Land use

12.5.7 Aerial imagery and OS mapping indicate that the agricultural land use within Section 1 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees and roads.

Soils and geology

12.5.8 Available national soil survey mapping data indicates that the Soil Association present within this section is the Holderness Association, which is described in **Table 12.2**

12.5.9 The underlying bedrock geology present is the Burnham Chalk Formation (chalk), described as thinly bedded chalk with common and discontinuous flint bands formed between 93.9 and 83.6 million years ago during the Cretaceous period.

12.5.10 Superficial drift present is predominantly Devensian Till (Diamicton), a sedimentary superficial deposit formed between 11.6 and 11.8 thousand years ago during the Quaternary period. Additionally, alluvium deposits are present adjacent to the rivers which consist of pockets of sand and gravel, as well as Devensian Glaciofluvial deposits generally located alongside the alluvium deposits.

Agri Environment Schemes

12.5.11 Agri Environment Schemes comprise government funding to farmers and land managers to support activities which improve the local environment. There are different levels of Environmental Stewardship schemes which have increasing complexity and land management requirements but also therefore have greater environmental benefits. There is one countryside stewardship of Higher Tier within this section, located on the southern edge of the Scoping Boundary, north east of Laceby.

Woodland and Forestry Scheme

12.5.12 Woodland and Forestry Schemes are government provided incentives that reward landowners for creation and management of woodlands. The areas within the Study Area that are involved in these schemes are all small areas of land. There is a small section of a Felling Agreement in the Scoping Boundary south of Healing.

Agricultural Land Classification

12.5.13 Provisional ALC mapping shows that the Study Area within Section 1 is comprised of Grade 3 land.

12.5.14 Provisional ALC mapping, at a scale of 1:250,000, does not split Grade 3 land into Subgrades 3a and 3b. Subgrade 3a land, along with Grade 1 and Grade 2 land, comprises BMV agricultural land. This distinction can only be confirmed through a detailed ALC survey.

12.5.15 There is detailed ALC survey data available in the east of the Study Area, which lies to the south west of the residential area Wybers Wood (Ref 12.15). The detailed survey found both Grade 3a and 3b agricultural land, which is consistent with the Provisional ALC mapping within the Study Area.

Section 2: Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A

Land use

12.5.16 Aerial imagery and OS mapping indicate that the agricultural land use within the Study Area of Section 2 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees, and roads.

Soils and geology

12.5.17 Available national soil survey mapping data indicates that within this section there are four Soil Associations present, including:

- Holderness;
- Burlingham 2;
- Newchurch 2; and
- Fladbury 2.

12.5.18 Soil Association descriptions are presented in **Table 12.2.**

12.5.19 There are three main underlying chalk bedrock geology formations within this section: the Burnham Chalk Formation, the Welton Chalk Formation and the Hunstanton Chalk Formation, all of which are sedimentary bedrock formations formed between 103 and 83.6 million years ago during the Cretaceous period. There is also sandstone of the Carstone Formation in the southwest along the Study Area boundary, of which is sedimentary bedrock formed between 113 and 100.5 million years ago. Superficial drift present is predominantly Devensian Till (Diamicton), a sedimentary superficial deposit formed during the Quaternary period, along with some tidal flat deposits of clay and silt and glaciofluvial sand and gravel deposits from the Quaternary period with alluvium deposits of sand and gravel adjacent to rivers.

Agri Environment Schemes

12.5.20 Middle Tier Countryside Stewardships are in place across land around Netherwood, Yarburgh and south east of Louth. Entry level plus Higher Level Stewardships are in place across land north east of Brigsley, south east of Utterby and around Tothill. Organic Entry Level plus Higher Level Stewardships are in place across land around Little Carton.

Woodland and Forestry Schemes

12.5.21 Woodland Grant Schemes are in place across small areas of farms near Grainsby Healing, Stewton, Legbourne Grange, Burgh le Marsh and east of Yarburgh. Felling license agreements in place in areas to the north east of Waltham and near Legbourne Furze.

Agricultural Land Classification

12.5.22 Provisional ALC mapping shows that the Study Area within Section 2 is comprised predominantly of Grade 3 land. There is also a very small proportion of Grade 2 land within the very southern extent of this section near to Withern.

12.5.23 Provisional ALC mapping, at a scale of 1:250,000, does not split Grade 3 land into Subgrades 3a and 3b. Subgrade 3a land, along with Grade 1 and Grade 2 land, comprises BMV agricultural land. This distinction can only be confirmed through a detailed ALC survey.

12.5.24 There is a small area of detailed ALC mapping in the north of the section, near to the boundary with Section 1: Grimsby West Substation (Ref 12.15). The detailed survey identifies both Grades 3a and 3b agricultural land, which is consistent with the Provisional ALC mapping within the Study Area.

Section 3: Lincolnshire Connection Substation A and B (including the overhead line between them)

Land use

12.5.25 Aerial imagery and OS mapping indicate that the agricultural land use within the Study Area of Section 3 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees, and roads.

Soils and geology

12.5.26 Available national soil survey mapping data indicates that within this section there are four Soil Associations present, including:

- Holderness;
- Fladbury 2;
- Wick 1; and
- Wallasea 2.

12.5.27 Soil Association descriptions are presented in **Table 12.2.**

12.5.28 The underlying bedrock present is the Burnham, Welton, Ferriby and Hunstanton Chalk Formations, which are sedimentary bedrock formations formed between 113 and 83.6

million years ago during the Cretaceous period. Superficial drift present is predominantly Devensian Till (Diamicton), a sedimentary superficial deposit formed during the Quaternary period, but with tidal flat deposits of clay and silt, glaciofluvial sand and gravel deposits from the Quaternary period and alluvium deposits of sand and gravel adjacent to rivers.

Agri Environment Schemes

12.5.29 Middle Tier Countryside Stewardships are in place across areas of land to the east of Strubby Airfield, north of Alford and south of Hannah. Higher Level Stewardships are in place south west of Beesby.

Woodland and Forestry Schemes

12.5.30 Woodland Grant Schemes are in place across small sections of farms north of Claythorpe.

Agricultural Land Classification

12.5.31 Provisional ALC mapping shows that the Study Area in Section 3 is comprised of Grade 2 and Grade 3 agricultural land. There is also a very small proportion of Grade 4 land within the north west of the section.

12.5.32 Provisional ALC mapping, at a scale of 1:250,000, does not split Grade 3 land into Subgrades 3a and 3b. Subgrade 3a land, along with Grade 1 and Grade 2 land, comprises BMV agricultural land. This distinction can only be confirmed through a detailed ALC survey.

12.5.33 There is no available detailed ALC survey data available for this section.

Section 4: Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation

Land use

12.5.34 Aerial imagery and OS mapping indicate that the agricultural land use within the Study Area of Section 4 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees, and roads.

Soils and geology

12.5.35 Available national soil survey mapping data indicates that within this Section there are eight Soil Associations present, including:

- Holderness;
- Wallasea 2;
- Downholland 1;
- Downholland 2;
- Salop;
- Wisbech;
- Agney; and

- Tanvats.

12.5.36 Soil Association descriptions are presented in **Table 12.2,** where the majority of these soils are characterised by marine alluvium including coarse silty and clayey soils. A small portion of Section 4 is also characterised by fen peat soils within the Downholland 1 Association.

12.5.37 There are eight underlying bedrock formations present across this section, which are described below:

- Welton Chalk Formation – sedimentary bedrock formed between 100.5 and 89.8 million years ago during the Cretaceous period.
- Ferriby Chalk Formation – sedimentary bedrock formed between 100.5 and 93.9 million years ago during the Cretaceous period.
- Claxby Ironstone Formation, Tealby Formation and Roach Formation (mudstone and limestone, interbedded) – sedimentary bedrock formed between 139.4 and 126.3 million years ago during the Cretaceous period.
- Spilsby Sandstone Formation – sedimentary bedrock formed between 152.1 and 133.9 million years ago during the Jurassic and Cretaceous periods.
- Kimmeridge Clay Formation (mudstone) – sedimentary bedrock formed between 157.3 and 152.1 million years ago during the Jurassic period.
- Ampthill Clay Formation (mudstone) – sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.
- West Walton Formation (mudstone and siltstone) – sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.
- Oxford Clay Formation (mudstone) – sedimentary bedrock formed between 166.1 and 157.3 million years ago during the Jurassic period.

12.5.38 The superficial geology of this section predominately comprises clay and silt tidal flat deposits from the Quaternary period. However, the north of the section is largely represented by Devensian till deposits, with Devensian Glaciofluvial deposits present in isolated areas in the north of this section.

Agri Environment Schemes

12.5.39 Middle Tier Countryside Stewardships are in place across areas near Little Steeping, east of Stickford Thorpe Fen, south east of Stickney, south of Carrington, east of Langrick, west of Wyberton, east of Quadring Eaudike and around Asperton. Higher Tier Schemes are in place across land south of Stickney. Entry Level plus Higher Level Stewardships are in place across areas of land to the south of Reston, south east of Tothill, north of Saleby, north of Slothby, north of Thorpe St Peter, east of Stickford, south east of Stickney, south of Carrington and near Halton Holegate Fen.

Woodland and Forestry Schemes

12.5.40 Woodland Grant Schemes are in place across small sections of farms around Thorpe Dales, east of Burgh le Marsh, east of Antons Gowt, west of Weston Marsh, near Gayton le Marsh, south of Carrington, east of Langrick, and at Kirto Meeres. Felling license agreements are in place around Sloothby, Croft End, east of Thorpe Fen, south of Burgh le Marsh and south of Carrington.

Agricultural Land Classification

12.5.41 Provisional ALC mapping shows that thia Section is comprised of predominantly Grade 3 land in the north from Alford to Thorpe Culvert, where there is also a very small area of Grade 4 land. There is also a large proportion of land provisionally graded as Grade 2 land in the central part of the section from Thorpe Culvert to Brothertoft. The southern third of the section from Brothertoft to Surfleet is largely mapped as Grade 1 land. th

12.5.42 Provisional ALC mapping, at a scale of 1:250,000, does not split Grade 3 land into Subgrades 3a and 3b. Subgrade 3a land, along with Grade 1 and Grade 2 land, comprises BMV agricultural land. This distinction can only be confirmed through a detailed ALC survey.

12.5.43 There is no available detailed ALC survey data available within Section 4.

Section 5: Weston Marsh Substation

Land use

12.5.44 Aerial imagery and OS mapping indicate that the agricultural land use within the Study Area of Section 5 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees, and roads.

Soils and geology

12.5.45 Available national soil survey mapping data indicates that the Soil Association present within this section is the Wisbech Association, which is described in **Table 12.2.**

12.5.46 The underlying bedrock geology present is the Oxford Clay Formation (mudstone), described as sedimentary bedrock formed between 166.1 and 157.3 million years ago during the Jurassic period. Clay and silt tidal flat deposits form the superficial drift present, which are sedimentary superficial deposits formed during the Quaternary period.

Woodland and Forestry Schemes

12.5.47 A Woodland Grant Scheme is in place across a small section of a farm west of Weston Marsh geographical feature and north east of the Moulton River.

Agri Environment Schemes

12.5.48 Middle Tier Countryside Stewardships are in place west of Weston Marsh.

Agricultural Land Classification

12.5.49 Provisional ALC mapping shows that the Study Area within Section 5 is comprised of Grade 1 land.

12.5.50 There is no available detailed ALC survey data available within Section 5.

Section 6: Overhead line from Weston Marsh Substation to Walpole B Substation

Land use

12.5.51 Aerial imagery and OS mapping indicate that the agricultural land use within the Study Area of Section 6 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees, and roads.

Soils and geology

12.5.52 Available national soil survey mapping data indicates that within this section there are three Soil Associations present which are predominantly deep clayey or silty soils associated with marine alluvium, including:

- Wallasea 2;
- Wisbech; and
- Normoor.

12.5.53 Soil Association descriptions are presented in **Table 12.2.**

12.5.54 This section comprises of three underlying bedrock formations: the Oxford Clay Formation (mudstone), the West Walton Formation (mudstone and siltstone) and the Ampthill Clay Formation (Mudstone). These sedimentary bedrock formations were formed during the Jurassic period. Clay and silt tidal flat deposits form the superficial drift present, which are sedimentary superficial deposits formed during the Quaternary period.

Agri Environment Schemes

12.5.55 Middle Tier Countryside Stewardships occupy a large majority of this Section from the east of Sutton St James towards the south of the section. Additionally, a small section directly west of Holbeach St James is within the Higher Tier Countryside Stewardship Scheme.

Woodland and Forestry Schemes

12.5.56 There are no woodland and forestry schemes within this Section.

Agricultural Land Classification

12.5.57 Provisional ALC mapping shows that the north west and south east of the Section is comprised of Grade 1 land and the central part is provisionally graded as Grade 2 land.

12.5.58 There is no available detailed ALC survey data available within the Section.

Section 7: Walpole B Substation

Land use

12.5.59 Aerial imagery and OS mapping indicate that the agricultural land use within the Study Area of Section 7 is predominantly arable, with some grassland and woodland areas. Field boundaries are lined with hedges, trees, and roads.

Soils and geology

12.5.60 Available national soil survey mapping data indicates that within this section there are four Soil Associations present which are predominantly deep clayey or silty soils associated with marine alluvium, including:

- Wallasea 2;
- Wisbech;
- Agney; and
- Tanvats.

12.5.61 Soil Association descriptions are presented in **Table 12.2.**

12.5.62 The underlying bedrock geology present in this section is the Ampthill Clay Formation (mudstone), described as sedimentary bedrock formed during the Jurassic period. Clay and silt tidal flat deposits form the superficial drift present, which are sedimentary superficial deposits formed during the Quaternary period.

Agri Environmental Schemes

12.5.63 Middle Tier Countryside Stewardships are in place north of Walton Highway.

Woodland and Forestry Schemes

12.5.64 There are no woodland and forestry schemes within this Section.

Agricultural Land Classification

12.5.65 Provisional ALC mapping shows that the section is comprised of Grade 1 land in the west and Grade 2 land in the east of the Section.

12.5.66 There is no available detailed ALC survey data available within the Section.

Table 12.2: Soil associations present

Soil Association	Description	Project Section
Holderness	Slowly permeable seasonally waterlogged fine loamy soils and similar soils with only slight waterlogging. Parent materials – Chalky till.	Section 1 Section 2 Section 3 Section 4
Burlingham 2	Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some well drained fine and coarse loamy soils. Parent materials – Chalky till.	Section 2
Newchurch 2	Deep stoneless mainly calcareous clayey soils. Parent materials – Marine alluvium.	Section 2
Fladbury 2	Stoneless clayey soils variably affected by groundwater some with sandy subsoils. Some similar fine loamy soils. Parent materials – River alluvium.	Section 2 Section 3

Soil Association	Description	Project Section
Wick 1	Deep well drained coarse loamy and sandy soils locally over gravel. Some similar soils affected by groundwater. Parent materials – Glaciofluvial or river terrace drift.	Section 3
Wallasea 2	Deep stoneless clayey soils. Calcareous in places. Some deep calcareous silty soils. Parent materials – Marine alluvium.	Section 3 Section 4 Section 6 Section 7
Downholland 1	Deep stoneless humose clayey soils, calcareous in places. Some peat soils and deep humose calcareous silty soils. Parent materials - Marine alluvium and fen peat.	Section 4
Downholland 2	Deep stoneless clayey or calcareous silty soils, mainly with a humose surface horizon. Parent materials – Marine alluvium.	Section 4
Salop	Slowly permeable seasonally waterlogged reddish fine loamy over clayey, fine loamy and clayey soils. Parent materials – Reddish till.	Section 4
Wisbech	Deep stoneless calcareous coarse silty soils. Parent materials – Marine alluvium.	Section 4 Section 5 Section 6 Section 7
Agney	Deep stoneless calcareous fine and coarse silty soils. Parent materials – Marine alluvium.	Section 4 Section 7
Tanvats	Deep stoneless fine and coarse silty and clayey soils with groundwater levels controlled by ditches and pumps. Parent materials – Marine alluvium.	Section 4 Section 7
Normoor	Deep stoneless clayey soils in places with humose surface horizon, often very acidic. Parent materials – Marine alluvium.	Section 6

Future Baseline

12.5.67 The future baseline relates to known or anticipated changes to the current baseline in the future that are predicted to occur in the absence of the Project.

12.5.68 It is considered that the baseline in relation to soils and ALC grades would not change from that described within the timeframe for the construction of the Project. While there may be potential changes in relation to climate change, including greater rainfall intensity and droughts, that could affect soil conditions, land grade and farming practices, it is likely that these would only be visible over longer periods of time.

12.5.69 There could potentially be changes to land management practices and business approaches across the landowners/land mangers over the construction and operation of the Project.

12.6 Design and Control Measures

Design Measures

12.6.1 The Project has been designed to avoid, as far as reasonably practicable, sensitive agriculture and soil features as set out in the Corridor and Preliminary Routing and Siting Study (Ref 12.20).

12.6.2 The extent of land required temporarily and permanaently to construct and operation the Project is being evaluated as part of the design development process, this is seeking to minimise overall impacts on BMV land, soils, and agricultural operations, where practicable.

12.6.3 Further design measures will be developed as the Project design evolves.

Control and Management Measures

12.6.4 An Initial Outline CoCP is provided in **Appendix 4A Outline Code of Construction Practice.** Measures relevant to the control and management of impacts that could affect the agriculture and soils assessment are:

- GG01: The Project will be run in compliance with all relevant legislation, consents and permits.
- GG03: A Construction Environmental Management Plan (CEMP), a Landscape and Ecological Management Plan (LEMP), a Site Waste Management Plan (SWMP) and a Construction Traffic Management Plan (CTMP), along with a Soil Management Plan (SMP) will be produced prior to construction. These are collectively referred to as 'the Management Plans.'
- GG04: The CEMP shall include measures to manage dust, waste, water, noise, vibration during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans.
- GG05: A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced Environmental Clerk of Works will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CEMP. The Environmental Clerk of Works will monitor that the works proceed in accordance with relevant environmental Development Consent Order (DCO) requirements and adhere to the required good practice and mitigation measures. The Environmental Clerk of Works will be supported as necessary by appropriate specialists, including ecologists and arboriculturists.
- GG06: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
    - pollution prevention and pollution incident response;
    - dust management and control measures;
    - location and protection of sensitive environmental sites and features;
    - adherence to protected environmental areas around sensitive features;
    - working hours and noise and vibration reduction measures;

- working with potentially contaminated materials;
- waste management and storage;
- flood risk response actions; and
- agreed traffic routes, access points, etc.

- GG07: A record of condition will be undertaken (photographic and descriptive) of the working areas that may be affected by the construction activities, prior to works commencing. This record will be available for comparison following reinstatement after the works have been completed to ensure that the standard of reinstatement at least meets that recorded in the pre-condition survey.
- GG08: Land used temporarily will be reinstated where practicable to its pre-construction condition (including ALC grade) and use. Hedgerows, fences, and walls (including associated earthworks and boundary features) will be reinstated to a similar style and quality to those that were removed, unless otherwise agreed.
- GG19: Earthworks and stockpiled soil will be protected by covering, seeding, or using water suppression where appropriate.
- GG24/AS09: Stone pads will be installed in areas where heavy equipment, such as cranes and piling rigs, are to be used. The stone pads will provide stable working areas and will reduce disturbance to the ground. The stone pad area will be stripped of the topsoil, which will be stored and reinstated in accordance with the soil management plan.
- LV03: A five-year aftercare period will be established for all reinstatement and mitigation planting.
- AS01: Soil management measures will be set out in the SMP. The SMP will include, but not be limited to, the following:
  - details of the soil resources present;
  - roles and responsibilities (and required competencies and training);
  - how topsoil and subsoil will be stripped and stockpiled;
  - suitable conditions for when handling soil will be undertaken, for example avoiding handling of waterlogged soil;
  - indicative soil storage locations;
  - how soil stockpiles will be designed taking into consideration site conditions and the nature/composition of the soil;
  - specific measures for managing sensitive soils;
  - suitable protective surfacing where soil stripping can be avoided, based on sensitivity of the environment and proposed works;
  - approach to reinstating soil that has been compacted, where required;
  - details of measures required for soil restoration; and
  - requirements for monitoring.
- AS02: Where land is being returned to agricultural use, the appropriate soil conditions (for example through the replacement of stripped layers and the removal

of any compaction) will be recreated. This will be achieved to a depth of 1.2 m (or the maximum natural soil depth if this is shallower).

- AS03: Access to and from residential, commercial, community and agricultural land uses will be maintained throughout the construction period or as agreed through the landowner discussions. This may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels will be communicated to affected parties at the start of the Project, with any changes communicated in advance of the change being implemented. Where field-to-field access points require alteration as a result of construction, alternative field access will be provided in consultation with the landowner/occupier.
- AS04: Existing water supplies for livestock will be identified pre-construction. Where supplies will be lost or access compromised by construction works, temporary alternative supplies will be provided. Water supplies will be reinstated following construction.
- AS05: Consultation with affected landowners will be carried out to investigate the current extent of land drainage. A scheme of pre-construction land drainage will be designed with the intent of maintaining the efficiency of the existing land drainage system and to assist in maintaining the integrity of the working area during construction. The Project may include a system of ‘cut-off’ drains which feed into a new header drain and the Project will also take into account surface water runoff measures.
- AS06: Should animal bones be discovered during construction, which may indicate a potential burial site, works will cease, and advice will be sought from the Animal Health Regional Office on how to proceed, relevant to the origin and age of the materials found.
- AS07: All movement of plant and vehicles between fields will cease in the event of a notification by the Department for Environment, Food and Rural Affairs (Defra) of a disease outbreak in the vicinity of the site that requires the cessation of activities. Advice will be sought from Defra in order to develop suitable working methods required to reduce the biosecurity risk associated with the continuation of works.
- AS08: Clay bungs or other vertical barriers will be constructed within trench excavations where deemed necessary by a suitably experienced person, to prevent the creation of preferential drainage pathways.
- AS09: Stone pads will be installed in areas where heavy equipment, such as cranes and piling rigs, are to be used. The stone pads will provide stable working areas and will reduce disturbance to the ground. The stone pad area will be stripped of the topsoil, which will be stored and reinstated in accordance with the soil management measures.
- H02: Where a previously unknown heritage asset is discovered, or a known heritage asset proves to be more significant than foreseen at the time of application, the Project will inform the relevant authorities and will agree a solution that protects the significance of the new discovery, so far as is practicable, within the Project parameters. An outline process for dealing with the unexpected discovery of archaeological remains including human remains and Treasure during construction will be set out in the Outline Written Scheme of Investigation and detailed CEMP.

12.7 Potential for Significant Effects

12.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 12.6.

12.7.2 **Table 12.3** sets out the receptors identified within the Study Area, the potential impacts as a result of construction, maintenance and/or operation activities associated with the Projects, whether these impacts are likely to give to rise to significant effects, and whether the receptor is scoped in or scoped out of the assessment.

12.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Sources and Impacts

12.7.4 This section identifies the sources and impacts that would occur as a result of the construction, operation and maintenance of the Project.

Potential sources of impacts

Sources of construction impacts

12.7.5 Construction activities as detailed in **Chapter 4 Description of the Project**, relevant to agriculture and soils include all those that will result in soil disturbance and the loss (temporary or permanent) of agricultural land. This will include:

- temporary working areas, including construction compounds, storage areas and pylon working areas;
- installation of access tracks (including culverts and bridges)
- installation of pylon foundations;
- removal of construction equipment, reinstatement of ground and restoration of soils; and
- permanent loss of land associated with new substations and associated infrastructure.

Sources of operational impacts

12.7.6 No impacts have been identified as a result of operation. The permanent loss of agricultural land (including BMV land) within the footprint of permanent infrastructure to accommodate the operation of the Project is assessed as part of the construction impacts (as the land would be taken at this stage of the Project).

Sources of maintenance impacts

12.7.7 Periodic temporary works for routine maintenance and emergency repairs, which may require temporary acquisition of land to accommodate vehicle access tracks and small compound areas. Temporary overhead line (OHL) works may disturb agricultural soils and temporary substation works may disturb soil resources despite no longer being in agricultural use.

Table 12.3: Impacts, receptors, and the potential for significant effect

Project phases	Impact Source	Impact	Receptor	Potential for Significant effect	Proposed to be scoped in/out
Construction	Construction of OHL infrastructure, including supporting structures, and associated access tracks in areas of agricultural land use.	Temporary and permanent loss of agricultural land (including BMV land) during construction.	Agricultural land quality (as defined by the ALC system)	**Yes** – during the construction phase. A very large proportion of land within the Scoping Boundary is predicted to be BMV land and thus the Project could result in an unavoidable temporary or permanent loss of agricultural land which is likely to include BMV land. ALC surveys are to be undertaken in areas where soils will be disturbed and BMV land is predicted. The assessment will inform good practice soil handling measures that will be detailed in the Soil Management Plan.	**Scoped in**
Construction	Construction of OHL infrastructure, including supporting structures, and associated access tracks in areas of agricultural land use.	Impacts upon soil ecosystem services during construction.	Soil function	**Yes** – the Project would potentially result in soil quality being adversely affected during construction. Due to the presence of clayey soils and possibly humic/peaty soils, a significant effect on soils cannot be ruled out and although good practice soil handling measures would be implemented through a Soil Management Plan during construction, the range of soil functions and quality may be comprised to some extent compared to those present prior to construction.	**Scoped in**

Project phases	Impact Source	Impact	Receptor	Potential for Significant effect	Proposed to be scoped in/out
Construction	Construction of OHL infrastructure, including supporting structures, and associated access tracks in areas of agricultural land use.	Temporary acquisition and permanent loss of agricultural land holdings during construction.	Agricultural land holdings	**Yes** – a very large proportion of the land within the Scoping Boundary is predicted to be BMV land, the impact on which would have an adversely significant impact on agricultural productivity and thus agricultural land holdings. The temporary acquisition of land to accommodate construction activities will result in temporary disruption and severance to agricultural land holdings and the permanent loss of some land from agricultural land holdings resulting in reduction in the operational capacity and loss of income to farm businesses (which would be addressed through compensation agreements, which lie out with the scope of the ES).	**Scoped in**[1] –
Operation and maintenance	Operation and maintenance of OHL infrastructure, including supporting structures, and associated access tracks in areas of agricultural land use.	Permanent loss of agricultural land (including BMV land) during operation and maintenance.	Agricultural land quality (as defined by the ALC system)	No – periodic vehicle access for routine maintenance and emergency repairs may require temporary access tracks and small compound areas but these are likely to be limited in extent and all soil handling would be undertaken in line with published good practice;	Scoped out

[1] The implementation of mitigation measures, such as providing temporary access to farmland, would likely result in the effects of the Project on agricultural land holdings being not significant. This will be fully assessed based on the additional information which will be gathered on agricultural operations.

Project phases	Impact Source	Impact	Receptor	Potential for Significant effect	Proposed to be scoped in/out
				therefore, no likely significant effects are expected.	
Operation and Maintenance	Operation maintenance of OHL infrastructure, including supporting structures, and associated access tracks in areas of agricultural land use.	Impacts upon soil ecosystem services during operation and maintenance.	Soil function	No – during the operation and maintenance phases. Maintenance activities may impact soil function and quality, but at a much smaller scale than construction. Any disturbance to soils during maintenance would also be undertaken in accordance with good practice soil handling methods, therefore no likely significant effects are expected.	Scoped out
	Operation/maintenance of OHL infrastructure, including supporting structures, and associated access tracks in areas of agricultural land use.	Temporary acquisition and permanent loss of agricultural land holdings during operation/maintenance.	Agricultural land holdings	No – disturbance to farm businesses should be resolved by design to avoid any operational disruption; therefore, no likely significant effects are expected and can be scoped out. Periodic vehicle access for routine maintenance and emergency repairs may require temporary access tracks and small compound areas but these are likely to be limited in extent and access arrangements will be designed to limit disturbance to landowners; therefore, no likely significant effects are expected.	Scoped out

12.8 Proposed Assessment Methodology

Proposed Data Sources

12.8.1 In addition to the data sources listed in Section 12.4, the following data sources are also proposed to be used to inform the agriculture and soils assessment:

- Detailed ALC surveys of relevant areas. These would be undertaken in accordance with the published guidance (Ref 12.6) at a survey density of 1 auger per hectare in areas where there will be disturbance to soils, for example where permanent infrastructure is proposed, sections of the access routes and construction compound locations through particularly sensitive soils (such as heavy soils prone to compaction). Surveys will also be undertaken where land use change would remove land from agricultural production, for example where new woodland planting is required to achieve Biodiversity Net Gain (BNG) requirements (**Chapter 8 Ecology and Biodiversity**)**.**
- Climatic data, purchased from the National Soil Resource Institute, will be used in the calculations of ALC grades.
- Land Information System Soil Site Report, purchased from the National Soil Resources Institute to provide an in-depth insight into the relevant Soil Associations and properties within the Study Area boundary.

Assessment Approach

12.8.2 The EIA assessment will be supported by an initial collation and review of available baseline data.

12.8.3 To fully inform the assessment of agricultural land and soils, an ALC and soil survey will be undertaken to determine the sensitivities of soils and the grade(s) of agricultural land within the Study Area. The survey and assessment will be undertaken in accordance with the Soil Survey Field Handbook (Ref 12.12) and the ALC guidelines (Ref 12.6) and will characterise soil properties based on an examination of soil profiles, from which agricultural land grade as well as soil resilience can be calculated and assessed.

12.8.4 In addition, to inform the assessment of farm holdings, data on agricultural land holdings will be collected through landowner/occupier or land agent interviews. The agricultural land holding information will enable an understanding of agricultural operations and an assessment of impacts (including cumulative impacts) on agricultural holdings.

Significance Criteria

12.8.5 The Institute of Environmental Management and Assessment (IEMA) guidance (Ref 12.11) will be used to assess the impact on agriculture and soils. The DMRB LA112 (Ref 12.19) will be used to assess the impact on agricultural land holdings.

12.8.6 **Tables 12.4** to **12.8** set out the criteria which would be used to determine the sensitivity of and the magnitude of impacts on agricultural land and soils through assessing soil quality, BMV land and agricultural landholdings.

Table 12.4: Determination of sensitivity of typical soil resource/functions

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

[2] As defined by the site and catchment characteristics according to the professional judgement of a catchment hydrologist.

[3] Area of Outstanding Natural Beauty (AONB) is now referred to as National Landscapes.

Receptor Sensitivity	Description
	(e.g. Local Nature Reserves (LNR), Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), Special Landscape Areas; non-native forest and woodland soils. **Soil carbon:** mineral soils with elevated soil carbon resulting from land management practices such as addition of organic amendments or minimisation of soil disturbance (for example under long-term pasture). **Soil hydrology:** important minor catchment pathway[2] for water flows and flood risk management. **Archaeology, cultural heritage, community benefits and geodiversity:** soils with possible (e.g. where professional judgement but as yet unproven (prior to being revealed by construction) archaeological interest; soils supporting community/recreational/educational access to land. **Source of materials:** surface mineral reserves that would remain accessible for extraction.
Low	**Biomass production:** ALC Grades 4 and 5s **Ecological habitat, soil biodiversity and platform for landscape:** soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils. **Soil carbon**: mineral soils. **Soil hydrology:** Pathway[2] for local water flows and flood risk management **Archaeology, cultural heritage, community benefits and Geodiversity:** soils supporting no notable cultural heritage, geodiversity nor community benefits; soils supporting limited community/recreational/educational access to land. **Source of materials:** surface mineral reserves that would remain accessible for extraction.
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions

Table 12.5: Determination of sensitivity of soils in handling

Soil Texture, Field Capacity Days (FCD) and Wetness Class (WC)[4]	Soil Texture, Field Capacity Days (FCD) and Wetness Class (WC)
High Sensitivity (low resilience to structural damage)	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams)

[4] The terminology high, medium and low sensitivity is used to describe potential risk of damage to a soil structure. Furthermore, a soil with high sensitivity is at high risk to damage and has a low resilience to structural damage. This terminology is directly referred to in the IEMA Guidance (Ref 12.11)

Soil Texture, Field Capacity Days (FCD) and Wetness Class (WC)[4]	Soil Texture, Field Capacity Days (FCD) and Wetness Class (WC)
	and organo-mineral and peaty soils where the FCD are 150 or greater; Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater; and All soils in wetness class (WCV or WCVI).
Medium Sensitivity (medium resilience to structural damage)	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150; Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225; and Sands, loamy sands, sandy loams, and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Low sensitivity (high resilience to structural damage)	Soils with a high sand fraction (sands, loamy sands, sandy loams, and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

Table 12.6: Determination of sensitivity of agricultural land holdings

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

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

Table 12.7: Determination of magnitude criteria for impact on agricultural land and soils

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
Large	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20 ha or loss of soil-related features set out in **Table 12.5**, as advised by other topic specialists in EIA team (including effects from 'Temporary Developments[5]); or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20 ha or gain in soil-related features set out in **Table 12.5**, as advised by other topic specialists in EIA team (including effects from 'Temporary Developments[6]).
Medium	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 and 20 ha or loss of soil-related features set out in **Table 12.5** as advised by other topic specialists in EIA team (including effects from 'Temporary Developments'[5]); or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20 ha or gain in soil-related features set out in **Table 12.5,** as advised by other topic specialists in EIA team.
Small	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes), or temporary, reversible loss of soil related features set out in **Table 12.5** above, as advised by other topic specialists in EIA team;

[5] Temporary development can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils.
[6] Temporary development can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils.

Magnitude of Impact (Change)	Description of Impacts Restricting Proposed Land Use
	or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5 ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features set out in **Table 12.5**, as advised by other topic specialists in EIA team.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

Table 12.8: Determination of magnitude criteria for impact on agricultural land holdings

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

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

Significance of Effects

12.8.7 Significance would be derived using the matrix set out in **Table 12.9.** An effect determined to be moderate or above would be deemed significant.

Table 12.9: Determination of significance matrix

		Value/Sensitivity of Receptor				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude	**Large**	Major	Major/Moderate	Major/Moderate/ Minor	Moderate/ Minor	Minor/ Negligible
	Medium	Major/Moderate	Major/Moderate	Moderate/Minor	Minor/ Negligible	Negligible
	Small	Major/Moderate/ Minor	Moderate/Minor	Moderate/Minor	Minor/ Negligible	Negligible
	Negligible	Minor/Negligible	Minor/Negligible	Minor/Negligible	Negligible	Negligible

12.9 Assumptions and Limitations

12.9.1 It is assumed that at the end of the construction phase, land temporarily taken by the Project will be reinstated and returned to agricultural use, whilst land required permanently for the Project will remain out of agricultural use.

12.9.2 No limitations have currently been identified. The full assessment will be reliant on land access to enable focused soil and ALC surveys; the extent of surveys undertaken will be fully detailed in the assessment reported in the ES.

12.9.3 It is assumed that at the end of the construction phase, land temporarily taken by the Project will be reinstated and returned to agricultural use, whilst land required permanently for the Project will remain out of agricultural use.

12.10 Conclusion

Summary

12.10.1 The potential for temporary and permanent effects on agricultural land (including BMV land) and on soils have been identified through the scoping exercise. Whilst the measures included in **Appendix 4A Outline Construction Code of Practice** will reduce effects as far as reasonably practicable, a full assessment of agriculture and soils, including agricultural land holdings, will be undertaken to understand the extent of BMV land and sensitive soils which would be affected by the Project during the construction phase. Impacts on agricultural land holdings will be minimised through embedded mitigation measures.

12.10.2 The construction phase will account for both temporary and permanent loss of agricultural land, and therefore no further significant effects on soils and agriculture are expected during operation and maintenance phases, assuming any works disturbing soils are undertaken in accordance with standard good practice soil handling methods.

Proposed Scope of the Assessment

12.10.3 A summary of the proposed scope of the assessment is provided in **Table 12.10**.

Table 12.10: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
Agricultural land quality (as defined by the ALC system)	Potential for temporary and permanent loss of agricultural land (including BMV land) during construction.	Construction	Scoped in
Soils	Potential for effects on soil ecosystem services during construction.	Construction	Scoped in
Agricultural land holdings	Potential for temporary acquisition and permanent loss of agricultural land.	Construction	Scoped in
Agricultural land quality, soils and agricultural land holdings	Potential for temporary impacts on agricultural land (including BMV land), soil ecosystem services and agricultural land holdings.	Operation, Maintenance	Scoped out

12.11 References

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13. Traffic and Transport

nationalgrid

Contents

13.1 Introduction

13.1.1 This chapter presents how the Traffic and Movement assessment will consider the potentially significant effects on traffic and movement receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4 Description of the Project**). It describes the methodology and datasets to be used within the traffic and movement assessment, presents an overview of the baseline conditions and identifies the potential likely significant effects to be considered within the assessment, and how these will be assessed as part of the Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the only element of the Project that will involve decommissioning in all or part is the existing Grimsby West Substation. There are currently no specific plans to decommission the Project as a whole. With the exception of Grimsby West Substation, decommissioning of the Project has therefore been scoped out of the environmental assessment.

13.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary.**

13.1.3 This Chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology.**

13.1.4 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 14 Air Quality** – which covers the air quality impacts associated with traffic as a result of the Project;
- **Chapter 15 Noise and Vibration** – which covers the noise and vibration impacts associated with traffic as a result of the Project;
- **Chapter 16 Socio-economics, Recreation and Tourism:** which considers potential disruption to users of recreational routes including public rights of way (PRoW);
- **Chapter 17 Health and Wellbeing** – which considers potential impact on residents' access to recreational routes and potential changes to neighbourhood quality as a result of noise, dust, air quality and amenity from traffic
- **Chapter 18 Climate Change** – which calculates greenhouse gas emissions from traffic.

13.1.5 This chapter is supported by the following figures:

- **Figure 13.1 Proposed Traffic and Movement Study Area**; and
- **Figure 13.2 Strategic Road Network**.

13.2 Legislation, Policy and Guidance

13.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context** and **Appendix 2A Key Legislation,**

Appendix 2B National and Regional Planning Policy and **Appendix 2C Local Policy**.

13.2.2 Relevant guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- Institute of Environmental Management and Assessment (IEMA) 2023 Environmental Assessment of Traffic and Movement (Ref 13.1) - Guidance on examining the environmental impacts of developments in terms of traffic and movement. This guidance has been used to outline the scope of the assessment.
- Planning Practice Guidance: Travel Plans, Transport Assessments and Statements, 2014 (Ref 13.2) - Sets out ways of assessing and mitigating the negative transport impacts of developments that generate significant amounts of movement, in order to promote sustainable development.
- Department for Transport (DfT) Strategic Road Network and the Delivery of Sustainable Development, Circular 01/2022 (Ref 13.3) – Guidance explaining how National Highways will engage with the planning system and fulfil its remit to be a partner for sustainable economic growth, whilst maintaining, managing and operating a safe and efficient strategic road network, with an emphasis on encouraging measures to reduce the impact of traffic.
- Future of Freight: A Long Term Plan, 2022 (Ref 13.4) - Guidance sets out the Government's long terms vision for the UK freight sector. Includes five priority areas – National Freight Network, enabling transition to net zero, planning, people and skills, data and technology.
- Design Manual for Roads and Bridges (DMRB): LA103 Scoping for Environmental Assessment, 2020 (Ref 13.5) - Covers the requirement and procedures that should be followed when scoping a project, to reach a reasoned conclusion on the likely effects of a project on the environment in line with the requirements of the 2014/52/EU.
- DMRB: LA104 Environmental Assessment Monitoring, 2020 (Ref 13.6) – Covers the requirement and procedures that should be followed when assessing, reporting and monitoring the environmental effects of projects in line with the requirements of the EIA Directive 2014/52/EU.
- Local Transport Note 1/20 Cycle Infrastructure Design (Ref 13.7) - Design guidance to inform/assess the level of acceptable restrictions and diversions of active travel routes.
- Chartered Institution of Highways and Transportation (CIHT) Planning for Journeys on Foot and CIHT Planning for Walking (Ref 13.8) - Design guidance to inform acceptable increases in walking distances, i.e. where routes might be diverted; and
- Sustrans: Temporary diversions of national cycle network routes (Ref 13.9) and Sustrans: Traffic-free and Greenways Design Guide (Ref 13.10) – Provide guidance in relation to cycle routes.

13.3 Consultation and Engagement

13.3.1 The EIA will be informed by consultation and engagement with stakeholders, including North East Lincolnshire Council Highways, Lincolnshire County Council Highways, Norfolk County Council Highways, Cambridgeshire County Council Highway, National

Highways for highways, Network Rail/Train Operating Companies for rail and Water/harbour authorities, such as Environment Agency and Canal & Rivers Trust, for navigable waterway. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

13.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. There has been no pre scoping engagement.

13.3.3 The principal feedback received from both Non-Statutory Consultation and of relevance to this scoping chapter is included in **Table 13.1,** together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 13.1: Engagement with Stakeholders

Stakeholder	Summary of Response	Consideration in the Scoping Report
Fenland District Council	Initial concerns relate to construction traffic impacts, damage to highways, diversions and congestion. Requirement for Transport Assessment, Phasing Plan and Construction Transport Management Plan.	An assessment of construction traffic impacts, damage to highways, diversions and congestion will be included in the transport and movement chapter of the PEI Report and the ES. A Transport Assessment (TA) and Construction Traffic Management Plan will accompany the ES.
Norfolk County Council	Scope of assessment to be agreed with local highway authority. Issues identified at this stage relate to road / haul routes providing access to compounds and pylon corridor during construction and maintenance. The assessment should consider accesses, access routes and vehicles. Details of impacts during construction to be identified, vehicle types, vehicle numbers, routes, timings. Plans are required to show site accesses with sightlines, removal/reinstatement of hedgerows, modifications to highway boundary, utility equipment, street furniture. Need to consider impacts to PRoW. Operational vehicle requirements should be set out and assess any long terms impacts to highway and PRoW.	This chapter sets out the approach to the traffic and movement assessment that will be reported in the PEI Report and ES. A Transport Assessment (TA) and Construction Traffic Management Plan will accompany the ES, and report on the likely construction and operational impacts including forecast vehicle types, vehicle numbers, routings and working periods. Plans showing the site accesses with sightlines, affected hedgerows and modifications required to the highway will accompany the ES. Any impact on Public Right of Ways (Prow) will be set out in the PRoW Management Plan that will accompany the DCO submission.

13.4 Study Area

13.4.1 The Project Scoping Boundary is shown on **Figure 1.1 Scoping Boundary.**

13.4.2 An initial Study Area for traffic and movement is shown on **Figure 13.1 Proposed Traffic and Movement Study Area** based on the extent of the Scoping Boundary, comprising the emerging preferred corridor and emerging preferred Substation Siting Zones. This highlights the key highways, bus routes, pedestrian/cycle network including PRoW, railways and navigable waterways that are in and around the Scoping Boundary and may be impacted by the Project. These road links, junctions, bus services and walking and cycling routes are identified in Section 13.5.

13.4.3 For the purposes of scoping, the Transport and Movement Study Area is based on the Scoping Boundary. However, as the Project Design is developed, consideration will be to the Likely Significant Effects on the transport network beyond the Scoping Boundary (as considered appropriate) taking account of likely access/delivery routes.

13.4.4 The Project is close to the boundary of North Lincolnshire and it is likely that abnormal loads may pass through the local authority area (i.e. from the Port of Immingham) with permission sought through the normal permit process.

13.4.5 In addition, the strategic road network, operated by National Highways, may be impacted by the Project and may form part of the Study Area. The strategic road network is shown on **Figure 13.2 Strategic Road Network.**

13.4.6 National Grid will liaise with the relevant highway authorities and National Highways to agree the Study Area and the location for traffic surveys (manual or Automatic Traffic Counts).

13.5 Baseline Conditions

Data Sources

13.5.1 The construction vehicle routes for the Project are not available at this stage and therefore baseline data collection has been limited to assumptions made using a desk-based study drawing on publicly available mapping and aerial imagery from Google Maps together with constraints information held within the Project WebGIS platform.

13.5.2 The baseline described in this chapter has been informed by the following data sources:

- Road network – Ordnance Survey open map, Google Maps;
- Bus route information – local bus operators, traveline.info;
- Rail information – National Rail;
- Waterways – Environment Agency and Navigation Authority; and
- Designated non-motorised user (NMU) routes and PRoW – Sustrans, Local Authority Definitive map(s).

13.5.3 The following data sources will be reviewed to determine more detailed baseline transport information when available:

- historic traffic count data from local Councils and/or DfT;
- historic traffic count data from National Highways (to be determined);

- traffic count data from potential surveys undertaken for this Project (to be determined) – the surveys will record road users, pedestrians, cyclists and equestrians as required;
- Traffic Regulation Orders restricting movement; and
- Personal Injury Collision (PIC) accident data for the latest five years including description of incident.

Baseline

13.5.4 The following sections present the existing baseline established at Scoping. The following highway links, key junctions, walking and cycling routes, railways and waterways are within or within the vicinity of the Scoping Boundary. Inclusion of transport infrastructure within the vicinity is because transport impacts have the potential to go beyond the Scoping Boundary.

Strategic highway links

13.5.5 The M180, A180 and A47 form part of the strategic road network with the M180 and the A180 providing an east west route to/from Grimsby to the north of the Scoping Boundary area and the A47 providing an approximately east west route between Leicester and King's Lynn to the south of the Scoping Boundary area. These provide connections to the wider strategic road network including the M18, the M62, and the A1. The M180 and A180 are dual carriageways subject to the national speed limit (70 mph). The A47 is a wide single carriageway subject to the national speed limit (60 mph). Footways are generally not provided alongside the roads and lighting is provided in built up areas and at key junctions only. **Figure 13.2 Strategic Road Network** shows the Scoping Boundary in the context of the road network managed by National Highways.

13.5.6 At a more local level, the A46, A18, A16, A158, A52 and A17 roads provide core routes through the wider area connecting destinations such as Grimsby, Louth, Skegness, Boston, Spalding and Wisbech and will likely form key transport routes to / from the Scoping Boundary. The A18 and the A16 are principally north-south routes, with the A46, the A158, the A17 and the A52 principally providing east-west connections linking the Study Boundary with the wider highway network to the west. They are generally wide single carriageways subject to the national speed limit. Footways and street lighting are generally not provided alongside the roads in rural areas but are provided where the road passes through urban areas. **Figure 13.1 Proposed Traffic and Movement Study Area** shows the highway network within and surrounding the Scoping Boundary.

13.5.7 An initial review of Google traffic data indicates congestion areas around Spalding (A16/B1180 roundabout, A16/A151 roundabout, Park Road/Winsover Road, Park Road/Pinchbeck Road, Winsover Road/St Thomas's Road, Twin Bridges, High Bridge Junction), and Boston (A52 and A16 approaches to and through Boston, A16 south of Boston, A52/A16 junction).

Transport Networks

13.5.8 The following section provides details of the baseline transport network within the Scoping Boundary sections based on the available information and assumptions.

13.5.9 The transport networks considered for the baseline are presented below and are separated into sections aligned with the Project for ease of referencing. The Sections are as follows:

- Section 1 - Grimsby West Substation.
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A.
- Section 3 - Lincolnshire Connection Substation A and B (including the overhead line between them).
- Section 4 - Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation.
- Section 5 - Weston Marsh Substation.
- Section 6 - Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation).
- Section 7 - Walpole B Substation.

Section 1: Grimsby West Substation

Highway network

13.5.10 Access to the proposed substation is assumed to be from the A180, the A1136, Aylesby Road and via an existing substation access road. The A180 is a dual carriageway subject to the national speed limit. The A1136 north-south link is a wide single carriageway with street lighting, no footways and is subject to a 50 mph speed limit. The A1136 provides an east west link and is a wide single carriageway, with street lighting and a footway on its southern side. The speed limit is 40 mph which reduces to 30 mph within the built up urban areas of west Grimsby. Aylesby Road is a narrow single carriageway with street lighting and a narrow footway on its western side. Double yellow line restrictions apply and the 30 mph speed limit within the built up area immediately west of the existing substation site. A 7.5 t weight restriction on Aylesby Road is signed. Outside of the built up urban area the speed limit increases to 40 mph and then 60 mph. No footways or street lighting are provided on Aylesby Road in the vicinity of the existing substation access junction.

13.5.11 The key highway links within or providing access to the section boundary are:

- The M180 and the A180 forming part of the strategic road network to the northwest of Grimsby; and
- Aylesby Road.

13.5.12 The key junctions within or providing access to the section boundary are:

- The junction of the A180 with the A1136; and
- The junction of the A1136 with the B1210.

Walking and cycling

13.5.13 There are two PRoWs that cross the emerging preferred Substation Siting Zone and no designated cycle tracks have been identified to cross the proposed Substation Siting Zone.

13.5.14 A network of footpaths, bridleways and byways (PRoW) are also noted.

Public transport

13.5.15 No bus stops are provided in the immediate vicinity of the Substation Siting Zone and the nearest stop is on A1136 Great Coates Road, approximately 1 km northeast of the site. From these bus stops, service 5 provides approximately 2 services per hour between Grimsby and Immingham, service 1 provides an hourly service between Grimsby and Wybers Wood and service 20 provides early morning and evening services to Europarc and Cleethorpes.

13.5.16 There are no railway lines close to the proposed Substation Siting Zone within Section 1. The nearest rail station is at Great Coates approximately 2 km north east of the site. East Midlands Railway operate one service every 2 hours between Cleethorpes and Barton on Humber.

Waterways

13.5.17 A number of becks, dykes, and land drains are noted within Section 1 of the Scoping Boundary.

Section 2: Overhead Line from Grimsby West Substation to Lincolnshire Connection Substation A

Highway network

13.5.18 The following key roads are within the Section 2 boundary: the A46 Grimsby Road, Waltham Road, the B1203 Main Road/Waltham Road, the A16, Grainsby Lane, the B1201 Fen Lane, Station Road, Pear Tree Lane, Alvingham Road, Lough Road, the B1200 Manby Road and the A157.

13.5.19 The A46, A16 and the A157 are strategic routes linking larger towns in the area. The A46 is a dual carriageway and the A16 and the A157 are generally wide single carriageways. The B roads and unclassified roads provide local connections to villages and individual farms and houses and are generally narrower single carriageways.

13.5.20 The key highway links within or providing access to the section boundary are:

- The A46 between the A18 and the B1444;
- Waltham Road between the A18 and the B1203 in Waltham;
- The B1203 between the A18 and Waltham High Street;
- Waithe Lane between Brigsley and Waithe;
- The A16 between Grainsby Lane and Holton le Clay;
- Grainsby Lane between Grainsby and Thoresby Road;
- The B1201 between the A16 and the A1031;
- Station Road between the A16 and Fulstow;
- Pear Tree Lane to the east of the A16;
- Ings Lane between the A16 and Covenham St Mary;
- Avingham Road between Louth and Avingham;
- The B1200 Manby Road between the A157 and Grimoldby;

- Vicarage Road between the A157 and Great Carlton;
- The A157 between Authorpe Road and Withern; and
- The unclassified Road between Tothill and Gayton le Marsh.

13.5.21 The key junctions within or providing access to the section boundary are:

- The junction of the A46 with the A18;
- The junction of the A16 with Grainsby Lane;
- The junction of the A18 with the A16;
- The junction of the A157 with the B1200;
- The junction of the A157 with the unclassified road north of Tothill; and
- The junction of the A157 with the B1373.

Walking and cycling

13.5.22 A network of PRoW cross the Section 2 boundary. The Greenwich Meridian long distance walking trail crosses the Scoping Boundary to the north of Louth. The Johnson Silver Lincs Way long distance walking route passes through the Scoping Boundary both north and south of Barnoldby le Beck.

13.5.23 National Cycle Route 1, which runs principally as a north-south route through Lincolnshire, passes near Grimsby, Boston and Wisbech. The NCR 110 connects to the A18 approximately 1km west of Barnoldby le Beck.

13.5.24 A network of footpaths, bridleways and byways (PRoW) also pass through or close to the Scoping Boundary.

Public transport

13.5.25 Two bus services run through Laceby and along the A46 (service 250 Hull to Grimsby and service 53 Lincoln to Grimsby). Service 9 and 10 Connect Barnoldby le Beck and Waltham with Grimsby, service 25 provides services between Ludford and Grimsby and service 51 runs through the area between Louth and Grimsby. Service 28 runs along the B1200 between Louth, Grimoldby and Mablethorpe. Service 50 provides services approximately every 2 hours between Louth and Mablethorpe along the A157.

13.5.26 The Lincolnshire Wolds Rail line passes through the Scoping Boundary at Section 2. This provides a tourist line running trains at weekends and bank holidays through the spring and summer with additional services at Halloween and Christmas.

Waterways

13.5.27 The River Freshney, Louth Canal, River Ludd, Long Eau and Great Eau cross the Scoping Boundary. A number of becks, dykes, and land drains are also noted within the Scoping Boundary for Section 2.

Section 3: Lincolnshire Connection Substation A and B (including the overhead line between them)

Highway network

13.5.28 Access to Lincolnshire Connection Substation A is expected to be from the A16, the A1104 and Rye Lane. The A16 is a wide single carriageway with no footway or street lighting and is subject to a 60 mph speed limit. The A1104 is a single carriageway with no footway or street lighting and is subject to a 60 mph speed limit. The speed limit reduces to 30 mph through Alford and comprises a narrow single carriageway with on street parking, narrow footways and retail frontages. The A1104 provides a north south route from Alford. It is a wide single carriageway through a rural area with no street lighting or footways and is subject to a 50 mph speed limit. Rye Lane is a narrow single carriageway (2 large vehicles cannot pass) with no footways or street lighting and a 60 mph speed limit applies.

13.5.29 Access to Lincolnshire Connection Substation B is currently expected to be from the A16, the A1104 and then onto the A1111 Sutton Road. The A1111 Sutton Road is a single carriageway with limited footways and subject to a 40 mph speed limit.

13.5.30 The key highway links within or providing access to the section boundary are:

- The unclassified road between the A1373 and Claythorpe;
- The B1373 between Withern and the A1104;
- The A1104 between the B1373 and Alford; and
- The A1111 between the B1449 and Markby.

13.5.31 The key junctions within or providing access to the section boundary are:

- The junction of the B1373 and the A1104; and
- The junction of the A1104 and the A1111.

Walking and cycling

13.5.32 Five PRoWs cross the Section 3 boundary including between Alford, Saleby and Bilsby and to the east of Asserby. The Lindsey Loop long distance walking route passes close to the Scoping Boundary through Alford.

13.5.33 The Greenwich Merdian Trail long distance route passes in a north south direction to the west of the Scoping Boundary.

Public transport

13.5.34 A number of services run through Alford and on to Mablethorpe and Skegness with bus stops on the A1104 in Alford and the B1449 in Bilsby and Thurlby. Service 7 provides occasional service between Skegness and Alford. Service 96 provides a few services daily between Mablethorpe and Spilsby.

Waterways

13.5.35 A number of becks, dykes, and land drains are noted within the Scoping Boundary for Section 3.

Section 4: Overhead Line from Lincolnshire Connection Substation B to Weston Marsh Substation

Highway network

13.5.36 The Scoping Boundary crosses the following key roads: the B1449 Thurlby Road, Sloothby High Lane, Marsh Lane, Ingoldsmell Road, Younger's Lane, the A158 Skegness Road, Low Lane/Low Road, Lymm Bank, Steeping Road, Thorpe Bank, High Lane/Church Lane, the B1195 Burgh Lane, Spilsby Road, Midville Road, the A16, the B1183 Main Road/Hale Lane, the B1184 Canister Lane, Castledyke Bank, Mere Booth Road, the A1121 Boardsides, the A52, the B1391, Willington Road, the A17, the B1397 Boston Road and the A16.

13.5.37 The key highway links within or providing access to the section boundary are:

- The B1449 between the A1111 and A52;
- Cumberworth Road between Bonthorpe and Cumberworth;
- Sloothby High Lane between Sloothby and South Ings Lane;
- Marsh Lane;
- Ingoldmells Road;
- A158 Skegness Road between Burgh le Marsh and Burgh Road;
- Billgate Lane, Low Road and other unclassified roads between Bratoft End and the A52 west of Skegness;
- Lymn Bank between the B1195 and Thorpe Fendykes;
- The B1195 between Wainfleet Road and Irby in the Marsh;
- Station Road between Thorpe Bank and Thorpe Culvert;
- Thorpe Bank between Station Road and Midville Road/Hobhole Bank;
- A number of unclassified roads running north and south across Thorpe Bank;
- Midville Road/Hobhole Bank between Foundry Farm and Midville;
- Scarborough Bank between Midville and the A16;
- A number of unclassified roads between the A16 and Hobhole Bank;
- The A16 between Stickney and Sibsey;
- The B1183 between Medlam and Frithville;
- Westville Road between Bunkers Hill and Frithville;
- The B1184 between Gipsey Bridge and Frithville;
- Unclassified roads Leagate Road and Mere Booth Road to the east of the B1184;
- The B1192 between Langrick Bridge and the A1121;
- The A1121 between the B1192 and the B1391;
- The A52 between the B1192 and the A1121;
- The B1391 between the A52 and the B1192;

- Unclassified roads between the B1391 and the A17;
- The A17 between the A52 and the A16;
- The B1397 between the A17 and the A152; and
- The A16 between the A17 and the A152.

13.5.38 The key junctions within or providing access to the section boundary are:

- The junction of the B1449 and the A52;
- The junction of the B1195 with Lymn Bank;
- The junction of the B1183 with the B1184;
- The junction of the B1192 with the A1121;
- The junction of the A1121 with the A52;
- The junction of the B1391 with the A52;
- The junction of the A52 with the A17;
- The junction of the A17 and the A16;
- The junction of the A152 with the B1397; and
- The junction of the A16 with the A152.

Walking and cycling

13.5.39 A network of PRoW cross the Section 4 boundary:

- the Cross Britain Way/The Macmilan Way long distance walking route passes through the Scoping boundary to the south of Boston and crosses through the Boundary again adjacent to the River Welland to the south of Fosdyke Bridge;
- the Greenwich Meridian long distance walking trail crosses the Scoping Boundary to the north of Boston;
- the Water Rail Way also crosses the Scoping Boundary to the north east of Boston following alongside the River Witham;
- the Lindsey Loop long distance walking route passes by the Scoping Boundary; and
- a network of footpaths, bridleways and byways (PRoW) are also noted.

13.5.40 National Cycle Route 1 passes through the Scoping Boundary to the northwest of Boston running adjacent to the River Witham. It also runs close to the Scoping Boundary to the south of Boston toward Fosdyke.

Public transport

13.5.41 A number of bus services run through or close to Section 4 of the Scoping Boundary. Service 55 provides services approximately every two hours between Boston and Lincoln with bus stops in Antons Gowt. Service 56 provides approximate hourly services in each direction between Lincoln, Horncastle and Skegness, with bus stops on the A158 passing through the Scoping Boundary. Service 57 provides an approximate hourly service in each direction between Skegness and Boston with stops close the

Scoping Boundary in Wainfleet and villages close to the A52. Bus stops are located on the A1121 and A52 to the west of Boston providing access to less frequent services between Boston, Spalding and local villages.

13.5.42 The main rail line running between Sleaford, Boston and Skegness, crosses the Scoping Boundary three times. Services running between Nottingham and Skegness operate at an approximate hourly frequency in each direction stopping nearby at Wainfleet, Boston, Heckington and Sleaford. Occasional services stop at smaller local stations along the route. The nearest main rail stations to the Scoping Boundary in this Section are at Skegness and Boston.

Waterways

13.5.43 The River Witham, Black Suice Navigation, the River Welland and Steeping River pass within the Scoping Boundary.

13.5.44 A number of becks, dykes, and land drains are noted within the Scoping Boundary for Section 4.

Section 5: Weston Marsh Substation

Highway network

13.5.45 Access to the Substation Siting Zone is currently expected from the A16, the A151 High Road and Stone Gate. The A16 is a wide single carriageway with no footways or street lighting and a 60 mph speed limit applies. The A151 comprises a wide single carriageway with a footway but no street lighting except in more urban sections where a 40 mph speed limit applies. The route widens to the north of Weston. Stone Gate is a narrow single carriageway, rural road with grass verges provided for passing. No footways or street lighting are provided and the national speed limit (60 mph) applies.

13.5.46 The key highway links within or providing access to the section boundary are:

- Marsh Road between the A16 and Marsh Farm; and
- Stone Gate between the A151 and Marsh Road.

13.5.47 At the time of writing, no key junctions have been identified within or in the vicinity of the section boundary that require further consideration.

Walking and cycling

13.5.48 The following PRoW pass through the Scoping Boundary or close to the boundary for Section 5:

- the Cross Britain/The Macmillan Way passes close to the boundary along the River Welland.
- the Greenwich Meridian long distance walking trail crosses the Scoping Boundary near Boston;
- the Lindsey Loop long distance walking route passes by the Scoping boundary; and
- a network of footpaths, bridleways and byways (PRoW) are also noted.

13.5.49 National Cycle Route 1 passes to the east of the Scoping Boundary to the north of Holbeach.

Public transport

13.5.50 No bus services run in the vicinity of the Weston Marsh Substation Siting Zone.

13.5.51 The nearest rail station is at Spalding for regular services to Peterborough, Lincoln, Newark Northgate and Doncaster.

Waterways

13.5.52 A number of becks, dykes, and land drains are noted within the Scoping Boundary for Section 5.

Section 6: Overhead Line from Weston Marsh Substation to Walpole B Substation

Highway network

13.5.53 The Scoping Boundary crosses the following key roads: the A151 High Road, Hall Gate, the B1357, B1165, Fox Headings, Cranegates South, Nutts Lane, B1168, Stoton's Gate, Neal's Gate, Inley Drove, Bardling's Drove, Broad Gate, Middle Broad Drove, High Road, the A1101 Sutton Road and Mill Road.

13.5.54 The key highway links within or providing access to the section boundary are:

- Stone Gate between the A151 and Marsh Road;
- The A151 between the A16 and the B1357;
- A number of unclassified roads running between the A151 and the B1165;
- The B1165 between the A16 and the B1168;
- The B1168 between Barrington House and Jekil's Bank;
- A number of unclassified roads running between the B1165 and the B1166;
- Cross Drove between Grangehill Road and Hassock Hill Drove;
- The B1165 between Mayner's Dike and the A1101; and
- The A1101 between the B1165 and Station Road.

13.5.55 The key junctions within or providing access to the section boundary are:

- The junction of the A16 and the A151;
- The junction of the A151 and the B1357;
- The junction of the B1168 with the B1165; and
- The junction of the A1101 with the B1165.

Public transport

13.5.56 Service 505 provides approximately two services per hour between Kings Lynn/Sutton Bridge and Spalding. Bus stops are located on the A151 within the Scoping Boundary and in Weston. Service 50 provides occasional services between Long Sutton and

Wisbech crossing the Scoping Boundary with stops in Tydd St Giles and Newton-in-the-Isle.

13.5.57 The nearest rail station is at Spalding for regular services to Peterborough, Lincoln, Newark Northgate and Doncaster.

Walking and cycling

13.5.58 A number of PRoW cross the Scoping Boundary through Section 6:

- the Nene Way running alongside the River Nene at the eastern end of Section 6;
- the Greenwich Meridian long distance walking trail which crosses the Scoping Boundary to the south of Holbeach;
- the Lindsey Loop long distance walking route passes by the Scoping Boundary; and
- a network of footpaths, bridleways and byways (PRoW) are also noted.

13.5.59 National Cycle Route 1 passes close to the Scoping Boundary running through Holbeach and crossing the boundary between Tydd St Giles and Leverington.

Waterways

13.5.60 The River Nene passes within the Scoping Boundary.

13.5.61 A number of becks, dykes, and land drains are noted within the Scoping Boundary for Section 6.

Section 7: Walpole B Substation

Highway network

13.5.62 Access to the proposed Walpole B Substation Siting Zone is, at this stage, assumed to be from the A47, Lynn Road and West Drove North. The A47 is a dual carriageway subject to the national speed limit (70 mph) with no footways or street lighting. Lynn Road comprises a wide single carriageway with footways and street lighting and a 50 mph speed limit applies. West Drove North is a narrow single carriageway with grass verges for passing and the national speed limit applies (60 mph).

13.5.63 The key highway links within or providing access to the section boundary are:

- Mill Road between West Walton and Walpole Bank;
- Lynn Road and West Drove North between the A47 and Walpole St Peter; and
- The A47 running to the south and east of Wisbech and forming part of the strategic road network.

13.5.64 A key junction providing access to the section boundary is the junction of the A47 and Lynn Road.

Walking and cycling

13.5.65 No PRoW or cycle routes cross the Scoping Boundary for the Walpole B Substation Siting Zone.

Public transport

13.5.66 Bus service 46 provides regular services between Wisbech and Kings Lynn with stops near to the Walpole B Substation Siting Zone in West Walton and Walton Highway.

Waterways

13.5.67 A number of becks, dykes, and land drains are noted within the Scoping Boundary for Section 7.

Future Baseline

13.5.68 The future baseline relates to known or anticipated changes to the current baseline in the future that are predicted to occur in the absence of the Project. The future baseline would take account of committed developments and transport schemes, along with background growth.

13.5.69 There is no anticipated impact during the operational phase of the Project that will require testing. Therefore, a future baseline will be considered to test construction activity that is likely to have a material impact and may require mitigation works.

13.5.70 The IEMA Guidance (Ref 13.1) suggest that future baseline and cumulative assessment are two different considerations within the environmental assessment process. The IEMA Guidance (Ref 13.1) states that:

13.5.71 *"Derived forecast traffic growth (e.g. TEMPro) should be utilised to derive future year baseline traffic conditions. However, discrete projects within the agreed study area that are existing, approved or likely to come forward (where sufficient certainty and relevant information about the project exists) should not be added to the baseline scenario and should be considered in the cumulative scenario."*

13.5.72 The inference is that this avoids double counting of growth from forecast growth factors and committed developments.

13.5.73 The future baseline will comprise the same Study Area and receptors as the existing (once confirmed). For the Project, it is proposed to use a single scenario that combines forecast growth and committed developments whilst minimizing double counting. The future baseline will be produced by factoring the baseline traffic flows using TEMPro, and then adding any extra trips generated by committed developments where they exceed the TEMPro growth i.e. the difference between the committed development trip generation and the TEMPro growth that would be added to the future baseline. Additional traffic from committed developments will be discussed with the LHAs.

13.5.74 The future baseline traffic volumes will be established for a single year during the construction period, which for the Project, is anticipated to take place between 2029 and 2033. It is proposed to use 2031 as the future baseline assessment year based on the construction period.

13.5.75 The construction assessment will consider the single year future baseline, in conjunction with the peak construction activities from the overall construction programme (whenever these may occur). The peak construction period(s) will be identified within the PEI Report and ES when more detailed construction information is available.

13.5.76 It is difficult to forecast how public transport services may change in the future; therefore, unless information on future services is available, it would be assumed that public transport services for the future year of assessment would be the same as those

currently operating. Similarly, pedestrian and cycle demand and facilities would be assumed to remain unchanged from the base year.

13.5.77 Consideration of any committed development and cumulative developments within the area will also be summarised in the Transport Assessment (TA) and ES.

13.6 Design and Control Measures

Design Measures

13.6.1 The emerging preferred corridor on which the Scoping Boundary is based has been designed to avoid, as far as practicable, sensitive traffic and movement features identified through the Corridor Preliminary Routing and Siting Study (Ref 13.11) and design development with further information within **Chapter 3 Main Alternatives Considered**.

13.6.2 As part of the Project design process, a number of embedded measures will be proposed to reduce the potential impacts for transport and movement. These will evolve over the development process as the EIA progresses and in response to consultation and will be fed iteratively into the assessment process. Examples of such measures include minimising congestion and avoiding severance.

13.6.3 Where road closures are required, the period of the closure would be kept to a minimum and diversions would be via the most appropriate alternative route. Access to properties would be maintained at all times.

13.6.4 Where PRoW closures are required, the period of the closure would be kept to a minimum, and a diversion provided where necessary and practicable. Any route diversions or closures will be discussed with the Local Highway Authority.

13.6.5 Construction traffic would be routed along classified roads as far as possible, and haul roads would be used to minimise construction vehicle movements on local roads.

13.6.6 Construction traffic crossing of rail lines or navigable waterways will be avoided or use existing vehicles crossing where possible.

Control and Management Measures

13.6.7 An Initial Outline Code of Construction Practice (CoCP) is provided at **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could affect the traffic and movement assessment are:

- GG03: A Construction Traffic Management Plan (CTMP) will be produced prior to construction.
- GG13: Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. All plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. Electric, or other low carbon plant and equipment should be used where available and where practicable.
- GG14: Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including excavated materials, drop heights will be limited.

- TT01: CTMP will set out measures to reduce route and journey mileage to and from and around site, and prevent nuisance to the residents, businesses and the wider community caused by parking, vehicle movements and access restrictions. It will also provide suitable control for the means of access and egress to the public highway and set out measures for the maintenance and upkeep of the public highway. The plan will also identify access for emergency vehicles. It will also set out measures to reduce safety risks through construction vehicle and driver quality standards and measures to manage abnormal loads.
- TT02: The contractor(s) will implement a monitoring and reporting system to check compliance with the measures set out within the CTMP. The contractor(s) will also be expected to monitor the number of construction vehicles on key approach routes between the site and the strategic and/or 'A' road network. Deviations from the authorised routes or changes to traffic levels that are higher than the CTMP assumptions will require discussion of the need for additional mitigation measures with directly affected highways authorities.
- TT03: All affected PRoWs will be identified, and any potential permanent or temporary closures detailed in the DCO. All designated PRoWs crossing the working area will be managed with access only closed for periods while construction activities occur. Any required diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns and will be subject to a Public Rights of Way Management Plan. PRoWs crossing the working areas will be managed in discussion with the relevant local authorities and potential temporary closures applied for discussed with the relevant local authority. Access disruption would be reduced as reasonably practicable while construction activities occur.
- W04: Where watercourses are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary spanned bridges. Once the temporary culvert is installed, the area above the temporary culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials, and people. Temporary culverts will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions and kept free from debris. Where used, temporary bridges will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross the bridge.
- AS03: Access to and from residential, commercial, community and agricultural land uses will be maintained throughout the construction period or as agreed through the landowner discussions. This may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels will be communicated to affected parties at the start of the Project, with any changes communicated in advance of the change being implemented. Where field-to-field access points require alteration as a result of construction, alternative field access will be provided in consultation with the landowner/occupier.

13.7 Potential for Significant Effects

13.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 13.6.

13.7.2 The assessment will consider the construction, maintenance and operation of the Project. Details of each of these stages are set out in **Chapter 4 Description of the Project**. The proposed scope of the assessment is set out below and has been determined using the approach described in **Chapter 5 EIA Approach and Methodology.**

13.7.3 **Table 13.2** sets out the receptors identified within the Study Area, the potential impacts as a result of construction, maintenance and/or operation activities associated with the Project, whether these impacts are likely to give to rise to significant effects, and whether the receptor is scoped in or scoped out of the assessment.

13.7.4 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Table 13.2: Impacts, receptors and potential for significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Construction traffic volumes and routes	Increased traffic or Heavy Goods Vehicle (HGV) volumes and congestion due to construction traffic and increased journey times/distance due to road closures/diversions	Road users	**Yes** - whilst short-term and temporary in nature, it is considered that there is still potential for significant effects on road users as a result of construction traffic and road closures/diversions leading to potential Severance, Driver Delay and Highway Safety effects.	**Scoped In**
Construction	Abnormal loads	Increased congestion and increased journey times/distance due to road closures/diversions for abnormal load access	Road users	**No** - abnormal loads would be planned for off peak times when the road network is less busy. Therefore there is expected to be infrequent and limited impacts on road users and therefore not expected to be a significant effects on road users. In-principle routes will be agreed with the local highway authorities and transport of abnormal loads will be subject to the usual permitting/notification process.	Scoped Out
Construction	Construction traffic volumes and routes	Increased traffic volumes and congestion due to construction traffic and increased journey times/distance due to road closures/diversions.	Public transport users (bus)	**Yes** - whilst short-term and temporary in nature, it is considered that there is still potential for significant effects on public transport users as a result of construction traffic and road closures/diversions leading to potential Public Transport Delays.	**Scoped In**
Construction	Construction traffic	Increased traffic volumes due to	Pedestrians and cyclists	**Yes** - whilst short-term and temporary in nature, it is considered that there is still potential for significant	**Scoped In**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
	volumes and routes	construction traffic, increased journey times/distance due to PRoW closures/diversions and construction works in general.		effects on pedestrians and cyclists as a result of construction traffic leading to Traffic Severance and Pedestrian/Cycle Delay, PRoW closures/diversions leading to Severance and/or Increased Journey Time, and general construction works leading to a decline in Pedestrian and Cycle Amenity and additional Fear and Intimidation.	
Construction	Abnormal loads	Increased number of vehicles transporting hazardous loads as a result of construction.	General public	No - there is low potential for significant effects on the general public as a result of a road traffic accident leading to a Hazardous Load spill.	Scoped Out
Construction	Methods to construct OHL	Closure of the railway line to enable construction of the OHL	Railway users	No - methods will be employed when installing OHL to avoid any potential impacts on the railway. This may include overnight blockades/temporary closures to install protection/temporary works.	Scoped Out
Construction	Methods to construct OHL	Closure of waterways to enable construction of the OHL	Waterway users	No - where waterways are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary spanned bridges. Once the temporary culvert is installed, the area above the temporary culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials, and people. Specific detailed designs for each waterway crossing, consistent with the design principles set out in the CoCP will be subject to appropriate consent by the relevant drainage authority.	Scoped Out
Operation/Maintenance	Operational/ maintenance vehicles	Increased traffic volumes and	Road users	No - the number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Driver	Scoped Out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
		congestion due to operational staff trips.		Delay and Highway Safety as a result of travelling to the site.	
Operation/Maintenance	Operational/ maintenance vehicles	Increased traffic volumes and congestion due to operational staff trips	Public transport users (bus)	No - the number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Public Transport Delay as a result of travelling to the site.	Scoped Out
Operation/Maintenance	Operational/ maintenance vehicles	Increased traffic volumes due to operational staff trips.	Pedestrians and cyclists	No - the number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Traffic Severance and Pedestrian Delay as a result of travelling to the site	Scoped Out
Operation/Maintenance	PRoW closures/diversions	Increased journey times/distance due to permanent PRoW closures/diversions associated with the substations	Pedestrians and cyclists	**Yes** - there is potential for significant effects on pedestrians and cyclists as a result of permanent PRoW closures/diversions leading to potential Increased Journey Time, and a decline in Pedestrian and Cycle Amenity.	**Scoped In**
Operation/Maintenance	Operational/ maintenance vehicles	Vehicle crossing points (if required)	Railway users	No – the number of vehicle maintenance trips crossing the railway would be low (if any) and there is not expected to be significant effects on rail passenger delay as a result. Any vehicle crossing points of the railway would be managed to ensure operational rail safety.	Scoped Out

13.8 Proposed Assessment Methodology

13.8.1 The following section summarises the methodology proposed to be used for the traffic and movement assessment which builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology**.

Data Sources

13.8.2 The assessment will be informed by desk studies and site surveys.

13.8.3 The baseline desk studies will build upon the scoping baseline using publicly available data and literature, together with survey data and data requested from local authorities.

13.8.4 An initial desk-based baseline assessment will be undertaken to gather information on highway infrastructure, construction routes and restrictions. The known or predicted current and future baseline will be informed by the following data sources:

- available and relevant traffic count data (DfT/local authority), to determine the levels of base traffic flows on the network under consideration;
- Personal Injury Collision (accident) data available from DfT for latest 5 year period;
- local travel information from various sources – bus operators, rail, PRoW, etc;
- OS/GIS mapping;
- highway boundary information from relevant LHAs;
- Census travel mode share;
- traffic counts and speed survey data;
- non-motorised user counts, and
- online maps and streetviews (i.e. Google, Bing, OpenStreetMaps, etc.).

Surveys

13.8.5 Traffic data will be obtained to determine the traffic flow baseline through various sources, including existing DfT and local authority data (where available). Traffic surveys will be conducted where data is not available and at required locations to support the baseline information.

13.8.6 This will also apply to non-motorised user flows on key routes and PRoW where additional surveys could be used to establish baseline flows. The locations and types of surveys will be agreed with the LHAs.

13.8.7 Where a navigable waterway is likely to be impacted by the construction works, surveys may be required to establish baseline flows along such affected routes.

Assessment scenarios

13.8.8 Where the Project is likely to have a moderate or severe impact on the local highway network, the following scenarios would be assessed to determine the impact of the Project:

- 2031 Future Baseline (‘Without Development’) – AM, PM and daily flows; and

- 2031 Future Baseline plus Construction ('With Development') – AM, PM and daily flows.

13.8.9 A Baseline scenario (2024) would be used from which to develop the future baseline (2031) traffic flows, taking account of committed developments and transport schemes, along with background traffic growth. The future baseline traffic flows would form the basis for assessing the impacts and effects of the Project.

13.8.10 The 'With Development' scenario would consider the 2031 background traffic flows (future baseline), in conjunction with the peak construction activities from the overall construction programme (whenever these may occur).

13.8.11 The peak construction traffic flows will be derived by analysing construction traffic data and the construction programme, along with consideration of any proposed road closures and associated diversions. Construction HGVs would be assigned to designated routes. A simple gravity model would be used to assign worker trips to and from the proposed construction compounds. The result of the assignment of construction traffic to the highway network and any road diversions will be used to calculate the resultant percentage increase on each link.

13.8.12 The scope of the TA will be agreed with the relevant Highway Authorities. In the event that junction capacity analysis is required, this will be discussed and agreed with the LHAs where necessary.

Technical Guidance

13.8.13 In accordance with the IEMA Guidance (Ref 13.1), the following criteria will be considered in this assessment.

- severance of communities;
- road vehicle driver and passenger delay;
- non-motorised user delay;
- non-motorised amenity;
- fear and intimidation on and by road users;
- road user and pedestrian safety; and
- hazardous/large loads.

13.8.14 The IEMA Guidance (Ref 13.1) set out two broad rules for identifying potential highway links for analysis:

- Rule 1: include highway links where traffic flows will increase by more than 30 per cent (or the number of HGVs will increase by more than 30 per cent); and
- Rule 2: include highway links of high sensitivity where traffic flows have increased by 10 per cent or more.

13.8.15 Highway links would therefore be assessed where traffic flows are expected to increase by 30 per cent or more, and where there are increases of 10 per cent or more in an area identified as sensitive.

13.8.16 The IEMA Guidance (Ref 13.1) suggests that the rules may not be appropriate for road safety and driver delay. Safety can be assessed by a competent independent

auditor/professional in accordance with DMRB guidance GG 119 and driver delay by undertaking highway/junction modelling if these aspects require further consideration.

13.8.17 In addition to the above, potential traffic-related effects will also be considered by other topics (see para. 13.1.3).

Assessment Method

13.8.18 **Chapter 5 EIA Approach and Methodology** sets out the standard EIA methodology and matrices to be used for the assessment. The methodology is based on the principle that the environmental effects will be determined by identifying potential receptors, assigning receptor value/sensitivity, assessing the magnitude of change on the receptor and then identifying the significance of the effect. This section provides a summary of the EIA methodology specifically relevant to this chapter.

13.8.19 The type of traffic which is anticipated to be generated by the Project will comprise general traffic, light good vehicles (LGVs), HGVs and Abnormal Indivisible Loads (AILs). It is intended that the proposed routeing and movement of construction traffic would be discussed with the LHAs.

13.8.20 Once the routeing and estimated volumes of construction traffic have been established, these will be compared to the future baseline flow (Without Development) to establish whether the increase in traffic would meet either of IEMA rules 1 and 2. For those locations where there is an increase in traffic of at least 10 per cent, the receptors that would be impacted by the increase in vehicle movements will be identified. Historic data or Automatic Traffic Counts (ATCs) would be used to derive 24 hour Annual Average Daily Traffic (AADT) for individual links, subdivided for total traffic and HGVs.

13.8.21 The methodology for assessing the impact of the Project generated construction traffic will be based on that outlined in the IEMA Guidance (Ref 13.1).

13.8.22 The sensitivity of receptors also considers the groups of people more sensitive/vulnerable to change; young (for example school age or younger), older age, lower income, with poor health or mobility impaired, with social disadvantage.

13.8.23 Sensitive receptor locations will inform the ‘Significance of Effect’ assessment when development traffic is assigned to the network. The IEMA Guidance (Ref 13.1) identifies the following list of ‘special interests’ that should be considered when defining sensitive receptor locations:

- people at home/people at work;
- sensitive and/or vulnerable groups (including younger and older age groups; lower income; poor health status; social disadvantage; and access and geographic factors);
- locations with concentrations of vulnerable users (e.g. hospitals, places of worship, schools, care/retirement homes);
- retail areas;
- recreational areas/tourist attractions;
- collision clusters and routes with road safety concerns; and
- junctions and highway links already at (or over) capacity.

13.8.24 The IEMA Guidance (Ref 13.1) states that this list of affected parties is not exhaustive. One affected party that is not on the list but will nevertheless be considered in this assessment is 'other road users'. All of the affected parties have one thing in common which is that their potential exposure to changes in traffic volume comes about through their proximity to a construction traffic route. It is important to note that the IEMA methodology does not consider the duration of effect, especially whether it is temporary (construction) or permanent (operational traffic). As such, effects identified through using this methodology may initially highlight aspects to be considered significant but later considered acceptable if the effect is temporary or infrequent (occurring only occasionally during construction for example).

Transport Assessment

13.8.25 The ability of the highway network to accommodate the construction traffic will be assessed and reported in a TA which will form a technical annex to the ES Chapter. The TA will include information on:

- relevant national, regional and local policies;
- the existing baseline conditions including a description of the roads, bus routes, railway lines, footpaths, bridleways, cycle paths and navigable waterways crossed by the route and/or impacted by the works;
- personal injury collision data for the most recent five-year period within the proposed Study Area;
- details of the Project including a description of the proposed works, the construction programme, typical working width, compound locations, access routes to compounds, potential road or PRoW closures/diversions and construction methods for individual railway, road and waterway crossings (where appropriate);
- future baseline including committed developments and transport schemes;
- trip generation during construction including worker trips and HGV traffic to/from compounds. Trip generation associated with the operation of the substations and OHLs;
- the distribution and assignment of construction trips on the road network;
- the impact of the construction works and operation of the Project (where applicable) on the transport network;
- mitigation measures, and
- summary and conclusions.

Defining Significance

13.8.26 This section outlines the approach that would be used to determine the sensitivity of the receptors and magnitude of impact.

Sensitivity

13.8.27 The general criteria for defining the importance or sensitivity of receptors for Traffic and Movement are set out in **Table 13.3**. Key factors influencing this include:

- The value of the receptor or resource based upon empirical and/or intrinsic factors, for example, considering any legal or policy protection afforded which is indicative of the receptor or resources' value internationally, nationally or locally; and
- The sensitivity of the receptor or resource to change, for example is the receptor likely to acclimatise to the change. This will consider legal and policy thresholds which are indicative of the ability of the resources to absorb change.

Table 13.3: Sensitivity of receptors

Sensitivity	Description
Very High	Highway links and junctions: more than two sensitive users locations present (eg schools, care/retirement homes, disabled parking bays, hospitals, places of worship, recreational/tourist and retail areas, routes with poor safety and congestion) Walk/cycle/bridleway links including PRoW: heavily trafficked highways with on-road pedestrian/cycle/bridleway routes
High	Highway links and junctions: two sensitive users location present (e.g. schools, care/retirement homes, disabled parking bays, hospitals, places of worship, recreational/tourist and retail areas, routes with poor safety and congestion) Walk/cycle/bridleway links including PRoW: lightly trafficked highway with on-road pedestrian/cycle/bridleway routes
Medium	Highway links and junctions: at least one of the following: • one sensitive users location present (e.g. schools, care/retirement homes, disabled parking bays, hospitals, places of worship, recreational/tourist and retail areas, routes with poor safety and congestion) • many residential properties with direct frontage to the highway link being used for construction traffic • pedestrians using footways, PRoW and/or crossings on highway link • cyclists using on-road designated cycle routes along highway link Walk/cycle/bridleway links including PRoW: heavily trafficked highway with off-road pedestrian/cycle/bridleway routes
Low	Highway links and junctions: at least one of the following: • few residential properties with direct frontage to the highway link being used for construction traffic • workplaces with direct frontage to the highway link being used for construction traffic • cyclists using off-road designated cycle routes along highway link Walk/cycle/bridleway links including PRoW: lightly trafficked highway with off-road pedestrian/cycle/bridleway route
Negligible	Highway links and junctions: no receptors on link

	Walk/cycle/bridleway links including PRoW: pedestrian/cycle/bridleway route not running alongside carriageway

13.8.28 The sensitivity of links within the Study Area will be assigned based on the above criteria. The link sensitivity will be based on an average sensitivity of the whole link with no separate assessment of high/very high receptors. Some links will be broken down into sensible sections where appropriate, i.e. between junctions or villages etc.

Magnitude

13.8.29 The IEMA Guidance (Ref 13.1) states in paragraph 1.27 that the magnitude of each impact should be determined as the predicted deviation from the baseline conditions.

13.8.30 The IEMA Guidance (Ref 13.1) sets out a number of criteria by which the magnitude of impact can be measured. These are outlined below. Many of the criteria do not provide specific thresholds by which such impacts can be measured, and as a result will be measured qualitatively where necessary.

13.8.31 **Severance** – severance is the perceived division that can occur within a community when it becomes separated by major transport infrastructure. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by infrastructure. As set out in para 3.16 of the IEMA Guidance (Ref 13.1), changes in traffic flow of 30 per cent, 60 per cent and 90 per cent are regarded as producing ‘slight’, ‘moderate’ and ‘substantial’ changes in severance, respectively, although caution should be applied to very low baseline flows.

13.8.32 **Road vehicle driver and passenger delay** – traffic delays to non-development traffic can occur as a result of development. The IEMA Guidance (Ref 13.1) indicates that these are only likely to be significant when the traffic on the network is already at, or close to capacity. The Project could result in changes which could significantly affect perceptions of driver delay during construction because of increased vehicle travel demand on the local network. In addition, where any temporary road closures or traffic management is likely to be in place to enable construction of the Project, any additional potential delay caused by resultant diversion routes will be reported. The assessment of delay will be based on technical work reported in the TA (i.e. junction modelling outputs) using professional judgement.

13.8.33 **Non-Motorised User delay** - Drawing upon the IEMA Guidance (Ref 13.1), the assessment of pedestrian delay serves as a proxy for the delay that other modes of non-motorised users may experience when crossing roads. In general, increases in traffic levels and/or traffic speeds are likely to lead to greater increases in non-motorised user delay. The IEMA Guidance (Ref 13.1) advises against definitive thresholds and recommends the use of professional judgement to determine the significance.

13.8.34 Public transport delay occurs due to a temporary closure or diversion of a highway. The effect would depend on whether a temporary closure or diversion is proposed, any increases in bus journey length as a result and how long any potential disruption would last. The assessment will consider indicative thresholds which have been derived based on professional judgement.

13.8.35 **Non-Motorised User amenity** - Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic. Drawing upon the IEMA

Guidance (Ref 13.1), with regard to amenity, there are no set thresholds, but this following is stated, "*a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled*" and that:

"*thresholds… should be used cautiously in any assessment. The assessment of amenity should pay full regard to specific local conditions*."

13.8.36 **Fear and intimidation** – The IEMA Guidance (Ref 13.1) indicate the extent of fear and intimidation is dependent on the volume of traffic, heavy vehicle composition speed of vehicles, proximity of traffic to people and the perception of protection/lack of protection. The guidance sets out thresholds to define the degree of hazard based on average traffic flow, 18hr heavy vehicle flow and average speed over an 18hr day, the level of fear and intimidation from combining the hazard scores and the magnitude of impact based on the change in level from baseline conditions.

13.8.37 **Highway safety** – personal injury collision data for most recent five year period on the local highway to include links and junctions along proposed construction traffic routes. These will be used to assess whether the additional traffic during construction of the Project would be likely to have a detrimental effect on road safety. The IEMA Guidance (Ref 13.1) references collision rates and collision clusters. Links where traffic flows increase by more than 30 per cent (rule 1) will be considered.

13.8.38 **Hazardous and dangerous loads** – The IEMA Guidance (Ref 13.1) states the assessment should estimate the number and composition of such loads and if significant should *include a risk or catastrophe analysis to illustrate the potential for an accident to happen*. There may be a requirement to transport some abnormal or hazardous loads during construction of the Project. This will be identified as the Project progresses. The impacts of such loads will be considered as a qualitative risk assessment. The CTMP and ES will include details of measures that will be employed to ensure the safe vehicular transport of components to and from the Project.

13.8.39 **Table 13.4** and **Table 13.5** summarise the criteria that will be used to assess the magnitude of impact, along with the thresholds that will be used to determine whether the impacts are considered large, medium, small or negligible. Depending on the baseline information available, the various thresholds identified for the proportional increase in traffic flow relate to peak hour and daily flows. Within these tables, neither the sensitivity receptors, nor the duration of effects is taken into consideration. These tables are formed using the IEMA Guidance (Ref 13.1) and professional judgement.

Table 13.4: Magnitude of impact

Impact	Negligible	Small	Medium	Large
Severance	Increase in total flows of 29% or under	Increase in total flows of 30-59%	Increase in total flows of 60-89%	Increase in total flows of 90% and above
Driver delay	Professional judgement – informed by analysis of junction modelling outputs where available and/or length and duration of diversions.			
NMU delay	Professional judgement based on changes in journey time.			

Impact	Negligible	Small	Medium	Large
NMU amenity	Increase in total flows of 49% or under	Increase in total traffic flows of 50-69%	Increase in total traffic flows of 70-99%	Increase in total traffic flows of 100% or above
Fear and intimidation	No change in calculated level of fear and intimidation	One step change in level with <400 veh increase in average 18hr flow and/or <500 HGV in total 18hr flow	One step change in level with >400 veh increase in average 18hr flow and/or >500 HGV in total 18hr flow	Two step change in calculated level of fear and intimidation
Public Transport Delay (diversion)	Percentage change in total bus journey distance less than 10%	Percentage change in total bus journey distance between 10% and 20%	Percentage change in total bus journey distance between 20% and 40%	Percentage change in total bus journey distance 40% or more
Highway safety	Increase in total flows of 29% or under (or increase in HGV flows under 10%)	All links with increase in traffic flows over 30% (or HGVs 10%) and which have an average of more than 3 accidents per year in the most recent five year period would be assessed on case by case basis using professional judgement		
Hazardous/dangerous loads	Probability of personal injury collision occurring – resulting in a serious or fatal incident.			

13.8.40 The above table gives indicative thresholds only where guidance is available. Throughout the assessment professional judgment will be applied taking account of local conditions.

13.8.41 An assessment of national/regional walking and cycling routes as well as PRoW will also be carried out where these are directly affected by construction works or intersected by a construction route, including in terms of severance, NMU delay, NMU amenity, and for fear and intimidation, by reviewing the thresholds as identified in **Table 13.5** where relevant. In terms of PRoW diversions and/or closures, the following thresholds are proposed to identify magnitude based on professional judgement.

Table 13.5: Magnitude of impact of a PRoW diversion and/or closure

Impact	Negligible	Small	Medium	Large
PRoW diversion and/or closure	A diversion and/or closure with less than 100 m increase	A diversion and/or closure with an increase in journey	A diversion and/or closure of 250-500 m or an increase in	A diversion and/or closure of 500 m or more or an increase in

Impact	Negligible	Small	Medium	Large
	in journey length or an increase in journey length for a less than 7 days	length of 100-250 m or an increase in journey length for a period of 1-4 weeks	journey length for 4-8 weeks .	journey length for 8 weeks or more

13.8.42 The tables above set out the proposed magnitude thresholds for the respective environmental impacts that will be considered in the assessment. With the exception of PRoW diversion and closure effects, all effects have a proposed magnitude that does not initially consider the duration over which an effect is likely to be experienced.

13.8.43 Duration is considered when assessing the overall significance of residual effects, recognising that permanent impacts will be more significant than those of a temporary nature and reversibility of the change as set out in DMRB guidance LA 104 (Ref 13.6).

13.8.44 The majority of traffic and movement effects will be associated with the construction of the Project and therefore would be temporary effects. Some temporary effects are likely to last longer than others, and these will be clearly reported in the PEI Report and ES. The permanent closure or diversion of PRoW or changes to the road network would be permanent effects and will be reported in the PEI Repot and ES. Following the quantified assessment, residual effects will be reported taking into account professional judgement on the duration over which effects are likely to be experienced.

Significance of effects

13.8.45 The general approach adopted for evaluating the significance of effects considering the sensitivity of the receptor and the magnitude of impacts is outlined in **Table 13.6**.

Table 13.6: Determination of significance matrix (Traffic and Movement)

Magnitude of effect	Receptor sensitivity				
	Very high	High	Medium	Low	Negligible
Large	Major	Major/ Moderate	Major/Moderate /Minor	Moderate/ Minor	Minor/ Negligible
Medium	Major/Moderate	Major/ Moderate	Moderate/Minor	Minor/ Negligible	Negligible
Small	Major/Moderate /Minor	Moderate/ Minor	Moderate/Minor	Minor/ Negligible	Negligible
Negligible	Minor/Negligible	Minor/ Negligible	Minor/Negligible	Negligible	Negligible

13.8.46 An impact is considered significant if the resultant effect is Major or Moderate and a resultant effect of Minor/Negligible is not considered significant.

13.9 Assumptions and limitations

13.9.1 At this stage the exact extent of the Study Area cannot be confirmed in terms of traffic and movement as detailed discussion have not yet taken place with National Highways or the LHAs for the strategic and local road networks respectively.

13.9.2 Some baseline traffic data has been reviewed but surveys have not yet been undertaken to fully understand the baseline conditions. In particular, data for the summer months, representing peak holiday traffic flows and how they differ from neutral months have not been undertaken.

13.9.3 Base traffic surveys are representative of normal traffic conditions and construction traffic flows will be based upon a best estimate of likely requirements.

13.10 Conclusion

Summary

13.10.1 This scoping chapter has outlined relevant legislation, policy and guidance in relation to the traffic and movement assessment for the Project. The data sources that will be used to predicate current and future baselines have been presented, before stating the management measures that will be adhered to. The potential for significant effects has been identified, as well as the associated source, impact and receptors.

13.10.2 A summary of the proposed scope of the assessment is provided in **Table 13.7**.

Table 13.7: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in or out
Road users	Potential for Severance, Driver Delay and Highway Safety effects due to increased traffic, congestion and journey times/distance from construction traffic and due to road closures/diversions.	Construction	**Scoped In**
Road users	Potential for abnormal loads to increase congestion and increased journey times/distance due to temporary road closures/diversions.	Construction	**Scoped Out**
Public transport users (bus)	Potential for Public Transport Delays due to increased traffic volumes and congestion from construction traffic and increased journey times/distance due to road closures/diversions.	Construction	**Scoped In**
Pedestrians and cyclists	Potential for Pedestrian/Cycle Delay, Severance and/or Increased Journey Time, and decline in Pedestrian/Cycle Amenity and additional Fear and Intimidation due to increased traffic volumes from construction traffic, increased	Construction	**Scoped In**

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in or out
	journey times/distance due to PRoW closures/diversions and construction works in general .		
General public	Potential for Increased Risk from Hazardous Load due to increased number of vehicles transporting hazardous loads as a result of construction.	Construction	Scoped Out
Railway users	No – Blockades/temporary closures to install protection/temporary works likely to occur overnight or during quiet periods to avoid/minimise impact. Any vehicle crossings (fi required) will be managed.	Construction	Scoped Out
Waterway users	No – Temporary closures to install protection/temporary works and crossing methods will be employed to avoid any potential impacts on waterways.	Construction	Scoped Out
Road users	No - the number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Driver Delay and Highway Safety as a result of travelling to the site.	Operation	Scoped Out
Public transport users (bus)	No - the number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Public Transport Delay as a result of travelling to the site.	Operation	Scoped Out
Pedestrians and cyclists	No - the number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Traffic Severance and Pedestrian Delay as a result of travelling to the site.	Operation	Scoped Out
Pedestrians and cyclists	Potential for Increased Journey Time and a decline in Pedestrian and Cycle Amenity due to increased journey times/distance from permanent PRoW closures/diversions associated with the substations.	Operation	**Scoped In**
Railway users	No – the number of vehicle maintenance trips crossing the railway would be low (if any) and there is not expected to be significant effects on rail passenger delay as a result. Any vehicle crossing points of the railway would be managed to ensure operational rail safety.	Operation	Scoped Out

13.11 References

Ref 13.1 Institute of Environmental Management and Assessment (2023). Environmental Assessment of Traffic and Movement [online]. Available at: https://www.iema.net/resources/blog/2023/07/12/new-iema-guidance-environmental-assessment-of-traffic-and-movement [Accessed 4 June 2024].

Ref 13.2 Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2014). Travel Plans, Transport Assessments and Statements [online]. Available at: https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements [Accessed 4 June 2024].

Ref 13.3 Department for Transport and National Highways (2022). Strategic road network and the delivery of sustainable development [online]. Available at: https://www.gov.uk/government/publications/strategic-road-network-and-the-delivery-of-sustainable-development [Accessed 4 June 2024].

Ref 13.4 Department for Transport (2022). Future of freight plan [online]. Available at: https://www.gov.uk/government/publications/future-of-freight-plan [Accessed 4 June 2024].

Ref 13.5 Standards for Highways (2020). LA 103 Scoping projects for environmental assessment [online]. Available at: https://www.standardsforhighways.co.uk/tses/attachments/fb43a062-65ad-48d3-8c06-374cfd3b8c23?inline=true [Accessed 4 June 2024].

Ref 13.6 Standards for Highways (2020). LA 104 Environmental assessment and monitoring [online]. Available at: https://www.standardsforhighways.co.uk/tses/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true [Accessed 4 June 2024].

Ref 13.7 Department for Transport (2020). Cycle infrastructure design (LTN 1/20) [online]. Available at: https://www.gov.uk/government/publications/cycle-infrastructure-design-ltn-120 [Accessed 4 June 2024].

Ref 13.8 Chartered Institution of Highways and Transportation (2000). Guidelines for Providing for Journeys on Foot [online]. Available at: https://www.nottinghamcity.gov.uk/media/gesgw5oh/lappncc40-71118-extract-from-guidelines-for-providing-for-journeys-on-foot-iht-2000.pdf [Accessed 4 June 2024].

Ref 13.9 Sustrans (no date). Temporary diversions of National Cycle Network routes [online]. Available at: https://www.sustrans.org.uk/for-professionals/infrastructure/temporary-diversions-of-national-cycle-network-routes/[Accessed June 2024].

Ref 13.10 Sustrans (no date) Sustrans traffic-free routes and greenways design guide [online]. Available at: https://www.sustrans.org.uk/for-professionals/infrastructure/sustrans-traffic-free-routes-and-greenways-design-guide/ [Accessed 4 June 2024].

Ref 13.11 National Grid (2024). Grimsby to Walpole Corridor Preliminary Routeing and Siting Study [online]. Available at: https://www.nationalgrid.com/electricitytransmission/document/152621/download. [Accessed 4 June 2024].

14. Air Quality

nationalgrid

Contents

14.1 Introduction

14.1.1 This chapter presents how the Air Quality assessment will consider the potentially significant effects on sensitive receptors that may arise from the construction, operation, and maintenance of the Project (as described in **Chapter 4 Description of the Project**). It describes the methodology and datasets to be used within the air quality assessment, presents an overview of the baseline conditions, and identifies the potential likely significant effects to be considered within the assessment, and how these will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project** the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

14.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

14.1.3 This chapter should be read in conjunction with:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 4 Description of the Project;**
- **Chapter 5 EIA Approach and Methodology**;
- **Chapter 8 Ecology and Biodiversity** which assesses the potential for air quality effects on ecological receptors;
- **Chapter 13 Traffic and Movement** which assesses the potential change in traffic movements hence a difference in air quality pollutant emissions;
- **Chapter 17 Health and Wellbeing** which assesses the potential for air quality effects on health and wellbeing; and
- **Chapter 18 Climate Change** which assesses the potential effect on climate from changes in air quality.

14.1.4 This chapter is supported by the following figures:

- **Figure 14.1 Air Quality Monitoring Locations**; and
- **Figure 14.2 Construction Dust Study Area.**

14.2 Legislation, Policy and Guidance

14.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context** and **Appendix 2A Key Legislation, Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy.**

14.2.2 Relevant legislation, guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- Environment Act 1995 (Ref 14.1);
- Environmental Protection Act 1990 (Ref 14.2);
- Air Quality (England) Regulations 2000 (Ref 14.3);
- Air Quality Standards Regulations 2010, as amended in 2016 (Ref 14.4);

- Environment (Miscellaneous Amendments) (EU) Regulations 2020, Regulation 2 of the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 updated the Air Quality Standards Regulations 2010 (Ref 14.5);
- Environment Act 2021 (Ref 14.6);
- The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (Ref 14.7);
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (2024) (Ref 14.8);
- IAQM (2018) Guidance on Monitoring in the Vicinity of Demolition and Construction Sites v1.1 (Ref 14.9);
- IAQM (2017) Land Use Planning and Development Control: Planning for Air Quality (Ref 14.10);
- IAQM (2020) A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites v1.0 (Ref 14.11);
- Department for Environment, Food & Rural Affairs (Defra) and the Devolved Administrations (2022) Local Air Quality Management Technical Guidance (TG22) (Ref 14.12); and
- Joint Nature Conservation Committee (2020) Nitrogen Futures (Ref 14.13).

14.3 Consultation and engagement

14.3.1 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities and Natural England. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

14.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024.

14.3.3 The principal feedback received from both Non-Statutory Consultation and pre-scoping consultation with Natural England of relevance to this scoping chapter is included in **Table 14.1,** together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 14.1: Engagement with Stakeholders

Stakeholder	Summary of Response	Consideration in the Scoping Report
Natural England	For the sections of the cable route which will involve construction traffic movements within 200m of the designated site the potential air quality impacts due to road traffic during the construction phase will need to be considered. When undertaking the assessment there will need to be clarification provided on which roads will be used to access the development site, and the number of predicted vehicle	The air quality assessment will assess air quality impacts on designated sites from construction traffic movements within 200m of roads that exceed the relevant

Stakeholder	Summary of Response	Consideration in the Scoping Report
	movements. Designated sites within 200m of a road which will experience a significant increase in traffic movements should be assessed for impacts due to air pollution from traffic. Natural England has produced guidance for assessing the impacts of air pollution due to traffic.	criteria and will be reported in the PEI Report and ES following the latest version of Natural England or other relevant guidance published at the time of reporting.
Natural England	Ammonia emissions from road traffic could make a significant difference to nitrogen deposition close to roads. As traffic composition transitions toward more petrol and electric cars (i.e., fewer diesel cars on the road) – catalytic converters may aid in reducing NOx emissions but result in increased ammonia emissions – therefore consideration of the potential for impacts is needed (see https://www.aqconsultants.co.uk/news/february-2020-(1)/ammonia-emissions-from-roads-for-assessing-impacts). There are currently two models which can be used to calculate the ammonia concentration and contribution to total N deposition from road sources. One of these models is publicly available and called CREAM (Air Quality Consultants - News - Ammonia Emissions from Roads for Assessing Impacts on Nitrogen-Sensitive Habitats (aqconsultants.co.uk) (Ref 14.14), and there is another produced by National Highways.	The air quality assessment will assess air quality impacts from construction traffic movements on designated sites; and will be reported in the PEI Report and ES using the latest version of CREAM to assess ammonia and nitrogen, where a detailed assessment is required based on Natural England's or other relevant guidance.
Grimsby West Housing Allocation	The consultation documents also highlights the potential risk of temporary impacts limited to localized changes in air quality and noise and vibration during construction. It should be noted from the outline delivery programme for the GWUE (see below) the construction of your project and our development could happen at the same time, and it is important that your scheme has regard to the potential cumulative impacts of both schemes so that appropriate levels of mitigation can be introduced to protect existing residents and future occupants of our development.	The proposed scope and approach of the cumulative effects assessment is explained **Chapter 5 EIA Approach and Methodology.** Cumulative effects on air quality and noise and vibration will be assessed in the air quality chapter and noise and vibration chapter of the PEI Report and ES respectively.

14.4 Study Area

Construction

14.4.1 For the construction phase dust impacts, the air quality Study Area will be defined by the screening criteria from the IAQM Construction Dust Guidance (Ref 14.8):

- A human receptor within the Scoping Boundary plus a 250 m area surrounding, or within 50 m of the proposed routes used by construction traffic on the public highway up to 250 m from the site entrance; and
- an ecological designated site within the Scoping Boundary plus a 50 m area surrounding, or within 50 m of the proposed routes used by construction traffic on the public highway up to 250 m from the site entrance.

14.4.2 At this time, only data for the location of the Scoping Boundary is available. Construction routes, site entrances and the location of source activities are not currently defined, so will be considered as part of the assessment within the Preliminary Environment Impact (PEI) Report and the (ES). It is likely that several 'Study Areas' within the Scoping Boundary will be defined depending either on the location of specific sources or Sections of the overhead line route. The Study Area is presented in **Figure 14.2 Construction Dust Study Area**. As the iterative design process continues, the Scoping Boundary will be refined to comprise the proposed Order Limits within the ES.

14.4.3 The Study Area for the assessment of construction phase road traffic impacts will be defined with reference to Environmental Protection UK/IAQM Planning Guidance (Ref 14.10):

- A change in Light Duty Vehicles (LDVs) of 100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA) or 500 AADT elsewhere; and/or
- a change in Heavy Duty Vehicles (HDVs) >3.5 tonnes of 25 AADT within or adjacent to an AQMA or 100 AADT elsewhere.

14.4.4 In areas where any of the above criteria are met, receptors within 200 m of the road would be scoped into the assessment (Ref 14.10). Construction routes, site entrances and the location of source activities are not currently defined so will be considered as part of the assessment within the PEI Report and the ES. It is therefore not possible to confirm a Study Area for the assessment of construction traffic impacts at the time of Scoping and professional judgement has been used to define the most likely routes construction traffic will take. During the PEI Report and the ES, when construction traffic data becomes available, screening against the IAQM Planning Guidance criteria will be undertaken and a Study Area will be defined. Potential construction traffic routes have been identified using professional judgement on the most likely routes in relation to the Scoping Boundary.

14.5 Baseline Conditions

Data Sources

14.5.1 The baseline assessment has been informed by a desk study which has drawn on the following information sources:

- Defra Background Air Quality Archive (2018-base year) (Ref 14.15);
- Defra AQMA dataset (Ref 14.16);
- Local Air Quality Management Reports (North East Lincolnshire Council, 2023) (Ref 14.17);
- Local Air Quality Management Reports (East Lindsey District Council, 2023) (Ref 14.18);
- Local Air Quality Management Reports (Boston District Council, 2023) (Ref 14.19);
- Local Air Quality Management Reports (South Holland District Council, 2023) (Ref 14.20);
- Local Air Quality Management Reports (Fenland District Council, 2023) (Ref 14.21);
- Local Air Quality Management Reports (Kings Lynn & West Norfolk District Council, 2023) (Ref 14.22);
- Local Air Quality Management Reports (West Lindsey District Council, 2023) (Ref 14.23);
- Ordnance Survey (OS) AddressBase Plus dataset (Ordnance Survey, 2021); and
- Critical level (Nitrogen Oxides (NO_X) and Ammonia (NH_3)) and load (nitrogen deposition rates) data for designated ecological sites. (Ref 14.24).

Baseline

14.5.2 Under the Environment Act 1995 (as amended 2021) (Ref 14.1, Ref 14.6Ref 14.1), local authorities are required to report to Defra on local air quality and local air quality management within their local authority area. This also requires an assessment of compliance with the relevant pollutant concentration limit or objective values and identification of any AQMAs due to exceedances of the relevant Air Quality Standard objectives.

14.5.3 The appropriate local authority Annual Status Reports (ASR) have been reviewed to determine baseline conditions. This report includes a presentation of the most recent, ratified monitoring data from the ASRs and a description of actions to improve air quality in the local authority areas. As the 2024 ASRs are still at draft stage, the latest available monitoring data available to describe local air quality is for the calendar year 2022 which is drawn from the 2023 ASR for each local authority.

Local Authority monitoring

14.5.4 The area delimited by the Scoping Boundary has been split into seven Sections. The Section and corresponding local authority are summarised in **Table 14.2**.

14.5.5 The local authority monitoring data is displayed in **Appendix 14A Local Authority Monitoring** and **Figure 14.1.**

Table 14.2: Sections and substation locations and the relevant local authority

Section Number	Description	Local Authority
1	Grimsby West Substation	North East Lincolnshire West Lindsey
2	Overhead line from Grimsby West Substation to Lincolnshire Connection Substation (LCS) A	North East Lincolnshire East Lindsey
3	LCS A and B (including the overhead line between them)	East Lindsey
4	Overhead line from LCS B to Weston Marsh Substation	East Lindsey Boston South Holland
5	Weston Marsh Substation	South Holland
6	Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation).	Fenland South Holland
7	Walpole B Substation	Kings Lynn & West Norfolk

Potential Sources of Air Pollution

14.5.6 There are two main potential sources of air pollution associated with this Project, construction dust emissions and construction road traffic emissions.

14.5.7 During construction and demolition works required by the Project, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive human receptors within the Study Area. The main potential impacts are loss of amenity (as a result of dust soiling) and deterioration of human health (as a result of concentrations of Particulate Matter (PM_{10})).

14.5.8 Traffic tail-pipe emissions contain air pollutants that are released by construction, operation and maintenance vehicles, including Non-Road Mobile Machinery (NRMM), associated with the Project. The emissions from vehicles include NO_x comprising of Nitrogen Monoxide (NO) and Nitrogen Dioxide (NO_2), NH_3 from vehicular exhaust emissions and PM_{10} and $PM_{2.5}$ from brake and tyre wear.

South Holland District Council Annual Status Report

14.5.9 South Holland District Council monitors NO_2, PM_{10} and Ozone (O_3) (Ref 14.20).

14.5.10 The 2023 ASR states that there are no AQMAs within South Holland District (Ref 14.20).

14.5.11 In relation to NO_2, monitoring is undertaken within South Holland District using two automatic monitors and 15 passive NO_2 diffusion tubes. 10 locations are in proximity to a potential construction traffic route. The relevant monitoring from the 2023 ASR shows

the majority of concentrations decrease from 2019 to 2020 owing to social mobility restrictions imposed because of the COVID-19 pandemic before increasing from 2020 to 2022.

14.5.12 PM_{10} is also monitored by two automatic monitors in South Holland.

14.5.13 The concentrations of both NO_2 and PM_{10} are under half of the 40 µg/m^3 Air Quality Objective (AQO), where NO_2 ranges from 7.4 µg/m³ to 8.9 µg/m³ and PM_{10} ranges from 9 µg/m³ to 15.5 µg/m³. There are no exceedances of the relevant AQO within the monitoring locations across the monitoring period.

Fenland District Council Annual Status Report

14.5.14 Fenland District Council monitors NO_2, and Sulphur Dioxide (SO_2) through Whittlesey brick works (Ref 14.21). There are no anticipated sources of SO_2 during the construction or operation of this Project.

14.5.15 The 2023 ASR states that there are four AQMAs within Fenland District (Ref 14.21). There are three of the four AQMA's within Wisbech. Wisbech AQMA No.1 and No.2 were declared on 1 May 2001 for 15-minute mean concentrations of SO_2 and 24-hour mean concentrations of PM_{10} for an area in central Wisbech surrounding the '*H.L Food'* site owing to exceedances from an industrial source, although there are proposals to revoke this AQMA within the local plan The third Wisbech AQMA was declared in April 2006 for the annual mean of NO_2 for an area extending along the B198 Lynn Road and along the A1101. The fourth AQMA is declared for 15-minute mean SO_2 concentrations in Whittlesey for an area covering an area along roads and cycle routes to the west and northwest of Whittlesey brickworks and an area covering roads, footpaths, dwellings, schools, and public open spaces to the east of Whittlesey brickworks. There is no anticipated impacts onto this AQMA from the Project.

14.5.16 There are no continuous automatic monitors within the local authority area, however monitoring is undertaken using passive NO_2 diffusion tubes at 41 locations. Nine locations are in proximity to a potential construction traffic route. The relevant monitoring from the 2023 ASR shows a general decrease in NO_2 concentrations across the five-year period where all concentrations shown are lower in 2022 than 2018. Although, decreases in concentrations in 2020 and 2021 are likely to be attributed to the social mobility restrictions imposed owing to the COVID-19 pandemic. There are no exceedances of the relevant AQO's seen within the scoped in monitoring locations.

14.5.17 SO_2 concentrations are also monitored by an automatic station in Fenland District Council.

14.5.18 The number of exceedances of SO_2 are below the SO_2 objectives, where two 15-minute mean exceedances occurred (35 being allowed a year).

Boston District Council Annual Status Report

14.5.19 Boston District Council only monitors NO_2 concentrations within their local authority boundary (Ref 14.19).

14.5.20 The 2023 ASR states that there is one AQMA within Boston District (Ref 14.19) located at Haven Bridge along the A16. It was declared in September 2001 because of elevated concentrations of annual mean NO_2. There was also an AQMA at Bargate Bridge declared for exceedances of annual mean NO_2 concentrations, however, the AQMA was revoked in February 2023.

14.5.21 Monitoring is undertaken within Boston District through 15 passive NO_2 diffusion tubes. Twelve locations are in proximity to a potential construction traffic route. The relevant monitoring from the 2023 ASR shows that whilst site ID 3 and 20 have seen decreases in NO_2 concentrations, site ID 1 still sees persistently high concentrations, over the AQO of 40 m3/m^3. All three tubes, site ID 3, 20 and 1, are situated on main roads within Boston but sit over 3.5 km from the Project's Scoping Boundary. Overall, there was a general decrease in NO_2 concentrations across all sites between 2018 and 2022 but concentrations over the AQO for NO_2 at site ID 1. It must be noted that the decrease in concentrations from 2020 to 2021 is likely to be attributed to the social mobility restrictions imposed due to the COVID-19 pandemic.

East Lindsey District Council Annual Status Report

14.5.22 East Lindsey District Council only monitors NO_2 concentrations (Ref 14.18).

14.5.23 The 2023 ASR states that there are no AQMAs within East Lindsey District (Ref 14.18).

14.5.24 Monitoring is undertaken within East Lindsey District using 10 passive diffusion tube sites, no automatic monitoring is undertaken. Three locations are in proximity to a potential construction traffic route. The relevant monitoring from the 2023 ASR shows that concentrations decreased to 2020 (as expected due to coronavirus lockdowns) before rising through 2021 and 2022, although all remain well below the relevant annual mean NO_2 AQO.

Kings Lynn and West Norfolk District Council Annual Status Report

14.5.25 Kings Lynn and West Norfolk measure PM_{10} $PM_{2.5}$and $PM_{2.5}$ concentrations (Ref 14.22).

14.5.26 The 2023 ASR states that there are two AQMAs within Kings Lynn and West Norfolk District (Ref 14.22) declared due to exceedances of annual mean NO_2 concentrations along Railway Road and Gaywood Clock in September 2003 and April 2009, respectively.

14.5.27 Monitoring is undertaken within Kings Lynn and West Norfolk through 72 passive diffusion tube sites and seven automatic monitoring locations. Two locations are in proximity to a potential construction traffic route. The relevant monitoring from the 2023 ASR shows that although there is limited data available, both sites recorded concentrations below the annual mean NO_2 AQO in 2021 and 2022. It must be noted that the 2021 concentrations will be influenced by the social mobility restrictions imposed due to the COVID-19 pandemic.

14.5.28 The concentrations of $PM_{2.5}PM_{10}$ and $PM_{2.5}$ are monitored by automatic stations in Kings Lynn and West Norfolk.

14.5.29 The concentration$PM_{2.5}NO_2$, PM_{10} and $PM_{2.5}$ are below the relevant AQO's.

North East Lincolnshire District Council Annual Status Report

14.5.30 North East Lincolnshire measure pollutant concentrations for NO_2 (Ref 14.17).

14.5.31 The 2023 ASR states that there is one AQMA within North East Lincolnshire District (Ref 14.17) declared due to exceedances of annual mean NO_2 concentrations along Cleethorpe Road in Grimsby in August 2010.

14.5.32 Monitoring of annual mean NO_2 is undertaken within North East Lindsey District through 30 passive diffusion tube sites and two automatic monitoring locations. Twelve locations

are in proximity to a potential construction traffic route. The relevant monitoring from the 2023 ASR shows that concentrations generally decreased from 2018 to 2020 before increasing in 2021 (as consistent with national trends due to behavioural change during coronavirus lockdowns). All concentrations saw a decrease between 2021 and 2022. There are no exceedances of the AQO's seen within the scoped in monitoring locations.

West Lindsey District Council Annual Status Report

14.5.33 West Lindsey District Council measure pollutant concentrations for NO_2 (Ref 14.23).

14.5.34 The 2023 ASR states that there are no AQMAs within West Lindsey District (Ref 14.23).

14.5.35 Monitoring is undertaken within East Lindsey District through 12 passive diffusion tube sites, no automatic monitoring is undertaken. All locations monitored saw concentrations under the AQO, and all of the diffusion tubes are sufficiently remote from the proposed Project and they cannot be considered to represent local air quality. The nearest locations are in Market Rasen, approximately 20 km from the indicative Scoping Boundary.

14.5.36 Across all of the local authority monitoring data there is general decrease in NO_2 concentrations to 2020, as a result of the impact of the COVID-19 pandemic mobility restrictions. The majority of monitoring locations then show an increase in concentrations from 2020 to 2022 as restrictions were reduced.

Background Pollutant Concentrations

14.5.37 The background pollutant concentrations within the Scoping Boundary for each Local Authority are presented in **Table 14.3**.

Table 14.3: 2024 Projected Defra background concentrations within the Scoping Boundary

Local Authority	Average 2024 Concentration $PM_{2.5}m^3$)			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
North East Lincolnshire	8.5	11.0	14.9	8.0
East Lindsey	6.9	8.9	14.5	7.8
Boston	6.6	8.4	15.3	8.2
South Holland	6.1	7.8	15.4	8.4
Fenland	5.9	7.5	15.7	8.6
Kings Lynn	6.2	7.8	15.7	8.7

14.5.38 The background concentrations of NO_2 are generally low (between 5.9 µg/m³ and 8.5 µg/m³) within the Scoping Boundary which is under half of the limit value of 40µg/m³.

14.5.39 The background concentrations of NO_x (relevant to ecological receptors) are generally low within the Scoping Boundary. The maximum local authority background NO_x concentration is 11.0 µg/m³ and the minimum is 7.5 µg/m³, against a limit value for the protection of vegetation of 30 µg/m³.

14.5.40 The background concentrations of PM_{10} do not exceed 50 per cent of the limit value of 40µg/m³. The highest local authority average concentration within the Scoping Boundary is 15.7 µg/m³ and the lowest is 14.5 µg/m³.

14.5.41 $PM_{2.5}$ round concentrations of $PM_{2.5}$ are below the relevant limit value (10 µg/m³) where the maximum local authority average concentration within the Scoping Boundary is 8.0 µg/m³ and the$PM_{2.5}$mum concentration 7.8 µg/m³. $PM_{2.5}$ is the pollutant for which background concentrations are closest to the limit value in 2024.

14.5.42 **Table 14.4** below shows the relevant rate of nitrogen deposition, ammonia concentrations and critical load ranges for the' identified Local Nature Reserves (LNR's) within the Scoping Boundary:

Table 14.4: Deposition rates for ecological sites within Scoping Boundary

Ecological Site	Section of Project	2019 - 2021 Average Concentration				
		Ammonia Critical Level (µg/m³)	Ammonia Concentration (µg/m³)	Nitrogen Deposition (Kg N/ha/yr)	Critical Load Range (Kg N/ha/yr)	Acid Deposition (keq/ha/yr)
Bradley & Dixon Woods Local Nature Reserve	2	3	1.83	24.69	10-15	1.68 (N: 1.76 | S: 0.21)
Willoughby Branch Line Local Nature Reserve	4	3	1.46	26.95	10-15	1.73 (N: 1.92 | S:0.14)

14.5.43 Table 14.4 shows that the average nitrogen deposition rate between 2019 and 2021 ranged from 25 to 27 Kg N/ha/yr. Acid deposition ranged from 1.68 to 1.73 keq/ha/yr. The critical load is exceeded, which is a function of the background at a higher rate than the critical load. The average ammonia concentration ranged from 1.46 µg/m³ to 1.83 µg/m³ which is below the critical level of 3 µg/m³.

Receptors

14.5.44 For scoping, human receptors equating to residential receptors have been used to show indicative human exposure. Only residential receptors have been able to be identified through the current OS dataset provided. It is noted that this is a limitation as a number of other human receptors such as schools, hospitals, care homes and doctors' surgeries will be considered in further detail during the PEIR and the ES. A limit of 250 m from the Scoping Boundary has been used to identify human receptors as per the IAQM guidance (Ref 14.8). This exercise showed that there is a total of 3,469 human receptors within 250 m of the Scoping Boundary. The receptor counts for each distance banding have been presented in **Table 14.5** split by Sections of the Project.

14.5.45 The main communities identified within the proximity to the Scoping Boundary are Brigsley in Section 2, Bisby and Huttoft on the border of Sections 3 and 4, Wigtoft in Section 4, Weston, Broadgate and Newton in Section 6 and West Walton in Section 7. In Section 4, the highest number of receptors within close proximity to the Scoping Boundary are at Wigtoft and surrounds.

Table 14.5: Receptor counts

Section Number	Distance from Scoping Boundary				
	0-20 m	0-50 m	0-100 m	0-200 m	0-250 m
1	3	19	54	241	415
2	51	160	281	648	849
3	8	35	86	267	321
4	136	403	617	868	991
5	15	29	35	40	41
6	35	105	208	518	652
7	27	35	49	131	200
Total	275	786	1330	2713	3469

14.5.46 A scoping exercise was undertaken to identify all designated ecological sites within 200 m of the Scoping Boundary in line with IAQM guidance (Ref 14.8). An ecologically significant site has been defined as a Special Protection Area, Special Areas of Conservation, Ramsar, Site of Special Scientific Interest and Local Nature Reserves.

There are two designated ecological sites that match this criteria, Willoughby Branch Line (LNR) and Bradley & Dixon Woods (LNR).

Future Baseline

14.5.47 The future baseline relates to known or anticipated changes to the current baseline in the future that are predicted to occur in the absence of the Project.

14.5.48 Background air pollutant concentrations are currently available using a 2018 base year for projections (Ref 14.13). These are predicted to improve over time due to reductions in emissions resulting from:

- Reductions in transport emissions resulting from improvements in fuel efficiency and uptake in low emission vehicles;
- general reduction in the use of fossil fuels;
- reductions in pollutant emissions from agricultural sources due to improvements in management envisaged in the 2019 Clean Air Strategy (Ref 14.16); and
- improved emission standards for NRMM and static generators.

14.5.49 The future baseline year of 2030 will be used. Generally, concentrations of air pollutants in the UK are anticipated to decrease in the coming years; as such, in most cases, the earlier the year that is assessed, the more worst-case the assessment is. The earliest year that the Project could potentially be operational by is 2033. Background concentrations are not currently provided from Defra beyond the year 2030. Therefore, in order to take account of uncertainties relating to future year vehicle emissions and background pollutant concentrations to provide a conservative assessment, the assessment will be carried out utilising 2030 background concentrations. This is considered a conservative assumption of emissions in the future.

14.5.50 The predicted concentrations for the year 2030, as shown in **Table 14.6**, show reductions in both NO_2 and NO_x levels within the Scoping Boundary compared to the 2024 forecast as shown in **Table 14.3**. There is a steady reduction in both NO_x and NO_2 concentrations of about 0.6 – 1 µg/m³, and whilst there is a reduction in PM_{10} and $PM_{2.5}$ it is of a lower magnitude of 0.1 – 0.2 µg/m³.

Table 14.6: 2030 Defra background concentrations within the Scoping Boundary

Local Authority	Average 2030 Concentration (µg/m³)			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
North East Lincolnshire	7.7	10.0	14.7	7.8
East Lindsey	6.3	8.1	14.3	7.6
Boston	6.0	7.6	15.1	8.1
South Holland	5.6	7.0	15.2	8.2
Fenland	5.4	6.8	15.5	8.5
Kings Lynn	5.6	7.1	15.5	8.5

14.5.51 The future baseline for background concentrations of NH_3 and rates of nutrient nitrogen deposition are based upon the 2019-21 data from Air Pollution Information System with the application of factors reported in the Joint Nature Conservation Committee Nitrogen Futures report (Ref 14.13). The report states that there will be an increase of 3.5 per cent per annum to inform the concentration values for the expected opening year.

14.6 Design and Control Measures

Design Measures

14.6.1 The Project has sought to avoid, as far as reasonably practicable, sensitive features such as larger residential areas and ecologically designated sites for air quality.

Control and Management Measures

14.6.2 An Initial Outline Code of Construction (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts will be made specific to each Section of the Project based on the individual characteristic of each Section. Those that could affect the air quality assessment include:

- AQ01: Dust management measures will be set out in the Dust Management Plan (DMP) as part of the Construction Environmental Management Plan (CEMP). This will be specific to particular phases of the Project. The DMP, will include, but not be limited to the following:
    - Communications to include display of the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.
    - Site management measures to include recording all dust and air quality complaints, identify causes and take measures to reduce emissions in a timely manner, and record the measures taken.
    - Preparation and management of the site.
    - Monitoring and inspections to include evolving evaluation of Project phases as required and practicable.
    - Construction Operations.
- AQ02: The contractor will ensure that soft strip will be used inside buildings prior to demolition (retaining walls and windows in the rest of building where possible, to provide a screen against dust). Sufficient effective water suppression will be used during demolition operations. The use of explosive blasting will be avoided where possible, using appropriate manual or mechanical alternatives.
- AQ03: The contractor is to ensure exposed areas of earthworks are to be vegetated and stabilised as soon as practicable. Use of hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Covers will only be removed in small areas during working.
- AQ04: During construction, bulk cement and other fine powder materials are to be delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. Sand and other aggregates are stored in bunding areas and not allowed to dry out, unless

this is required for a particular process, in which case ensure that appropriate control measures to reduce dust are in place. For smaller supplies of fine powder materials, bags are to be ensured to be sealed after use and stored appropriately.

- AQ05: If on-site haul routes are used, the contractor is to inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- AQ06: Burning of waste materials and bonfires are not to be undertaken.
- GG01: The Project will be compliant with all relevant legislation, consents and permits.
- GG02: The Project design will be compliant with the guidelines and policies relating to electromagnetic fields stated in National Policy Statement EN-5, including the International Commission on Non-Ionizing Radiation Protection guidelines (1998).
- GG03: A CEMP, a Landscape and Ecological Management Plan, a Site Waste Management Plan and a Construction Traffic Management Plan, Public Rights of Way Management Strategy, Overarching Written Scheme of Investigation, along with a Soil Management Plan will be produced prior to construction. These are collectively referred to as 'the environmental control Plans.'
- GG04: The CEMP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans.
- GG06: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
    - Pollution prevention and pollution incident response;
    - dust management and control measures;
    - location and protection of sensitive environmental sites and features;
    - adherence to protected environmental areas around sensitive features;
    - working hours and noise and vibration reduction measures;
    - working with potentially contaminated materials;
    - waste management and storage;
    - flood risk response actions;
    - agreed traffic routes, access points, etc.;
    - soil management; and
    - drainage management.
- GG11: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG17: Wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing

untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps and groundwater monitoring.

- GG18: Wheel washing facilities will be provided at each main compound, where appropriate. Road sweepers will be deployed on public roads where necessary to prevent excessive dust or mud deposits.
- GG19: Earthworks and stockpiled soil will be protected by covering, seeding, or using water suppression where appropriate.
- GG20: Bonfires and the burning of waste material will be prohibited.

14.7 Potential for Significant Effects

14.7.1 The air quality assessment will consider the construction, operation, and maintenance of the Project. Details of each of these stages are set out in **Chapter 4 Description of the Project.** The proposed scope of the air quality assessment is set out below and has been determined using the approach described in **Chapter 5 EIA Approach and Methodology.**

14.7.2 The potential for the Project to result in the likely significant effects identified below takes into account the design and control and management measures described in Section 14.6, but does not take into account any additional mitigation that could be identified as being required.

14.7.3 **Table 14.7** identifies the sources and potential impacts that could result in a significant effect. Where an impact could give rise to potentially significant effects on receptors identified in the Study Area, these are then scoped into the assessment. Impact pathways that are unlikely to give rise to potentially significant effects on receptors identified in the Study Area are scoped out of the assessment. The following pathways have been identified:

- Fugitive dust emissions associated with demolition, earthworks construction and trackout can become airborne, increase particulate matter concentrations and cause ecological and health impacts to receptors; and,
- construction and operational vehicle emissions can increase local air pollutant concentrations and nitrogen deposition rates which may have adverse impacts to sensitive human and ecological receptors.

Table 14.7: Potential sources, impacts and pathways with receptors.

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
Construction	Fugitive dust emissions	Increased levels of dust deposition which can cause ecological and health impacts from elevated particulate matter concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	Yes – there is potential for significant effects if no mitigation was implemented on site.	Scoped in
	Combustion emissions from NRMM and static equipment such as power generators for cable pulling	Increase in local air pollutant concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	No – it is predicted that there will be no significant impact due to the short-term nature and best practice followed within the CoCP and NRMM standards.	Scoped out
	Construction vehicle emissions	Increase in local air pollutant concentrations and nitrogen deposition rates.	Sensitive ecological and human receptors within 200 m of roads that may be affected by the project.	Yes – there is a potential for a significant effect if traffic flows are above the IAQM criteria (Ref 14.10).	Scoped in
Operation/ Maintenance	Dust generating activities	Increased levels of dust deposition which can cause ecological and health impacts from elevated particulate matter concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	No – due to infrequent, temporary and transient nature and incorporation of best practice measures.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in or out
	Operation and maintenance vehicle emissions	Increase in local air pollutant concentrations and nitrogen deposition rates.	Sensitive ecological and human receptors within 200 m of roads that may be affected by the project.	No - it is predicted that the vehicle trips will not exceed the IAQM criteria (Ref 14.10). However, full screening of the traffic flows will occur to confirm whether there is a significant effect.	Scoped out
	Emissions from NRMM	Increase in local air pollutant concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	No – it is predicted that there will be no significant impact due to the short-term nature and best practice followed within the CoCP and NRMM standards.	Scoped out

14.8 Proposed Assessment Methodology

Proposed Assessment Methodology

14.8.1 The overall assessment methodology for the EIA is outlined in **Chapter 5 EIA Approach and Methodology.**

14.8.2 In addition to the data sources outlined in 14.4, the following datasets will be used to inform the air quality assessment

- Meteorological Datasets;
- construction traffic flows and routing;
- operation and maintenance traffic flows and routing; and
- Project design information.

14.8.3 The legislation, policy and technical guidance that will be used to inform the air quality assessment is commensurate with those outlined in Section 14.2.

Construction Dust Assessment

14.8.4 The assessment of construction impacts will be undertaken in line with IAQM guidance on the assessment of dust from demolition and construction (Ref 14.8). This guidance provides a risk-based approach to the assessment of the potential for dust effects from four types of activities taking account of the sensitivity of the environment surrounding the works: demolition; earthworks; construction; and track-out (the movement of dust/mud offsite on construction vehicles).

14.8.5 Construction dust effects will be assessed for each specific Section as detailed in **Error! Reference source not found.**. This will produce a specific dust emission risk per Section and allow the application of location-specific mitigation.

Sensitivity

14.8.6 A receptor is defined as, '*a location that may be affected by dust emissions during demolition and construction. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust'* within the IAQM guidance (Ref 14.8).

14.8.7 The sensitivity of an area, hence receptor sensitivity, to dust impacts is defined as either low, medium or high and IAQM guidance (Ref 14.8) distinguishes these impacts as outlined in **Table 14.8**.

Table 14.8: Descriptions of levels of sensitivity

Level of Sensitivity	Description
Low	Where enjoyment of amenity would not reasonably be expected and exposure would be for limited periods e.g. footpaths, shopping streets and car parks. Locally designated ecological sites.

Level of Sensitivity	Description
Medium	Where users would expect to enjoy a reasonable level of amenity and value could be diminished by dust soiling e.g. parks and places of work. Nationally designated ecological sites
High	Where human receptors expected to be present continuously for extended periods of time e.g. residential properties, hospitals, schools and care homes. Internationally or nationally designated ecological sites

Magnitude

14.8.8 The level of magnitude is determined by the scale and nature of works that will be undertaken using the relevant descriptors outlined within IAQM guidance (Ref 14.8) and are displayed in **Table 14.9**.

Table 14.9: Descriptions of levels of magnitude

Level of Magnitude	Description
Small	Demolition volume under 12,000 m^3 less than 6 m above ground level, total site area less than 18,000 m^2, soil type with large grain size, construction material with low potential for dust release, less than 20 HDV trips per day, unpaved road length less than 50 m etc.
Medium	Demolition activities 6 m – 12 m above ground level with a total volume of 12,000 m^3 – 75,000 m^3, moderately dusty soil type, potentially dusty construction material, total site area of 18,000 m^2 – 110,000 m^2, 20 to 50 HDV trips per day, unpaved road length 50 – 100 m etc.
Large	On-site crushing and screening demolition, demolition activities greater than 12 m above ground level and 75,000 m^3, total site area greater than 110,000 m^2, more than 50 heavy earth moving vehicles active at any one time, on site concrete batching, sandblasting, more than 50 HDV trips per day, unpaved road length greater than 100 m etc.

Significance of effects

14.1.1 The IAQM guidance on the assessment of dust from demolition and construction (Ref 14.8) recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations. The main purpose of the assessment of dust risk is to ensure that any proposed mitigation is appropriate for the Project.

14.1.2 With appropriate mitigation in place, the IAQM guidance indicates that the residual effect dust emissions associated with the demolition and construction can be classified as being 'not significant'.

Construction Traffic Vehicle Emission Assessment

14.8.9 The proposed traffic flows using the public highway as a result of construction of the Project could meet the assessment criteria from the IAQM guidance (Ref 14.8) Where

the traffic flows meet the criteria for more than the duration of a year, detailed dispersion modelling will be undertaken. This screening will subject to professional judgement on the extent of the impact on the relevant road links to assess the changes in concentrations of air pollutants. The screening criteria are:

- A change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere; and
- a change in HDV (>3.5 tonnes) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.

14.8.10 Road links that do not meet the criteria will not be subject to assessment.

Sensitivity

14.8.11 Human and ecological sensitive receptors, within 200 m of the roads that exceed the screening criteria will be considered. Relevant sensitive human receptor locations are places where members of the public might be expected to be regularly present over the averaging period of the AQOs. This includes but is not limited to residential properties, schools, care homes and hospitals. Ecological receptors are considered sensitive if they are classified as a designated site of local, national or international importance.

Magnitude

14.8.12 If the screening criteria are met or exceeded, then a calculation of emissions from traffic will be undertaken using the latest available version of the Defra Emissions Factors Toolkit (currently v12.0.1) in conjunction with construction traffic flow information from the Transport Assessment. This would also consider the need for road closures and diversions where necessary. Dispersion modelling would be undertaken using the Air Dispersion Modelling System-Roads dispersion modelling program.

14.8.13 The conversion of road NO_x to NO_2 will be undertaken using the latest version of the Defra NOx to NO_2 Calculator (currently v8.1).

14.8.14 Calculation of emissions from traffic will be undertaken with the most recently available local air quality management tools and background air quality concentrations from Defra. These are periodically updated, and this may occur during the course of the Project. Where this occurs, the tools and data used will be stipulated to maintain continuity, where appropriate, throughout the Project.

14.8.15 The magnitude of change will be assessed by comparing a do minimum scenario, with no Project traffic flows, to a do something, with Project traffic flows. This magnitude of change in pollutant concentrations combined with the background concentrations allows for the assessment of significance.

Significance

14.8.16 The significance of effects will be assessed by comparing the percentage change of modelled concentrations in ‘with Project’ and ‘without Project’ scenarios at identified receptors relevant to the air quality objectives as shown in **Table 14.10** and established in the IAQM planning guidance (Ref 14.10).

Table 14.10: IAQM impact descriptors for individual receptors

Long Term Average Concentration at Receptor in Assessment Year	% Chance in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 -109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

14.8.17 The guidance states that the overall assessment of significance should be based on professional judgement, taking into account factors including:

- The number of properties affected by 'slight', 'moderate' or 'substantial' adverse air quality impacts and a judgement on the overall balance;
- the magnitude of the changes and the descriptions of the impacts at the receptors;
- whether or not an exceedance of an National Air Quality Objective (NAQO) or limit value is predicted to arise in the operational Study Area (where there are significant changes in traffic) where none existed before or an exceedance area is substantially increased;
- the uncertainty, comprising the extent to which worst-case assumptions have been made; and
- the extent to which an NAQO or limit value is exceeded.

14.9 Assumptions and Limitations

14.9.1 There is limited information available for NRMM during the construction and maintenance phase, however, it is assumed that the work will be short term in nature and best practice followed within the CoCP and NRMM standards.

14.9.2 It has been assumed that the IAQM Land-Use Planning & Development Control: Planning for Air Quality (January 2017) (Ref 14.10) screening criteria will not be met or exceeded for operation / maintenance vehicles. However, if it the predicted traffic flows exceed the criteria a full assessment will be considered.

14.9.3 Only residential receptors have been able to be identified through the current OS dataset provided. It is noted that this is a limitation as a number of other human receptors such as schools, hospitals, care homes and doctors surgeries will be considered in further detail during the PEIR and the ES.

14.10 Conclusion

Summary

14.10.1 The assessment of the risk of impacts from construction dust has been scoped into the ES on the basis that there is a possibility of a significant effect on receptors in close proximity to the Project. This will be completed using the IAQM (January 2024) Guidance on the Assessment of Dust from Demolition and Construction.

14.10.2 Emissions from NRMM and static equipment has been preliminarily scoped out as it is assumed that the work will be short term in nature and best practice followed within the CoCP and NRMM standards.

14.10.3 If the IAQM Land-Use Planning & Development Control: Planning for Air Quality (January 2017) (Ref 14.10) screening criteria are met or exceeded for construction vehicles, then an assessment of the effects of the emissions of construction traffic using the public highway will be scoped into the assessment. The assessment of emissions from diverted traffic and road closures has been scoped out, however, if the above criteria is exceeded, this effect will be scoped into the assessment.

14.10.4 In the operational phase, it is predicted that there will be infrequent and temporary dust generating activities which will not lead to significant impacts. Therefore, operational dust generation has been scoped out.

14.10.5 There will be the use of road vehicles associated with the maintenance of the project. However, the numbers of vehicles are expected to be small and as such operational effect are scoped out of the assessment pending the screening of anticipated traffic volumes against the screening criteria.

14.10.6 The use of NRMM within the operation and maintenance phase is predicted not to have a significant impact due to the short term nature and best practice followed within the CoCP and NRMM standards and is therefore scoped out.

14.10.7 A summary of the proposed scope of the assessment is provided **in Table 14.11**.

Table 14.11: Proposed scope of the assessment

Receptor	Potential for Significant Effects	Project phase	Scoped in/out
Dust Emissions	Yes - elevated airborne dust can cause potential harm to human and ecological receptors	Construction	Scoped in in accordance with IAQM construction dust guidance.
Dust Emissions	No	Operation and Maintenance	Scoped out as there are no anticipated operational / maintenance dust emission sources.
NRMM Emissions	No	Construction	Scoped out provisionally based on temporary nature – further. information required to confirm this at PEIR stage.

Receptor	Potential for Significant Effects	Project phase	Scoped in/out
NRMM Emissions	No	Operation and Maintenance	Scoped out as there is no NRMM expected during operation or maintenance.
Vehicular Emissions	No - potential harm to ecological and human receptors from elevated pollutant concentrations	Construction, Operation and Maintenance	Scoped out subject to not exceeding the IAQM traffic screening.

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15. Noise and Vibration

nationalgrid

Contents

15.1 Introduction

15.1.1 This chapter presents how the noise and vibration assessment will consider the potentially significant effects on noise and vibration sensitive receptors (NSRs), such as residential dwellings, schools, and health care facilities, that may arise from the construction, operation, and maintenance of the Project (as described in **Chapter 4 Description of the Project**). It describes the methodology and datasets to be used within the noise and vibration assessment, presents an overview of the baseline conditions, and identifies the potential likely significant effects to be considered within the assessment, and how these will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

15.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

15.1.3 This chapter should be read in conjunction with:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 4 Description of the Project**;
- **Chapter 5 EIA Approach and Methodology**;
- **Chapter 8 Ecology and Biodiversity** – impacts on ecology receptors;
- **Chapter 9 Historic Environment** – impacts of heritage assets, including vibration;
- **Chapter 13 Traffic and Movement** – impacts of construction traffic; and
- **Chapter 17 Health and Wellbeing** – amenity and nuisance on the population.

15.1.4 This chapter is supported by the following figures:

- **Figure 15.1 Noise and Vibration Study Area**; and
- **Figure 15.2 Noise and Vibration Baseline**.

15.2 Legislation, Policy and Guidance

15.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context** and **Appendix 2A Key Legislation, Appendix 2B National and Regional Planning Policy and Appendix 2C Local Policy**.

15.2.2 Relevant guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- BS 5228-1:2009+A1:2014. 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' (BS 5228-1) (Ref 15.1);
- BS 5228-1:2009+A1:2014. 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration' (BS 5228-2) (Ref 15.2);
- Calculation of Road Traffic Noise 1988 (CRTN) (Ref 15.3);
- Design Manual for Roads and Bridges LA 111: Noise and Vibration (DMRB LA 111) (Ref 15.4);

- BS 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142) (Ref 15.5);
- BS 7445-1:2003 ‘Description and measurement of environmental noise. Guide to quantities and procedures’ (BS 7445) (Ref 15.6);
- BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ (BS 8233) (Ref 15.7);
- ISO 9613-2:2024 ‘Acoustics – Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors’ (ISO 9613) (Ref 15.8); and
- Association of Noise Consultants BS 4142:2014+A1:2019 Technical Note (ANC Guidance) (Ref 15.9).

15.3 Consultation and Engagement

15.3.1 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities, Natural England, and the Environment Agency. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

15.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. No pre-scoping engagement has been undertaken for noise and vibration which is considered to be an appropriate approach and normal practice for this discipline.

15.3.3 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 15.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 15.1: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
Grimsby West Housing Allocation	The consultation documents also highlights the potential risk of temporary impacts limited to localised changes in noise and vibration during construction. It should be noted from the construction of your project and our development could happen at the same time, and it is important that your scheme has regard to the potential cumulative impacts of both schemes so that appropriate levels of mitigation can be introduced to protect existing residents and future occupants of our development. The consultation document confirms at paragraph 9.2.17 that no potential adverse air quality impacts are anticipated during operation, but it goes on to say that there is the potential for localised changes in noise and vibration on settlements adjacent to the siting areas. The GWUE would significantly	The proposed scope and approach of the cumulative effects assessment is explained Chapter 5 EIA Approach and Methodology. Appendix 4A Initial Outline Code of Construction Practice outlines how construction noise and vibration will be managed. Noise and vibration impacts on noise sensitive receptors will be included in the noise and vibration chapter of the PEI Report

Stakeholder	Summary of response	Consideration in the Scoping Report
	increase the proximity of the new substation and the OHLs to this new community. Indeed, adjacent to your development we are proposing to locate a primary and secondary through school. We note from your list of constraints within Table 5-6 that residential areas and education establishments are susceptible to noise and vibration issues associated with your type of development. It is important that suitable mitigation measures are put in place to avoid any adverse impacts.	and ES. This would include consideration of potential impacts on noise sensitive receptors proposed within the Grimsby West Housing Allocation.

15.4 Study Area

15.4.1 The Study Area for the noise and vibration scoping is illustrated in **Figure 15.1 Noise and Vibration Study Area**. The study area is 1km from the Scoping Boundary.

15.5 Baseline Conditions

Data Sources

15.5.1 The known or predicted current and future baseline environment described in this section has been informed by the following data sources:

- Ordnance Survey (OS) AddressBase Plus data, as presented within **Figure 15.1 Noise and Vibration Study Area**;
- Department for Environment, Food and Rural Affairs (Defra) strategic noise mapping, presented as noise contours within **Figure 15.2 Noise and Vibration Baseline**, represents the daytime ambient noise levels from road and rail sources and Noise Important Areas (NIAs); and
- Current OS mapping.

Baseline

15.5.2 The emerging preferred corridor on which the Scoping Boundary is based has been designed as far as practicable to avoid NSRs. This includes avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of NSRs being isolated dwellings and small settlements. **Figure 15.1 Noise and Vibration Study Area** also shows NSR locations, including residential and non-residential receptors.

15.5.3 The noise environment is expected to vary along the Scoping Boundary depending on the nature of the area. For example, close to noise sources, such as roads and railways and in built up areas, ambient noise levels are expected to be higher. Further away from road and rail sources and in rural areas, ambient and background noise levels would be expected to be lower. Daytime noise level contours from existing road and railway sources are presented in **Figure 15.2 Noise and Vibration Baseline**, showing how existing noise levels vary along the Scoping Boundary. Areas outside of the contours are generally considered to have low ambient and background noise levels. Areas

where the road and rail contours overlap are considered to experience noise effects from both sources.

15.5.4 NIAs are determined via strategic noise maps and highlight the residential areas experiencing the highest 1 per cent of noise levels from road and rail sources in England and are shown in **Figure 15.2 Noise and Vibration Baseline**.

15.5.5 Construction vibration impacts are assessed against fixed thresholds, rather than relative thresholds. It is assumed that the existing vibration levels within the Scoping Boundary are negligible compared to construction vibration threshold values, which is likely to be the case even close to railways or busy main roads.

15.5.6 The Project has been divided into seven Sections as detailed in **Chapter 4 Description of the Project**. The Sections are split from north to south by the geographical alignment of the Scoping Boundary and are included as per the following in this chapter:

- Section 1 - Grimsby West Substation.
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation (LCS) A.
- Section 3 - LCS A and B (including the overhead line between them).
- Section 4 - Overhead line from LCS B to Weston Marsh Substation.
- Section 5 - Weston Marsh Substation.
- Section 6 - Overhead line from Weston Marsh Substation to the new substation at Walpole (herein after referred to as Walpole B Substation).
- Section 7- Walpole B Substation.

15.5.7 Specific details of the baseline environment in the various Sections along the Scoping Boundary are provided below.

Section 1: Grimsby West Substation

15.5.8 This Section is located within a mixed rural and suburban environment to the west of Grimsby. The main sources of environmental noise include the A180 to the north, the A1136 to the east, and the Barton Line to the north, as well as traffic on local roads. In terms of industrial sources, there is the existing National Grid Grimsby West Substation as well as agricultural activity.

15.5.9 There are several NIAs close to the Section, including NIA_6541 and NIA_6542 on the A1136.

15.5.10 With regards to NSRs in the Section, there are built up residential areas of Great Coates to the west of Grimsby, Healing, and Laceby. There are also isolated dwellings, farmhouses, and settlements.

15.5.11 This Section includes part of the strategic allocation location of the proposed Grimsby West Urban Expansion which would also be considered during the assessment. The proposed urban expansion aims to deliver 3,500 new homes and associated facilities, as well as new transport links.

Section 2: Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A

15.5.12 This Section is predominantly rural, passing through agricultural land. The main sources of environmental noise include the A46 Grimsby Road, the A16, the B1200, and the A157, as well as traffic on local roads. In terms of industrial sources, the main source of noise is likely to be agricultural activity.

15.5.13 There are several NIAs close to the Section, including NIA_6550, NIA_6551 and NIA_6552 on the A46 Grimsby Road, and NIA_14303 on the A16.

15.5.14 With regards to NSRs in the Section, the emerging preferred corridor passes by several built-up areas, particularly to the north, and villages. These include the southwest of Grimsby off Laceby Road, Barnoldby le Beck, Waltham, Brigsley, North Thoresby, Fulstow, Yarburgh, Covenham St Mary, Little Carlton, South Reston, and Withern. There are also isolated dwellings, farmhouses, and settlements.

15.5.15 The northern part of this Section also includes part of the strategic allocation location of the proposed Grimsby West Urban Expansion, as detailed above.

Section 3: Lincolnshire Connection Substation A and B (including the overhead line between them)

15.5.16 This Section is predominantly rural, passing through agricultural land. The main sources of environmental noise include the A1104 and the A1111, as well as traffic on local roads. In terms of industrial sources, the main source of noise is likely to be agricultural activity.

15.5.17 There are no NIAs close to the Scoping Boundary in this Section.

15.5.18 With regards to NSRs in the Section, the emerging preferred corridor passes by several villages. These include Woodthorpe, Saleby, Thoresthorpe, and Bilsby. There are also isolated dwellings, farmhouses, and settlements.

Section 4: Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation

15.5.19 This Section is predominantly rural, passing through agricultural land. The main sources of environmental noise include the A158 Skegness Road, the A16, the A1121, the A52, the A17, and the and the Poacher Line, as well as traffic on local roads. In terms of industrial sources, the main source of noise is likely to be agricultural activity.

15.5.20 There are no NIAs close to the Scoping Boundary in this Section.

15.5.21 With regards to NSRs in the Section, the emerging preferred corridor passes by several built-up areas and villages. These include Cumberworth, Sloothby, Burgh le Marsh, Irby in the Marsh, Midville, Sibsey, Gipsey Bridge, Hubbert's Bridge, Kirton End, Wigtoft, and Surfleet. There are also isolated dwellings, farmhouses, and settlements.

Section 5: Weston Marsh Substation

15.5.22 This Section is predominantly rural, passing through agricultural land. The main sources of environmental noise are likely to be relatively distant road traffic on the A52 and A17, as well as traffic on local roads. In terms of industrial sources, the main source of noise is likely to be agricultural activity.

15.5.23 There are no NIAs close to the Scoping Boundary in this Section.

15.5.24 With regards to NSRs in the Section, these are predominantly isolated dwellings and farmhouses.

Section 6: Overhead line from Weston Marsh Substation to Walpole B Substation

15.5.25 This Section is predominantly rural, passing through agricultural land. The main sources of environmental noise include the A151 and the A1101, as well as traffic on local roads. In terms of industrial sources, the main source of noise is likely to be agricultural activity.

15.5.26 There is one NIA close to the Section, namely NIA_11378 on the A151.

15.5.27 With regards to NSRs in the Section, the emerging preferred corridor passes by several built-up areas and villages. These include Weston Spalding, Weston Hills, Moulton, Whaplode St Cathrine, Holbeach St Johns, Tydd St Giles, and Newton. There are also isolated dwellings, farmhouses, and settlements.

Section 7: Walpole B Substation

15.5.28 This Section is predominantly rural, passing through agricultural land. The main sources of environmental noise are likely to be relatively distant road traffic on the A47 and A1101, as well as traffic on local roads. In terms of industrial sources, the main source of noise is likely to be agricultural activity.

15.5.29 There are no NIAs close to the Scoping Boundary in this Section.

15.5.30 With regards to NSRs in the Section, the emerging preferred corridor passes by several villages. These include the Ingleborough, West Walton, and Walton Highway. There are also isolated dwellings, farmhouses, and settlements.

Future Baseline

15.5.31 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES.

15.5.32 With regards to construction noise, no significant changes to the future noise and vibration baseline that would affect the assessment are anticipated owing to the largely rural and agricultural nature of the Scoping Boundary. Should there be any changes, these would be assessed within the ES.

15.5.33 With regards to operational noise, there are several other projects which are proposed to be located in proximity to the Project, particularly around proposed substation locations due to the desire to connect into the National Grid transmission network. These projects have the potential to affect the future baseline. However, it is the intention to assess the impacts of such projects with reference to an agreed baseline at shared NSRs, and consider any potential cumulative effects. Changes to the future baseline would therefore not be expected to affect the assessment of operational noise. However, should there be any changes, these would be assessed within the ES.

15.6 Design and Control Measures

Design Measures

15.6.1 The Project has been routed to avoid designated sites and NSRs as far as possible, considering both overhead line routeing and substation sites, as set out in the Corridor Preliminary Routing and Siting Study (Ref 15.10).

15.6.2 Further embedded measures will be developed as the Project design evolves, for example through detailed routeing within the Scoping Boundary.

15.6.3 The proposed overhead line system is a 'triple Araucaria' conductor bundle, which is regarded as practically quiet during both typical dry and wet weather conditions and would not lead to significant adverse effects at nearby NSR.

15.6.4 In addition, pylon fittings, such as insulators, dampers, spacers, and clamps, are designed and procured in accordance with a series of National Grid Technical Specifications and must be type registered (rigorously tested) to ensure the fitting conforms to the specification. These processes reduce the potential for audible noise and tones to occur from all types of fittings, including insulators. Where noise does occur, it is likely to be localised and of short duration. If this is due to a fault, action can be taken to rectify it. Where noise from fittings does occur which results in a complaint, appropriate action can be taken to seek to remedy the cause of the noise, usually through cleaning or replacing the relevant fitting.

15.6.5 At this stage, the proposed substations have not yet been designed. However, appropriate noise mitigation measures will be considered in the designs. This will include consideration of plant selection, site layout, screening, and enclosures, as may be considered appropriate.

15.6.6 Substation plant would also include vibration isolation measures. This is principally to protect the plant from potential external sources of vibration, but also serves to attenuate vibration from the plant such that vibration levels would be well below significant levels, even immediately adjacent to the plant.

Control and Management Measures

15.6.7 Construction noise and vibration will be managed using best practicable means (BPM), secured through the Code of Construction Practice and management plans.

15.6.8 Standard measures comprising management activities and techniques, would be implemented during construction of the Project to limit impacts through adherence to good site practices and achieving legal compliance. This is captured within **Appendix 4A Initial Outline Code of Construction Practice** in accordance with Control of Pollution Act (CoPA) (Ref 15.11) and Environmental Protection Act (Ref 15.12)**:**

- GG04: Suitably experienced Environmental Managers will be appointed for the duration of the construction phase. In addition, qualified and experienced Environmental Clerks of Works will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the Management Plans. The Environmental Clerks of Works will monitor that the works proceed in accordance with relevant environmental Development Consent Order (DCO) requirements and adhere to the required good practice and mitigation measures. The Environmental Clerks of Works will be supported as

necessary by appropriate specialists, including ecologists and arboriculturists, soils and land drainage experts.

- GG05: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
  - pollution prevention and pollution incident response;
  - dust management and control measures;
  - location and protection of sensitive environmental sites and features;
  - adherence to protected environmental areas around sensitive features;
  - working hours and noise and vibration reduction measures;
  - working with potentially contaminated materials;
  - waste management and storage;
  - flood risk response actions;
  - agreed traffic routes, access points, etc.;
  - soil management; and
  - drainage management.
- GG06: A Construction Environmental Management Plan (CEMP), a Landscape and Ecological Management Plan, a Site Waste Management Plan and a Construction Traffic Management Plan, Public Rights of Way Management Strategy, Overarching Written Scheme of Investigation, along with a Soil Management Plan will be produced prior to construction. These are collectively referred to as 'the environmental control Plans.'
- GG07: The CEMP shall include measures to manage dust, waste, water, noise, and vibration during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans.
- GG11: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG13: Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. All plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. Electric, or other low carbon plant and equipment should be used where available and where practicable
- GG14: Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including excavated materials, drop heights will be limited.
- GG25: Working areas will be appropriately fenced. For some locations the fence used may also serve to provide acoustic and visual screening of the work sites and reduce the potential for disturbance of users in the surrounding areas. Fencing will be regularly inspected and maintained and removed as part of the demobilisation unless otherwise specified.

- GG26: Members of the community and local businesses will be kept informed regularly of the works through active community liaison and groups with local membership. This will include notification of noisy activities, heavy traffic periods and start and end dates of key phasing. A contact number will be provided which members of the public can use to raise any concerns or complaints about the project. All construction-related complaints will be logged by the contractor(s) in a complaints register, together with a record of the responses given and actions taken.
- TT01: The CTMP will set out measures to reduce route and journey mileage to and from and around site, and prevent nuisance to the residents, businesses and the wider community caused by parking, vehicle movements and access restrictions. It will also provide suitable control for the means of access and egress to the public highway and set out measures for the maintenance and upkeep of the public highway. The plan will also identify access for emergency vehicles. It will also set out measures to reduce safety risks through construction vehicle and driver quality standards and measures to manage abnormal loads.
- TT02: The contractor(s) will implement a monitoring and reporting system to check compliance with the measures set out within the CTMP. The contractor(s) will also be expected to monitor the number of construction vehicles on key approach routes between the site and the strategic and/or 'A' road network. Deviations from the authorised routes or changes to traffic levels that are higher than the CTMP assumptions will require discussion of the need for additional mitigation measures with highways authorities.
- NV01: Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise will be set out within the CEMP.
- NV02: BPM measures will be identified within the Code of Construction Practice (CoCP) and may include housing continuous noisy plant in acoustic enclosures, siting semi-static equipment as far as reasonably practicable away from occupied buildings, and fitting equipment with suitable enclosures or screening.

Control of Pollution Act 1974

15.6.9 The CoPA (Ref 15.11) sets out the framework for the legislative control of construction noise and vibration on any given site. It also sets out the principle of BPM (as defined in Section 72 of the Act) and how that should be applied to construction activity noise. The Act refers to approved Codes of Practice, which include British Standards 5228 Part 1 and Part 2, as being relevant for the purposes of determining the 'best practicable means'.

15.6.10 Section 61 of the Act states that consent may be sought from the relevant local authorities prior to the construction works commencing. If prior consent is sought, the relevant local authorities will need to be provided with information about the proposed construction works and how construction noise will be managed, including the use of BPM.

15.7 Potential for Significant Effects

15.7.1 The noise and vibration assessment will consider the construction, operation, and maintenance of the Project. Details of each of these stages are set out in **Chapter 4**

Description of the Project. The proposed scope of the noise and vibration assessment is set out below and has been determined using the approach described in **Chapter 5 EIA Approach and Methodology**.

15.7.2 The potential for the Project to result in the likely significant effects identified below takes into account the embedded and control and management measures described in Section 15.6.8.

15.7.3 **Table 15.2** identifies the sources and potential impacts that could result in a significant effect. Where an impact could give rise to potentially significant effects on receptors identified in the Study Area, these are then scoped into the assessment. Impact pathways that are unlikely to give risk to potentially significant effects on receptors identified in the Study Area are scoped out of the assessment.

Table 15.2: Impacts, receptors and the potential for significant effect

Project phase	Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
Construction	Construction activities including general construction activities, such as construction of the overhead line, and substations.	Noise impact from construction activities.	NSRs within the Study Area	Yes – there is the potential for effects due to construction noise within the Study Area. There is a greater likelihood of significant adverse effects from construction noise at static sites, such as construction compounds where the duration of works may be medium to long term. Construction noise hotspots are likely to include in areas where piling may be required and at any trenchless crossing locations where night-time working may be required where certain operations cannot be stopped once started.	**Scoped in**
		Vibration impact from construction activities.	Structures within the Study Area	Yes – construction vibration would not be expected to cause damage to buildings or structures unless very high levels of vibration are generated within approximately 10 m. In practice, measures would be put in place to avoid potential damage to structures. However, this would be reviewed during the iterative design process and potential areas of concern would be highlighted.	**Scoped in**
		Vibration impact from construction activities.	Humans within NSRs in the Study Area	Yes – there is the potential for effects on human receptors (i.e. nuisance) due to construction vibration at NSRs within the Study Area.	**Scoped in**

Project phase	Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
	Construction traffic	Noise impact at NSRs	NSRs within the Study Area	Yes – there is the potential for significant effects at NSRs close to construction traffic routes.	**Scoped in**
		Vibration impact at NSRs	NSRs within the Study Area	No – vibration from traffic on the public highway is caused by irregularities in the road surface. Where the road surface is well maintained, as per TT01, and free from irregularities, such as potholes, significant vibration effects would not be expected, even at relatively short distances.	Scoped out
Operation	Overhead lines	Noise impact from overhead lines	NSRs within the Study Area	No – operational noise from the overhead lines is not likely to be significant at nearby NSRs under any weather conditions owing to the proposed 'triple Araucaria' conductor bundle (see Section 15.6) and is therefore proposed to be scoped out of further noise assessment. Should the iterative design process result in alternative conductor types being used, consideration for this would be assessed within the noise and vibration assessment. Technical information would be submitted as part of the application for development consent to support scoping out noise associated with overhead lines from the noise and vibration assessment.	Scoped out
	Substation reactive plant (e.g., transformers) and	Noise from substation reactive plant (e.g., transformers) and	NSRs within the Study Area	Yes – there is the potential for significant effects at NSRs close to substations where they contain reactive plant, such as	**Scoped in**

Project phase	Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
	associated cooling plant	associated cooling plant		transformers, and their associated cooling plant. Transformer noise is almost constant, with a hum occurring at exact harmonics of the supply frequency; 100 Hz and 200 Hz components are usually dominant. Transformers generally run continuously except for occasional maintenance and fault outages. Transformer coolers typically emit a broadband noise; however, their operation depends on temperature and loading.	
	Substation switchgear and auxiliary plant	Noise from substation switchgear and auxiliary plant	NSRs within the Study Area	No – Switchgear noise is generated, in the main, by the operation of circuit breakers, for which the noise emissions are 'impulsive' in character (i.e., of short duration). Switchgear operations would be very infrequent. Modern switchgear operates with a dull 'thud'. Switchgear would operate infrequently and is therefore proposed to be scoped out. Auxiliary plant may comprise standby diesel generators and air compressors to provide emergency back-up power to cooling plant. When present and operating, these may contribute to the broadband noise climate. They do not run continuously, and in any case, would be housed in a building or outdoor acoustic enclosure. Noise from such assets is therefore not considered significant, given its emergency function and as such is proposed to be scoped out.	Scoped out

Project phase	Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
	Operational vibration	Vibration impact at NSRs	NSRs within the Study Area	No – There are no sources of operational vibration proposed as part of the Project and substation plant would include vibration isolation measures within the design (see Section 15.6).	Scoped out
Maintenance	Maintenance for overhead lines, and/or tunnel head houses	Noise or vibration impact from maintenance activities	NSRs within the Study Area	No – maintenance of the overhead lines, and substations would be infrequent and localised and short term in duration. Maintenance activities would follow standard measures to reduce noise and vibration where required.	Scoped out

15.8 Proposed Assessment Methodology

Proposed Data Sources

15.8.1 The following data sources are proposed to be used to inform the noise and vibration assessment:

- AddressBase Plus data;
- Noise survey data;
- Project design information;
- Construction programme, schedule, and plant data (if available);
- Baseline and construction traffic data;
- Topography data;
- Substation plant noise and/or specification data;
- Defra strategic noise mapping;
- NIAs; and
- Current OS mapping.

Proposed Assessment Methodology

15.8.2 The following section summarises the methodology proposed to be used for the noise and vibration assessment which builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology.**

Sensitivity

15.8.3 NSRs are determined partly on property type, for example residential properties are of a higher sensitivity than factories and offices. The sensitivity of residential NSRs is factored into the assessment criteria for noise and vibration impacts.

15.8.4 Although all residential NSRs are sensitive to noise and vibration, there are also cases where the sensitivity of an NSR may depend on the pre-existing noise climate. For example, NSRs falling within existing high noise areas (such as NIAs) may be more sensitive to increases in noise than those outside NIAs. Consideration would be given to such instances as part of the assessment of construction traffic impacts.

15.8.5 Although the sensitivity of residential NSRs is factored into the assessment methodologies, additional consideration of sensitivity may be required in certain cases for non-residential NSRs. The criteria used to determine the value and sensitivity of non-residential NSRs specific to noise and vibration are set out in **Table 15.3**:. These values are based on standard practice.

Table 15.3: Criteria for determining value/sensitivity – non-residential NSRs

Sensitivity/value	Impact
High	Schools and education premises, hospitals, clinics, care homes, places of worship, community centres, libraries.
Medium	Areas primarily used for leisure activities including Public Rights of Way, sports facilities, sites of historic or cultural importance, camp sites, hotels, gardens parks.
Low	Offices, cafes/bars with external areas.
Negligible	Industrial or retail premises.

Assessment Study Areas

Study area for construction noise and vibration

15.8.6 The assessment study areas for noise impacts would comprise NSRs within 300 m from construction works associated with the Project, excluding traffic on the public highway which is considered separately below. This is based on guidance in BS 5228-1 (Ref 15.1) and DMRB LA 111 (Ref 15.4).

15.8.7 At the time of writing this Scoping Report, traffic data and construction traffic routes were not available. Noise from construction traffic on the existing road network would be assessed for each applicable road affected and defined within the ES. The assessment would consider the change in Basic Noise Level (BNL), calculated in line with the methodology described in CRTN, with a subsequent assessment of the impacts on NSRs along existing routes where potential significant effects are identified in accordance with DMRB LA 111.

15.8.8 The proposed assessment study area for vibration impacts, based on guidance from BS 5228-2 (Ref 15.2) and DMRB LA 111, comprises 100 m from construction activities with a potential to generate vibration, such as piling or compaction.

Study Area for operational noise

15.8.9 New substations are proposed in the following Sections:

- Section 1 - Grimsby West Substation;
- Section 3 - LCS A and B;
- Section 5 - Weston Marsh Substation; and
- Section 7- Walpole B Substation.

15.8.10 The proposed Study Area for operational noise comprises 1 km from each substation, based on guidance from ISO 9613 (Ref 15.8), with a particular emphasis on the closest NSRs.

Magnitude

15.8.11 This section describes the impact magnitudes for the various noise and vibration sources associated with the Project. Reference is made to ‘lowest observed adverse effect levels’ (LOAEL) and significant observed adverse effect levels’ (SOAEL) when describing the magnitude of impact for the various sources. LOAELs and SOAELs are

defined based on applicable guidance with reference to the Noise Policy Statement for England (Ref 15.16) and Planning Practice Guidance for Noise (Ref 15.17).

Impact magnitude – construction noise

15.8.12 Construction noise impacts will be assessed in accordance with BS 5228-1 (Ref 15.1) and with the guidance of DMRB LA 111 (Ref 15.4).

15.8.13 Construction noise levels will be calculated at the facades of NSRs within the Study Area in accordance with the methodology described in Annex F of BS 5228-1. The predicted construction noise levels at NSRs would be compared against the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the 'ABC' method). The Category 'A' construction noise thresholds represent the lowest assessment criteria (typically used to assess impacts in rural areas) and are proposed to be used throughout the Project as a worst-case unless there is a justification for a higher threshold to be set at specific locations.

15.8.14 The LOAEL and SOAEL for construction noise will be established in accordance with **Table 15.4**:.

Table 15.4: Construction noise LOAELs and SOAELs at residential receptors

Time Period	LOAEL	SOAEL
Weekdays 7:00am to 7:00pm, and Saturdays 7:00am to 1:00pm	50 dB $L_{Aeq,T}$	65 dB $L_{Aeq,T}$
Weekdays 7:00pm to 11:00pm, Saturdays 1:00pm to 11:00pm, and Sundays 7:00am to 11:00pm	50 dB $L_{Aeq,T}$	55 dB $L_{Aeq,T}$
Night-time 11:00pm to 7:00am	40 dB $L_{Aeq,T}$	45 dB $L_{Aeq,T}$

15.8.15 The magnitude of impact of construction noise would be determined against the criteria specified by DMRB LA 111 as detailed in **Table 15.5**:.

Table 15.5: Magnitude of impact from construction noise at residential receptors

Magnitude	Construction Noise Level
Large	Above or equal to SOAEL +5 dB
Medium	Above or equal to SOAEL and below SOAEL +5 dB
Small	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Impact magnitude – construction traffic noise

15.8.16 Noise from construction traffic on the public highway would be calculated in accordance with CRTN (Ref 15.3) and assessed against the criteria detailed in DMRB LA 111 (Ref 15.4). The BNL from roads within the construction traffic Study Area would be calculated in accordance with CRTN for the 'do-nothing' and 'do-something' scenarios in the construction year.

15.8.17 The calculated BNL values for the ‘do-minimum’ and ‘do-something’ scenarios in the construction year would be compared to determine the magnitude of the impact in accordance with criteria specified by DMRB LA 111 as detailed in **Table 15.6**:.

Table 15.6: Magnitude of impact from construction traffic noise at residential receptors

Magnitude	Increase in BNL of Closest Public Road Used for Construction Traffic (dB)
Large	Greater than or equal to 5.0
Medium	Greater than or equal to 3.0 and less than 5.0
Small	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

Impact magnitude – construction vibration on human receptors

15.8.18 Construction vibration levels would be calculated and assessed in accordance with the methodologies described in BS 5228-2 (Ref 15.2). Since the vibration impact depends on the absolute vibration level instead of comparing against baseline vibration level, no vibration baseline study is proposed within the assessment and construction vibration levels will be compared against fixed appropriate assessment criteria detailed in BS 5228-2.

15.8.19 Vibration levels from construction activities would be calculated in accordance with the methodology described in Annex E of BS 5228-2. Construction vibration effect threshold levels, including applicable LOAEL and SOAEL, are presented in **Table 15.7**:.

Table 15.7: Construction vibration effect levels at residential receptors

Vibration Level mm/s PPV*	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments (LOAEL).
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents (SOAEL).
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments
* Peak Particle Velocity	

15.8.20 The magnitude of impact of construction vibration would be determined against the criteria specified by DMRB LA 111 (Ref 15.4), as detailed in **Table 15.8**:.

Table 15.8: Magnitude of impact of construction vibration at residential receptors

Magnitude	Construction Vibration Level
Large	Above or equal to 10 mm/s PPV
Medium	Above or equal to SOAEL and below 10 mm/s PPV
Small	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Impact magnitude – construction vibration on structures

15.8.21 As above, construction vibration levels would be calculated and assessed in accordance with the methodologies described in BS 5228-2 (Ref 15.2). Since the vibration impact depends on the absolute vibration level instead of comparing against baseline vibration level, no vibration baseline study is proposed within the assessment and construction vibration levels will be compared against fixed appropriate assessment criteria detailed in BS 5228-2.

15.8.22 Vibration levels from construction activities would be calculated in accordance with the methodology described in Annex E of BS 5228-2.

15.8.23 In the case of potential structural damage an impact magnitude scale is not deemed appropriate. As such a fixed threshold is proposed

15.8.24 BS 5228-2 notes that the probability of damage tends towards zero at 12.5 mm/s PPV. Buildings and structures where the predicted vibration level is above or approaching this value will be highlighted such that measures can be put in place to reduce vibration levels. The specific threshold may be reviewed for specific structures as deemed appropriate.

Impact magnitude – operational substations

15.8.25 The assessment of operational noise will follow the methodology stated in BS 4142 (Ref 15.5).

15.8.26 Noise limits will be determined based on background sound level surveys at locations representative of nearby NSRs. Sound level surveys will be conducted in accordance with the requirements of BS 4142 and in general accordance with the methodology detailed in BS 7445 (Ref 15.6).

15.8.27 BS 4142 assesses the potential significance of effects by comparing the 'rating sound level' of an industrial source to the typically representative ‘background sound level’ at the location of nearby receptors. The sound rating is a combination of the specific sound level at the NSR and any applicable penalties that may be required for acoustic character, such as tonality or impulsivity.

15.8.28 The specific sound level at nearby NSRs will be predicted by incorporating the available substation design information in a computer noise model, based on the methodology detailed in from ISO 9613 (Ref 15.8).

15.8.29 The predicted sound rating levels will be compared against the relevant noise limits determined from the baseline sound level survey data. The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact, depending on context. Where the rating level does not exceed the

background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

15.8.30 When considering context, BS 4142 references BS 8233 (Ref 15.7) as providing context where background and rating noise levels are low. BS 8233 provides recommended noise levels for a variety of situations and locations, including in habitable spaces such as living rooms and bedrooms, and external amenity areas. Guidance may also be sought from the ANC BS 4142 guidance (Ref 15.9).

15.8.31 It is anticipated that further detailed assessment of operational noise from the proposed substations, once the designs have been finalised, detailing specific mitigation measures would be secured via a requirement of the consent, if granted. The assessment will therefore focus on setting of noise limits such that adverse impacts are avoided. It is standard practice to set the limit for operational noise such that the sound rating level does not exceed the background sound level, such that the impact is negligible (or 'low', as defined by BS 4142), depending on context. The magnitude impacts for operational noise are detailed in **Table 15.9**:.

Table 15.9: Magnitude of impact from operational substation noise

Magnitude	Comparison of sound rating level and background sound level
Large	Rating level > 10dB above the background sound level
Medium	Rating level between 5 and 9 dB above background sound level
Small	Rating level between 0 and 4 dB above background sound level
Negligible	Rating level below background sound level

Significance of effects

15.8.32 The significance of effect at residential and non-residential NSR would be expressed as a result of the sensitivity of the NSR and magnitude of impact on receptors, experienced as a result of the Project. The significance would be expressed as major, moderate, minor, negligible, or neutral and either adverse or beneficial.

Significance of construction effects on residential receptors

15.8.33 Noise from construction activities, construction traffic noise, and construction vibration would constitute a significant adverse effect at residential NSRs where it is determined that a large or medium magnitude of impact would occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; and/or
- a total number of days or nights exceeding 40 in any six consecutive months.

Significance of operational effects on residential receptors

15.8.34 Operational noise impacts will constitute a significant adverse effect where it is determined that a large or medium magnitude of impact occur at residential NSRs.

Significance of effects on non-residential receptors

15.8.35 With regards to non-residential receptors, the significance of effect would be determined via the matrix shown in **Table 15.10**:, taking account of the sensitivity of the NSR and

the impact magnitude. For construction impacts, the duration of impact would also be considered, as above, depending on the receptor type.

Table 15.10: Significance matrix at non-residential NSRs

Magnitude	NSR sensitivity			
	High	Medium	Low	Negligible
Large	Major	Major	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Small	Moderate	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

15.8.36 Major and moderate effects are typically considered to be significant, whilst minor and negligible effects are not considered to be significant. However, professional judgement would also be applied in reaching conclusions as to the significance of effects at specific non-residential NSRs.

15.9 Assumptions and limitations

15.9.1 The assessment of noise and vibration will be based on the best available data with regards to proposed construction methods at the time of assessment. Where there is uncertainty in the assessment, this will be stated and precautionary principles will be applied, such as assuming the shortest distance between construction noise sources and NSRs, typical worst-case plant selection, and high percentage ‘on-times’.

15.9.2 The assessment of operational noise will be based on available design information and/or National Grid noise specification data for operational plant. Proposed plant would be required to produce noise levels at or below the specification noise levels and therefore the assessment would be expected to be relatively worst-case.

15.10 Conclusion

Summary

15.10.1 With regards to noise and vibration impacts associated with the Project, the assessment of construction noise and vibration, construction traffic noise, and operational noise from substation reactive plant (such as transformers) are scoped into the assessment. No significant adverse effects are expected from the operation of overhead lines, substation switchgear and auxiliary plant, and maintenance due to the embedded measures applied as part of the project design. Operational noise from overhead lines, substation switchgear and auxiliary plant, and maintenance noise is therefore scoped out of the assessment. However, evidence will be provided as part of the application for development consent to justify scoping out operational noise from overhead lines.

15.10.2 Based on the desktop study, most of the study area is within the rural area and baseline noise levels are low. The lower construction noise thresholds detailed in BS 5228-1 will therefore be used in the assessment of construction noise.

15.10.3 A summary of the proposed scope of the assessment is provided in **Table 15.11**:.

Table 15.11: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phase(s)	Proposed to be scoped in/out
NSRs within the study area	**Yes**	Construction noise	**Scoped in**
	Yes	Construction vibration on human receptors	**Scoped in**
	Yes	Construction vibration on structures	**Scoped in**
	Yes	Construction traffic noise	**Scoped in**
	No	Construction traffic vibration	Scoped out
	No	Operational noise from overhead lines	Scoped out
	Yes	Operational noise from reactive substation plant (e.g., transformers)	**Scoped in**
	No	Operational noise from substation switchgear and auxiliary plant	Scoped out
	No	Operational vibration	Scoped out
	No	Maintenance noise and vibration	Scoped out

15.11 References

Ref 15.1 BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, British Standard Institution, 2014.

Ref 15.2 BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration, British Standard Institution, 2014.

Ref 15.3 Department of Transport. (1988). Calculation of Road Traffic Noise.

Ref 15.4 Highways England et al. (2020). Design Manual for Roads and Bridges LA 111 Noise and vibration.

Ref 15.5 BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound, British Standard Institution, 2019.

Ref 15.6 British Standard 7445-1:2003 – Description and measurement of environmental noise – Part 1: Guide to quantities and procedures, British Standard Institution, 2003.

Ref 15.7 BS 8233:2014 Guidance on sound insulation and noise reduction for buildings, British Standard Institution, 2014.

Ref 15.8 ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors. International Organisation for Standardization. 2024.

Ref 15.9 BS 4142:2014+A1:2019 Technical Note Version 1.0. Association of Noise Consultants, 2020.

Ref 15.10 Grimsby to Walpole Corridor Preliminary Routeing and Siting Study. January 2024 [online]. Available at: https://www.nationalgrid.com/electricity-transmission/document/152621/download [Accessed 4 June 2024]

Ref 15.11 Control of Pollution Act 1974 [online]. Available at: https://www.legislation.gov.uk/ukpga/1974/40/contents [Accessed 11 July 2023]

Ref 15.12 Environmental Protection Act 1990 [online]. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents [Accessed 11 July 2023]

Ref 15.13 Department for Energy Security & Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1).

Ref 15.14 Department for Energy & Climate Change. (2024). National Policy Statement for Electrical Networks Infrastructure (EN-5).

Ref 15.15 Ministry of Housing, Communities & Local Government. (2023). National Planning Policy Framework.

Ref 15.16 Department for Environment, Food and Rural Affairs. (2010). Noise Policy Statement for England.

Ref 15.17 Planning Practice Guidance for Noise. 2019 [online]. Available at: https://www.gov.uk/guidance/noise--2 [Accessed 3 May 2024].

16. Socio-economics, Recreation and Tourism

nationalgrid

Contents

16.1 Introduction

16.1.1 This chapter presents how the socio-economic, recreation and tourism assessment will consider the potential likely significant effects on socio-economic, recreation and tourism receptors that may arise from the construction, maintenance and operation of the Project (as described in **Chapter 4 Description of the Project**). It describes the methodology and datasets to be used within the assessment, presents an overview of the baseline conditions, and identifies the potential likely significant effects to be considered within the assessment, and how these will be assessed for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project**, the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

16.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

16.1.3 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to the EIA:

- **Chapter 2 Regulatory and Planning Policy;**
- **Chapter 3 Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology**.

16.1.4 The assessment will consider the potential for likely significant socio-economic, recreation and tourism effects on the following receptors:

- the labour market (including employment, supply chain effects, training and apprenticeship opportunities);
- users of promoted recreational routes and users of Public Rights of Way (PRoW) of significance in the local area (because they are heavily used and/or popular with visitors);
- local communities; and
- land use, including local businesses, visitor attractions, tourism accommodation, community facilities, open space, utilities and renewables infrastructure, and development land.

16.1.5 It is important to note that there are interrelationships related to the potential effects on socio-economics, recreation and tourism and other environmental topics, for example the likely amenity impacts of these receptors are assessed within specific topic chapters, and the scope of the assessment seeks to avoid duplication or double counting the reporting of significant effects throughout the Environmental Statement (ES). The approach suggested seeks to draw on findings of other topic chapters taking into account the potential for in-combination effects. Therefore, please also refer to the following chapters:

- **Chapter 7 Visual** – amenity effects on population and users of promoted recreational routes and PRoW of significance in the Study Area;
- **Chapter 12 Agriculture and Soils –** impacts on farm holdings;

- **Chapter 13 Traffic and Movement –** impacts on access and promoted recreational routes and PRoW of significance in the Study Area;
- **Chapter 14 Air Quality –** amenity effects on residential and community receptors, and local businesses in the Study Area;
- **Chapter 15 Noise and Vibration –** amenity effects on noise and vibration sensitive receptors, including residential and community receptors, local businesses, and users of promoted recreational routes and PRoW in the Study Area; and
- **Chapter 17 Health and Wellbeing –** amenity effects on population and users of promoted recreational routes and PRoW of significance in the Study Area.

16.1.6 This chapter is supported by the following figures:

- **Figure 16.1 Indices of Multiple Deprivations**; and
- **Figure 16.2 Socio-economic, Tourism and Recreation Receptors**.

16.1.7 At the time of writing, efforts to obtain sufficient Geographic Information Systems (GIS) data to produce an additional figure to show Strategic Land Allocations are ongoing. It is intended that this will be available for the Preliminary Environmental Information (PEI) Report.

16.2 Legislation, Policy and Guidance

16.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context** and **Appendix 2A Key Legislation, Appendix 2B National and Regional Policy** and **Appendix 2C Local Policy.**

16.2.2 Relevant guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- Homes & Communities Agency (HCA) Additionality Guide (Ref 16.1).

16.3 Consultation and Engagement

16.3.1 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities and Natural England. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA. For example, with the National Trust, relevant tourism boards, Greater Lincolnshire Local Enterprise Partnership (LEP), and representatives of local access, businesses and local community groups.

16.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. No pre-scoping engagement has been undertaken for socio-economics, recreation and tourism, which is considered to be an appropriate approach and normal practice for this discipline.

16.3.3 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 16.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 16.1: Engagement with Stakeholders

Stakeholder	Summary of response	Consideration in the Scoping Report
National Trust	The National Trust believes that there will be a significant amount of disruption during construction in connection with the new pylons, substations, haul roads, and construction compounds. At this stage they are concerned about the possible impacts on transport routes to Sandilands and Gunby (from A111/A157/A158) and how this may impact upon business and local tourism.	Potential impacts on businesses and local tourism receptors from a socio-economic perspective will be considered in the PEI Report and ES. The impacts on transport routes will be considered in the transport and movement assessment in the PEI Report and ES.
Norfolk County Council	National Grid will need to set out clearly from the outset: a) How local communities impacted by the onshore construction (e.g. Cable Route and Substation) can have such impacts mitigated.	Potential impacts on communities from a socio-economic perspective will be considered in the socio-economics, recreation and tourism assessment in the PEI Report and ES. Impacts such as noise and access will be mitigated through the control and management measures set out in **Appendix 4A Initial Outline Code of Construction Practice** (CoCP).
Boston Aerodrome, Fenland Airfield, and Strubby North Airfield	Concerns raised over the proposed height of the pylons and the overhead lines and potential impacts on flight paths and commercial operations of the airfields	The socio-economics, recreation and tourism assessment will assess impacts on airfield receptors within the Study Area as detailed in **Table 16.2.** It is acknowledged that there are aerodromes and airfields outside of the Study Area and any potential impact of the Project on flight paths will be considered through ongoing stakeholder engagement.

16.4 Study Area

16.4.1 The Study Area for the assessment of socio-economic, recreation and tourism effects varies depending on the likely spatial extent of the effect under consideration.

16.4.2 The proposed Study Areas for this Project is shown on **Figure 1.1 Scoping Boundary** and **Figure 16.2 Socio-economic, Tourism and Recreation Receptors**.

16.4.3 **Table 16.2** summarises the Study Areas considered for each receptor type that are taken into account within this Chapter.

Table 16.2: Study Areas

Receptor type	Study Area for direct effects	Study Area for indirect effects
Population and deprivation	Receptors located within the Scoping Boundary	Receptors located within a regional and sub-regional level
Economy and employment	Receptors located within a regional and sub-regional level	Receptors located within a regional and sub-regional level
Tourism and recreation	Receptors located within the Scoping Boundary	Receptors located within 5 km of the Scoping Boundary
Local business and community receptors	Receptors located within the Scoping Boundary	Receptors located within 500 m of the Scoping Boundary
Development land, utilities and renewables infrastructure	Receptors located within the Scoping Boundary	Receptors located within 500 m of the Scoping Boundary
Strategic housing land allocations	Receptors located within the Scoping Boundary	Receptors located within 500 m of the Scoping Boundary
Promoted recreational routes and PRoW of significance in the local area	Receptors located within the Scoping Boundary	Receptors located within 500 m of the Scoping Boundary
Open space	Receptors located within the Scoping Boundary	Receptors located within 500 m of the Scoping Boundary

16.5 Baseline Conditions

Data Sources

16.5.1 A summary of baseline socio-economic conditions has been collated and presented based upon review of the following datasets:

- Office for National Statistics (ONS), Census 2021 (Ref 16.2);
- ONS (2024) Mid-year population estimates (Ref 16.3);
- Ministry of Housing, Community and Local Government (now Department for Levelling Up, Housing and Communities), (2019), English Indices of Deprivation (Ref 16.4);
- ONS (2023), Regional Gross Value Added (balanced) per head and income components (Ref 16.5);
- ONS (2022), UK Business Register and Employment Survey (Ref 16.6);
- ONS (2018) Population projections (Ref 16.7);
- Ordnance Survey (OS) Open Greenspace (Ref 16.8);
- OS Local Important Buildings (Ref 16.9);
- OS AddressBase (Ref 16.10); and

- Visit Britain (2023), Great Britain Tourism Survey (Ref 16.11).

16.5.2 Data gathering for the baseline is ongoing and any additional datasets made available by the relevant Local Planning Authorities (LPAs) or other third-party stakeholders such as the tourism boards will be incorporated at PEI Report and ES stage. This will complement existing information (for example the OS Local Important Buildings dataset has been used to identify community receptors such as schools, religious buildings, and sport and leisure facilities in the Study Area). Additional information could, for example, include data from tourism economic impact assessments commissioned by the LPAs, such as reports from the Scarborough Tourism Economic Activity Monitor.

16.5.3 In addition, the baseline for private assets is based on desk-based research to identify locations of residential properties, businesses, community and recreational facilities and development land allocations. Publicly available information on planning permissions relative to the Project has also been gathered using data available from the relevant LPAs. This will be set out and mapped in the ES.

16.5.4 The baseline for development land allocations will be provided in the PEI Report and ES. Development land allocations will be identified based on the adopted Local Plans for each LPA within the Study Area, and, where relevant, any emerging or replacement Local Plans (and acknowledging their status). Development land allocation polygons will be mapped in GIS and cross-referenced with the Study Area to understand the potential interface of any strategic site allocations with the Project.

16.5.5 Further information, including individual community receptors and local businesses that may experience effects as a result of the construction of the Project will be provided in the baseline for the PEI Report and ES.

Baseline

16.5.6 The Project has been divided into seven sections as detailed in **Chapter 4 Description of the Project**. The sections are split from north to south by the geographical alignment of the Scoping Boundary and identifies the relevant Local Authority as outlined in **Table 16.3**.

Table 16.3: Local authorities by section of the Project

Section	Location	Local Authority
Section 1	Grimsby West Substation	North East Lincolnshire West Lindsey
Section 2	Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A	North East Lincolnshire East Lindsey
Section 3	Lincolnshire Connection Substation A and B (including the overhead line between them).	East Lindsey
Section 4	Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation.	East Lindsey Boston South Holland
Section 5	Weston Marsh Substation	South Holland

Section	Location	Local Authority
Section 6	Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation)	South Holland Fenland
Section 7	Walpole B Substation	Kings Lynn and Norfolk

16.5.7 For the purposes of this chapter, taking into account the multiple receptor types and the nature of their features (e.g. long-distance recreational routes that span geographical boundaries), a route-wide approach has been taken in order to avoid unnecessary duplication and assist legibility for the reader.

16.5.8 The potential impacts arising from the Project (identified in Section l) are assessed relative to the baseline conditions and benchmarked against regional and national standards where appropriate. The key indicators and measures of the areas will be established for:

- population and deprivation;
- an overview of the local economy, including the role of the tourism and agriculture sectors; and
- the local labour market.

16.5.9 This section provides the baseline conditions for the following geographical areas:

- the local authorities of North East Lincolnshire, East Lindsey, West Lindsey, Boston, South Holland, Fenland, and Kings Lynn and West Norfolk;
- the Yorkshire and the Humber, East Midlands and East of England regions; and
- England.

16.5.10 Baseline data is set out at the Project-wide level, rather than by Project component, for each of the local authorities within the Study Area.

Population and deprivation

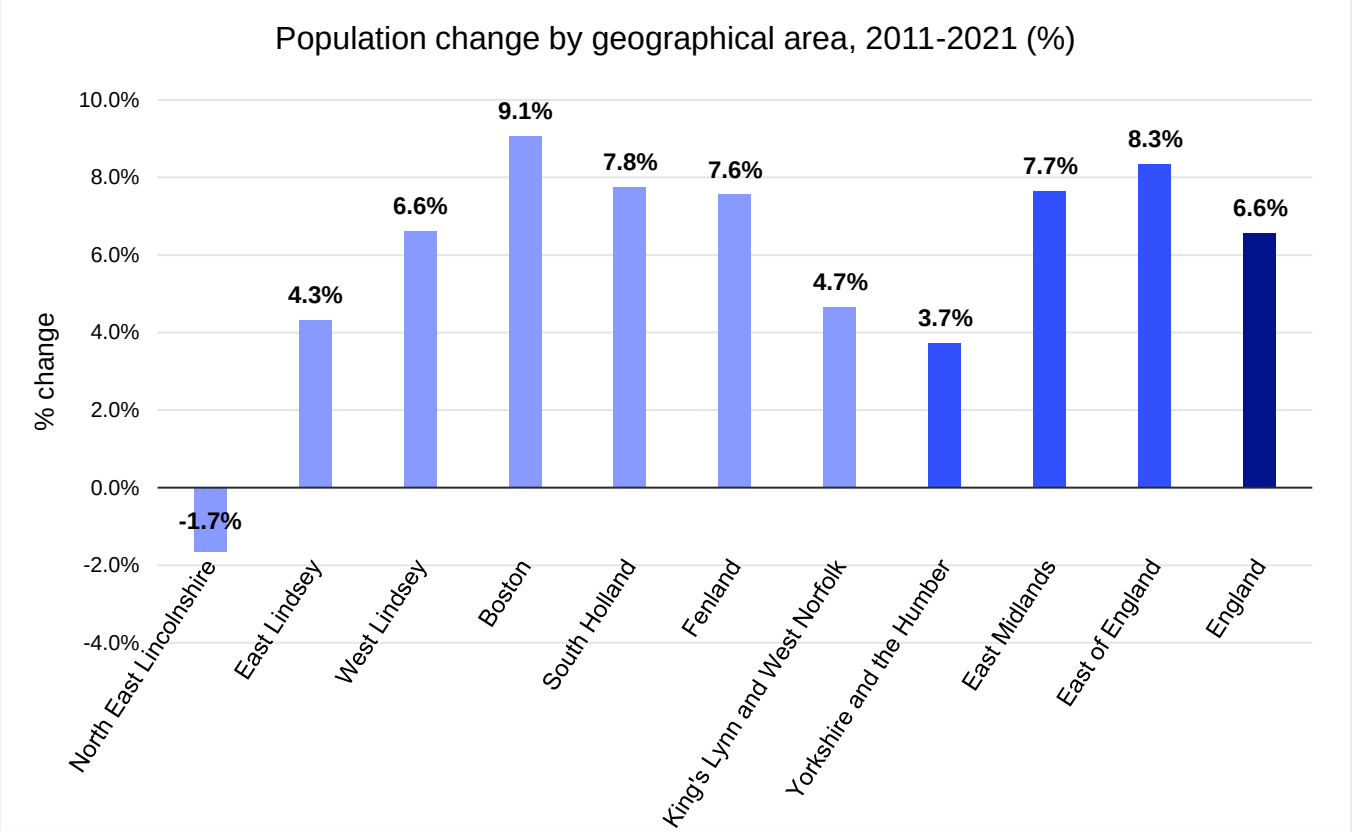
16.5.11 The estimated population by geographical area within the Study Area is presented in **Table 16.4**: below. North East Lincolnshire is the largest local authority within the Study Area by population, with an estimated population of approximately 157,800 according to 2022 ONS mid-year population estimates. However, as shown in **Image 16.1**, North East Lincolnshire recorded a population decline of 1.7 per cent between 2011 and 2021. Boston, in the East Midlands region, has a population of approximately 70,800, which is the smallest of the local authorities within the Study Area. Boston recorded the highest population growth of the local authorities within the Study Area of 9.1 per cent between 2011 and 2021.

16.5.12 At the regional level, the East of England region recorded the highest population growth rate of the regions within the Study Area of 8.3 per cent between 2011 and 2021, which is also higher than the population growth recorded for England as a whole (6.6 per cent). The population growth rate in the East Midlands for this period was 7.7 per cent, and in Yorkshire and the Humber recorded a population growth rate of 3.7 per cent, which is significantly lower than the national average.

Table 16.4: Geographical areas by population (Ref 16.2)

Geographical area	Population
Local authorities	
North East Lincolnshire	157,800
East Lindsey	144,400
West Lindsey	96,800
Boston	70,800
South Holland	97,000
Fenland	103,000
King's Lynn and West Norfolk	155,800
Regions	
Yorkshire and the Humber	5,541,300
East Midlands	4,934,900
East of England	6,398,500
National	
England	57,106,400

Image 16.1: Population change by geographical area, 2011-2021 (Ref 16.2 and Ref 16.12)

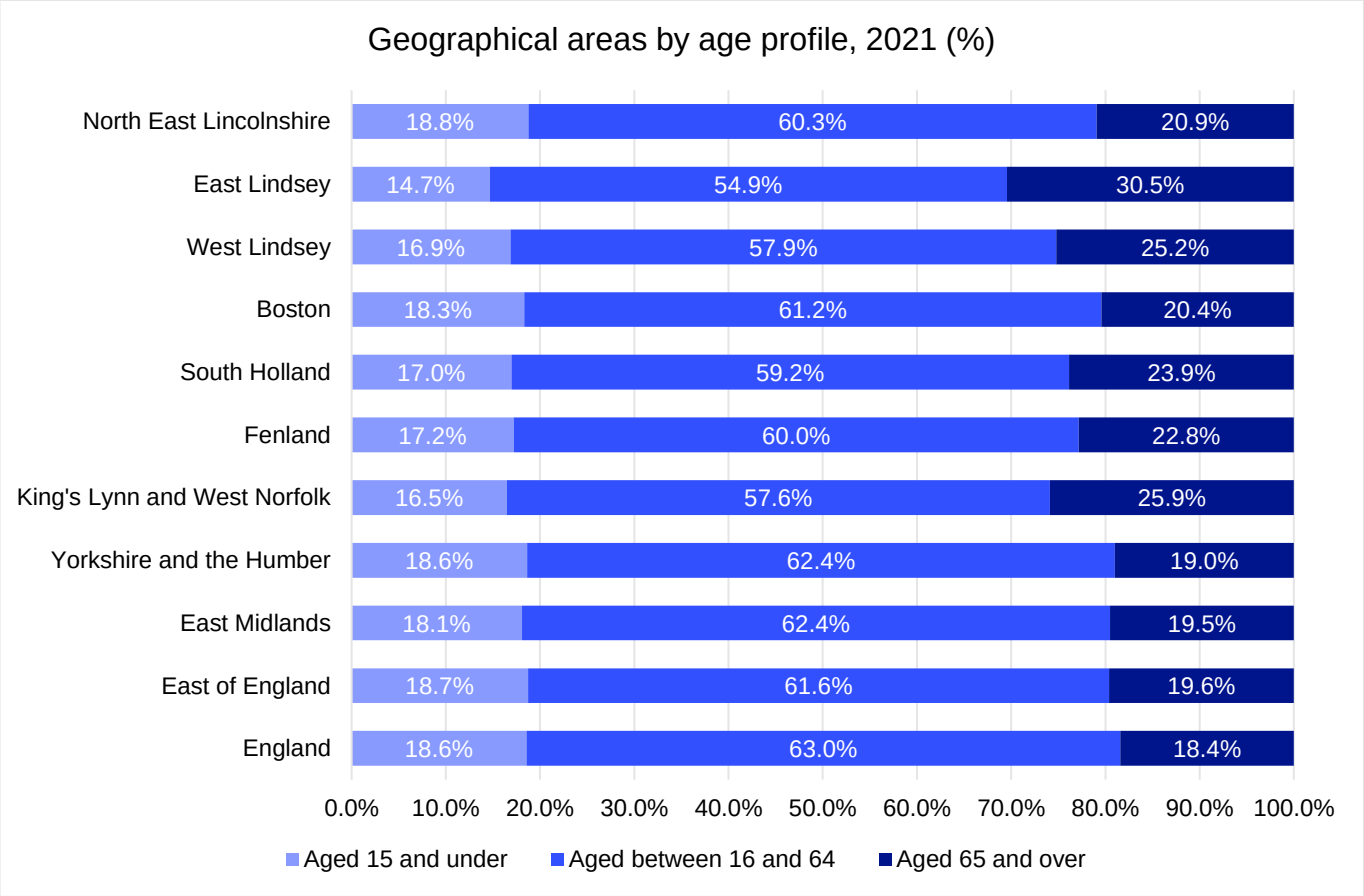


16.5.13 **Image 16.2** shows the age profile of the geographical areas within the Study Area. The proportion of the population of working age (aged between 16 and 64) in all local

authorities within the Study Area is lower than the national average of 63 per cent. At the local authority level, Boston has the highest proportion of the population that is of working age at 61.2 per cent, followed by North East Lincolnshire and Fenland, at 60.3 per cent and 60 per cent respectively. The local authorities within the Study Area have an overall older age profile compared the regional and national averages. East Lindsey has a significantly lower proportion of young people aged 15 and under (14.7 per cent) and working age people (54.9 per cent) compared to the regional average for East Midlands of 18.1 per cent and 62.4 per cent, respectively.

16.5.14 At the national level, the proportion of the population aged 15 and under is 18.6 per cent, and the population of working age (16-64) is 63 per cent. East Lindsey also has a significantly higher proportion of the population aged 65 and over compared to the regional and national averages, at 30.5 per cent compared to 19.5 per cent for the East Midlands region and 18.4 per cent across England as a whole.

Image 16.2: Geographical areas by age profile (Ref 16.2)



16.5.15 **Table 16.5** presents the local authorities by the average Index of Multiple Deprivation (IMD) score rank and the proportion of Lower layer Super Output Areas (LSOAs) in the most deprived 10% areas nationally. North East Lincolnshire is the most deprived local authority by both metrics, ranking 29th out of 317 district-tier local authorities in England by average IMD score. In addition, almost one-third (30.2 per cent) of LSOA in North East Lincolnshire are within the 10 per cent most deprived areas in England. East Lindsey is within the 20 per cent most deprived local authorities in England, ranking 39th. In contrast, South Holland is the least deprived local authority within the Study Area and none of the LSOAs in South Holland are within the top 10 per cent most deprived areas nationally.

16.5.16 There are clusters of highly deprived LSOAs along coastal urban areas, and within the central areas of Boston and King's Lynn. There are generally lower levels of deprivation within the rural communities in the Study Area.

Table 16.5: Local authorities within the Study Area by average IMD score rank and proportion of LSOAs within the most deprived 10 per cent nationally (Ref 16.4)

Local Planning Authority	IMD rank of average score	Proportion of LSOAs in most deprived 10% nationally
North East Lincolnshire	29	30.2%
East Lindsey	39	16.1%
West Lindsey	136	7.7%
Boston	102	2.8%
South Holland	168	0.0%
Fenland	80	7.3%
King's Lynn and West Norfolk	94	7.9%

16.5.17 **Table 16.6**: below identifies the key urban areas, based on towns identified within the first tier of the settlement hierarchy in each of the respective Local Plans for each Local Authority within the Study Area.

Table 16.6: Key settlements within the Study Area

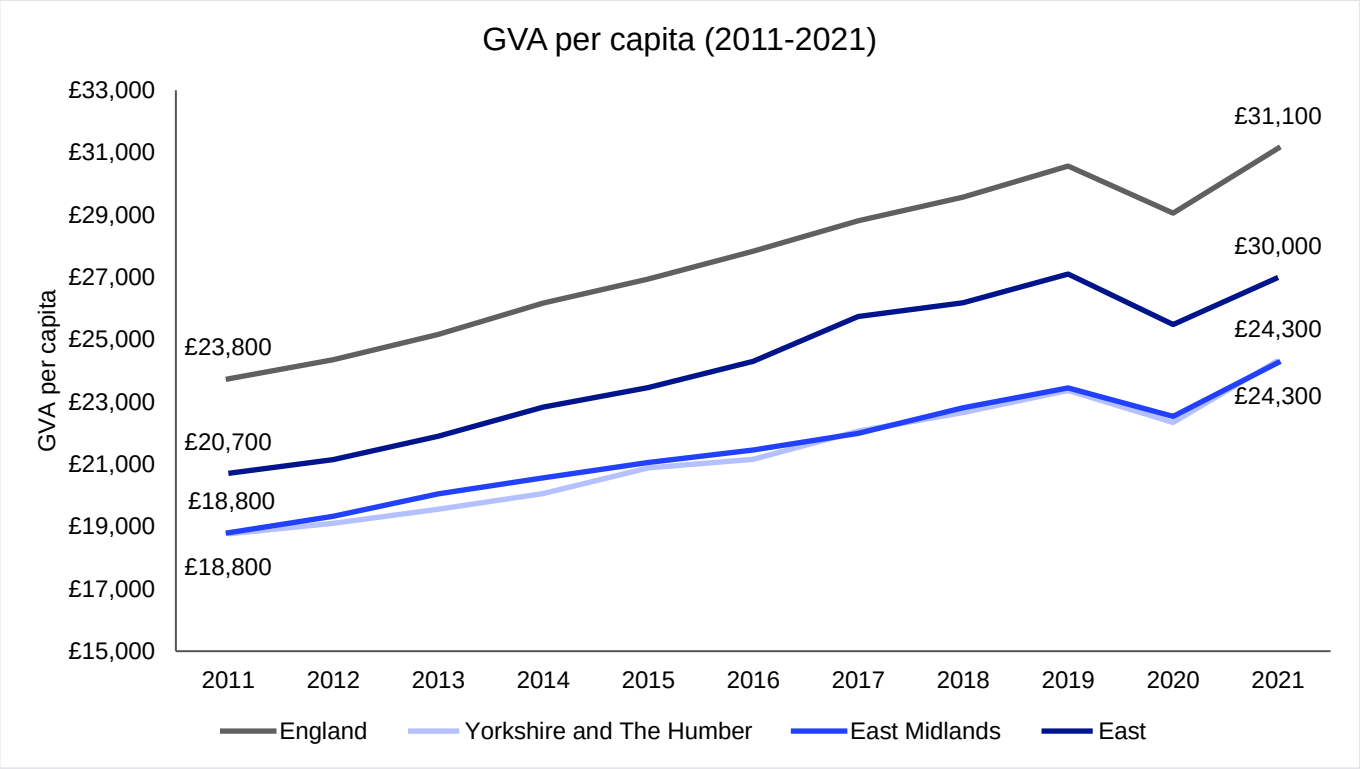
Local Planning Authority	Key settlements in hierarchy
North East Lincolnshire Borough Council Adopted Local Plan (adopted March 2018) (Ref 16.13) - Policy 3 – Settlement Hierarchy	**Level 1 (Urban areas) comprising:** - Grimsby - Cleethorpes - Great Coates (adjoining parish)
East Lindsey Borough Council Adopted Local Plan Core Strategy (adopted July 2018) (Ref 16.14) - Strategic Policy 1 (SP1) – A Sustainable Pattern of Places	**Towns** - Louth - Skegness - Alford - Coningsby/Tattershall - Horncastle, - Mablethorpe/Sutton/Trusthorpe - Spilsby
West Lindsey District Council– - Central Lincolnshire Local Plan (adopted April 2023) (Ref 16.15) - Policy S1: The Spatial Strategy and Settlement Hierarchy	**Level 1 (Lincoln Urban Area) comprising:** - City of Lincoln - North Hykeham

Local Planning Authority	Key settlements in hierarchy
- Policy S35: Network and Hierarchy of Centres	- South Hykeham Fosseway - Waddington Low Fields - Any other developed land adjoining these areas. **Main Towns** - Sleaford - Gainsborough **Market Towns** - Caistor - Market Rasen **Large Villages, Small Villages and Hamlets (as defined in Policy S1)**
South East Lincolnshire Joint Strategic Authority (Ref 16.16) - Policy 11L Distribution of new Housing	**Sub-regional centre:** - Boston
Fenland District Council Adopted Local Plan (adopted March 2014) (Ref 16.17) - Policy LP3 – Spatial Strategy, the Settlement Hierarchy and the Countryside	**Primary market towns:** - March - Wisbech
West Norfolk and Kings Lynn Borough Council Local Development Framework – Core Strategy (July 2011) (Ref 16.18) - Policy CS02 – Settlement Hierarchy	**Sub-regional centre** - King's Lynn (including West Lynn)

Economy and employment

16.5.18 **Image 16.3** presents Gross Value Added (GVA) per head in the regions within the Study Area compared to the national average for 2011-2021. As of 2021, GVA per head across all three regions is lower than the national average of £31,100. The East of England region has the highest GVA per head of the three regions, at £30,000, compared to £24,300 in East Midlands and Yorkshire and the Humber. Notably, the East of England region is the only region within the area of study where GVA per head has not returned to pre-pandemic levels.

Image 16.3: GVA per capita, regional and national, 2011-2021 (Ref 16.5)



16.5.19 **Table 16.7** shows the geographical areas within the Study Area by economic activity and unemployment rate among the population aged 16 years and over. All local authorities within the Study Area, with the exception of Boston, have a lower economic activity rate than the national average of 58.6 per cent. Boston has an economic activity rate of 59.7 per cent, which is also higher than the regional average for East Midlands of 57.5 per cent. East Lindsey has a significantly lower economic activity rate than the regional and national averages at 47.6 per cent compared to 56.2 per cent for Yorkshire and the Humber and 58.6 per cent in England as a whole. One underlying factor for the lower level of economic activity in East Lindsey and local authorities within the Study Area is a higher proportion of the population that is aged 65 and over and retired.

16.5.20 All local authorities and regions within the Study Area have a lower unemployment rate than the national average (2.9 per cent). North East Lincolnshire has the highest unemployment rate among the local authorities, at 2.8 per cent, and King's Lynn and West Norfolk has the lowest, at 2.1 per cent.

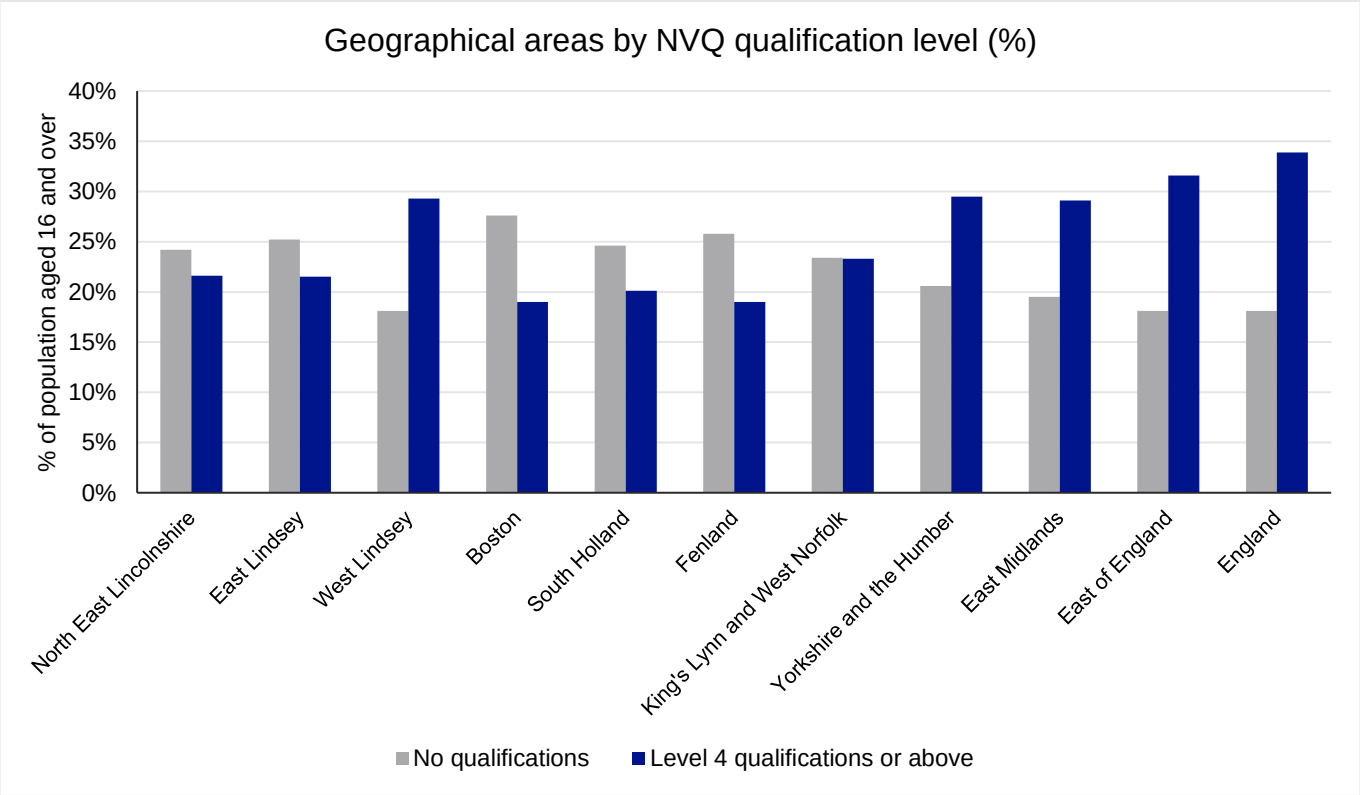
Table 16.7: Geographical areas by economic activity and unemployment rate (Ref 16.2)

Geographical area	Economic activity rate	Unemployment rate
Local authorities		
North East Lincolnshire	55.4%	2.8%
East Lindsey	47.6%	2.7%
West Lindsey	54.4%	2.2%
Boston	59.7%	2.5%
South Holland	58.5%	2.2%
Fenland	57.0%	2.4%
King's Lynn and West Norfolk	55.0%	2.1%
Regions		
Yorkshire and the Humber	56.2%	2.7%
East Midlands	57.5%	2.4%
East of England	59.8%	2.5%
National		
England	58.6%	2.9%

16.5.21 **Image 16.4** shows the geographical areas within the Study Area by percentage of the population aged 16 years and over with a degree-level qualification (National Vocational Qualification (NVQ) Level 4) and with no qualifications. All local authorities within the Study Area have a lower proportion of the population aged 16 and over with a degree-level qualification compared to the national average of 33.9 per cent. West Lindsey records the highest proportion of the population with a degree-level qualification or higher, at 29.3 per cent, and Boston and Fenland record the lowest, both at 19 per cent. All regions within the Study Area also record a lower proportion of the population with a degree-level qualification or above compared to the national average. The East of England records the highest proportion, at 31.6 per cent, followed by Yorkshire and the Humber (29.5 per cent) and East Midlands (29.1 per cent).

16.5.22 All local authorities within the Study Area also record a higher proportion of the population with no qualifications compared to the national average of 18.1 per cent. Boston is the local authority within the Study Area with the highest proportion of the population with no qualifications, at 27.6 per cent, followed by Fenland and East Lindsey, at 25.8 per cent and 25.2 per cent respectively. Yorkshire and the Humber and the East Midlands regions record a higher proportion of the population without qualifications compared to the national average, at 20.6 per cent and 19.5 per cent respectively. The East of England region is in line with the national average, at 18.1 per cent.

Image 16.4: Geographical areas by proportion of the population with an NVQ of level 4 (degree-level) or above and with no qualifications (Ref 16.2)



16.5.23 At the local authority level, manufacturing is the largest sector by employment in South Holland (17.9 per cent), Fenland (16.2 per cent), and West Lindsey (12.5 per cent). In contrast, the health sector is the largest employer in Boston (18.8 per cent), North East Lincolnshire (18.2 per cent), and King's Lynn and West Norfolk (16.7 per cent). In East Lindsey, accommodation and food services is the largest sector by employment and employs 19.6 per cent of the workforce. At the regional and national levels, the health sector is the largest employer. It is noted that the analysis presented here is at local authority level.

16.5.24 It is noted that the baseline in the PEI Report and ES reports will use a lower level of geographic administrative area, such as wards, which may reveal further trends in employment data that are not highlighted here.

16.5.25 **Table 16.8** shows the geographical areas within the Study Area by employment in the agriculture, forestry, and fishing industry (A) and in tourism and hospitality industries, which is composed of employment in accommodation, food and beverage services, and travel and tour agency related activities. At the regional level, employment in the agriculture industry is slightly higher than the national average in the East of England (1 per cent) and the East Midlands (0.8 per cent), and in line with the national average in Yorkshire and the Humber (0.6 per cent). Boston, South Holland, and West Lindsey have a notably higher proportion of the workforce employed in the agricultural industry, at 7.8 per cent, 5.8 per cent, and 5.4 per cent respectively, which is significantly higher than the regional averages and the national average for England as a whole of 0.6 per cent.

16.5.26 The tourism and hospitality sector in East Lindsey accounts for 18.6 per cent of employment, which is significantly higher than the regional average for the East

Midlands (7.6 per cent) and the national average of 8.2 per cent. Tourism also accounts for a significant proportion of employment in King's Lynn and West Norfolk, at 10.9 per cent. At the regional level, all three regions have slightly lower employment in the tourism industry compared to the national average.

Table 16.8: Geographical areas by employment in agriculture and tourism (Ref 16.6)

Geographical area	Employment in agriculture, forestry, and fishing (A)	Employment in tourism and hospitality
Local authorities		
North East Lincolnshire	0.2%	7.7%
East Lindsey	3.3%	18.6%
West Lindsey	5.4%	6.9%
Boston	7.8%	4.7%
South Holland	5.8%	4.9%
Fenland	3.4%	5.8%
King's Lynn and West Norfolk	5.0%	10.9%
Regions		
Yorkshire and the Humber	0.6%	7.5%
East Midlands	0.8%	7.6%
East of England	1.0%	8.1%
National		
England	0.6%	8.2%

Tourism and recreation

16.5.27 **Table 16.9**: shows the value of tourism in each local authority and region within the Study Area. The Greater Lincolnshire LEP identifies the visitor economy as a priority sector, and tourism is estimated to contribute £2.39 billion per annum to the Greater Lincolnshire economy and supports 30,000 full-time equivalents across the region (Ref 16.19). Recent developments and key projects in the region include a series of investments on the coastline and in the Lincolnshire Wolds aimed at enhancing the quality of the visitor experience. These include the opening of the £2 million North Sea Observatory at Chapel St Leonards, near Skegness, and the delivery of cultural and tourism projects in Alford and Spilsby through £8 million in Levelling Up funding awarded to East Lindsey Council (Ref 16.20). Gibraltar Point, together with the Humber Estuary, have also been added to the UK's tentative list for the United Nations Educational, Scientific and Cultural Organization World Heritage status (Ref 16.21).

16.5.28 Among the local authorities, East Lindsey receives the highest number of day and overnight visitors, contributing £217 million and £284 million to the local economy respectively. In contrast, the tourism industry contributes significantly less to the local economies of Boston and Fenland, which receive the lowest number of visitors and the lowest tourist spend. Key tourism attractions within the Study Area are identified in **Table 16.12**.

Table 16.9: Geographical areas within the Study Area by day and overnight visits and total spend (Ref 16.22)

Geographical area	Day visits volume, annual average *(millions)*	Day visits spend, annual average *(£millions)*	Overnight trips, annual average *(millions)*	Overnight spend, annual average *(£millions)*
Local authorities				
North East Lincolnshire	1.58	£75	0.23	£46
East Lindsey	4.31	£217	1.06	£284
West Lindsey	0.71	£27	0.10	£9
Boston	0.54	£9	0.08	£6
South Holland	0.66	£9	0.09	£23
Fenland	0.44	£8	0.04	£3
King's Lynn and West Norfolk	3.47	£83	0.34	£82
Regions				
Yorkshire and the Humber	49.45	£2,280	6.01	£1,382
East Midlands	66.91	£2,423	7.85	£1,696
East of England	94.20	£2,928	9.39	£1,979

16.5.29 **Table 16.10**: shows the number and proportion of jobs in the tourism sector by local authority. The tourism sector supports approximately 8,550 jobs in East Lindsey, where the sector also accounts for the highest proportion of employment, at 18.6 per cent, followed by King's Lynn and West Norfolk (6,550) and North East Lincolnshire (5,075). The tourism industry supports the lowest number of jobs in Boston (1,515), South Holland (1,885), and West Lindsey (1,950).

Table 16.10: Geographical areas by employment in the tourism industry: absolute employment and as a proportion of total (Ref 16.6)

Geographical area	Total employment in the tourism industry	Employment in the tourism industry (% of total)
Local authorities		
North East Lincolnshire	5,075	7.7%
East Lindsey	8,550	18.6%
West Lindsey	1,950	6.9%
Boston	1.515	4.7%
South Holland	1,885	4.9%
Fenland	2,145	5.8%
King's Lynn and West Norfolk	6,550	10.9%
Regions		
Yorkshire and the Humber	185,000	7.5%
East Midlands	164,500	7.6%

Geographical area	Total employment in the tourism industry	Employment in the tourism industry (% of total)
East of England	228,000	8.1%
National		
England	2,213,000	8.2%

16.5.30 **Table 16.11**: summarises the number of bedspaces available by accommodation type and geographical area according to the 2016 Visit Britain survey of accommodation stock. Serviced accommodation includes hotels and similar establishments, such as bed and breakfasts (B&Bs), and non-serviced accommodation includes holiday lets, caravan parks and tourist campsites, and other collective accommodation. In total, there are 40,574 bedspaces among the local authorities within the Study Area. East Lindsley has the highest total of serviced and non-serviced bedspaces, however a significant proportion of these bedspaces are made up of caravan parks and tourist camping site accommodation. Occupancy data from the Visit Britain survey indicates a hotel occupancy rate of 84% over the peak months (July and August). Applying a 16% spare capacity rate indicates that there could be 6,491 spare bedspaces within the LPAs over the peak tourist season. This analysis will be reviewed further at PEI Report and ES stages.

Table 16.11: Total bedspace stock by geographical area and accommodation type (Ref 16.23)

Geographical area	Serviced accommodation	Non-serviced accommodation	Total serviced and non-serviced
Local authorities			
North East Lincolnshire	2,379	3,335	**5,714**
East Lindsey	5,563	17,348	**22,911**
West Lindsey	473	981	**1,454**
Boston	1,002	405	**1,407**
South Holland	882	484	**1,366**
Fenland	505	159	**664**
King's Lynn and West Norfolk	2,501	4,557	**7,058**
Regions			
Yorkshire and the Humber	127,223	114,723	**241,946**
East Midlands	96,115	82,417	**178,532**
East of England	111,885	73,596	**185,481**
National			
England	1,768,795	1,401,716	**3,170,511**

16.5.31

16.5.32 **Table 16.12**: shows strategic visitor attractions identified within 5 km of the Study Area using data from the Visit Britain Annual Attractions Survey 2022 report. For the purposes

of the baseline study, strategic visitor attractions are defined as tourism attractions that are considered to be of importance to the regional economy, and, where data is available, record over 50,000 visitors per year. Four of the strategic visitor attractions identified in the baseline study are located in Skegness, showing the importance of the tourism sector for the local economy in this area.

16.5.33 By exception, the baseline for strategic visitor attractions is considered over a wider geography, i.e. a 5 km buffer beyond the Scoping Boundary, where it is known that there are strategic visitor attractions of importance to the local and regional economy that could be sensitive to indirect effects in relation to access, such as temporary disruption during construction, or in-combination effects on amenity. No strategic visitor attractions in **Table 16.12**: are within 5 km of the Project Scoping Boundary.

16.5.34 The PEI Report and ES will also consider potential impacts on visitors to broader tourism and recreation areas or assets that may include natural (e.g. Areas of Outstanding Natural Beauty, coastal destinations, and associated promoted recreational routes and trails), settlements such as market towns with farmers' markets, specific cultural and heritage attractions and other more local visitor attractions such as caravan parks, campsites, golf courses, horse riding centres, activity centres etc. Some of these receptors will be assessed within other specific topic chapters (see paragraph 16.1.4), and the scope of the assessment will seek to avoid duplication or double counting the reporting of significant effects throughout.

16.5.35 The PEI Report and ES will identify and define visitor destinations where there are clusters of tourism receptors that could be affected by the construction or operation of the Project.

Table 16.12: Strategic visitor attractions within 5 km of the Scoping Boundary

Tourism receptor	Location	Category	Visitor numbers
East Lindsey			
Ark Wildlife and Dinosaur Park	Stickney	Zoos and aquariums	Up to 7,000 per day (peak)
Fantasy Island Theme Park	Skegness	Amusement parks	Up to 40,000 per day (peak)
Lincolnshire Wildlife Park	Friskney	Zoos and aquariums	Unknown
Skegness Aquarium	Skegness	Zoos and aquariums	Unknown
Skegness Natureland Seal Sanctuary	Skegness	Zoos and aquariums	112,840 (2022)
Skegness Pleasure Beach	Skegness	Amusement parks	600,000 (2018)

Local businesses and community receptors

16.5.36 The Study Area includes numerous towns and villages, including those identified in **Table 16.6**:. The main town and villages are outlined below and are listed from north to south of the Project by local authority:

- Grimsby, North East Lincolnshire;
- Alford, Mablethorpe, Louth, and Skegness, East Lindsey;

- Lincoln, West Lindsey;
- Boston, South East Lincolnshire;
- March and Wisbech, Fenland; and
- King's Lynn, West Norfolk and King's Lynn.

16.5.37 Businesses tend to be clustered in town and village centres, with farms and other businesses such as farm shops located in more rural areas. Clusters of commercial properties have been identified using the OS AddressBase dataset (Ref 16.10). Community receptors, such as schools, medical facilities, and sports and recreational facilities, tend to be located centrally within the settlements, remaining accessible to the local residents. These have been identified using the OS Local Important Buildings dataset (Ref 16.9).

16.5.38 Using desk-top research and engagement with relevant stakeholders, the PEI Report and ES will identify businesses and community receptors within the local Study Area.

Development land, utilities and renewables infrastructure

16.5.39 Each Local Plan within the Study Area includes strategic land allocations for future development. These will be shown on a figure at PEI Report and ES stage once sufficient GIS data has been sourced.

16.5.40 Within the Study Area there are a range of solar farms, wind turbines / farms and other utilities and renewable energy infrastructure. **Table 16.13**: provides a summary of utilities and renewable energy infrastructure by LPA within the Study Area. Some of these receptors may operate as businesses and engagement is ongoing to understand how the infrastructure operates, including needs and requirements. Relevant receptors will be identified and shown in a figure at PEI Report stage.

Table 16.13: Utilities and renewable energy infrastructure by LPA within the Study Area

Utilities and renewable energy infrastructure	Status	Within Scoping Boundary?	Within 500 m of Scoping Boundary?
Infrastructure within multiple LPAs			
Viking Carbon Capture and Storage Pipeline	Planning application submitted (project is at examination stage)	Y	Y
Viking Link Interconnector Power Cable	In operation	Y	Y
North East Lincolnshire			
Aylesby Wind and Solar Photovoltaic (PV) Farm	Planning application submitted	Y	Y
Laceby Solar PV Farm	In operation	Y	Y
Grimsby West Solar PV and Storage	In operation	Y	Y
Low Farm Solar Array	Planning permission granted	Y	Y
East Lindsey			

Utilities and renewable energy infrastructure	Status	Within Scoping Boundary?	Within 500 m of Scoping Boundary?
Yarburgh Grove Solar PV Farm	In operation	Y	Y
Manby Anaerobic Digester	In operation	Y	Y
Outer Dowsing Offshore Wind Farm (onshore infrastructure)	Planning application submitted (project is at pre-examination stage)	Y	Y
Triton Knoll Offshore Wind Farm (onshore infrastructure)	In operation	Y	Y
The Hollies Solar PV Farm	In operation	Y	Y
Lincoln Solar PV Farm	In operation	N	Y
Manor Farm Solar PV	Planning permission granted	N	Y
Boston			
Fen Road Solar PV Farm	In operation	N	Y
Kirton Solar PV Farm	In operation	N	Y
Nowhere Farm Solar PV	In operation	N	Y
South Holland			
Spalding Solar PV and Battery Energy Storage System	Planning permission granted	Y	Y
Holbeach Solar Farm	Planning application rejected	Y	Y
King's Lynn and West Norfolk			
Walpole Bank Solar Farm	In operation	N	Y

16.5.41 There is one airstrip within the Study Area near Listoft, west of Hogsthorpe, but a site visit has indicated it appears to be disused. As such it is not being considered as a receptor unless alternative evidence is provided to confirm it is operational. It is recognised that there are aerodromes and airfields outside of the Study Area and any potential impact of the Project on flight paths will be considered through ongoing stakeholder engagement.

16.5.42 Traveller caravan count (January 2024) data also validates that there are no traveller sites within the Study Area, however there may be some unauthorised caravans on sites in East Lindsey, Fenland, King's Lynn, South Holland, and West Lindsey (Ref 16.20). As such at this stage it is assumed there are no formal sites to be considered as receptors unless alternative evidence is provided to confirm otherwise at PEI Report stage.

Promoted recreational routes and PRoW of significance in the local area

16.5.43 Promoted national cycle routes, the local cycle network, long-distance paths and national trails have been identified in the Study Area. These are shown on **Figure 16.2 Socio-economic, tourism and recreation receptors** and listed below.

National Cycle Network

- National Cycle Network (NCN) Route 1: Peterborough to March, to Wisbech, to King's Lynn;
- NCN Route 1: Boston, to Lincoln;
- NCN Route 1: Lindon, to Cleethorpes; and
- NCN Route 63: Peterborough, to Wisbech.

Long Distance Paths

- Greenwich Meridian Path (Greenwich to Withernsea);
- Peter Scott Walk (King's Lynn to The Wash);
- Nene Way (Via Wisbech);
- MacMillan Way (Boston to Abbotsbury);
- MacMillan Way (Cross Britain Way);
- Water Rail Way (Boston to Lincoln);
- Lindsey Loop (Lincolnshire Wolds); and
- Johnson Silver Lincs Way (from Grimsby).

National Trail

- King Charles III England Coast Path, North East Route, Skegness to Mablethorpe.

16.5.44 Further information about walking, cycling and horse-riding routes can be found in **Chapter 13 Traffic and Movement**, which includes a full baseline of PRoW within the Study Area. The traffic and transport assessment will identify PRoW of significance in the local area.

Open space

16.5.45 The Study Area comprises large areas of agricultural land or open countryside interspersed by settlements.

16.5.46 Open spaces have been identified using the OS Open Greenspace dataset, which is a vector polygon dataset of open greenspaces in urban and rural areas including playing fields, sports' facilities, play areas and allotments. **Table 16.14**: provides open greenspaces by local authority within 500 m of the Scoping Boundary.

16.5.47 Open spaces within the Study Area are shown in **Figure 17.4 Location of Green Open Spaces** in **Chapter 17 Health and Wellbeing**.

16.5.48 Whilst the OS Open Greenspace dataset provides a useful indication of the level of green space provision, it does not provide a comprehensive dataset of areas of open access and common land to which there is a right of access under the Countryside and Rights of Way Act 2000 (Ref 16.24). It is intended those areas will be identified at the PEI stage through further desk based study and engagement with stakeholders. The Project crosses numerous fields and open spaces, and engagement is ongoing to understand how these open spaces are used to inform the socio-economic, recreation, and tourism assessment.

Table 16.14: Open space (Ref 16.8)

Open space	Within Scoping Boundary?	Within 500 m of Scoping Boundary?
North East Lincolnshire		
Grimsby Golf Club	N	Y
Butt Lane Park, Laceby	N	Y
Laceby Manor Golf Course	N	Y
Play space on Waltham Road, Brigsley	N	Y
Greenspace adjacent to St Helen's Church, Brigsley	N	Y
Greenspace adjacent to St Peter's Church, Ashby cum Fenby	N	Y
East Lindsey		
Greenspace adjacent to St Martin's Church, Waithe	N	Y
Greenspace adjacent to St Edith's Church, Grimoldby	N	Y
Woodthorpe Hall Golf Course, Alford	N	Y
Greenspace adjacent to Skegness Raceway, Skegness	Y	Y
Burgh Sports Field, Burgh le Marsh	N	Y
Boston		
Boston Golf Course, Boston	N	Y
Kirton Holme Golf Course, Kirton	N	Y
South Holland		
Spalding Golf Course, Surfleet	N	Y
Allotments on Delgate Bank	Y	Y
Weston Playing Field, Delgate Bank	N	Y
Fenland		
Fields adjacent to Tydd St Giles Community Centre	N	Y
Tydd St Giles Golf Course	N	Y
Fields adjacent to Newton Village Hall, Newton	N	Y

Future Baseline

16.5.49 **Table 16.5** uses data from ONS 2018 based population projections to show total population change and projected change by age group to 2043. The populations of Boston, South Holland, Fenland, and East Lindsey are projected to grow at a significantly higher rate compared to the national average. In contrast, the population of North East Lincolnshire is projected to decline by 0.9 per cent between 2018 and 2043.

16.5.50 The growth rate of the working age population is projected to vary considerably by local authority. The population of Boston aged between 16 and 64 is projected to increase by 9.2 per cent between 2018 and 2043, followed by 7.3 per cent in South Holland and 5.6 per cent in Fenland. In contrast, the working age population is expected to decrease by 13.3 per cent within this period.

16.5.51 Reflecting the regional and national trend, all local authorities within the Study Area are projected to experience a significant increase in the population aged 65 and over by 2043. In East Lindsey, the population aged 65 and over is projected to increase by 45.9 per cent between 2018 and 2043, which is the highest amongst the local authorities within the Study Area.

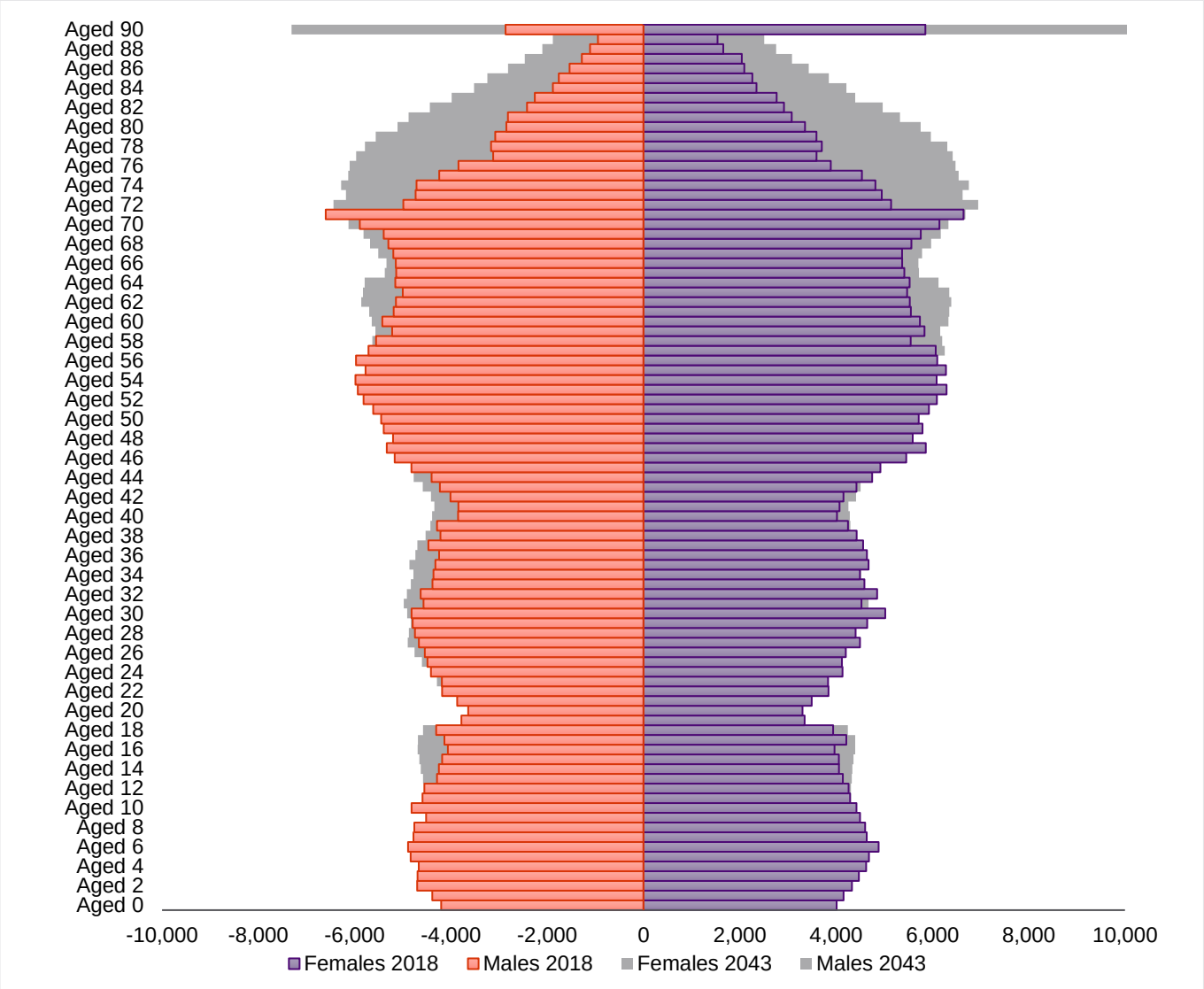
16.5.52 In contrast, this age group in King's Lynn and West Norfolk is expected to increase by 34.3 per cent from 2018 to 2043, which is significantly lower than the regional and national averages. At the regional level, the working age population in the East Midlands is expected to increase by 4.4 per cent between 2018 and 2043. The East of England and Yorkshire and the Humber are projected to register a decrease of 1.3 per cent and 1.5 per cent respectively. In England as a whole, the population of working age is expected to decline by 0.9 per cent from 2018 to 2043.

Table 16.15: Geographical areas within the Study Area by projected population change from 2018 to 2043 – total and by age group (Ref 16.7)

Geographical area	% Change, total	% Change, 0-15	% Change, 16-64	% Change, 65+
Local authorities				
North East Lincolnshire	-0.6%	-13.3%	-8.7%	35.8%
East Lindsey	14.9%	-1.7%	2.7%	45.9%
West Lindsey	8.5%	-4.0%	-1.4%	41.0%
Boston	19.1%	9.2%	14.5%	41.5%
South Holland	17.3%	7.3%	10.7%	40.7%
Fenland	17.2%	5.6%	9.9%	45.5%
King's Lynn and West Norfolk	5.5%	-6.7%	-3.8%	34.3%
Regions				
Yorkshire and the Humber	7.5%	-1.5%	1.4%	37.4%
East Midlands	14.3%	4.4%	7.3%	46.3%
East of England	10.3%	-1.3%	3.3%	43.4%
National				
England	10.3%	-0.9%	3.8%	44.7%

16.5.53 **Image 16.5** shows a population pyramid of the total population in the local authorities within the Study Area in 2018, with the grey bars representing an increase in population between 2018 and 2043. The significant widening of the top of the pyramid reflects an ageing population, with an increasing proportion of the population in the area aged 65 and over.

Image 16.5: Population pyramid of the local authorities within the Study Area from 2018 to 2043 (Ref 16.7)



16.5.54 The future baseline for residential properties, businesses, community facilities, open spaces, visitor attractions and development land over the medium to longer-term is uncertain beyond where allocated and planned development sites have been identified. Due to this uncertainty, it is assumed the future baseline for the Study Area would be unchanged from the current baseline to the completion of the Project, except where new development is expected to be delivered in line with allocated and planned development sites as set out above.

16.6 Design and Control Measures

Design Measures

16.6.1 The Scoping Boundary has been designed as far as is practicable to avoid direct effects to sensitive socio-economic, recreational and tourism features as set out in the Corridor Preliminary Routing and Siting Study (Ref 16.25) with further information in **Chapter 3 Main Alternatives Considered**.

16.6.2 The detailed design, including the selection of the preferred route corridor and the precise siting of the substations will also seek to avoid and minimise effects on potential receptors as far as is practicable.

16.6.3 Where practicable, the Project has been routed to avoid interacting with clusters of local businesses, properties, recreational and community facilities and visitor attractions.

Control and Management Measures

16.6.4 An Initial Outline Code of Construction (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could specifically affect the socio-economic, recreation and tourism assessment are:

- TT03 – All affected PRoWs will be identified, and any potential permanent or temporary closures detailed in the Development Consent Order (DCO). All designated PRoWs crossing the working area will be managed with access only closed for periods while construction activities occur. Any required diversions will be clearly marked at both ends with signage explaining the diversion, the duration of the diversion and a contact number for any concerns, and will be subject to a PRoW Management Plan. PRoWs crossing the working areas will be managed in discussion with the relevant local authorities and potential temporary closures applied for discussed with the relevant local authority. Access disruption would be reduced as reasonably practicable while construction activities occur.
- S01 - Provision of training to construction workers, particularly in relation to working hours and the management of emissions (dust, noise, vibration, etc).
- S02 – As set out in TT03 PRoW including any promoted recreational routes crossing the working areas will be managed in discussion with the relevant local authorities and will be subject to a PRoW Management Plan, which will ensure users of PRoW including any promoted recreational routes are informed of any temporary or permanent diversions, which will help ensure any potential disruption is avoided or limited.
- NV01 - Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise will be set out within the Construction Environmental Management Plan (CEMP).
- GG11 - Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG03 - A CoCP will be produced prior to the defined ‘commencement’ of construction – which will be defined within the DCO.

16.7 Potential for Significant Effects

16.7.1 The assessment will consider the construction, maintenance and operation of the Project. Details of each of these stages are set out in **Chapter 4 Description of the Project**. The proposed scope of the assessment is set out below and has been determined using the approach described in **Chapter 5 EIA Approach and Methodology**.

16.7.2 The potential for the Project to result in the likely significant effects identified below takes into account the embedded and control and management measures described in section 16.6.

16.7.3 **Table 16.16**: identifies the sources and potential impacts that could result in a significant effect. Where an impact could give rise to potentially significant effects on receptors identified in the Study Area, these are then scoped into the assessment. Impact pathways that are unlikely to give risk to potentially significant effects on receptors identified in the Study Area are scoped out of the assessment.

Table 16.16: Impact pathways and proposed scope of the assessment

Project phase	Receptor	Impact	Potential for significant effects	Proposed to be scoped in/out
Construction	The local labour market	Potential employment and training benefits within the local labour market, including supply chain opportunities, as well as opportunities for training and skills development.	**Yes** – the Project will generate beneficial direct and indirect temporary employment, training and apprenticeship opportunities both on site and indirectly in the supply chain during the construction phase, which could be significant.	**Scoped in**
Operation and maintenance	The local labour market	Potential employment and training benefits across the supply chain.	No – the scale of operational employment generated is likely to be very limited, and this has therefore been scoped out of further consideration.	Scoped out
Construction	Users of promoted recreational routes and PRoW of significance in the local area	Potential disruption to local users of promoted recreational routes and PRoW of significance in the local area.	**Yes** – disruption to promoted recreational routes and PRoW of significance in the local area during the construction phase will be avoided as far as possible and considered with a PRoW Management Plan. However, there is the potential for significant effects during construction due to the possible need for temporary or permanent suitable diversions to be agreed with relevant bodies, and so this has been scoped in for further consideration at this stage.	**Scoped in**

Project phase	Receptor	Impact	Potential for significant effects	Proposed to be scoped in/out
Operation and maintenance	Users of promoted recreational routes and PRoW of significance in the local area	Potential disruption to local users from temporary closure or diversions of promoted recreational routes and PRoW of significance in the local area.	No – Any temporary or permanent effects on promoted recreational routes and PRoW of significance in the local area would arise during the construction period and would therefore be assessed as construction effects. No significant effects on promoted recreational routes and PRoW of significance in the local area are anticipated during operation. Disruption to promoted recreational routes and PRoW of significance in the local area during maintenance will be avoided as far as possible, managed with a PRoW Management Plan, and it is not considered that there is the potential for significant effects.	Scoped out
Construction	Development land, utilities and renewables infrastructure	Potential temporary or permanent loss of development land.	**Yes** – the Project has been designed to avoid development land, utilities and renewables infrastructure as far as possible, however there may be the potential for land take which could result in the potential for significant effects and so this has been scoped in for further consideration at this stage.	**Scoped in**

Project phase	Receptor	Impact	Potential for significant effects	Proposed to be scoped in/out
Operation and maintenance	Development land, utilities and renewables infrastructure	Potential temporary or permanent loss of development land.	No – any temporary or permanent effects on development land, utilities and renewables infrastructure would arise during the construction period and would therefore be assessed as construction effects. No significant effects on development land are anticipated during operation. Disruption to development land during maintenance will be avoided as far as possible and it is not considered that there is the potential for significant effects.	Scoped out
Construction	Open space	Potential temporary or permanent loss of open space.	**Yes** – the Project has been designed to avoid open space as far as possible, however there may be the potential for land take which could result in the potential for significant effects and so this has been scoped in for further consideration at this stage.	**Scoped in**
Operation and maintenance	Open space	Potential temporary or permanent loss of open space.	No – Any temporary or permanent effects on open space would arise during the construction period and would therefore be assessed as construction effects. No significant effects on open space are anticipated during operation. Disruption to open space during maintenance will be avoided as far as possible and it is not considered that there is the potential for significant effects.	Scoped out

Project phase	Receptor	Impact	Potential for significant effects	Proposed to be scoped in/out
Construction	Affected communities, community facilities, visitor attractions and businesses	Potential disruption (indirect effects) during construction based activities	**Yes** – the Project has been designed to avoid direct effects on these receptors as far as possible. However, there is the potential for indirect temporary effects to arise from construction activities that may give rise to significant effects, so this has been scoped in for further consideration at this stage.	**Scoped in**
Construction, operation and maintenance	Affected communities, community facilities, visitor attractions and businesses	Potential temporary or permanent loss of or impact on receptors (direct effects).	No – the Project has been designed to avoid direct effects on these receptors as far as possible. Should this position change between Scoping and PEI Report or ES stage, and any communities, community facilities, visitor attractions and businesses be likely to be directly impacted, those would be included in the assessment as appropriate.	Scoped out
Operation and maintenance	Affected communities, community facilities, visitor attractions and businesses	Potential temporary or permanent loss of access and impact on amenity (indirect effects).	No – access to these receptors will be reinstated post construction and their ongoing use will be unaffected during operation and maintenance activities.	Scoped out
Construction	Tourism accommodation	Potential for impacts on the availability of tourism accommodation due to use by the construction workforce (indirect effects).	**Yes** – impact of the construction workforce on bedspace availability is scoped in due to the potential scale of employment generated during the construction phase and the cumulative impact of other projects in the region.	**Scoped in**

Project phase	Receptor	Impact	Potential for significant effects	Proposed to be scoped in/out
Operation and maintenance	Tourism accommodation	Potential for impacts on the availability of tourism accommodation during operation and maintenance.	No – the scale of operational employment generated is likely to be very limited. Therefore, tourism accommodation availability will be unaffected during operation and maintenance activities.	Scoped out
Construction, operation and maintenance	Residential properties	Potential temporary or permanent loss of residential property, access and impact on amenity (direct or indirect effects).	No – the emerging preferred corridor for the Project and substation siting areas avoid acquisition or over-sail of residential properties. Indirect effects such as access and noise will be managed through the CTMP and CEMP, and appropriate management will reduce the potential for significant effects.	Scoped out

16.8 Proposed Assessment Methodology

Proposed Assessment Methodology

16.8.1 The overall assessment methodology for the EIA is outlined in **Chapter 5 EIA Approach and Methodology**.

Proposed data sources

16.8.2 A desk-based baseline assessment will be undertaken using a range of sources to provide a description of the socio-economic conditions within the geographical areas set out in section 16.5. This will be done using established statistical sources, and in consultation with stakeholders, where relevant. Relevant policy will be reviewed at the local, regional and national levels to identify the key issues of relevance to the Project.

16.8.3 Community facilities, open space, business and tourism receptors will be identified using web mapping of OS data, cross-checked against internet searches, and taking into account stakeholder feedback. The baseline for promoted and recreational routes will also draw on OS data, as well as information from the relevant local planning authorities, maps of Sustrans National Cycle Network routes, and the baseline collected by **Chapter 13 Traffic and Movement**.

Technical guidance

16.8.4 There is limited technical guidance available for socio-economic assessments. However, the assessment of employment effects will follow the approach set out in the HCA Additionality Guide (Ref 16.1), which provides guidance on assessing the additional impact (or 'additionality') of local economic interventions, taking into account the potential for leakage, displacement and supply chain effects. The HCA approach represents standard industry guidance on the assessment of additionality, and this guidance has recently been applied to the assessment of direct, indirect and induced effects on employment and GVA for Luton Rising's DCO application for the London Luton Airport Expansion.

Proposed assessment methodology

16.8.5 As noted above, there is limited technical guidance available for socio-economic assessment. As such, the methodology for assessing impacts will follow standard EIA guidance and will entail:

- assessment of the likely scale, permanence and significance of effects associated with socio-economics, recreation and tourism receptors; and
- an assessment of the potential cumulative impacts with other projects within the surrounding area.

16.8.6 For socio-economics, recreation and tourism there is no accepted definition of what constitutes a significant (or not significant) effect. It is however recognised that effects are categorised based upon the relationship between the scale (or magnitude) of impact and the sensitivity (or value) of the affected resource or receptor.

16.8.7 Appropriate qualitative and quantitative sensitivity and magnitude criteria have therefore been defined, based on expert judgment and understanding of local and regional

priorities, to assess the scale and nature of the impacts of the Project against baseline conditions. These are set out below.

Sensitivity

16.8.8 **Table 16.17**: sets out the sensitivity criteria that will be used in the assessment.

Table 16.17: Sensitivity of receptors

Level of Sensitivity	Description
Very high	Businesses, individuals, groups of individuals, or other receptors possessing very significant economic, social and/or community value. These receptors are considered very likely to incur a material loss or gain as a result of potential changes in the environment, with little to no potential for substitution.
High	Businesses, individuals, groups of individuals, or other receptors possessing some significant economic, social and/or community value. These receptors are considered likely to incur some material loss or gain as a result of potential changes in the environment, with limited potential for substitution.
Medium	Businesses, individuals, groups of individuals, or other receptors possessing some economic, social and/or community value. These receptors are considered likely to incur a material loss or gain as a result of potential changes in the environment, with potential for substitution.
Low	Businesses, individuals, groups of individuals, or other receptors possessing some economic, social and/or community value. These receptors are not considered likely to incur any loss or gain as a result of potential changes in the environment.
Negligible	Businesses, individuals, groups of individuals, or other receptors possessing limited economic, social and/or community value. These receptors are not considered likely to incur any loss or gain as a result of potential changes in the environment.

Magnitude

16.8.9 **Table 16.18** sets out the magnitude criteria that will be used in the assessment.

Table 16.18: Magnitude of impact

Level of Magnitude	Description
Large	An impact that would be likely to result in total loss of an individual receptor or permanent changes to baseline conditions for a large number of businesses, individuals or groups of individuals.
Medium	An impact that would be very likely to result in partial changes to baseline conditions for a moderate number of businesses, individuals or groups of individuals.

Level of Magnitude	Description
Small	An impact that would be likely to result in minor changes to baseline conditions for a small number of businesses, individuals or groups of individuals.
Negligible	An impact that would be likely to result in little or no change to baseline conditions for businesses, individuals or groups of individuals.

Significance of effects

16.8.10 Those effects which are found to be moderate or major are considered to be 'significant' and those which are minor or negligible are 'not significant'. Duration of impact will also be considered, with more weight given to reversible long-term or permanent changes than to short-term, temporary ones. Temporary effects are typically considered to be those associated with the construction and maintenance works, whereas long-term reversible effects/permanent effects are generally those associated with the operational stage (notwithstanding in some cases there may be exceptions, such as permanent PRoW diversions during construction). **Table 16.19**: sets out the sensitivity criteria that will be used in the assessment.

Table 16.19: Determination of significance matrix

		Value/Sensitivity of receptor				
		Very high	**High**	**Medium**	**Low**	**Negligible**
Magnitude	**Large**	Major	Major/ moderate	Major/moderate/ minor	Moderate/ minor	Minor/ negligible
	Medium	Major/moderate	Major/ moderate	Moderate/minor	Minor/ negligible	Negligible
	Small	Major/moderate/ minor	Moderate/ minor	Moderate/minor	Minor/ negligible	Negligible
	Negligible	Minor/ negligible	Minor/ negligible	Minor/negligible	Negligible	Negligible

16.9 Assumptions and Limitations

16.9.1 This EIA Scoping Report has been collated based on a range of publicly available data and information only. It is assumed that the data collated is accurate. The baseline will be supplemented with additional data collected as part of the EIA process. A precautionary approach has been taken and professional judgement, based on experience of similar linear projects, has been used where required to inform the scope of the assessment.

16.9.2 The commercial agreement for land, including productive land, between the applicant and landowners is beyond the scope of this assessment and the future ES. This chapter does not consider the financial effects on individual businesses, as this may be the subject of the landowner negotiations and may result in compensation payments to offset effects on landowners and businesses. In addition, this chapter does not consider the effects of the Project on property values as this is not a matter for assessment under the EIA Regulations 2017. As a result, this is scoped out of the ES. Also, it should be

noted that potential impacts on farm business would be included in **Chapter 12 Agriculture and Soils**.

16.9.3 Information on open greenspace has been drawn from desk-based research using OS data and checked against Google Maps. This may not capture the most comprehensive or up to date information, and therefore, the list of baseline open greenspaces should be viewed as indicative rather than a comprehensive assessment. A more detailed baseline will be provided as part of the ES, drawing on information provided through consultation and stakeholder engagement.

16.9.4 A proportion of the construction and maintenance workers are likely to live locally to the site, while a proportion will travel to the site to work. More detail on the average and peak number of workers expected to work across the construction and maintenance period, and the proportion of workers who will be expected to live locally to the site, will likely become available as the Project progresses and will be set out in the ES, also taking into account other developments taking place or planned locally. This will inform the assessment of construction employment effects.

16.10 Conclusion

Summary

16.10.1 This chapter of the Scoping Report has set out the proposed scope and methodology for the ES assessment of socio-economic, tourism, and recreation effects arising from the construction, operation, and maintenance of the Project.

16.10.2 The next steps for the socio-economics, tourism and recreation assessment are:

- Continued engagement with affected stakeholders, including representatives of businesses and community facilities that could be directly impacted, to understand potential adverse impacts and develop appropriate mitigation.
- Continued updates to baseline, drawing on published data sources, online mapping and information received through stakeholder engagement and consultation.
- Review and identify appropriate mitigation to reduce likely significant effects. This will be carried out in coordination with other topics including noise and vibration, air quality, landscape and visual, traffic and transport and health.

Proposed Scope of the Assessment

16.10.3 It is considered that the socio-economic, tourism, and recreation topics summarised in **Table 16.20**: should be scoped in and out of the EIA.

Table 16.20: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in/out
Local labour market	Construction of the Project will create employment, training and apprenticeship opportunities. However, the scale of operational and maintenance employment	Construction	**Scoped in**
		Operation	Scoped out

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in/out
	generated by the Project is likely to be very limited.	Maintenance	Scoped out
Users of promoted recreational routes and PRoW of significance in the local area	The baseline has identified a number of routes within the Study Area that are likely to be temporarily or permanently managed or diverted during construction. Disruption during the operation and maintenance periods will be avoided as far as possible and managed through a PRoW Management Plan. Any temporary or permanent effects on promoted recreational routes would arise during the construction period and would therefore be assessed as construction effects.	Construction	**Scoped in**
		Operation	Scoped out
		Maintenance	Scoped out
Development land, utilities and renewables infrastructure	The Project has been designed to avoid development land, utilities, and renewable energy infrastructure as far as possible. However, there may be the potential for land take which falls within a current development land allocation. Any temporary or permanent effects on land allocated for development by local plans would arise during the construction period and would therefore be assessed as construction effects. Disruption during maintenance will be avoided as far as possible.	Construction	**Scoped in**
		Operation	Scoped out
		Maintenance	Scoped out
Open space	There may be the potential for the need to take land classified as open space. Any temporary or permanent effects on open space would arise during the construction period and would therefore be assessed as construction effects. Disruption during operation and maintenance will be avoided as far as possible.	Construction	**Scoped in**
		Operation	Scoped out
		Maintenance	Scoped out
Affected communities, community facilities, visitor	The emerging preferred corridor for the Project and substation siting areas avoid acquisition or over-sail of these receptors.	Construction, Operation and Maintenance	Scoped out

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in/out
attractions and businesses – direct effects			
Affected communities, community facilities, visitor attractions and businesses – indirect effects	The Project has been designed to avoid direct effects on these receptors as far as possible. However, there is the potential for indirect temporary effects to arise from construction activities that may give rise to significant effects, so this has been scoped in for further consideration at this stage. Access to these receptors will be reinstated post construction and their ongoing use will be unaffected during operation and maintenance activities.	Construction	**Scoped in**
		Operation	Scoped out
		Maintenance	Scoped out
Tourism accommodation	Due to the potential scale of employment generated by the Project during construction, and the potential cumulative impact of National Grid Electricity Transmission plc projects in the region, potential impacts on tourism bedspace availability have been scoped in during the construction phase. It is anticipated that tourism accommodation availability will be unaffected during operation and maintenance due to the small scale of employment generated during these phases of the Project.	Construction	**Scoped in**
		Operation	Scoped out
		Maintenance	Scoped out
Residential properties - direct and indirect effects	The emerging preferred corridor for the Project and substation siting areas avoid acquisition or over-sail of residential properties. Indirect effects such as access and noise will be managed through the CTMP and CEMP, and appropriate management will reduce the potential for significant effects.	Construction, Operation and Maintenance	Scoped out

16.11 References

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Ref 16.2 ONS, 2021. Census 2021 [online]. Available at: https://www.ons.gov.uk/census [Accessed 12 July 2024].

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17. Health and Wellbeing

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Contents

17.1 Introduction

17.1.1 The World Health Organisation defines health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ (Ref 17.1). Factors that have the most significant influence on the physical and mental health of a population are called ‘determinants of health’ and include a wide range of social, economic and environmental factors which then influence the health of individuals and populations.

17.1.2 This chapter presents how the health and wellbeing assessment will consider the potentially significant effects on health and wellbeing receptors that may arise from the construction, operation and maintenance of the Project (as described in **Chapter 4 Description of the Project**). An electromagnetic fields (EMF) report will also be prepared as part of the Project, however this is separate to this chapter and the Environmental Impact Assessment (EIA) process as a whole.

17.1.3 This chapter describes the methodology and datasets to be used within the health and wellbeing assessment, presents an overview of the baseline conditions, and identifies the potential likely significant effects to be considered within the assessment will be assessed for the purpose of EIA. As detailed in **Chapter 4 Description of the Project**, the decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

17.1.4 In November 2022, the Institute of Environmental Management and Assessment (IEMA) published new guidance on assessing human health as part of EIA (Ref 17.2). The human health assessment will be based on this guidance, and it will consider the potential physical and mental health and wellbeing impacts for each phase of the Project. Wherever possible, the impacts identified in the assessment will be appraised against relevant national standards. Where relevant standards do not exist, professional experience and expert judgement will be applied and justified.

17.1.5 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

17.1.6 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology**.

17.1.7 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 7 Visual:** which covers effects on residential properties and recreational, tourism and community visual receptors and their impact on human receptors including the ability to enjoy open space and recreational amenities.
- **Chapter 11 Geology and Hydrology:** which covers contamination sources and potential remediation effects following construction activities.
- **Chapter 13 Traffic and Movement:** which covers effects on accessibility, active travel, use of Public Rights of Way (PRoW) as a result of construction traffic.
- **Chapter 14 Air Quality:** which covers air quality effects following construction activities and traffic and their impact on human receptors.

- **Chapter 15 Noise and Vibration:** which covers noise and vibration effects following construction activities and traffic and their impact on human receptors.
- **Chapter 16 Socio-economic, Recreation and Tourism:** which covers impacts on community land and facilities, commercial property and land, and employment creation, as well as effects on recreational, tourism and community receptors including the ability to access open space and recreational amenities.

17.1.8 This chapter is supported by the following figures:

- **Figure 17.1 Study Area**;
- **Figure 17.2 Location of Health Care and Other Social Infrastructure with 500m Study Area**;
- **Figure 17.3 Location of Residential Properties within 500m Study Area**;
- **Figure 17.4 Location of Green Open Spaced within 500m Study Area**;
- **Figure 17.5 Promoted Recreational Routes**; and
- **Figure 17.6 Indices of Multiple Deprivation**.

17.2 Legislation, Policy and Guidance

17.2.1 Legislation and policy relevant to the proposed Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context** and **Appendix 2A Key Legislation, Appendix 2B National and Regional Policy** and **Appendix 2C Local Policy**.

17.2.2 Relevant guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- IEMA (2022) Effective Scoping of Human Health in Environmental Impact Assessment (Ref 17.2);
- IEMA (2022) Determining Significance for Human Health in Environmental Impact Assessment (Ref 17.3);
- Highways England (2020) Design Manual for Roads and Bridge Document LA112 (Ref 17.4);
- IEMA (2017) Health in Environmental Impact Assessment: A Primer for a Proportionate Approach (Ref 17.5);
- Public Health England (PHE) The Public Health England Strategy 2020 to 2025 (Ref 17.6);
- PHE (2020) Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime (Ref 17.7);
- Institute of Health Equality (2010) Fair Society, Healthy Lives: The Marmot Review (Ref 17.8);
- Institute of Health Equality (2020) Healthy Equity in England: The Marmot Review 10 Years On (Ref 17.9);
- Institute of Health Equality (2020) Build Back Fairer: The COVID-19 Marmot Review (Ref 17.10);

- International Commission on Non-Ionising Radiation Protection (1998) Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields. Health Physics, 74(4), p.494. (Ref 17.11); and
- The Control of Electromagnetic Fields at Work Regulations (2016) (Ref 17.12).

17.3 Consultation and Engagement

17.3.1 The EIA will be informed by consultation and engagement with stakeholders, including local planning authorities, National Health Service Integrated Care Systems, relevant emergency service authorities, Health and Safety Executive, UKHSA, OHID and Natural England. In addition, engagement will be undertaken with non-statutory stakeholders as required to ensure that specialist local views and expertise can be considered as part of the EIA.

17.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback relevant to health and wellbeing received at Non-Statutory Consultation held between January to March 2024. No pre-scoping engagement has been undertaken for health and wellbeing, which is considered to be an appropriate approach and normal practice for this discipline.

17.3.3 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 17.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 17.1: Engagement with Stakeholders

Organisation	Summary of response	Consideration in the Scoping Report
Natural England	Natural England encourages any proposal to incorporate measures to help improve people's access to the natural environment. As such, impacts on existing footpaths, as well as mitigation and enhancements should be considered. Consideration should also be given to the potential impacts on nearby National Trails.	The health and wellbeing assessment will consider measures to help improve people's access to the natural environment including consideration of impacts on existing footpaths, including National Trails; and appropriate mitigation and enhancements.
Norfolk County Council	Norfolk County Council would like to see a full health impact assessment undertaken, setting out appropriate mitigation measures if required. The Council notes that public concern regarding EMF could give rise to potential anxiety in local populations, and therefore requests that a mental health assessment is carried out.	The health and wellbeing assessment of the PEI Report and ES will consider direct and indirect impacts on health and wellbeing. The Project will be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN5 (Ref 17.13) including the International Commission on Non-Ionizing Radiation Protection guidelines for electric and magnetic fields (EMFs) and associated precautionary policy (Ref 17.11).

Organisation	Summary of response	Consideration in the Scoping Report
		An EMF report will be prepared as part of the Project. This is separate to the EIA process. A mental health assessment is not currently scoped into the health and wellbeing assessment of the PEI Report and ES, however further engagement with the Norfolk Country Council will be undertaken to ensure mental health is considered appropriately.
UKHSA and OHID	No specific concerns were raised at this stage, however UKHSA and OHID would like to attention to its Public Health England's 'Advice on the content of Environmental Statements accompanying an application under the NSIP Regime' (Ref 17.7), which sets out aspects to be addressed within the Environmental Statement.	As set out in the health and wellbeing assessment, the suggested advice note forms part of the guidance that will be used for the health and wellbeing assessment which will be reported in the PEI Report and ES.

17.4 Study Area

17.4.1 The Study Area for the assessment will vary by the type of health impact being assessed.

17.4.2 The Study Area will comprise the wards in which the Project is located and residential, community and healthcare facilities and open spaces within 500 m of the Scoping Boundary. This area is considered to cover the likely extent of environmental effects arising from the construction, operation, and maintenance of the Project that are likely to give rise to health effects.

17.4.3 Where data is not available at ward level, local authority level data will be provided for North East Lincolnshire, East Lindsey, West Lindsey, Boston, South Holland, Fenland, and Kings Lynn and West Norfolk. Given the size of the Scoping Boundary (**Figure 1.1 Scoping Boundary**) this level of geography has been used to present the baseline for this assessment. This is alongside the corresponding regions of Yorkshire and The Humber (region of North East Lincolnshire), East Midlands (region for East Lindsey, West Lindsey, Boston and South Holland) and East of England (region for Fenland and King's Lynn and West Norfolk) and the national comparator of England.

17.4.4 In addition, the Study Areas for assessing specific health and wellbeing impacts of the Project will be influenced by the geographic extent of the relevant technical assessments listed in section 17.1.6.

17.5 Baseline Conditions

Data Sources

17.5.1 The known or predicated current and future baseline environment described in this section has been informed by the following data sources:

- Ministry of Housing, Communities and Local Government, Indices of Multiple Deprivation 2019;
- Office of National Statistics (ONS), Census 2021 (2022) (Ref 17.14);
- OHID, Local Health data (Ref 17.15);
- Ordnance Survey data;
- Public Health England, Health Profiles (2022) (Ref 17.16); and
- Sustrans Open data.

Baseline

17.5.2 The Project has been divided into seven sections as detailed in **Chapter 4 Description of the Project.** The sections are split from north to south by the geographical alignment of the Scoping Boundary and are included as per the following in this chapter:

- Section 1 - Grimsby West Substation;
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation (LCS) A;
- Section 3 - LCS A and B (including the overhead line between them);
- Section 4 - Overhead line from LCS B to Weston Marsh Substation;
- Section 5 - Weston Marsh Substation;
- Section 6 - Overhead line from Weston Marsh Substation to the new Walpole Substation (herein after referred to as Walpole B Substation); and
- Section 7- Walpole B Substation.

17.5.3 **Table 17.2** below sets out the local authorities each section of the Project passes through.

Table 17.2: Scoping Boundary sections and the relevant local authority

Section	Location	Local Authority
1	Grimsby West Substation	North East Lincolnshire West Lindsey
2	Overhead line from Grimsby West Substation to LCS A	North East Lincolnshire East Lindsey
3	LCS A and B (including the overhead line between them)	East Lindsey
4	Overhead line from LCS B to Weston Marsh Substation	East Lindsey Boston

Section	Location	Local Authority
		South Holland
5	Weston Marsh Substation	South Holland
6	Overhead line from Weston Marsh Substation to Walpole B Substation	South Holland Fenland
7	Walpole B Substation	Kings Lynn and West Norfolk

17.5.4 The following sections present the existing local authority level baseline established at scoping.

Population

17.5.5 The data in **Table 17.3** sets out the age breakdown of the resident population. Key points are as follows:

- All seven local authorities in the Study Area have ageing populations, as their proportion of the population aged 65 and over are all above their respective regional and national average. Of the seven local authorities, East Lindsey has the highest proportion of residents aged 65 and over (30 per cent) This is considerably higher than the East Midlands (20 per cent) and national (16 per cent) average.
- In contrast, the working age population (aged 16-65) in all local authorities is lower than their respective regional averages, and below the national average of 65 per cent. Of the local authorities, East Lindsey has the lowest proportion of working age residents (55 per cent).
- The resident population aged under 16 in East Lindsey (15 per cent) is lower than the East Midlands (18 per cent) and national (19 per cent) average. The proportion of residents aged under 16 in the remaining local authorities is broadly in line with respective regional and national averages.

Table 17.3: Population breakdown

	North East Lincolnshire	East Lindsey	West Lindsey	Boston	South Holland	Fenland	King's Lynn and West Norfolk	Yorkshire and the Humber	East Midlands	East of England	England
Population (2021)	157,000	142,300	95,200	70,500	95,100	102,500	154,300	5,480,800	4,880,000	6,335,100	56,490,000
Population under 16 (%) (2021)	19	15	17	18	17	17	16	19	18	19	19
Population 16 - 64 (%) (2021)	60	55	58	61	59	60	58	62	62	62	65
Population aged 65 and over (%) (2021)	21	30	25	20	24	23	26	19	20	20	16

Economic Activity

17.5.6 The data in **Table 17.4**: sets out economic activity across the relevant local authorities, regions and England. Key points are as follows:

- East Lindsey (48 per cent) has a considerably lower economic activity rate compared to its regional (East Midlands (58 per cent)) average and England (59 per cent). The economic activity rate across the remaining local authorities in the Study Area are broadly in line with the economic activity in their respective regional and national averages.
- Unemployment rates in all local authority areas are broadly in line with the unemployment rates in their respective regional percentages and the national percentage.

Table 17.4: Economic activity

	North East Lincolnshire	East Lindsey	West Lindsey	Boston	South Holland	Fenland	King's Lynn and West Norfolk	Yorkshire and the Humber	East Midlands	East of England	England
Economic activity rate (%) (2021)	55	48	54	60	59	57	55	56	58	60	59
Unemployment rate (%) (2021)	3	3	2	3	2	2	2	3	2	2	3

Health indicators

17.5.7 The data in **Table 17.5**Error! Reference source not found. below sets out health indicators for the Study Area. Key points are as follows:

- At the local authority level, the proportion of residents in most districts who consider their health to be 'not good' is broadly in line with their respective regional averages. However, at 26 per cent, East Lindsey has a considerably higher proportion of people not in good health when compared to the East Midlands (19 per cent) and England (18 per cent).
- The proportion of residents who are disabled under the Equality Act is higher in all local authorities compared to the national average (17 per cent). With the exception of East Lindsey, the proportion of disabled residents in all other local authorities is broadly in line with their respective regional averages. East Lindsey (25 per cent) has a higher proportion of disabled residents than both the proportion across the East Midlands (18 per cent) as well as England (17 per cent).
- Among reception year children, overweight and obesity proportions varied slightly from one local authority to another. 25 per cent of reception year children in West Lindsey are overweight and obese, which is higher than the average for East Midlands and England – both 21 per cent. 24 per cent of reception year children in North East Lincolnshire, East Lindsey, Fenland and King's Lynn and West Norfolk are overweight and obese. This is in line with the proportion in Yorkshire and The Humber (also 24 per cent), but slightly higher than the proportion in East Midlands (21 per cent), East of England (20 per cent) and England (21 per cent).

- The number of emergency hospital admissions for chronic obstructive pulmonary disease (COPD) per 100,000 people varies in each local authority in the Study Area. West Lindsey (345) and South Holland (350) had lower emergency admissions per 100,000 population compared to the national average (415 admissions). Despite the East of England having fewer emergency admissions for COPD (368 per 100,000) when compared to the national level, Fenland and King's Lynn and West Norfolk (both in East of England), have considerably higher admissions levels then the rest of the Study Area – at 631 and 528 admissions respectively.
- The standardised mortality rate (SMR) for death from respiratory diseases across all ages is not available at the regional level. When compared to the national rate (100), South Holland has a slightly lower rate of 93.6. With a rate of 111.8, Fenland has the highest rate for death from respiratory diseases out of all the local authorities within the Study Area.
- Male and female life expectancy in all local authority areas is broadly in line with respective regional and national averages.

Table 17.5: Health indicators

	North East Lincolnshire	East Lindsey	West Lindsey	Boston	South Holland	Fenland	King's Lynn and West Norfolk	Yorkshire and the Humber	East Midlands	East of England	England
General Health- Not good (%) (2021)[1]	22	26	20	21	21	22	21	20	19	19	18
Disability (% under the Equality Act) (2021)	20	25	21	18	19	20	20	19	18	18	17
Overweight and obese children (reception year) (%) (2022/23)	24	24	25	23	23	24	24	24	21	20	21
Emergency hospital admissions for COPD (per 100,000) (2019/20)	457	463	345	428	350	631	528	415	462	368	415
Deaths from Respiratory diseases, all ages (SMR) (2016-20)	106.4	108.8	-	103	93.6	111.8	105.2	-	-	-	100
Life expectancy at birth (Male) (2018-20)	78.0	78.2	79.1	77.4	80.0	78.5	79.3	78.4	79.2	80.2	79.4
Life expectancy at birth (Female) (2018-20)	82.2	81.6	83.6	82.4	83.4	82.2	82.7	82.2	82.7	83.8	83.1

[1] General Health- Not good (%) value was calculated by adding the values: fair, bad and very bad

Healthcare and social infrastructure

17.5.8 **Table 17.6** sets out the healthcare and other social infrastructure located within 500 m of the Scoping Boundary (as shown in **Figure 17.2 Location of Health Care and Social Infrastructure).** These include:

Table 17.6: Healthcare and social infrastructure

	Within Scoping Boundary?	Within 500 m of Scoping Boundary?
North East Lincolnshire		
Cloverdale Residential Home	N	Y
East Lindsey		
The Thomas Centre	N	Y
North Cockerington Church of England Primary School	N	Y
East Wold Primary School	N	Y
Red Hen Day Nursery	N	Y
Huttoft Primary School	N	Y
Boston		
Gipsy Bridge Academy	N	Y
South Holland		
Weston St. Mary's Church of England Primary School	N	Y
Fenland		
Kinderley Community Primary School	N	Y
Marshland High School	N	Y
West Walton Primary School	N	Y

17.5.9 Further health care and social infrastructure receptors may be identified within the Study Area following the use of additional Geographic Information Systems data, desk-top research and engagement with relevant stakeholders. These will be reported at the Preliminary Environmental Information (PEI) Report stage.

Promoted recreational routes

17.5.10 Promoted national cycle routes, long-distance paths and national trails have been identified in **Figure 17.5 Promoted Recreational Routes**. These include:

National Cycle Network

- National Cycle Network (NCN) Route 1: Peterborough to March, to Wisbech, to King's Lynn;
- NCN Route 1: Boston, to Lincoln;
- NCN Route 1: Lindon, to Cleethorpes; and
- NCN Route 63: Peterborough, to Wisbech.

Long Distance Paths

- Greenwich Meridian Path (Greenwich to Withernsea);
- Peter Scott Walk (King's Lynn to The Wash);
- Nene Way (Via Wisbech);
- MacMillan Way (Boston to Abbotsbury);
- MacMillan Way (Cross Britain Way);
- Water Rail Way (Boston to Lincoln);
- Lindsey Loop (Lincolnshire Wolds); and
- Johnson Silver Lincs Way (from Grimsby).

National Trail

- King Charles III England Coast Path, North East Route, Skegness to Mablethorpe.

Canal

- Louth Canal

17.5.11 Further information can be found in **Chapter 13 Traffic and Movement,** which includes a full baseline of PRoW within the Study Area.

Open space

17.5.12 Open spaces within the Study Area are shown in **Figure 17.4 Location of Green Open Spaces**.

17.5.13 Community open spaces have been identified using the Ordnance Survey Open Greenspace dataset, which is a dataset of open greenspaces in urban and rural areas including playing fields, sports' facilities, play areas and allotments. **Table 17.7**: provides open greenspaces by local authority within 500 m of the Scoping Boundary.

Table 17.7: Open space

Open space	Within Scoping Boundary?	Within 500 m of Scoping Boundary?
North East Lincolnshire		
Grimsby Golf Club	N	Y
Butt Lane Park, Laceby	N	Y

Open space	Within Scoping Boundary?	Within 500 m of Scoping Boundary?
Laceby Manor Golf Course	N	Y
Play space on Waltham Road, Brigsley	N	Y
Greenspace adjacent to St Helen's Church, Brigsley	N	Y
Greenspace adjacent to St Peter's Church, Ashby cum Fenby	N	Y
East Lindsey		
Greenspace adjacent to St Martin's Church, Waithe	N	Y
Greenspace adjacent to St Edith's Church, Grimoldby	N	Y
Woodthorpe Hall Golf Course, Alford	N	Y
Greenspace adjacent to Skegness Raceway, Skegness	Y	Y
Burgh Sports Field, Burgh le Marsh	N	Y
Boston		
Boston Golf Course, Boston	N	Y
Kirton Holme Golf Course, Kirton	N	Y
South Holland		
Spalding Golf Course, Surfleet	N	Y
Allotments on Delgate Bank	Y	Y
Weston Playing Field, Delgate Bank	N	Y
Fenland		
Fields adjacent to Tydd St Giles Community Centre	N	Y
Tydd St Giles Golf Course	N	Y
Fields adjacent to Newton Village Hall, Newton	N	Y

Future Baseline

17.5.14 **Table 17.8** sets out ONS population projection data for mid-2043 using the year 2018 as a baseline. Key points are as follows:

- All regions will experience a growth in population. However, Yorkshire and The Humber will experience a lower than national average increase – 7 per cent compared to 10 per cent - while East Midlands will see a higher than national

average growth in population. Total population growth in East of England (10 per cent) is in line with national levels.

- With the exception of North East Lincolnshire and King's Lynn and West Norfolk, all other local authorities in the Study Area will experience a considerably higher than national average increase in resident population. While King's Lynn and West Norfolk will see a 6 per cent increase in population, this is at a slightly lower increase than the national average (10 per cent). North East Lincolnshire is the only district that will experience negative growth, with a 1 per cent decline in the population by 2043.
- All local authorities will experience a considerable increase in the over 65 resident population. This will be in line with respective regional growth rates, with the exception of King's Lynn and West Norfolk. By 2043, King's Lynn and West Norfolk will experience a 34 per cent increase in residents ages 65 and above which is considerably lower than the East of England (43 per cent) and national (42 per cent) projected increase.
- On the whole, England is projected to see a decline (-1 per cent) in people aged 0 to 15 years. Three local authorities, North East Lincolnshire (-13 per cent), East Lindsey (-2 per cent) and King's Lynn and West Norfolk (-7 per cent) also see a decline - with North East Lincolnshire experiencing a considerably greater decline in child population. In contrast, all other local authorities will see an increase in the 0-15 year old population. At 9 per cent, Boston will a considerably higher growth in child population compared to the region (East Midlands (4 per cent)) and national (-1 per cent) average.

Table 17.8: Population projections for 2043

	North East Lincolnshire	East Lindsey	West Lindsey	Boston	South Holland	Fenland	King's Lynn and West Norfolk	Yorkshire and the Humber	East Midlands	East of England	England
Population growth (%)	-1%	15%		19%	17%	17%	6%	7%	14%	10%	10%
Population growth 65+ (%)2	36%	46%		42%	41%	46%	34%	37%	46%	43%	42%
Population growth 0-15 (%)	-13%	-2%		9%	7%	6%	-7%	-2%	4%	-1%	-1%

17.6 Design and Control Measures

Design Measures

17.6.1 Health and wellbeing will be taken into consideration as part of the iterative design and development of the Project to avoid effects on sensitive receptors as far as possible,

[2] 2019 was used as a baseline for population growth of 65+ due to data at single year of age above 84 not being available in 2018.

enhance potential beneficial effects, and mitigate any potential significant adverse effects on health and wellbeing. The emerging preferred corridor on which the Scoping Boundary has been based has been located to avoid sensitive health features as far as practicable, such as built up residential areas.

17.6.2 The design of the Project will be compliant with the guidelines and policies relating to EMFs stated in National Policy Statement (NPS) EN-5 (Ref 17.13), the main component of which are the International Commission on Non-Ionizing Radiation Protection guidelines (1998) (Ref 17.11).

Control and Management Measures

17.6.3 An Initial Outline Code of Construction Practice (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could affect the health and wellbeing assessment are:

- GG04 - Suitably experienced Environmental Managers will be appointed for the duration of the construction phase. In addition, qualified and experienced Environmental Clerks of Works will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the Management Plans. The Environmental Clerks of Works will monitor that the works proceed in accordance with relevant environmental Development Consent Order requirements and adhere to the required good practice and mitigation measures. The Environmental Clerks of Works will be supported as necessary by appropriate specialists, including ecologists and arboriculturists, soils and land drainage experts.
- GG06 - A Construction Environmental Management Plan, a Landscape and Ecological Management Plan, a Site Waste Management Plan and a Construction Traffic Management Plan, PRoW Management Strategy, Overarching Written Scheme of Investigation, along with a Soil Management Plan will be produced prior to construction. These are collectively referred to as ‘the Management Plans.
- GG11 - Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG26 - Members of the community and local businesses will be kept informed regularly of the works through active community liaison. This will include notification of noisy activities, heavy traffic periods and start and end dates of key phasing. A contact number will be provided which members of the public can use to raise any concerns or complaints about the Project. All construction-related complaints will be logged by the contractor(s) in a complaints register, together with a record of the responses given and actions taken.
- AS03 - Access to and from residential, commercial, community and agricultural land uses will be maintained throughout the construction period or as agreed through the landowner discussions. This may require signed diversions or temporary restrictions to access. The means of access to affected properties, facilities and land parcels will be communicated to affected parties at the start of the Project, with any changes communicated in advance of the change being implemented. Where field-to-field access points require alteration as a result of construction, alternative field access will be provided in consultation with the landowner/occupier.

- S01 - Provision of training to construction workers, particularly in relation to working hours and the management of emissions (dust, noise, vibration, etc).
- S02 – As set out in TT03 PRoWs including any promoted recreational routes crossing the working areas will be managed in discussion with the relevant local authorities and will be subject to a PRoW Management Plan, which will ensure users of PRoW including any promoted recreational routes are informed of any temporary or permanent diversions, which will help ensure any potential disruption is avoided or limited.

17.7 Potential for Significant Effects

17.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 17.6.

17.7.2 **Table 17.9**: sets out the receptors identified within the Study Area, the potential impacts as a result of construction, maintenance and/or operation activities associated with the Project, whether these impacts are likely to give to rise to significant effects, and whether the receptor is scoped in or scoped out of the assessment.

17.7.3 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Table 17.9: Impacts, receptors and potential for significant effects

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
Construction	The demands of the construction of the Project leading to an increase in temporary employment due to the need for a construction workforce.	Increased employment for the construction workforce, leading to improved health outcomes.	Local residents and workers	**Yes** – increased employment opportunities for the construction workforce.	**Scoped in**
	Potential temporary changes in neighbourhood quality. Changes in neighbourhood quality will arise when two significant residual environmental effects occur at the same location at the same period in time. These include changes in noise, dust, air quality, traffic and visual amenity.	Potential temporary changes in neighbourhood quality leading to worsened health outcomes.	Local residents within 500 m of Scoping Boundary (**Figure 17.3 Location of Residential Properties**)	**Yes** – potential for health related effects based on how people feel about their local environment, determined through the topic specific assessment, but expected to include air quality, noise and vibration, visual amenity and traffic and transport effects.	**Scoped in**
	Potential temporary and permanent closure or diversions to promoted recreational routes.	Impact on local residents' access to promoted recreational routes within 500 m of the Scoping Boundary (**Figure 17.5 Promoted Recreational Routes)** affecting health outcomes.	Local residents and users of promoted routes within 500 m of Scoping Boundary	**Yes** – disruption to promoted recreational routes affecting opportunities to engage in physical exercise.	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
	Potential temporary and permanent changes in access to open space.	Potential temporary and permanent changes in access to open space within 500 m of the Scoping Boundary (**Figure 17.4 Location of Green Open Spaces**) affecting health outcomes.	Local residents and users of open spaces within 500 m of Scoping Boundary	**Yes** – disruption to open space affecting opportunities to engage in physical exercise	**Scoped in**
	Potential temporary and permanent changes in access to healthcare and social infrastructure.	Potential temporary and permanent changes in access to healthcare and social infrastructure within 500 m of the Scoping Boundary (**Figure 17.2 Location of Health Care and Social Infrastructure**), potentially leading to worsened health outcomes.	Local residents within 500 m of Scoping Boundary	**Yes** – disruption to routes offering access to community services and social infrastructure.	**Scoped in**
Operation	The demands of the operational phase of the Project leading to permanent employment.	Increased employment for the operational workforce, leading to improved health outcomes.	Local residents and workers	No – the scale of operational employment generated is likely to be very limited, and this has therefore been scoped out of further consideration.	Scoped out
	Potential permanent changes in neighbourhood quality.	Potential permanent changes in neighbourhood quality leading to potentially worsened health outcomes.	Local residents within 500 m of Scoping Boundary	**Yes** – potential for health related effects, based on how people feel about their local environment, determined	**Scoped in**

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
				through the topic specific assessment, but expected to include noise and vibration and visual amenity effects.	
	Potential permanent impacts during operation associated with the generation of EMFs.	Potential permanent impacts on local residents and workers associated with the generation of EMFs.	Local residents within 500 m of Scoping Boundary	No – The Project will be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN5 (Ref 17.13) including the International Commission on Non-Ionizing Radiation Protection guidelines for electric and magnetic fields (EMFs) and associated precautionary policy. An EMF report will be prepared as part of the Project. This is separate to the EIA process.	Scoped out
Maintenance	Potential temporary changes in neighbourhood quality. Changes in neighbourhood quality will arise when two significant residual environmental effects occur at the same location at the	Potential temporary changes in neighbourhood quality leading to worsened health outcomes.	Local residents within 500 m of Scoping Boundary	No – due to the scale of maintenance activities, there is little potential for health-related effects.	Scoped out

Project phase	Impact Source	Impact	Receptor	Potential for significant effect	Proposed to be scoped in/out
	same period in time. These include changes in noise, dust, air quality, traffic and visual amenity.				
	Potential temporary closure of promoted recreational routes.	Impact on local residents' access to promoted recreational routes adjacent to Project infrastructure, potentially leading to worsened health outcomes.	Local residents and users of promoted routes adjacent to Project infrastructure	No – disruption is not expected to promote recreational routes affecting opportunities to engage in physical exercise.	Scoped out

17.8 Proposed Assessment Methodology

17.8.1 The following section summarises the methodology proposed to be used for the health and wellbeing assessment which builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology** and the new IEMA guidance (Ref 17.1 and Ref 17.2) for the assessment of significance for health effects.

17.8.2 The assessment of likely significant health effects will follow IEMA's guidance on *"Determining Significance for Human Health in Environmental Impact Assessment"* (2022) (Ref. 17.2). This guidance presents a framework that supports a proportionate approach to assessing significance, which can apply to all scales of EIA. Certain principles apply in all cases, including applying a population health approach (as opposed to health of individuals) and considering health inequalities.

17.8.3 The IEMA guidance provides indicative criteria to inform judgements of magnitude and sensitivity. It recommends that the use of these terms is supported by a narrative explaining the rationale for the assessment. IEMA recommends an approach based on magnitude and sensitivity levels, or categories, using a matrix. The guidance notes that the matrix is only a tool to assist with judgement and that there are no clear cut-off points between categories. The point at which an impact changes category is a professional judgement and should be supported by evidence and justification.

17.8.4 The health and wellbeing assessment will include:

- Policy review: a review of the relevant national and local health policy context.
- Baseline conditions: a profile of the local community will be compiled using publicly available baseline data, focusing on population demographics, socio-economic status and health indicators.
- Evidence review: a review of publicly available evidence will be undertaken to establish the links between the identified health determinants and potential health outcomes.
- Assessment of health effects: a qualitative assessment will be undertaken to identify impacts on the determinants of health, and potential health outcomes for the study population. The qualitative assessment of health outcomes will be based on magnitude, duration and exposure of impact taking account of the size and sensitivity of population exposed.
- Mitigation and enhancement: subject to the outcome of the assessment, measures to mitigate significant adverse effects and improve health outcomes will be identified.

17.8.5 Wherever possible, the impacts identified in the assessment will be appraised against relevant national standards. Where relevant standards do not exist, professional experience and expert judgement will be applied and justified.

17.8.6 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact, as set out below.

Sensitivity

17.8.7 The sensitivity of health effects is driven by a number of indicative factors which are set out below and are based on guidance set out in Section 17.2.2. A potential health effect may not meet all of the criteria in a particular category or may exhibit criteria across two

or more categories. Therefore, justification for the selection of sensitivity criteria will be provided as detailed in **Table 17.10**.

Table 17.10: Sensitivity classification

Sensitivity	Indicative criteria
Very high	• Very high levels of deprivation. • Complete severance between communities and their assets with little/no accessibility provision. • Community services and social infrastructure is used very frequently (daily). • Alternative community services and social infrastructure are only available outside of the local planning authority area. • Regularly used by vulnerable travellers such as the elderly school children and people with disabilities who could be considerably affected by small changes in the baseline due to potentially different needs.
High	• High levels of deprivation (including pockets of deprivation). • High proportion of residents with very poor health status when compared to the national average. • People who are prevented from undertaking from undertaking daily activities and/or with very low capacity to adapt. • Community services and social infrastructure is used frequently (weekly). • Substantial severance between communities and community assets, with limited accessibility provision. • Alternative facilities are only available in the wider local planning authority/Reliance on shared resources (between the population and the Project).
Medium	• Moderate levels of deprivation. • High proportion of residents with poor health status when compared to the national average. • People who are highly limited from undertaking from undertaking daily activities. • Community services and social infrastructure is used reasonably frequent (monthly). • There is severance between communities and community assets, but with existing accessibility provision. • Limited alternative facilities are available at a local level within adjacent communities/Few alternatives to shared resources.
Low	• Low levels of deprivation. • High proportion of residents with fair health status when compared to the national average. • People who are slightly limited from undertaking from undertaking daily activities.

Sensitivity	Indicative criteria
	• Community services and social infrastructure is used infrequently (monthly or less frequent). • Limited existing severance between communities and community assets. • Alternative facilities are available at a local level within the wider community/Many alternatives to shared resources.
Negligible	• Very low levels of deprivation. • High proportion of residents with good health status when compared to the national average. • People who are not limited from undertaking from undertaking daily activities. • Community services and social infrastructure is used very infrequently (a few occasions yearly). • No or limited severance or accessibility issues between communities and community assets. • Alternative facilities are available within the same community/No shared resources.

Magnitude

17.8.8 Magnitude of impact is driven by a number of indicative factors which are set out in **Table 17.11** and are based on guidance set out in Section 17.2.2. A potential health effect may not meet all of the criteria in a particular category or may exhibit criteria across two or more categories. Therefore, justification for the selection of magnitude criteria will be provided.

Table 17.11: Magnitude classification

Magnitude	Indicative criteria
Large	• High exposure or scale; • long-term duration (lasting five years or more); • continuous frequency; • majority of population affected; • permanent change; and • substantial service quality implications.
Medium	• Low exposure or medium scale; • medium-term duration (lasting one to five years); • frequent events; • large minority of population affected; • gradual reversal; and • small service quality implications.
Small	• Very low exposure or small scale;

Magnitude	Indicative criteria
	• short-term duration (lasting less than one year); • occasional events; • small minority of population affected; • rapid reversal; and • slight service quality implications.
Negligible	• Negligible exposure or scale; • very short-term duration; • one-off frequency; • very few people affected; • immediate reversal once activity complete; and • no service quality implication.

Significance of effects

17.8.9 The overall effects of the Project are defined as one of the following:

- Beneficial – an advantageous or beneficial effect on a receptor;
- Negligible – an imperceptible effect on a receptor;
- Adverse – a disadvantageous or negative effect on a receptor; or
- No effect – no discernible effects on a receptor.

17.8.10 Duration of effect is also considered, with more weight given to permanent changes than to temporary ones.

17.8.11 Where an effect is assessed as being beneficial or adverse, the effect will be classified as Major, Moderate, Minor or Negligible. The assessment of significance will be informed by considering the sensitivity of the receptor (**Table 17.10**) and the magnitude of impact **(Table 17.11**). For the purposes of this assessment, Moderate and Major effects will be considered to represent significant effects as shown in **Table 17.12**.

Table 17.12: Determination of significance matrix

		Sensitivity				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude	**Large**	Major	Major	Major/Moderate	Moderate/Minor	Minor/ Negligible
	Medium	Major/Moderate	Major/Moderate	Moderate	Minor	Minor/ Negligible
	Small	Major/Moderate/ Minor	Moderate/Minor	Minor	Minor	Negligible
	Negligible	Minor/Negligible	Minor/Negligible	Minor/Negligible	Negligible	Negligible

17.9 Limitations and assumptions

17.9.1 The assessment of the significance of effects will be carried out against a benchmark of current human health baseline conditions prevailing around the Project, as far as is possible within the limitations of such a dataset.

17.9.2 Baseline data is also subject to a time lag between collection and publication. As with any dataset, these conditions may be subject to change over time which may influence the findings of the assessment. It is assumed that the data collated is accurate.

17.10 Conclusion

Summary

17.10.1 This chapter of the Scoping Report has set out the proposed scope and methodology for the Environmental Statement assessment of health and wellbeing effects arising from the construction, operation, and maintenance of the Project. The health receptors that have been identified within the respective Study Areas include:

- Residents;
- on-site workers;
- users of promoted recreational routes;
- users of open space; and
- users of community services and social infrastructure.

17.10.2 The Scoping Boundary indicates that there is the potential for significant effects on these receptors.

17.10.3 A summary of the proposed scope of the assessment is provided in **Table 17.13** below.

Table 17.13: Summary of proposed scope of the assessment

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in/out
Local residents and workers	**Yes** – increased employment opportunities	Construction	**Scoped in**
Local residents within 500 m of Scoping Boundary	**Yes** – potential neighbourhood quality effects	Construction and operation	**Scoped in**
Local residents and users of promoted recreational routes within 500 m of the Scoping Boundary	**Yes** – potential disruption to promoted recreational routes	Construction	**Scoped in**

Receptor	Potential for significant effect	Project phase	Proposed to be scoped in/out
Local residents and users of open spaces within 500 m of the Scoping Boundary	**Yes** – potential disruption to open spaces	Construction	**Scoped in**
Local residents and users of health care and social infrastructure	**Yes** – potential disruption to routes providing access to community services and social infrastructure	Construction	**Scoped in**
Local residents and workers within 500 m of Scoping Boundary	No – the Applicant will ensure that policies and procedures are in place at the design phase to ensure that all equipment will comply with public EMF exposure limits	Operation	Scoped out

17.11 References

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Ref 17.7 Public Health England (2020). Advice on the Content of Environmental Statements accompanying an Application Under the Nationally Significant Infrastructure Planning Regime [online]. Available at: https://khub.net/documents/135939561/390856715/Advice+on+the+content+of+environmental+statements+accompanying+an+application+under+the+Nationally+Significant+Infrastructure+Planning+Regime.pdf/a86b5521-46cc-98e4-4cad-f81a6c58f2e2?t=1615998516658 [Accessed 22 March 2024].

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18. Climate Change

nationalgrid

Contents

18.1 Introduction

18.1.1 This chapter presents how the climate change assessment will consider the potentially significant effects on climate change receptors that may arise from the construction, operation, and maintenance of the Project as described **in Chapter 4 Description of the Project**. It identifies the Climate receptors of relevance and sets out the methodology and datasets to be used to inform the climate change assessment, presents an overview of the baseline conditions and sets out the methodology to be used to assess the potential impacts on, and from, the construction, operation and maintenance of the Project for the purpose of an Environmental Impact Assessment (EIA). As detailed in **Chapter 4 Description of the Project** decommissioning of the Project has been scoped out of the environmental assessment, with the exception of the decommissioning of relevant parts of the existing Grimsby West Substation.

18.1.2 The Project will directly support the government's identified critical national priority for the provision of nationally significant low carbon infrastructure, as identified in National Policy Statement EN-1 in that it will contribute towards greater efficiency in constructing, operating and connecting low carbon infrastructure to the National Electricity Transmission System.

18.1.3 The following elements of a climate change assessment have been scoped out:

- Climate Change Resilience (CCR) - this looks to identify the changes in climate and weather events expected in the future with regards to the operational life of the Project and assesses how the Project may be exposed to additional vulnerability arising from these changes. Appendix 18A Climate Change Resilience Screening Assessment sets out a screening assessment for the current stage of the Project to inform this Scoping assessment. The Screening Assessment sets out the potential impacts of current and future climate change on the construction, operation, and maintenance of the Project and provides justification for the proposal to scope out a standalone CCR assessment from the EIA based on proposed Design, Control and Management Measures. The vulnerability of the Project to future flooding will be considered as part of the flood risk assessment and associated analysis presented in Chapter 10 Water Environment. Further embedded design measures will be developed as the Project design evolves through engagement with the engineering design team, and measures will incorporated into the future development of Project design principles. On this basis, no further assessment of the Project's vulnerability to climate change is required in the Environmental Statement (ES).
- In-Combination Climate Change Impact (ICCI) assessment - this looks to consider where the future changed climate may increase environmental impacts from the Project on all environmental receptors, beyond those impacts arising from present climate conditions. It is proposed to scope out a standalone ICCI assessment in the ES and instead, each environmental chapter will take account of projected future climate change within their future baseline.

18.1.4 The following climate change assessment has been considered in this chapter:

- Greenhouse Gas (GHG) assessment - Greenhouse gases are gases in the earth's atmosphere that trap heat. Increased GHGs in the earth's atmosphere are the cause of global warming and climate change. The GHG assessment will identify the likely GHG emissions associated with construction, operation and maintenance (i.e. whole lifecycle GHG emissions) in comparison with the current and future baseline. It will also identify mitigation measures to reduce GHG emissions through

the life cycle of the Project. The term ‘carbon’ is used interchangeably to refer to GHG emissions.

18.1.5 The Scoping Boundary that has been used for the GHG scoping assessment is illustrated on **Figure 1.1 Scoping Boundary**.

18.1.6 This Chapter should be read in conjunction with the following chapters which provide Project context and approach to EIA:

- **Chapter 2 Regulatory and Planning Policy Context;**
- **Chapter 3 Main Alternatives Considered;**
- **Chapter 4 Description of the Project;** and
- **Chapter 5 EIA Approach and Methodology.**

18.1.7 In addition, there may be interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 8 Ecology and Biodiversity**– outputs from the biodiversity net gain assessment will be used in the land use GHG assessment;
- **Chapter 13 Traffic and Movement –** GHG calculations may use outputs from the traffic and transport assessment; and
- **Chapter 14 Air Quality** – there is a strong relationship between GHG emissions and air quality, similar inputs will be used in the assessment;

18.1.8 This chapter is supported by the following appendix:

- **Appendix 18A Climate Resilience Screening Technical Note.**

18.2 Regulatory and Planning Context

18.2.1 Legislation and policy relevant to the Project and this chapter is outlined in **Chapter 2 Regulatory and Planning Policy Context** and **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Planning Policy** and **Appendix 2C Local Policy.**

Technical Guidance

18.2.2 Relevant guidance and standards that have informed the scoping process are listed below (but not limited to) and will also be taken into account as part of the assessment:

- The Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (18.11); and
- The Publicly Available Specification 2080 (PAS 2080:2023) on carbon management in infrastructure, a global standard for managing infrastructure carbon (Ref 18.2);
- Department for Energy Security and Net Zero Emission Conversion Factors 2023 (Ref 18.3).

18.3 Consultation and Engagement

18.3.1 Given the nature of the Project and it's direct contribution towards supporting the UK's net zero target by connecting low carbon infrastructure to the National Electricity Transmission System, no specific future engagement is currently planned for climate change over and above that proposed as part of statutory consultation.

18.3.2 In preparing this scoping chapter consideration has been given to stakeholder feedback received during Non-Statutory Consultation held between January and March 2024. No pre-scoping engagement has been undertaken for climate change, which is considered to be an appropriate approach and normal practice for this discipline.

18.3.3 The principal feedback received from Non-Statutory Consultation of relevance to this scoping chapter is included in **Table 18.1**, together with a response on how the comments have been considered in this Scoping Report, where applicable.

Table 18.1: Engagement with Stakeholders

Stakeholder	Summary of Response	Consideration in the Scoping Report
Woodland Trust	The Trust holds concern regarding this project on account of the potential for ancient woodland and ancient/veteran trees to be adversely impacted by the proposals. The concern that is relevant to the climate assessment relates to the value of soils within existing Ancient Woodland for the purpose of carbon capture and storage.	Any loss of ancient woodland will be assessed in **Chapter 8 Ecology and Biodiversity.** Any impact to the value of soils within existing Ancient Woodlands will be assessed within the Agriculture and Soils Chapter of the PEI Report and ES. The Climate Change chapter of the PEI Report and ES will qualitatively assess GHG emissions associated with land use change as part of the lifecycle assessment.
Environment Agency	The Environment Agency raised the requirement for the Project to take into account all sources of flood risk and the current and future impact of climate change, including an updated climate change allowance, to avoid (where possible) flood risk to people and property.	The vulnerability of the Project in terms of flood risk will be addressed in the water environment chapter of the PEI Report ES, taking into account the future impact of climate change.

18.4 Study Area

18.4.1 The Study Area for the GHG assessment considers GHG emissions arising over the lifecycle of the Project and will be refined for the assessment in the Preliminary Environmental Information (PEI) Report and ES.

18.4.2 The spatial scope of GHG emissions accounting includes direct emissions arising from pre-construction, construction, operation and maintenance within the Scoping Boundary (based on the emerging preferred corridor), and indirect emissions resulting from activities associated with the pre-construction, construction, operation and maintenance activities outside of the Scoping Boundary (such as the transport network utilised for material transport, and the embodied carbon associated with the relevant construction materials).

18.4.3 It is not considered that the Project, as electricity transmission infrastructure and a boundary reinforcement, will be the direct or indirect cause of either upstream electricity generation or downstream electricity consumption. Hence, it will not be the direct or indirect cause of emissions from upstream or downstream activities. The Project will facilitate the transport of electricity on the network in response to an identified projected increase in demand. The mix of electricity generation sources cannot be known at the time of undertaking the EIA and will likely change over time, especially in relation to government policy on decarbonisation of the energy sector. In addition, sources of electricity entering the network will likely be varied and subject to their own carbon assessments.

18.4.4 The temporal Study Area is also an important aspect of the GHG assessment because of the diminishing nature of the carbon budgets up to 2050. The temporal boundary for GHG assessment constitutes the construction phase (assumed to commence in 2029 for a duration of approximately four years) and the operational phase (assumed to be 80 years).

18.4.5 It is unusual for elements of National Grid's transmission system to be decommissioned and the site reinstated. In general, assets will be replaced towards the end of an assets design life (which will vary depending on the asset and the asset condition throughout its operational life).

18.5 Baseline Conditions

18.5.1 This section of the Chapter comprises an overview of the baseline conditions for the GHG assessment, to establish the type and nature of potentially significant effects.

Data Sources

18.5.2 The information to inform the GHG assessment will be from a combination of Project specific information available at the current design stage alongside publicly available industry benchmarks that can be used to provide a preliminary estimate of life cycle GHG emission impacts. The following data sources are proposed to be used to inform the GHG assessment:

- bill of material quantities (estimated breakdown of construction materials by volume);
- construction programme;
- estimated fuel/energy use for construction activities;
- number of construction workers on site per day;
- estimated volumes of earthworks cut/fill;
- estimated volumes of construction waste and method of disposal;

- land use change; and
- maintenance regimes.

18.5.3 More detailed information will be obtained and reported in the PEI Report and ES.

18.5.4 The GHG emissions for the Project will be calculated by converting 'activity' data into carbon emissions through the application of referenced typical emissions conversion factors widely used within the industry, Section 18.8 contains further detail on the assessment methodology. The emissions factors used in the assessment will be informed by the following data sources:

- Greenhouse Gas Reporting: Conversion Factors (published annually by UK Government) (HM Government, 2023) (Ref 18.5);
- Inventory of Carbon and Energy database v3 (Circular Ecology, 2023) (Ref 18.6); and
- Valuation of energy use and GHG emissions for appraisal: supplementary guidance to the HM Treasury Green Book on Appraisal and Evaluation in Central Government (Department for Energy Security and Net Zero, 2023) (Ref 18.7).

18.5.5 **Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.**Data of appropriate quality to satisfy the goal and scope of the assessment will be used. Where limited data is available, for example, due to the fact that some details of the Project may not have been confirmed and where flexibility is required to address uncertainty, appropriate assumptions or benchmarks will be used.

Baseline

18.5.6 The Project has been divided into seven sections as detailed in **Chapter 4 Description of the Project**. The sections are split from north to south by the geographical alignment of the Scoping Boundary and are included as per the following in this chapter:

- Section 1 - Grimsby West Substation.
- Section 2 - Overhead line from Grimsby West Substation to Lincolnshire Connection Substation A.
- Section 3 - Lincolnshire Connection Substation A and B (including the overhead line between them).
- Section 4 - Overhead line from Lincolnshire Connection Substation B to Weston Marsh Substation.
- Section 5 - Weston Marsh Substation.
- Section 6 - Overhead line from Weston Marsh Substation to Walpole B Substation.
- Section 7- Walpole B Substation.

18.5.7 The Study Area for the GHG assessment includes all seven sections, measuring approximately 140 km in length. The spatial scope for the GHG assessment includes sources and removals of GHG emissions arising from pre-construction, construction, operation and maintenance of the Project. The Scoping Boundary is shown on **Figure 1.1 Scoping Boundary** and described in **Chapter 4 Description of the Project**.

18.5.8 Aligning with IEMA (2022) guidance (18.11), the baseline (Do-Minimum (DM) scenario) is the reference against which the impact of the Project will be compared and assessed.

The DM scenario comprises the cumulative GHG emissions within the Study Area without implementation of the Project (the current situation where the Project is not delivered). Assumptions are made on the projected cumulative GHG emissions over the study period under this DM scenario.

18.5.9 The Scoping Boundary generally comprises predominately arable land, managed hedgerows, and trees. As the land use within the Scoping Boundary is mainly arable there are nominal GHG emissions which are associated with land management (including fuel use for machinery use), and the soil types/vegetation present. Given the nominal emissions it is proposed that the baseline will be considered as zero GHG emissions, being a worst–case analysis as a precautionary approach.

Future Baseline

18.5.10 The future baseline for the assessment of the impact of the Project on climate takes account of emissions caused by not implementing the Project (the 'Baseline' as described above). It is assumed that the existing land use identified in the Scoping Boundary continues and no other projects/schemes are developed, therefore the future baseline will include operational emissions associated with land use activities over the study period, which will be considered as zero GHG emissions, being a worst–case analysis as a precautionary approach.

18.5.11 The future baseline will also qualitatively consider the impact of the increasing capacity restrictions of the existing transmission network, which would be insufficient to accommodate the connection of the proposed renewable power sources. As a result, potentially more carbon intensive sources of generation would likely be relied upon resulting in additional GHG emissions.

18.6 Design and Control Measures

Design Measures

18.6.1 The Project has been routed in accordance with Holford Rule (National Grid) (Ref 18.8) to consider options to reduce the overall route length where possible, which therefore may lead to a reduction in the quantity of materials (and associated embodied carbon) required for construction. The detailed design process for the Project will be iterative and shall seek to minimise GHG emissions associated with the design of assets, construction and operation.

18.6.2 A number of measures are under consideration subject to the relevant assessments being undertaken and their needs identified. These considerations include:

- circular economy principles will be considered at the design stage with the intention to implement measures to design out waste and integrate circular economy principles which will include consideration of pre-construction, construction, operation, and end-of-life processes and materials will be selected to minimise waste over the whole life cycle of the Project. More information can be found in **Chapter 4 Description of the Project** under 'Approach to materials and waste';
- the design of the Project shall, where practicable, maximise the potential for reuse of material recovered from site. Alternatively near-site sources of material will be identified to minimise transportation and ground treatment emissions;

- where appropriate the Project will endeavour to use materials with the highest recycled content, where this leads to lower whole life carbon emissions and encourage their use through procurement exercises;
- the Project will consider a range of measures to reduce energy consumption (and associated emissions) during both construction and operation, as set out in **Chapter 4 Description of the Project** under 'Approach to energy consumption';
- the Project will continue to integrate carbon as a weighted element within the design and decision-making process and continue to work with partners across the industry on lower carbon alternatives; and
- consideration of lower carbon options for goods transportation, for example through considering alternative options to Heavy Goods Vehicle delivery to site and alternative fuel vehicles.

Control and Management Measures

18.6.3 An Initial Outline Code of Construction (CoCP) is provided in **Appendix 4A Initial Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could affect the GHG assessment may include, but are not limited to:

- CC01 The Main Works Contractor will develop and implement a Carbon Efficiency Plan as part of their Environmental Management System, to manage carbon emissions from construction activities. This will contain:
    - a. proposed measures to reduce significant sources of construction energy use (fuel/electricity) and associated emissions;
    - b. the approach to securing energy from renewable and/or zero or low emission sources;
    - c. the approach to energy and carbon dioxide reporting from relevant site activities including construction activities and the transportation of materials and waste; and
    - d. consideration of the procurement, maintenance and use of energy and carbon efficient construction plant.
- CC02 Mitigation measures set out within the Carbon Efficiency Plan will include:
    - a commitment to avoid or prevent greenhouse gas (GHG) emissions as far as reasonably practical by maximising the potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required, and/or explore alternative lower carbon options to deliver the Project objectives
    - a commitment to reduce GHG emissions as far as reasonably practical by implementing low carbon and/or reduced resource consumption solutions (including technologies, materials and products) to minimise resource consumption during the construction, operation, and at end of life.
    - The design of the Project should minimise the requirement for energy consuming operational equipment such as lighting wherever possible. Where lighting cannot be avoided, use of low lux and demand-sensitive lighting should be considered.

- the specification of materials with fewer embodied GHG emissions within the Main Works Contractor's contracts (e.g. where practical, sustainable materials, materials with a higher recycled content and locally sourced materials should be selected), including where feasible, design for end of component reuse;
- use of renewable/zero or low carbon energy sources for construction vehicles, plant and machinery where reasonably practicable, e.g. electric vehicles and plant;
- efficient use of construction plant and machinery, i.e. using appropriately sized plant and machinery, and switching off when not in use;
- fuel use monitoring;
- employing low carbon construction techniques;
- plant and machinery to be kept in good working order to maintain power efficiency;
- Sufficient training for operatives to use machinery and plant efficiently;
- Using appropriate size generators for plant and any temporary buildings etc.;
- Nominating named individuals with responsibility for minimising energy use on site;
- commitments to recycle/reuse demolition waste wherever practicable;
- commitments to reduce water use and disposal;
- provision of suitable thermal insulation for site accommodation to minimise energy demand for heating;
- early connection to grid electricity to reduce use of mobile diesel energy generation;
- efficient transportation of construction materials and waste transport, with the aim to use electric vehicles wherever practicable;
- sourcing construction materials from local suppliers where practicable to reduce transport emissions;
- promotion and provision of modes of sustainable transport for construction workers;
- Material excavated during construction should be processed for use in the works wherever possible to reduce the amount of material disposed of off-site as well as imported from other sources;
- The Project design should carefully consider the use of appropriate tree and shrub species to reduce associated maintenance operations; and
- Once operational, asset data should be managed, maintained and monitored to ensure the Project design is operating as intended. Corrective action to be taken where necessary.

- CC03 The contractor will pay due consideration to the impacts of extreme weather events and related conditions during construction. Measures will include, for example:

- health and safety plans to prevent worker exhaustion due to heat supportive measures for working in high temperatures might include the provision of sunblock, sun hats and lightweight clothing, refreshment breaks and cooled water supply;
- temporary buildings designed with measures to cool summertime overheating;
- safety measures to mitigate against issues caused by high winds such as increase dust or damage to structures/construction plant.

- CC04 The contractor should use a short to medium range weather forecasting service from the Met Office, or other approved meteorological data and weather forecast provider, to inform short to medium term programme management, environmental control and impact mitigation measures e.g. health and safety plans to include supportive measures for working in extreme high or low temperatures. The contractor's EMS will consider all measures deemed necessary and appropriate to manage severe weather events and should as a minimum cover training of personnel and prevention and monitoring arrangements to manage severe weather events. As appropriate, construction method statements should also consider severe weather events where risks have been identified
- CC05 An early warning system for wildfire detection and evacuation procedures for construction workers should be implemented alongside fire safety measures such as clearance of vegetation around temporary structures (where appropriate), access to fire extinguishing equipment, and evacuation protocols developed.
- GG04 Suitably experienced Environmental Managers will be appointed for the duration of the construction phase. In addition, qualified and experienced Environmental Clerks of Works will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the Management Plans. The Environmental Clerk of Works will monitor that the works proceed in accordance with relevant environmental Development Consent Order (DCO) requirements and adhere to the required good practice and mitigation measures. The Environmental Clerk of Works will be supported as necessary by appropriate specialists, including ecologists and arboriculturists.
- GG13 Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. All plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. Electric, or other low carbon plant and equipment should be used where available and where practicable.
- GG20 Bonfires and the burning of waste material will be prohibited.
- GG21 Construction lighting will be of the lowest luminosity necessary to safely perform each task. It will be designed, positioned, and directed to reduce the intrusion into adjacent properties, protected species and habitats.
- GG22 A Site Waste Management Plan (SWMP) will be developed prior to construction. The SWMP shall include but not be limited to:
  - waste forecasts;
  - identification of recovery routes;
  - Actual waste figures once work has begun;

- Consideration will be given to the guidance in the Code of Practice developed by Contaminated Land: Applications in Real Environments (CLAIRE) “A Definition of Waste: Development Industry Code of Practice”;
- Dedicated waste management areas will be designed to sufficiently accommodate the types and volumes of waste produced and to reduce the environmental risk of storing waste on site (covered, secured and away from drainage);

- LV01 The contractor(s) will retain vegetation where practicable. Where vegetation is lost and trees cannot be replaced in situ due to the restrictions associated with land rights required for operational safety, native shrub planting approved by National Grid will be used as a replacement, in accordance with the outline vegetation reinstatement plans included within the Landscape Environment Management Plan (LEMP);
- LV03 A five-year aftercare period will be established for all reinstatement and mitigation planting, details of which will be set out in the LEMP; and
- TT02 The contractor(s) will implement a monitoring and reporting system to check compliance with the measures set out within the Construction Traffic Management plan (CTMP). The contractor(s) will also be expected to monitor the number of construction vehicles on key approach routes between the site and the strategic road network. Deviations from the authorised routes or changes to traffic levels that are higher than the CTMP assumptions will require discussion of the need for additional mitigation measures with highways authorities.

18.7 Potential for Significant Effects

18.7.1 This section identifies the potential for the Project to give rise to likely significant effects, taking into account the design and control measures identified in Section 18.6.

18.7.2 The single receptor for the GHG assessment is the global atmosphere and all net emissions of GHGs to the atmosphere will contribute to climate change. The source of GHG emissions are varied but there is only one impact pathway; GHG emissions released into the atmosphere contribute to global warming by absorbing heat that would otherwise be radiated into space.

18.7.3 **Table 18.2** and **Table 18.3** provide a summary of the potential emissions sources identified through the project lifecycle that could give rise to a potentially significant effect on the global atmosphere and provides justification for scoping into or out of the GHG assessment.

18.7.4 A precautionary approach has been taken and where there is no strong evidence base, insufficient baseline or the significance is uncertain at this stage the impact has been scoped into the EIA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped out of the EIA.

Table 18.2: Construction emission sources to be scoped in or out

Project Phase and (PAS 2080 Boundary Stage)	PAS 2080 Module	Module Description/Pathway	Justification for inclusion in/exclusion from the assessment	Proposed to be scoped in / out
Construction (Product)	A1-3	Raw material supply, transport and manufacture The product stage captures the GHG emissions attributable to cradle to gate processes: raw material extraction and supply, transport, and manufacturing. The GHG emissions resulting from these processes are often referred to as embodied carbon.	A1-A3 emissions (i.e. from raw material extraction, product processing, and final product manufacture, its energy use, and waste management within these processes, transportation within the supply chain, and manufacture) will be quantified to understand the emissions associated with the construction of the Project, for example, the use of steel or concrete in pylon design.	**Scoped in**
Construction process	A4 – A5	Transport to works site and construction /installation processes This construction stage captures the GHG emissions associated with the transportation of the materials and components from the factory gate to the project site. GHG emissions associated from any on-site construction-related activities must be considered.	A4 and A5 emissions will be quantified to understand the emissions associated with the transportation of materials required for the construction of the Project and construction activities undertaken.	**Scoped in**
Supplementary information beyond the infrastructure lifecycle	D	Boundary of benefits and loads beyond the infrastructure life cycle Land use change	A qualitative assessment will be provided to understand the potential impact of removal of any vegetation due to construction of the Project.	**Scoped in**

Table 18.3: Operational emission sources to be scoped in or out

Project Phase and (PAS2080 boundary Stage)	PAS 2080 module	Module Description/ Pathway	Justification for inclusion in/exclusion from the assessment	Proposed to be scoped in / out
Operation (Installed products and materials)	B1	Use This use stage captures carbon emitted directly from the fabric of products and materials once they have been installed as part of the project and it is in normal use. This includes GHG emissions from the use of sulphur hexafluoride (SF6) in switch gear equipment installed as part of the Project.	The use of SF6 within switchgear equipment is a potential source of GHG emissions during operation of the Project. It is anticipated that associated GHG emissions will be estimated as part of the GHG assessment.	**Scoped in**
	B2	Maintenance of the built asset components and systems over the Project design life.	The Project is not designed with the expectation of any significant plant maintenance and repair activities, or refurbishment being required, and therefore emissions due to these activities are expected to be minimal	Scoped out
	B3 and B4	Repair and Replacement B3 and B4 captures the GHG emissions associated with repair and replacement of the built asset components and systems over the Project design life.	B3 and B4 emissions will be quantified using the same method as the construction works and supply chain carbon emissions. At this stage it is assumed this will cover the new overhead line and five proposed substations. The following list provides a summary of key asset components and replacement requirements. See	**Scoped in**

Project Phase and (PAS2080 boundary Stage)	PAS 2080 module	Module Description/ Pathway	Justification for inclusion in/exclusion from the assessment	Proposed to be scoped in / out
			Chapter 4 Description of the Project for further information: Overhead Lines: 40 years for overhead line circuits and 20-40 years for insulators Pylons: 80 years, although there are options available for re-use at the end of the design life, including use of pylons for new replacement conductors. Substations: 40 years.	
	B5	Refurbishment	Excluded. It is unusual for elements of National Grid's transmission system to be decommissioned and the site reinstated. In general, assets will be replaced towards the end of an assets design life (which will vary depending on the asset and the asset condition throughout its operational life). See **Chapter 4 Description of the Project** for further information.	Scoped out
	B6 – B7	Operational energy use and operational water use This use stage captures the GHG emissions associated with regulated energy consumption including heating, cooling, ventilation, domestic hot water, lighting, and auxiliary systems as	Excluded. Minimal operational energy use or water use expected and therefore emissions will not be material to the assessment conclusions. This follows the approach stated in IEMA guidance states that "*Where expected emissions are less than 1% of total*	Scoped out

Project Phase and (PAS2080 boundary Stage)	PAS 2080 module	Module Description/ Pathway	Justification for inclusion in/exclusion from the assessment	Proposed to be scoped in / out
		projected over the life cycle of the project.	*emissions, and where all such exclusions total a maximum of 5% of total emissions; all exclusions should be clearly stated'.*	
	B8	Other operational processes This use stage captures the GHG emissions associated with other operational processes. For this Project, it captures indirect emissions associated with transmission and distribution (T&D).	When electrical currents travel on a network, some energy is dissipated in the form of heat, and is "lost" due to the electrical resistance in the network. This energy is known as network losses. A portion of the electricity purchased from the power generators will be consumed during its transmission and distribution to end-customers. A qualitative assessment of emissions from network losses will be included. It is not considered feasible to quantify these losses and the nature of the Project is such that it largely transmits rather than uses energy.	**Scoped in**
	B9	Users utilisation of infrastructure This use stage captures the activities associated with user's utilisation of the infrastructure.	Excluded. The Project is not expected to have any direct and quantifiable impact on GHG emissions from electricity use that is distinct from wider national trends on grid decarbonisation.	Scoped out

Project Phase and (PAS2080 boundary Stage)	PAS 2080 module	Module Description/ Pathway	Justification for inclusion in/exclusion from the assessment	Proposed to be scoped in / out
End of life	C1 - 4	Deconstruction, Transport, Waste processing for recovery and disposal	End of life (C1-C4) impacts will not be considered due to the long design life of the Project. It is unusual for elements of National Grid's transmission system to be decommissioned and the site reinstated. Note that parts of the existing Grimsby West Substation are planned to be decommissioned as part of the construction of the Project, and emissions associated with this will be considered as part of the construction phase.	Scoped out
Supplementary information beyond the infrastructure lifecycle	D	Benefits and loads beyond the system boundary: Exported utilities (i.e. electric energy)	Included: Reduction in GHG emissions from non-renewable energy generation sources once the proposed renewable energy generation can connect to the reinforced network. A qualitative assessment will be provided as there is no practical mechanism to quantify the carbon impact without carrying out a time-based analysis of relative grid carbon emissions factors over the operational life of the Project, seeking to identify over what period electricity will be supplied to UK at grid intensities above/below the grid average.	**Scoped in**

Project Phase and (PAS2080 boundary Stage)	PAS 2080 module	Module Description/ Pathway	Justification for inclusion in/exclusion from the assessment	Proposed to be scoped in / out
Supplementary information beyond the infrastructure lifecycle	D	Benefits and loads beyond the system boundary: Ongoing land use emissions and sequestration	Included: A qualitative assessment will be provided to understand the potential impact of landscaping and habitat creation proposed as part of the design (which has the potential to change GHG sequestration).	**Scoped in**

18.8 Proposed Assessment Methodology

Proposed Assessment Methodology

18.8.1 **Chapter 5 EIA Approach and Methodology** sets out the standard EIA methodology and matrices to be used for the assessment. The methodology is based on the principle that the environmental effects will be determined by identifying potential receptors, assigning receptor value, assessing the magnitude of change on the receptor and then identifying the significance of the effect. This section provides a summary of the EIA methodology specifically relevant to the GHG assessment.

18.8.2 The GHG assessment will quantify and report the GHG emissions anticipated to be generated or avoided by the Project. This will be reported in tonnes of carbon dioxide equivalent (tCO_2e), a single metric of the global warming potential of the main GHGs. This approach is consistent with the principles set out in IEMA guidance (18.11).

18.8.3 Expected GHG emissions arising from the Project will be quantified using a calculation–based methodology as per the following equation and aligned with the GHG Protocol: Activity data x GHG emissions factor = GHG emissions

18.8.4 The methodology focuses on assessing the impact of the Project on GHG emissions by quantifying the GHG emissions arising from each lifecycle stage. Emissions associated with the Project will be compared to the baseline and future baseline DM scenario (as described under 'Baseline Conditions' above). If relevant GHG activity data are unavailable, the assessment may be more qualitative and/or assumptions and estimations developed. Any assumptions, inclusions and exclusions that inform the GHG emissions calculation will be clearly described.

18.8.5 The significance criteria for the GHG assessment will take account of the Project's GHG emissions in the context of policy, and specifically the UK's target of net zero by 2050. This will consider the Project's net GHG emissions, but also whether the Project contributes to reducing GHG emissions consistent with a trajectory towards net zero by 2050.

18.8.6 The net GHG emissions associated with the Project will also be contextualised against appropriate existing national carbon budgets where practicable to understand its relative contribution to climate change. Where possible, this will also be contextualised against industry specific carbon budgets.

18.8.7 The assessment process will include work with the wider design team to identify opportunities to reduce the whole-life carbon of the Project.

Sensitivity

18.8.8 The global climate is the receptor for the purposes of the GHG assessment. The sensitivity of the climate to GHG emissions is 'high'. The rationale is as follows:

- GHG emission impacts could compromise the Climate Change Committee's (CCC) sectoral construction and net zero pathways and therefore the ability to meet its future carbon reduction trajectory;
- GHG emission impacts could compromise the UK's ability to reduce its GHG emissions and therefore the ability to meet its future legally binding carbon budgets;

- the extreme importance of limiting global warming to below 2 °C above industrial levels, while pursuing efforts to limit such warming to 1.5 °C as set out in the Paris Agreement and a recent report by the Intergovernmental Panel on Climate Change highlighted the importance of limiting global warming below 1.5 °C (Ref 18.9); and
- disruption to global climate is already having diverse and wide ranging impacts to the environment, society, economic and natural resources. Known effects of climate change include increased frequency and duration of extreme weather events, temperature changes, rainfall and flooding, and sea level rise and ocean acidification. These effects are largely accepted to be negative, profound, global, likely, long term to permanent, and are transboundary and cumulative from many global actions.

Magnitude

18.8.9 The estimated GHG emissions from the Project will be considered in the context of the UK carbon budgets (Ref 18.4), summarised in **Table 18.4** below.

18.8.10 The UK carbon budgets are in place to restrict the amount of GHG emissions the UK can legally emit in a five–year period. The UK is currently in the 4th carbon budget period, which runs from 2023 to 2027. The 4th and 5th Carbon Budgets reflect the previous 80% reduction target by 2050. The 6th carbon budget aligns with the legislated 2050 net zero commitment.

Table 18.4: Carbon budget periods

Carbon Budget and Period	Carbon Budget Limit	Reduction below 1990 levels
Fourth (2023-2027)	1,950 $MtCO_2e$	50% by 2025
Fifth (2028-2032)	1,725 $MtCO_2e$	68% by 2030*
Sixth (2033-3037)	965 $MtCO_2e$	78% by 2035

* Originally 57% when Fifth Carbon Budget was enshrined in law, was increased to 68% as the UK's National Determined Contribution ahead of the United Nations' COP26 in November 2021 (Department for Business, Energy, and Industrial Strategy, 2021).

18.8.11 It is noted that the contribution of most individual projects to national level budgets will be small, so the UK context will have limited value. It is proposed that the GHG assessment, therefore, uses the IEMA guidance (18.11) to assess the significance of effects with the UK carbon budgets being used to provide context to the GHG emissions.

Significance of effects

18.8.12 IEMA guidance (Ref 18.1) provides criteria for assessing the significance of GHG emissions effects. Five levels of significance are presented which focus on how the Project makes a relative contribution towards achieving a science based 1.5°C aligned transition towards net zero and the levels of mitigation applied. The different levels of significance are plotted against the UK's net zero compatible trajectory as presented in **Table 18.5** to determine the Project's significance.

Table 18.5: IEMA guidance levels of significance (18.11)

Effects	Significance level	Description	Example in the guidance
Significant adverse	Major adverse	A project that follows a 'business–as–usual' or 'do minimum' approach and is not compatible with the UK's net zero trajectory, or accepted aligned practice or area-based transition targets. It is down to the practitioner to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects.	The project's GHG impacts are not mitigated or are only compliant with do–minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Significant adverse	Moderate adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type.	A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Not significant	Minor adverse	A project that is compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up–to–date policy and 'good practice' reduction measures to achieve that. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario, keeping the UK on track towards net zero by 2050 with at least a 78% reduction by 2035 and thereby potentially avoiding significant adverse effects.	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Not significant	Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions. This project is playing a part in	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of

Effects	Significance level	Description	Example in the guidance
		achieving the rate of transition required by nationally set policy commitments.	the curve' for the trajectory towards net zero and has minimal residual emissions.
Not significant	Beneficial	A project that causes GHG emissions to be avoided or removed from the atmosphere. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without–project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

18.9 Assumptions and Limitations

18.9.1 The GHG assessment will be undertaken using the best available information at time of assessment. A reasonable worst case assessment will be developed using appropriate industry benchmarks, and conservative assumptions on materials, design, assembly, earthworks and use of components to provide a robust assessment of likely carbon emissions.

18.9.2 Assumptions will be made about design and construction information to inform the assessment of GHG emissions. In general, any assumptions made will seek to reflect a reasonable worst case (i.e. seeking not to under-report GHG emissions arising from the Project).

18.9.3 Assumptions/judgements in each case will be made from either:

- emerging design detail;
- engineering specialist knowledge;
- environmental specialist knowledge;
- climate change/carbon specialist knowledge;
- manufacturer specifications; or
- proxy engineering data from previous comparable projects.

18.9.4 The methodology used to calculate the UK carbon budgets is different to that used for the calculation of lifecycle emissions for the Project and therefore caution must be taken when making a direct comparison. However, for the purposes of identifying the extent to which the Project may impact the ability of the UK government to meet its carbon budgets it is necessary to make this comparison to put the Project into context. Additionally, the GHG emissions to be calculated for the Project will be best estimations based on the design information available at the time of the assessment and the carbon factors utilised.

18.9.5 A comprehensive list of assumptions and limitations will be provided within the ES once the assessment has been undertaken.

18.10 Conclusion

Summary

18.10.1 The assessment of construction and operational emissions are scoped into the assessment. As per the IEMA guidance, the GHG emissions from construction and operation will be assessed against the Paris Agreement's goal of achieving net zero by 2050.

Proposed Scope of the Assessment

18.10.2 A summary of the proposed scope of the assessment is provided in **Table 18.6.**

Table 18.6: Summary of the GHG assessment scope

Project Phase	Proposed to be scoped in / out	Rationale
Pre-construction	Scoped out	Emissions associated with pre-construction are considered to be very small and therefore not likely to be material to the assessment.
Construction	**Lifecycle Stage Modules Scoped in:** **A1 Raw Material Supply** **A2 Transport** **A3 Manufacture** **A4 Transport to Works Site** **A5 Construction /Installation processes** **D Benefits and Loads Beyond the System Boundary (Land use change)**	The Project could give rise to significant effects on climate change arising from GHG emissions during construction.
Operation	**Lifecycle Stage Modules Scoped in:** **B1 Use** **B3 Repair** **B4 Replacement** **B8 Other operational processes (emissions associated with network losses)**	The Project could give rise to significant effects on climate change arising from GHG emissions during operation.

Project Phase	Proposed to be scoped in / out	Rationale
	D Benefits and Loads Beyond the System Boundary (Reduction in GHG emissions from non-renewable energy generation sources once the proposed renewable energy generation can connect to the reinforced network).	
Decommissioning	Scoped out	It is unusual for elements of National Grid's transmission system to be decommissioned and the site reinstated. In general, assets will be replaced towards the end of an assets design life (which will vary depending on the asset and the asset condition throughout its operational life). See **Chapter 4 Description of the Project** for further information. Note that parts of the existing Grimsby West Substation are planned to be decommissioned as part of the construction phase of the Project, and emissions associated with this will be considered as part of the construction phase.

18.11 References

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Ref 18.3 Department for Energy Security and Net Zero (2023) 'Valuation of energy use and greenhouse gas (GHG) emissions' [online]. Available at: https://assets.publishing.service.gov.uk/media/65aadd020ff90c000f955f17/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal.pdf.

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19. Major Accidents and Disaster

nationalgrid

Contents

19.1 Introduction

19.1.1 This chapter considers the potential risk of a major accident or disaster causing a significant environmental effect that may arise relating to the construction, operation, or maintenance of the Project (as described in **Chapter 4 Description of the Project**).

19.1.2 The Project Scoping Boundary is illustrated on **Figure 1.1 Scoping Boundary**.

19.1.3 There may be interrelationships between Major Accidents and Disasters and other disciplines. Therefore, consideration should also be given to the following technical chapters and appendices:

- **Chapter 10 Water Environment** – covers the flood risk of the area.
- **Chapter 11 Geology and Hydrogeology –** covers the ground conditions of the area.
- **Chapter 14 Air Quality** – covers the air quality baseline conditions of the area.
- **Chapter 18 Climate Change** – provides an overview of the climatic conditions and trends in the area.
- **Appendix 19A Major Accidents and Disasters Scoping Table**

19.1.4 This assessment for major accidents and disasters is guided by a Primer published by Institute of Environmental Management and Assessment (IEMA) (2020) called, 'Major Accidents and Disasters in EIA' (Ref 19.1) ('the Primer'). The Primer defines the following:

- **Major accident:** events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the Client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.
- **Disaster:** may be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident.

19.1.5 This chapter considers two aspects: the vulnerability of the Project to a major accident/disaster, and the potential for the Project to cause a major accident.

19.1.6 This chapter:

- identifies whether there are any major accidents and disasters topics and events that are proposed to be scoped into the Environmental Impact Assessment (EIA) and thus reported within the Environmental Statement (ES);
- identifies those major accident and disaster topics and events that are proposed to be scoped out of further assessment, with a justification provided; and
- defines the approach and methodology for identifying potential major accidents and disasters and their assessment, in the context of the Project.

19.2 Legislation, Policy and Guidance

19.2.1 **Chapter 2 Regulatory and Planning Policy Context** describes the overall regulatory and planning policy context that applies to the Project. This includes national, regional, and local planning policy and marine policy, which has been considered across all environmental topic chapters in the preparation of this EIA Scoping Report.

19.2.2 Legislation and policies relevant for different environmental topics are set out below with specific details included in **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Policies** and **Appendix 2C Local Policy.**

19.2.3 The requirement to consider major accidents and disasters as part of the EIA process is set out in the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as 'the EIA Regulations') which state:

"*A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned… Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies*".

Guidance and Advice Notes

19.2.4 The following core guidance documents provide the technical framework for applying a risk management process when dealing with major accidents and disasters in EIA's, in addition to other useful documents which relate to the assessment of risk:

- The International Standards Organizations ISO 311000: 2018 Risk Management – Principles and Guidelines (Ref 19.2);
- Defra, 2011, 'Guidelines for Environmental Risk Assessment and Management' (Ref 19.3); and
- IEMA, 2020, 'Major Accidents and Disasters in EIA: An IEMA Primer' (Ref 19.1).

19.3 Consultation and Engagement

19.3.1 Consideration has been given to responses received at Non-Statutory Consultation held between January and March 2024 in preparing this scoping chapter. Of the responses received there was one relating directly to Major Accidents and Disasters.

19.3.2 No pre-scoping engagement has been undertaken in preparing this scoping chapter and it is proposed that no further engagement will be undertaken unless there is a future requirement.

19.4 Study Area

19.4.1 As there is no specific regulatory guidance or standardised methodology, the preliminary Study Area distances are based on professional judgement. All distances are from the Scoping Boundary illustrated in **Figure 1.1 Scoping Boundary**:

- Manmade features:
  - Nuclear sites;

- Airports, airfields, airstrips and ports within 5 km;
- Control of Major Accident Hazard (COMAH) facilities within 3 km;
- Major accident hazard pipelines within the Scoping Boundary;
- Rail infrastructure within the Scoping Boundary; and
- Transmission (gas, electrical, oil/fuels) crossing, and within the Scoping Boundary.

- Natural features with the potential to create risks within:
  - Seismic activity within 5 km; and
  - Flood risk and unstable ground conditions within 1 km.

19.5 Baseline Conditions

Baseline Environment

19.5.1 The baseline relevant to major accidents and disasters primarily comprises:

- features external to the Project that present a potential source of hazard to the Project itself;
- sensitive environmental receptors at risk of significant effect from the Project; and
- identified major accident and disaster risks that currently exist within the local area that could affect the Project or be exacerbated by the Project.

19.5.2 The baseline conditions described for major accidents and disaster events are derived from the following desk study sources:

- technical chapters of this Scoping Report: **(Chapters 6-19)**;
- National Risk Register 2020 (Ref 19.4);
- British Geological Survey 'Onshore GeoIndex' (Ref 19.5);
- The Coal Authority Interactive Map (Ref 19.6);
- Health and Safety Executive's Planning Advice Web App (Ref 19.7);
- COMAH 2015 Public Information Search (Ref 19.8); and
- Google street view maps covering the Scoping Boundary.

19.5.3 The baseline conditions are split into three areas:

- potential environmental receptors: receptors that could be vulnerable to a major accident or disaster as a result of the Project;
- nearby major accident installations: potential linkages with other projects that could increase the risk of a major accident within the Study Area; and
- natural hazards and disasters: a review of existing baseline data relating to natural hazards/disasters, such as flooding or drought, that inform the likelihood of a natural disaster occurring within the Study Area.

Accident and Disaster Categories

19.5.4 Within the Study Area, the potential major accidents and disaster groups and categories considered are those listed in **Table 19.1.**

Table 19.1: Major accidents and disaster groups and categories

Groups	Categories
Natural Events	Geophysical
	Hydrology
	Climatological and meteorological
	Biological
Technological or manmade hazards	Societal
	Industrial and urban accidents
	Transport accidents
	Pollution accidents
	Utility failures
	Malicious attacks
	Engineering accidents and failures
	Human error
	Sabotage/arson
	Explosion

Potential Environmental Receptors

19.5.5 All potential receptors that could be affected by a major accident or disaster have been described and outlined within the specific environmental topic chapters. **Table 19.2** signposts the technical chapters and the potential receptors relevant to major accidents and disasters. No additional receptors have been identified outside those set out within the technical chapters.

Table 19.2: Signpost to chapters with relevant receptors

Chapter	Receptor
Chapter 6 and 7 Landscape and Visual	Designated Sites
Chapter 8 Ecology and Biodiversity	Ecological receptors
	Notable Habitats

Chapter	Receptor
	Designated Sites
Chapter 9 Historic Environment	Designated heritage assets
	Non-designated heritage assets
Chapter 10 Water Environment	Water resources
	Watercourses and waterbodies
Chapter 11 Geology and Hydrogeology	Groundwater and aquifers
	Land stability
Chapter 12 Agriculture and Soils	Soil
	The best and most versatile (BMV) Agricultural Land
Chapter 13 Traffic and Movement	Roads
	Cycle routes
	Public rights of way
Chapter 14 Air Quality	Residential receptors
Chapter 15 Noise and Vibration	Commercial receptors
Chapter 16 Socio-economics, Recreation and Tourism	Communities
Chapter 17 Health and Wellbeing	

Nearby Major Accident Hazard Installations

19.5.6 There are no sites that fall under the COMAH Regulations 2025 within proximity to the Project (Ref 19.8). The closest COMAH site is Novaritis Grimsby Ltd., located approximately 3 km east of the Scoping Boundary of Section 1: Grimsby West Substation.

Natural Hazards and Disasters

19.5.7 The Primer (Ref 19.1) outlines examples of natural hazards in the UK. These have been used to guide the baseline data collection and assist with determining the likelihood of the identified risk. The main natural hazards that can disrupt infrastructure in the UK are outlined below.

Flooding

19.5.8 The majority of the Project Scoping Boundary is located in Flood Zone 2 and 3. The northern part of the Project is located just outside the Flood Zone that is associated with the hydrological catchments of the Humber Estuary. The central and southern sections of the Project are located within Flood Zones that are associated with The Wash Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI), Special Protected Area (SPA), and the Greater Wash SPA. The Greater Wash SPA covers a large area of the east coast, from East Yorkshire southwards and into Suffolk.

19.5.9 With regard to flood risk and drainage, future baseline conditions will be forecasted, drawing on current best practice guidelines. These will consider the likely impacts of climate change on river flows, rainfall intensities, and tidal flood levels/storm surges. Further information on the baseline conditions for flooding for the Project can be found in **Chapter 10 Water Environment**.

19.5.10 For the assessment of the impact of climate change on the future physical environment, the UK guidance and projection of sea level rise and changing storm conditions are applied to the baseline.

19.5.11 Guidance on changes in future wind and wave conditions has been provided by the Environment Agency (Ref 19.9). The guidance states that wind speeds and wave height should be increased by 5% between 1990 and 2055, then by 10% for 2056 to 2115.

19.5.12 UK Climate Projections 2018 (UKCP18) (Ref 19.10) provides the most up-to-date assessment of climate change up to and beyond 2100. Sea level rise data along the UK coastline is available to download from the Met Office UKCP18 website at the grid square. Sea levels are predicted to increase 1.12 m under the RCP8.5 Scenario by 2100 which would threaten communities on sea cliffs and coastal plains around much of east and south coast of England.

Climate

19.5.13 Data sourced from the UK Met Office confirm the highest daily maximum temperature in the UK to be 40.3°C, recorded in Coningsby, Lincolnshire in July 2022. The lowest daily minimum temperature on record in the UK is -27.2°C recorded in Altnaharra, Scotland in December 1995.

19.5.14 Further climate information was sourced from the Met Office to help understand the climate of eastern England where the Project is located:

- mean daily maximum temperatures 6°C to 8°C (winter) and 20°C to 23°C (summer); and
- days of air frost per year: Ranges from 30 (coastal areas) to 55 (well inland).

19.5.15 Compared to the Lake District, which receives on average about 3000 mm of rain a year, much of the surrounding areas of East Yorkshire and Lincolnshire receive less than 700 mm per year. Across the region there is, on average, about 30 rain days (rainfall greater than 1 mm) in winter (December to February) and less than 25 days in summer (June to August).

19.5.16 The occurrence of snow is linked closely to temperature, with falls rarely occurring if the temperature is higher than 4°C, and temperatures below this are generally required for snow to lie for any length of time. The Met Office data indicates that snow falls around 20 days per year in low lying areas in north-east England.

19.5.17 The National Risk Register (Ref 19.4) states that the UK is likely to experience a trend towards warmer winters and hotter summers. This would also lead to changing rainfall patterns, leading to heavier rainfall. Other extreme weather events such as storms and heavy snowfalls could also be expected as a result of climate change. The National Risk Register expects extreme weather events to become more frequent.

Storms and high winds

19.5.18 Being one of the most sheltered parts of the UK, the east of England usually experiences mean wind speeds of around 10 knots. Gales (a mean windspeed of 34 knots or more over 10 consecutive minutes) only occur on average two days a year in Lincolnshire, though coastal areas of the Humberside experience on average 10 days of gale a year.

19.5.19 Extreme storms are very rare in the UK; however, storms of a lower magnitude occur particularly during winter, cause issues when they do occur.

Land Instability

19.5.20 The Project is located in areas that are predominantly rural, with large parts of the land under arable use.

19.5.21 Earthquakes in the UK are moderately frequent but are unlikely to be powerful enough to inflict severe damage. The British Geological Society (BGS) acknowledges although the UK is distant from the nearest plate boundary, the Mid-Atlantic Ridge, earthquakes in the UK occur as crustal stresses within the tectonic plates are relieved by movement occurring on pre-existing fault planes. One of the driving forces is regional compression caused by motion of the Earth's tectonic plates and uplift resulting from the melting of the ice sheets that covered many parts of Britain thousands of years ago. The Project Scoping Boundary passes through an area of low seismicity. BGS data indicates that the Project passes through areas with a Peak Ground Acceleration of 0.02 to 0.04 g. This is the second lowest of the nine BGS seismicity categories for the UK (Ref 19.11).

Wildfire

19.5.22 The UK has a temperate climate that is not usually associated with wildfires; however, wildfires do occur annually. Wildfires generally start from human error, such as discarded cigarettes or barbeques, when ground conditions are dry after extended periods of hot, dry weather, when vegetation may have increased susceptibility to fire.

19.6 Scoping Methodology

19.6.1 In order to understand the initial risk with regards to major accidents and disasters an initial scoping exercise has been undertaken to identify and review the sources outlined in **Table 19.1** and the results of this scoping exercise are included in **Appendix 19A Major Accidents and Disasters Scoping Table**. The appendix outlines the potential vulnerability of the Project to the natural, man-made and technological risks and hazards, as well as the major accidents and disasters that could occur as a result of the Project. Each hazard is assessed to identify the risk or interaction that could result in a major accident or disaster.

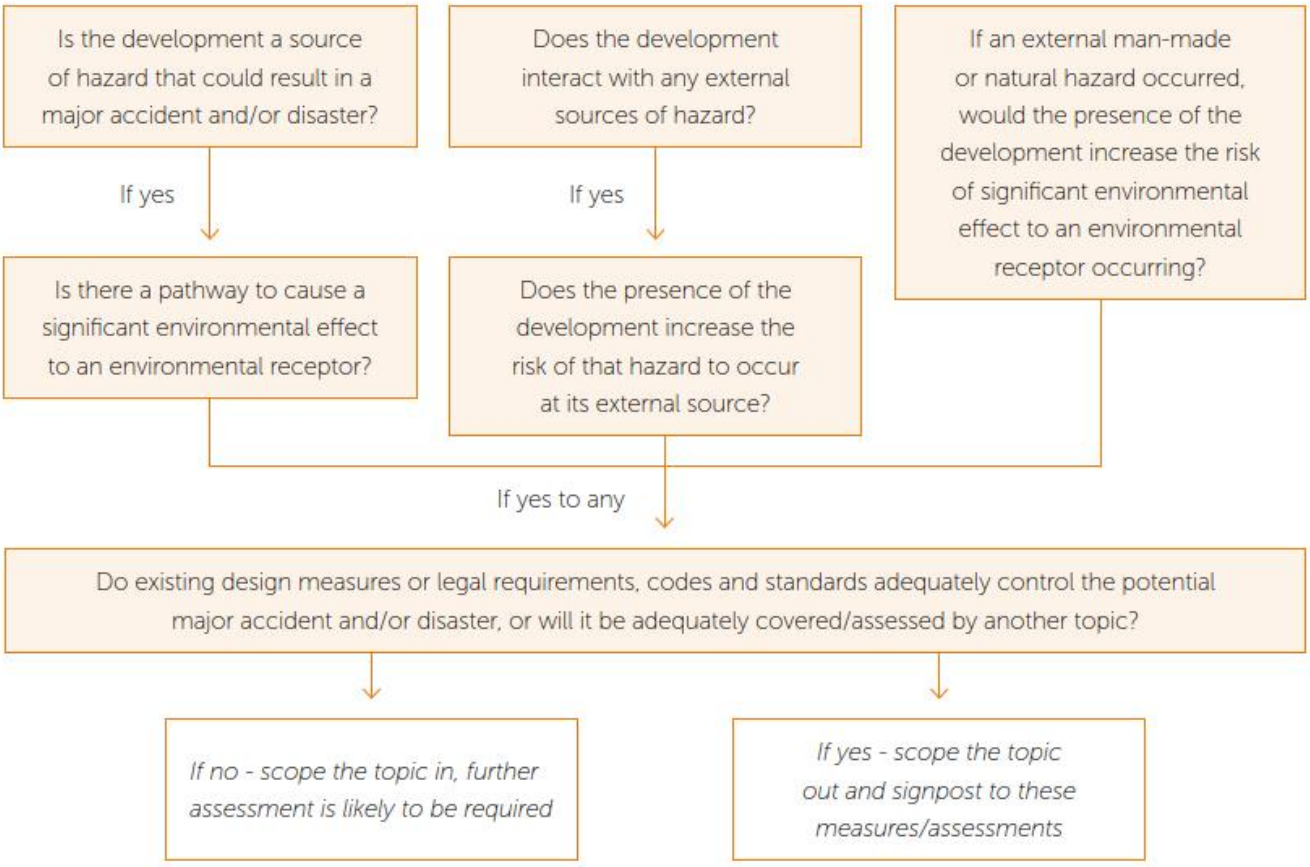
Establishing the Proposed Scope of Assessment

19.6.2 This scoping exercise focusses on identifying the potential impact sources (the Project itself or other existing hazard sources) and the impact pathways that exist between these and potential receptors, that could lead to a significant environmental effect occurring. It then considers whether existing legal requirements and codes and standards are sufficient to control risks. Potential impact sources associated with construction, operation and maintenance that fall within the scope for health and safety legislation and are not considered.

19.6.3 Each hazard was screened in turn to identify whether it could result in a major accident or disaster, or whether it could interact with any external source of hazard. The potential for the Project to result in the potential significant effects described in this section considers the embedded and control and management measures described in the Outline Code of Construction Practice (**Appendix 4A Initial Outline Code of Construction Practice**).

19.6.4 Details of each of these stages are set out in the methodology set out within the Primer (Ref 19.1) in **Image 19.1**.

Image 19.1: Scoping decision process flow (Ref 19.1)



19.7 Potential for Significant Effects

19.7.1 The scoping exercise presented in **Appendix 19A Major Accidents and Disasters Scoping Table** has not identified any hazard/events that would have the potential to result in significant effects and that are proposed to be scoped into the ES.

19.8 Proposed Assessment Methodology

19.8.1 **Appendix 19A Major Accidents and Disasters Scoping Table** does not identify any hazard/events that are proposed to be scoped into the assessment. During the Project development new sources of hazards or events could emerge and these would be considered and scoped in at a later stage where required. This will be assessed using a staged approach as set out below:

- identify the potential risk events related to the major event types;
- screen the risk events;
- define the reasonable worst consequence should the event occur;
- identify all cross-disciplinary impacts;
- identify mitigation measures, management and, if possible, prevention;
- assess the likelihood; and
- determine the risk has been mitigated to as low as reasonably practical and identify any residual risks and their significance.

19.8.2 In the event of a hazard needing to be considered the ES would include a detailed methodology for the assessment of the relevant major accidents and disasters, based on the guiding principles outlined above. Any limitations of the assessment of major accidents and disasters would also be clearly presented.

19.9 Assumptions and Limitations

19.9.1 Major accidents and/or disasters associated with construction, operation and maintenance activities that fall within the scope for health and safety legislation and Construction Design and Management (CDM) regulations are not considered.

19.10 Conclusion

19.10.1 **Appendix 19A Major Accidents and Disasters Scoping Table** summarises the hazard/events that are proposed to be scoped out of the assessment. No hazard/event is proposed to be scoped into the ES. The scoping assessment has shown that the vulnerability of the Project to major accidents and disasters can be mitigated or reduced by the processes and standards in place. It also outlines that the Project is unlikely to generate any potential significant effects on the environment if a major accident or disaster were to occur. The potential effects that are proposed to be scoped out of the assessment are summarised in **Table 19.3**.

Table 19.3: Proposed scope of the assessment

Receptor	Potential for significant effect	Project phases(s)	Proposed to be scoped in/out
The Project	No potential vulnerability of the Project to a major accident or disaster as set out in **Appendix 19A Major Accidents and Disasters Scoping Table**	Construction, operation and maintenance.	Scoped out
Receptors listed in Table 19.2	No potential for the Project to exacerbate existing hazard as set out in **Appendix 19A Major Accidents and Disasters Scoping Table**.	Construction, operation and maintenance.	Scoped out

19.11 References

Ref 19.1 Institute of Environmental Management and Assessment (IEMA) (2020). Major Accidents and Disasters in EIA: An IEMA Primer [online]. Available at: https://www.iema.net/resources/reading-room/2020/09/28/major-accidents-and-disasters-in-eia-an-iemaprimer#:~:text=Major%20accidents%20and%20disasters%20should,minor%20clean%2Dup%20and%20restoration [Accessed: 30 May 2024].

Ref 19.2 The International Standards Organizations (ISO) (2018). ISO 311000: 2018 Risk Management – Principles and Guidelines [online]. Available at: https://www.iso.org/standard/65694.html [Accessed: 30 May 2024].

Ref 19.3 Department of Food, Environment and Rural Affairs (DEFRA) (2011). Guidelines for Environmental Risk Assessment and Management Green Leaves III[online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69449/pb13670-green-leaves-iii-summary-111107.pdf [Accessed: 30 May 2024].

Ref 19.4 Cabinet Office (2020). National Risk Register [online] Available at: CCS's National Risk Register 2020 (publishing.service.gov.uk) [Accessed: 30 May 2024].

Ref 19.5 British Geological Survey (BGS) (N/A) Onshore GeoIndex [online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed 30 May 2024].

Ref 19.6 The Coal Authority (N/A). The Coal Authority Interactive Map [online] Available at: https://mapapps2.bgs.ac.uk/coalauthority/home.html [Accessed: 30 May 2024].

Ref 19.7 Health and Safety Executive (N/A). Health and Safety Executive's Planning Advice Web App [online] Available at: https://www.hse.gov.uk/landuseplanning/planning-advice-web-app.htm [Accessed: 30 May 2024].

Ref 19.8 Health and Safety Executive (2015). COMAH 2015 Public Information Search. [online]. Available at: https://notifications.hse.gov.uk/COMAH2015/Search.aspx [Accessed: 30 May 2024].

Ref 19.9 Environment Agency (2021). Flood Risk Assessments: Climate Change Allowances [online]. Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [Accessed: 30 May 2024].

Ref 19.10 Met Office (2018). UK Climate Projections. [online] Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

Ref 19.11 British Geological Society (BGS) (2022). Seismic Hazard in the UK. [online] Available at: http://www.earthquakes.bgs.ac.uk/hazard/UKhazard.html [Accessed: 30 May 2024].

20. Summary

nationalgrid

Contents

20.1 Summary

20.1.1 This chapter provides a summary of the proposed scope of **Chapters 6 - 19**. Error! Reference source not found. to **Table 20.14** provide summaries of the aspects of the Chapters that are proposed to be scoped into and out of the Environmental Impact Assessment (EIA).

Table 20.1: Proposed scope of the Landscape assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
National Landscapes			
Physical and/or perceptual effects on designated landscapes from construction including vegetation removal, site preparation, OHL and substation construction, and presence of compounds, storage areas access routes, plant (including mobile cranes), vehicles and personnel.	Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty (AONB)).	**Scoped in**	At its closest the Lincolnshire Wolds National Landscape (AONB) lies within 1 km of the Scoping Boundary and the Project is partly within the setting of the designated area. Some of the roads through the designated area may be used as temporary access routes.
	Proposed extension of the Lincolnshire Wolds National Landscape (AONB)	Scoped out	This area has no formal status and lies outside the Scoping Boundary. This will be kept under review as Project develops.
	North Norfolk National Landscape (AONB).	Scoped out	At its closest the North Norfolk National Landscape (AONB) is some 14 km from the Scoping Boundary. At this distance, significant effects due to the presence of construction activities are highly unlikely to arise.
National Character Areas			
Physical and/or perceptual effects on the landscape from construction activities including vegetation	NCA Profile 42: Lincolnshire Coast and Marshes	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.

Impact	Receptor	Proposed to be scoped in or out	Rationale
removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	NCA Profile 46: The Fens.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Locally Designated Landscapes			
Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	Area of Great Landscape Value (AGLV) north of the Lincolnshire Wolds National Landscape (AONB).	**Scoped in**	**Yes** – potential for indirect effects on overall composition and character.
North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study			
Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	Landscape Character Type (LCT) Ai: Industrial Landscape, LCT Biii: Flat Open Farmland, LCT Biv: Sloping Farmland and LCT Ci: High Farmland.	Scoped out	The distance of the Scoping Boundary (minimum 500 m) from these LCT means that there would be no direct effects and construction activities would not fundamentally alter the composition or character of the views out from the LCT or indirectly influence the character of the landscape within the LCT.
	LCT Aii: Flat Open Farmland,	**Scoped in**	Potential for direct effects on landscape elements and features and indirect

Impact	Receptor	Proposed to be scoped in or out	Rationale
	LCT Bi, Wooded Open Farmland LCT Bii: Wooded Open Farmland.		effects on overall composition and character.
East Midlands Region Landscape Character Assessment			
Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	Regional Landscape Character Type (RLCT) 1A: Coastal Saltmarshes and Mudflats, RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats, RLCT 1C: Shallow Coastal Waters, RLCT 1E: Offshore Industries, Fisheries and Navigations, RLCT 4B: Wooded Vales; RLCT 7B: Wolds Scarps, Ridges and Valleys.	Scoped out	The distance of the Scoping Boundary (minimum 1.7 km) from these RLCT means that the construction activities would not fundamentally alter the composition or character of the views out from the RLCT or indirectly influence the character of the landscape within the RLCT.
	RCLT 2A: Settled Fens and Marshes, RLCT 2B: Planned and Drained Fens, RLCT 2C: Fen and Marsh Margin Farmlands, RLCT 7A: Chalk Wolds.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Kings Lynn and West Norfolk Landscape Character Assessment (LCA) and Guidelines			
Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds,	LCA D2: Walpole, Terrington and Clench Warton and LCA E4: Marshland St. James.	Scoped out	The distance of the Scoping Boundary (minimum 1.3 km) from these LCA means that the construction activities would not fundamentally alter the composition or character of the views out from the LCA or indirectly influence

Impact	Receptor	Proposed to be scoped in or out	Rationale
storage areas access tracks, plant (including mobile cranes), vehicles and personnel.			the character of the landscape within the LCA.
	LCA D3: Terrington St John and LCA D4: Emneth, West Walton and Walsoken.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
	LCA E4: Marshland St. James	Scoped out	The construction activities would not fundamentally alter the composition or character of the views out from the LCA or indirectly influence the character of the landscape within the LCA.
Fenland District Council Draft Local Plan 2021 – 2040 (Draft Local Plan Consultation August 2022)			
Physical and/or perceptual effects on the landscape from construction activities including vegetation removal and presence of construction compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel.	LCA The Fens; and LCA Wisbech Settled Fen	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Project Wide Construction Effects			
Effects on landscape character from nighttime lighting of construction activities.	All landscape receptors.	**Scoped in**	There may be a requirement for nighttime lighting of the substations, construction compounds and site access points throughout the route.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Physical and perceptual effects on landscape character and resources from changes to landform and introduction of landscape elements such as trees and hedgerows	All landscape receptor groups listed above as scoped into the assessment.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Physical and perceptual effects on landscape character and resources from permanent loss of roadside vegetation	All landscape receptor groups listed above as scoped into the assessment.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Operational and Maintenance Phase			
Nationally Designated Landscapes			
Perceptual effects on the natural beauty and special qualities of the Lincolnshire Wolds National Landscape (AONB) or North Norfolk National Landscape (AONB) due to the presence of the of the new infrastructure.	Lincolnshire Wolds National Landscape (AONB).	**Scoped in**	At its closest the Lincolnshire Wolds National Landscape Area lies within 1 km of the Scoping Boundary and the Project is partly within the setting of the designated area.
	Proposed extension of the Lincolnshire Wolds National Landscape (AONB)	Scoped out	This area has no formal status and lies outside the Scoping Boundary. This will be kept under review as the Project develops.
	North Norfolk National Landscape (AONB)	Scoped out	At its closest the North Norfolk National Landscape (AONB) is some 14 km from the Scoping Boundary. At this distance, significant effects due to the

Impact	Receptor	Proposed to be scoped in or out	Rationale
			presence of the new infrastructure are highly unlikely to arise.
National Character Areas (NCA)			
Physical and/or perceptual effects on the landscape from long-term loss of landscape elements and features, and introduction of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows	NCA Profile 42: Lincolnshire Coast and Marshes	**Scoped in**	Potential for indirect effects on views with consequent effects on landscape character.
	NCA Profile 46: The Fens.	**Scoped in**	Potential for indirect effects on views with consequent effects on landscape character.
Locally Designated Landscapes			
Physical and perceptual effects on landscape character and resources from long-term loss of landscape elements and features, and introduction of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows.	Areas of Great Landscape Value (AGLV) north of the Lincolnshire Wolds National Landscape (AONB).	**Scoped in**	Potential for indirect effects on views with consequent effects on landscape character.

Impact	Receptor	Proposed to be scoped in or out	Rationale
North East Lincolnshire Landscape Character Assessment			
Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and presence of new infrastructure.	LCT Ai: Industrial Landscape.	Scoped out	The distance of the Scoping Boundary (minimum 1.8 km) from this LCT and the industrial character of the LCT means that the presence of new infrastructure would not fundamentally alter the composition or character of the views out from the LCT or indirectly influence the character of the landscape within the LCT.
	LCT Bii: Wooded Open Farmland.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
	LCT Aii: Flat Open Farmland, LCT Bi, Open Farmland, LCT Biii: Flat Open Farmland, LCT Biv: Sloping Farmland and LCT Ci: High Farmland.	**Scoped in**	Potential for indirect effects on views with consequent effects on landscape character.
East Midlands Region Landscape Character Assessment			
Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features,	RLCT 1A: Coastal Saltmarshes and Mudflats; RCLT 1B: Coastal Dunes, Beach and Intertidal Sand Flats; RLCT 1C: Shallow Coastal Waters; RLCT 1E: Offshore Industries, Fisheries	Scoped out	The distance of the Scoping Boundary (minimum 3 km) from this RLCT means that the presence of the new infrastructure would not fundamentally alter the composition or character of the views out from the RLCT or indirectly

Impact	Receptor	Proposed to be scoped in or out	Rationale
and presence of new infrastructure.	and Navigations, RLCT 4B: Wooded Vales.		influence the character of the landscape within the RLCT.
Potential changes to landform and introduction of landscape elements such as trees and hedgerows	RCLT 2A: Settled Fens and Marshes, RLCT 2B: Planned and Drained Fens, RLCT 2C: Fen and Marsh Margin Farmlands.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
	RLCT 7A: Chalk Wolds, RLCT 7B: Wolds Scarps, Ridges and Valleys.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Kings Lynn and West Norfolk Landscape Character Assessment and Guidelines			
Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and presence of new infrastructure.	LCA E4: Marshland St. James.	Scoped out	The distance of the Scoping Boundary (minimum 4.8 km) from this LCT means that the presence of the new infrastructure would not fundamentally alter the composition or character of the views out from the LCA or indirectly influence the character of the landscape within the LCA.
Potential changes to landform and introduction of landscape elements such as trees and hedgerows.	LCA D3: Terrington St John and LCA D4: Emneth, West Walton and Walsoken.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
	LCA D2: Walpole, Terrington and Clench Warton.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Fenland District Council Draft Local Plan 2021-2040 (Draft Local Plan Consultation August 2022)			
Effects on the physical landscape and/or landscape character resulting from long-term loss of landscape elements and features, and presence of new infrastructure. Potential changes to landform and introduction of landscape elements such as trees and hedgerows.	LCA The Fens; and LCA Wisbech Settled Fen.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.
Project wide operational effects			
Effects on landscape character from operational nighttime lighting.	All landscape receptor groups listed above as scoped into the assessment.	**Scoped in**	Yes – there may be a requirement for 24/7 security lighting.
Effects of mitigation measures proposed by other topics, particularly re-contoured landform, and new planting in relation to the mitigation of ecological and/or visual effects.	All landscape receptor groups listed above as scoped into the assessment.	**Scoped in**	Potential for direct effects on landscape elements and features and indirect effects on overall composition and character.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Localised widening of public highways.	All landscape receptor groups listed above as scoped into the assessment.	Scoped out	Any roadside vegetation lost during widening works would be reinstated like for like and therefore unlikely to result in significant effects.
Physical and perceptual effects on landscape character and resources from routine maintenance activities including temporary access tracks, storage compounds, vehicle and personnel movements.	All landscape receptor groups listed above as scoped into the assessment.	Scoped out	Maintenance activities would be temporary, short term and unlikely to result in significant effects.
Physical and perceptual effects on landscape character and resources from general maintenance activities including cutting back of vegetation.	All landscape receptor groups listed above as scoped into the assessment.	Scoped out	Vegetation management is unlikely to have ongoing significant effects, the main effect would be from the initial loss during construction and the effects of this are covered under construction above.

Table 20.2: Proposed scope of the Visual assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Perceptual effects on views and wider visual amenity from construction including vegetation removal, site preparation, OHL and substation construction, and presence of compounds, storage areas access tracks, plant (including mobile cranes), vehicles and personnel	Receptors further than 10 km from the Scoping Boundary and outside the Zone of Theoretical Visibility (ZTV) (based on operational ZTV).	Scoped out	The effects of the Project on visual receptors that are located wholly outside the ZTV (which illustrates a worst-case scenario using bare earth without intervening buildings and vegetation) will not be assessed as there would be no likelihood for any visual effects on these receptors.
	Key views to and from the Lincolnshire Wolds National Landscape.	**Scoped in**	Potential for indirect effects on composition and character of views.
	People living and moving around communities and engaging in recreational activities including people using Public Rights of Way (PRoW) and waterways (within 3 km of the Project).	**Scoped in**	Potential for indirect effects on composition and character of views.
	People using National Trails and regionally promoted routes (within 3 km)	**Scoped in**	Potential for indirect effects on composition and character of views.
	People living and moving around communities and engaging in recreational activities including people using PRoW and	Scoped out	The construction activities are unlikely to be perceptible beyond 3 km. If they are, the short term and temporary nature of the works is highly unlikely to result in significant effects.

Impact	Receptor	Proposed to be scoped in or out	Rationale
	waterways (beyond 3 km of the Project).		
	People using National Trails and regionally promoted routes (beyond 3 km).	Scoped out	The construction activities are unlikely to be perceptible beyond 3 km. If they are, the short term and temporary nature of the works is highly unlikely to result in significant effects.
	Main road and rail users (unless recognised as a scenic or tourist route).	Scoped out	People travelling by road or rail are not anticipated to experience significant effects because of the glimpsed nature of the views and the temporary nature of the construction works.
	People at their place of work whose attention is on their surroundings and where the setting is important to their quality of working life.	**Scoped in**	Potential for indirect effects on composition and character of views.
	People at protected viewpoints, panoramas and promoted viewing corridors.	**Scoped in**	Potential for indirect effects on composition and character of views.
	Occupants of individual properties.	**Scoped in**	Only if there is the potential for Residential Visual Amenity Effects. All other residential receptors are covered under communities above.
Perceptual effects on views and visual amenity	All visual receptor groups.	**Scoped in**	There may be a requirement for nighttime lighting of the substations,

Impact	Receptor	Proposed to be scoped in or out	Rationale
from nighttime lighting of construction activities.			construction compounds and site access points throughout the route.
Perceptual effects on views and visual amenity from changes to landform and introduction of landscape elements such as trees and hedgerows.	All visual receptor groups	**Scoped in**	Potential for indirect effects on composition and character of views.
Perceptual effects on views and visual amenity from temporary loss of roadside vegetation.	All visual receptor groups	**Scoped in**	Potential for indirect effects on composition and character of views.
Operational and Maintenance Phase			
Perceptual effects on views and visual amenity from long-term loss of landscape elements and features, and introduction of new OHL and substations.	Receptors further than 10 km from the scoping boundary and outside the ZTV.	Scoped out	The effects of the Project on visual receptors that are located wholly outside the ZTV (which illustrates a worst-case scenario using bare earth without intervening buildings and vegetation) will not be assessed as there would be no likelihood for any visual effects on these receptors.
	Key views to and from the Lincolnshire Wolds National Landscape (AONB).	**Scoped in**	Potential for indirect effects on composition and character of views.
	People living and moving around communities and engaging in recreational activities including	**Scoped in**	Potential for indirect effects on composition and character of views.

Impact	Receptor	Proposed to be scoped in or out	Rationale
	people using local roads, PRoW and waterways (within 3 km of the Project).		
	People using National Trails and regionally promoted routes (within 3 km)	**Scoped in**	Potential for indirect effects on composition and character of views.
	People living and moving around communities and engaging in recreational activities including people using PRoW and waterways (beyond 3 km of the Project).	Scoped out	Beyond 3 km, views of the new infrastructure are highly unlikely to give rise to significant effects.
	Main road and rail users (unless a scenic or tourist route)	Scoped out	People travelling by road or rail are not anticipated to experience significant effects because of the glimpsed nature of the views.
Perceptual effects on views and visual amenity from long-term loss of landscape elements and features, and introduction of new OHL and substations.	People at their place of work whose attention is on their surroundings and where the setting is important to their quality of working life.	**Scoped in**	Potential for indirect effects on composition and character of views.
	People at protected viewpoints, panoramas and promoted viewing corridors.	**Scoped in**	Potential for indirect effects on composition and character of views.
Effects on views and visual amenity from	All visual receptor groups listed above as scoped into the assessment.	**Scoped in**	There may be a requirement for 4/7 security lighting.

Impact	Receptor	Proposed to be scoped in or out	Rationale
operational nighttime lighting.			
Perceptual effects on views and visual amenity from changes to landform and introduction of landscape elements such as trees and hedgerows.	All visual receptor groups listed above as scoped into the assessment.	**Scoped in**	Potential for indirect effects on composition and character of views.
Perceptual effects on views and visual amenity from permanent loss of roadside vegetation.	All visual receptor groups listed above as scoped into the assessment.	Scoped out	Any roadside vegetation lost during widening works would be reinstated like for like and therefore unlikely to result in significant visual effects
Perceptual effects on views and visual amenity from routine maintenance activities including temporary access tracks, storage compounds, vehicle and personnel movements.	All visual receptor groups listed above as scoped into the assessment.	Scoped out	Maintenance activities would be temporary, short term and unlikely to result in significant effects.
Perceptual effects on views and visual amenity from general maintenance activities including cutting back of vegetation.	All visual receptor groups listed above as scoped into the assessment.	Scoped out	Vegetation management is unlikely to have ongoing significant effects, the main effect would be from the initial loss during construction and the effects of this are covered under construction above.

Table 20.3: Proposed scope of the Ecology and Biodiversity assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Permanent habitat loss. Temporary habitat loss, disturbance and fragmentation. Indirect impacts.	Statutory and non-statutory designated sites (without mobile qualifying criteria) located greater than 2 km from the Scoping Boundary.	Scoped out	The distance separating these sites from the Project is sufficient to reduce any risk of biophysical change to negligible.
Construction and Maintenance Phase[1]			
Permanent habitat loss, temporary habitat loss, disturbance and fragmentation	Statutory designated sites: Humber Estuary Special Areas of Conservation (SAC) / Special Protection Area (SPA) / Ramsar / Site of Specific Scientific Interest (SSSI) Gibraltar Point SPA / Ramsar The Wash and North Norfolk Cost SAC The Wash SPA / Ramsar Bratoft Meadows SSSI Tetney Blow Holes SSSI	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only)	There will be no direct loss of habitat from statutory designated sites. It is however possible that habitats utilised by birds or other species associated with nearby designated sites (i.e. functionally linked land) such as the Humber Estuary SPA/ SAC/Ramsar could be lost. Surveys will investigate use of these habitats by such species and inform any requirement for mitigation or necessity for design adjustments.
	Non-statutory designated sites;	**Scoped in** for construction (all impacts) and maintenance	The overhead line (OHL) infrastructure, supporting structures, and associated

[1] For the Ecology and Biodiversity assessment, maintenance activities have been considered alongside construction activities for the purposes of scoping. However, while some of the characteristics may be similar, it is expected that maintenance activities would be much more localised, generating less activity.

Impact	Receptor	Proposed to be scoped in or out	Rationale
	Local Wildlife Sites (LWS) Roadside Nature Reserves (RNRs) (Lincolnshire)	(temporary habitat loss, disturbance and fragmentation only)	tracks have the potential for direct habitat loss within non-statutory designated sites. Until the route corridor and working methods are confirmed this impact pathway will be included as a possibility. Permanent habitat loss of a non-statutory designated site could occur as a result of the transmission line infrastructure such as the siting of a pylon, or the required clearance below the OHL/conductors.
	Priority and notable habitats Ancient woodland and ancient and veteran trees	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only)	Semi-natural woodland (if present), hedgerows, lowland meadow, coastal and floodplain grazing marsh, arable field margins, and other notable habitats could be impacted by pylon locations, supporting structures and access routes. Permanent habitat loss of notable habitats could occur as a result of the OHL infrastructure such as the siting of a pylon, or the required clearance below the OHL/conductors. However, a combination of routeing, micro-siting, and habitat re-instatement and replacement will be employed as mitigation and reduce these impacts, where possible.

Impact	Receptor	Proposed to be scoped in or out	Rationale
	Protected and notable species: Invertebrates Great Crested Newts (GCN) Reptiles Non-breeding birds (terrestrial) Breeding birds Bats Badger Otter Water vole Other mammals (including only brown hare, hedgehog, polecat) Fish Aquatic macroinvertebrates and macrophytes	**Scoped in** for construction (all impacts) and maintenance (temporary habitat loss, disturbance and fragmentation only)	Habitats with potential to support protected and notable species to be potentially impacted by overhead line infrastructure, supporting structures, and associated access tracks. Permanent habitat losses may impact reduce the extent of habitat available to protected or notable species. Mitigation measures will include habitat avoidance, reinstatement and compensation. Habitat connectivity may be impacted in the short term but will be minimised where possible to avoid key habitats. Where unavoidable fragmentation or habitat degradation is unavoidable this will be a temporary effect until habitat re-instatement is established.
Incidental mortality of protected or notable species due to site clearance activities.	Invertebrates	Scoped out	It is unlikely that notable population assemblages will be significantly affected by direct mortality once mitigation measures are in place, as such populations will be linked to habitat.
	GCN Reptiles	**Scoped in** for all during construction and maintenance	Potential exists for unmitigated works to impact protected and notable species which may be relatively isolated along

Impact	Receptor	Proposed to be scoped in or out	Rationale
	Breeding birds Non-breeding birds Bats Badger Other mammals (including only brown hare, hedgehog, polecat)		the route corridor depending on the access routes (haul road) and result in direct mortalities. If the route corridor cannot avoid suitable habitat, mitigation options include a works Ecological Method Statement or Natural England mitigation licence to avoid direct mortalities.
	Riparian mammals (otter and water vole) and other aquatic species	**Scoped in** for all during construction and maintenance	Increased levels of incidental mortality may undermine the conservation status of protected or notable species. It is expected that direct impacts on watercourses (and therefore water vole, otter and other aquatic species) can be avoided through appropriate design and routing of access requirements. However, until routing and design can be confirmed, there is a potential requirement for mitigation and these receptors remain scoped in.
Disturbance to protected or notable species (noise/ vibration, visual, lighting) due to construction activities.	GCN Non-breeding birds (intertidal) Non-breeding birds (terrestrial) Breeding birds Bats Badger Otter	**Scoped in** for all during construction and maintenance	Trees, hedgerows and other habitats within the Scoping Boundary may be suitable for protected or notable species. Disturbance above a tolerable threshold may affect the extent of habitat that is available to protected or notable species. If the route corridor cannot avoid disturbance impacts, then mitigation (i.e. works under an Ecological Method Statement or

Impact	Receptor	Proposed to be scoped in or out	Rationale
	Water vole Fish		Natural England mitigation licence) could be required.
Changes in air quality, negatively impacting protected or otherwise notable habitats within 200 m of the affected road network due to construction activities.	Designated sites and notable habitats (ancient woodland and ancient and veteran trees) within 200 m of roads that may be affected by the Project.	**Scoped in** for construction	Should screening of construction traffic flows show vehicle trips exceed the Institute of Air Quality Management (IAQM) criteria then habitat degradation can occur. Changes in air quality during maintenance are not predicted to lead to significant effects upon ecological receptors (**Chapter 14 Air Quality**) and therefore are scoped out.
Pollution impacts (dust deposition water)	Designated sites and notable habitats	**Scoped in** for all during construction and maintenance	Potential for pollution or other indirect impacts during construction resulting in degradation of habitats, including those used by protected and notable species. This will be mitigated though implementation of the CEMP. Changes in water quality (**Chapter 10 Water Environment**) and dust (**Chapter 14 Air Quality**) during maintenance are not predicted to lead to significant effects upon ecological receptors and therefore are scoped out.
Introduction of invasive non-native species leading to degradation of existing habitat quality and reduction in native species	Designated sites and protected and notable habitats and species	**Scoped in** for all during construction and maintenance	Potential for spread of invasive non-native species during works and movement around the site. Introduction of Invasive Non-native Species (INNS)

Impact	Receptor	Proposed to be scoped in or out	Rationale
due to being outcompeted.			can be detrimental to native habitats and species present.
Loss/reduction in habitat quality for protected and notable species due to changes in ground water levels or altered water quality	Designated sites and protected and notable habitats and species.	**Scoped in** for all during construction and maintenance	Potential for degradation of existing habitat quality, which could impact designated or otherwise notable habitat and protected and notable species.
Operational Phase			
Collision mortality due to permanent structures/barriers.	Breeding and non-breeding birds	**Scoped in** for breeding and non-breeding birds	Potential exists for the OHL to affect breeding and non-breeding birds through collision risk.
Light pollution spilling onto surrounding habitats, resulting in disturbance impacts to protected or notable species	Protected and notable species	**Scoped in** – for substation locations only	In the absence of mitigation and appropriate design, there is potential for operational lighting to result in the accidental disturbance of protected or notable species, limited to substations.
Habitat fragmentation through the development creating a barrier to species dispersal.	Protected and notable species	**Scoped in** for protected and notable species	Infrastructure could result in a degree of habitat fragmentation to terrestrial and potentially aquatic habitat.
Habitat gains for nesting birds, created by proposed pylons.	Nesting birds (primarily corvids, kestrel, hobby and peregrine)	**Scoped out,** while some beneficial effects may occur these would be localised and are unlikely to be significant	Pylons could provide additional nesting habitat for species where this was not previously available, with a beneficial effect on local or regional populations for these species. Hobby and peregrine are rare breeding birds in the UK.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Increased predation of birds arising from potential increased population of predatory bird species nesting and roosting on proposed pylons	Statutory designated sites: Humber Estuary SPA / Ramsar / SSSI The Wash SPA / Ramsar Non-breeding birds	**Scoped in** for designated sites only	Increased occurrences of nesting corvids, kestrel, hobby and peregrine may increase predation rates of birds across the route. However, this is only likely to be significant for designated sites; this would be expected to occur only where the distance between proposed pylons and designated site(s) with ornithological qualifying features is less than the foraging range of the predatory species in question..

Table 20.4: Proposed scope of the Historic Environment assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction phase			
Proposed scope of the ecology assessment	Non-designated heritage assets Historic landscapes	**Scoped in**	The Project has the potential to result in a physical impact on heritage assets through their truncation, removal, or alteration.
Temporary impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets	**Scoped in**	The Project has the potential to result in significant effects on designated and non-designated heritage assets.
Temporary impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets	**Scoped in**	The Project has the potential to result in significant effects on designated and non-designated heritage assets.
Operational and Maintenance Phase			
Impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets	**Scoped in**	The Project has the potential to result in significant effects on designated, non-designated heritage assets and historic landscapes.
Impacts to the access of heritage assets.	Designated heritage assets Non-designated heritage assets Historic Landscapes	Scoped out	Given the scale and size of the footprint of individual pylons, there is limited potential for significant effects to occur due to changes in access to heritage assets.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Temporary impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets Historic Landscapes	**Scoped in**	The Project has the potential to result in significant effects on designated and non-designated heritage assets.
Physical Impacts to heritage assets or impacts to heritage assets as a result of changes to their setting.	Designated heritage assets Non-designated heritage assets Historic Landscapes	Scoped out	Maintenance visits required for the Project would not constitute an impact of sufficient magnitude to cause significant effects to either designated or non-designated heritage assets.

Table 20.5: Proposed scope of the Water Environment assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Pollution from silt, hydrocarbons and other construction materials. Increase rates and volumes of rainfall runoff reduced channel flow capacity due to siltation and disruption to the land drainage regime.	Main rivers, ordinary watercourses, Internal Drainage Board (IDB) maintained watercourses, surface water abstractions, standing water bodies.	**Scoped in**	Although measures outlined in Section 10.6 of **Chapter 10 Water Environment** would act to manage work site runoff to ensure watercourses are not polluted, nor their flow capacities reduced. The scale of the proposed works (especially at substation sites) means that the potential for a significant effect cannot be ruled out at this stage.
Physical disturbance and change to flow regime.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Scoped in**	The Project will cross numerous watercourses, with potential for temporary physical disturbance and impacts on flow regimes.
Increased flood risk to people, existing property and infrastructure.	People, existing property, and infrastructure	**Scoped in**	Due to the large swathes of floodplain within the Study Area, temporary works in floodplain cannot be avoided.
Impacts on flood risk and water quality in	Main rivers, ordinary watercourses, IDB maintained watercourses, surface	**Scoped in**	The Project will be surrounded by numerous watercourses which could be impacted by pollution or changes in flows arising from discharges of

Impact	Receptor	Proposed to be scoped in or out	Rationale
receiving watercourses	water abstractions, standing water bodies.		surface runoff or dewatered groundwater from construction areas.
Impact on flood conveyance arising from scaffolding structures on riverbanks.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	Scoped out	Installations will be temporary and managed through regulatory permitting process (Flood Risk Activity Permit (FRAP) will be required for any structures within 8 m -16 m of main rivers). Effects on flood conveyance will be localised.
Impact from any dewatering for substation construction.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Scoped in**	Northern sections of the Project lie in chalk catchments which could be impacted by pollution from nutrients through the groundwater – surface water interface, contaminating groundwater which is a source of baseflow.
Operational and Maintenance Phase			
Increased surface water flood risk.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	Scoped out	Permanent surface areas associated with overhead line infrastructure will be minimal.
Increased pollution risk.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	Scoped out	There are no significant sources of potential pollution associated with overhead line infrastructure once construction is complete.
Increased flood risk.	People, property and infrastructure.	Scoped out	The minimal footprint of the pylons would not cause significant floodplain

Impact	Receptor	Proposed to be scoped in or out	Rationale
			storage losses or disruption to floodplain flow paths.
Increased flood risk from rivers.	People, property and infrastructure.	**Scoped in**	The footprint of operational above ground substation infrastructure has the potential to cause significant floodplain storage losses or disruption to floodplain flow paths for those sites which must be in floodplain areas due to a lack of alternatives (Weston Marsh and Walpole B Substation).
Increased surface water pollution.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Scoped in**	Operational works have the potential to increase pollution. Drainage strategies will be required.
Increased surface water flood risk.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	**Scoped in**	The extent of new impermeable areas has the potential to increase runoff. Drainage strategies and flood mitigation will be required.
Pollution of watercourses and physical disturbance.	Main rivers, ordinary watercourses, IDB maintained watercourses, surface water abstractions, standing water bodies.	Scoped out	The nature and scale of the maintenance activities would not cause pollution of the water environment and any physical disturbance would be highly localised.

Table 20.6: Proposed scope of the Geology and Hydrogeology assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Harm to human health through exposure to contamination, including dust and vapours	Adjacent land users, construction workers	**Scoped in**	Initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted.
Deterioration in chemical quality of the land and aquifers	Groundwater aquifers Groundwater abstractions	**Scoped in**	Initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted.
Physical effects on aquifers, such as depletion of the aquifer and increased solids / turbidity	Groundwater aquifers Groundwater abstractions	**Scoped in**	Due to the nature of the Project and the potential for shallow groundwater, there is likely to be some level of dewatering required, so the effect is scoped in for further consideration/assessment.
Physical and chemical effects on groundwater as a result of the discharge of groundwater arising from dewatering or surface water control	Groundwater aquifers Groundwater abstractions	**Scoped in**	Some level of dewatering activities is likely to be required, generating water that will require either discharge or disposal.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Deterioration in chemical quality of the land and aquifers	Soil / land quality Groundwater aquifers Groundwater abstractions	**Scoped in**	Some level of risk of inadvertent release of contamination is inherent in the construction activities associated with the Project. However, environmental controls should be such that any accidental leaks / spills are minimised as far as reasonably possible.
Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures	Adjacent land users, construction workers Structures	**Scoped in**	Potential for localised areas of gas generating soils cannot be discounted, so the effect should be given consideration on a precautionary basis.
Unstable ground and damage to buildings or property	Adjacent land users, construction workers Structures	**Scoped in**	Potential for localised areas of unstable ground / local steep slopes cannot be discounted, so the effect should be given consideration on a precautionary basis.
Deterioration in chemical quality of the land and aquifers	Soil/land quality (only aspects related to land contamination; other effects for these receptors fall under **Chapter 12 Agriculture and Soils**) Groundwater within aquifers – the Study Area contains several different aquifers along its length of differing sensitivities, including Principal Aquifers and groundwater Source Protection Zones.	**Scoped in**	Initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted. There is also a risk that construction activities could introduce contamination.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Damage to a designated geological conservation site	Geological conservation sites	Scoped out [2]	At present no such sites have been identified within the Study Area.
Harm to human health and structures through ground instability effects from historical coal mining	Adjacent land users, construction workers	Scoped out	The Study Area is not located within a recorded Coal Mining Reporting Area, so there are no potential effects associated with this to assess.
Operational and Maintenance Phase			
Harm to human health through exposure to contamination, including dust and vapours	Future land users, adjacent land users	Scoped out	It is considered that best practice measures included in the Initial Outline Code of Construction Practice (CoCP) (**Appendix 4A Initial Outline CoCP**) (e.g. GH03 and GH06) would prevent any significant effect during this Project.
Deterioration in chemical quality of the land and aquifers			

[2] Note that this is provisional and is subject to confirmation of the absence of locally designated sites in the Study Area, which will be carried out as part of further baseline characterisation to support the Environmental Impact Assessment (EIA). Therefore, the proposed assessment methodology in Section 11.7 of Chapter 11 Geology and hydrogeology includes a methodology for how effects on geological conservation receptor effects would be assessed, should it be necessary to scope this effect back into the assessment following further baseline characterisation.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Changes to infiltration and corresponding effects on groundwater levels as a result of the presence of new structures and surfaces	Groundwater aquifers	**Scoped in**	In particularly in relation to substations due to the relatively larger area of impermeable surfacing and presence of engineered drainage. Effects on flows and levels from other aspects of the Project, such as pylon foundations and permanent accesses, are not expected to be significant, but this should be verified through assessment.
Physical effects on aquifers, such as depletion of the aquifer and increased solids / turbidity	Groundwater aquifers Groundwater abstractions	Scoped out	There are not expected to be any excavations required as part of the operational phase of the Project.
Structural damage caused by aggressive ground conditions.	Proposed structures	Scoped out	This is considered to be a matter of engineering design (i.e. addressed as an 'embedded engineering measure' as previously described) and is not to be considered further within the EIA process. This effect is effectively designed out as part of standard engineering design procedures.
Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures	Workers (i.e. manual access to carry out operational activities). Structures	**Scoped in**	The potential for localised gas generating ground in proximity of proposed substations cannot be discounted at present.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Harm to human health through exposure to contamination, including dust and vapours	Maintenance workers, future land users, adjacent land users	**Scoped in**	Initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted.
Deterioration in chemical quality of the land and aquifers	Soil / land quality Groundwater aquifers Groundwater abstractions	**Scoped in**	Initial consideration of the Study Area indicates a generally low risk of potential contamination, but isolated areas of existing contamination cannot be discounted.
Explosion or asphyxiation as a result of ingress and accumulation of ground gas within structures	Maintenance workers, future land users Structures	**Scoped in**	The potential for localised as generating ground in proximity of proposed substations cannot be discounted at present.
Deterioration in chemical quality of the land and aquifers through disturbance of ground that is affected by pre-existing contamination for maintenance purposes	Soil / land quality Groundwater aquifers Groundwater abstractions	Scoped out	It has been assumed that this will not result in a significant effect given the nature of the Project and in consideration of best practice measures (GH03 and GH06 in **Appendix 4A Initial Outline CoCP**).

Table 20.7: Proposed scope of the Agriculture and Soils assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction phase			
Temporary and permanent loss of agricultural land (including Best and Most Versatile (BMV) land) during construction.	Agricultural land quality (as defined by the Agricultural Land Classification (ALC) system)	**Scoped in**	During the construction phase. A very large proportion of land within the Scoping Boundary is predicted to be BMV land and thus the Project could result in an unavoidable temporary or permanent loss of agricultural land which is likely to include BMV land. ALC surveys are to be undertaken in areas where soils will be disturbed and BMV land is predicted. The assessment will inform good practice soil handling measures that will be detailed in the Soil Management Plan.
Impacts upon soil ecosystem services during construction.	Soil function	**Scoped in**	The Project would potentially result in soil quality being adversely affected during construction. Due to the presence of clayey soils and possibly humic/peaty soils, a significant effect on soils cannot be ruled out and although good practice soil handling measures would be implemented through a Soil Management Plan during construction, the range of soil functions and quality may be comprised to some extent compared to those present prior to construction.

Temporary acquisition and permanent loss of agricultural land holdings during construction.	Agricultural land holdings	**Scoped in**	A very large proportion of the land within the Scoping Boundary is predicted to be BMV land, the impact on which would have an adversely significant impact on agricultural productivity and thus agricultural land holdings. The temporary acquisition of land to accommodate construction activities will result in temporary disruption and severance to agricultural land holdings and the permanent loss of some land from agricultural land holdings resulting in reduction in the operational capacity and loss of income to farm businesses (which would be addressed through compensation agreements, which lie out with the scope of the ES).
Operational and Maintenance Phase			
Permanent loss of agricultural land (including BMV land) during operation and maintenance.	Agricultural land quality (as defined by the ALC system)	Scoped out	Periodic vehicle access for routine maintenance and emergency repairs may require temporary access tracks and small compound areas but these are likely to be limited in extent and all soil handling would be undertaken in line with published good practice; therefore, no likely significant effects are expected.
Impacts upon soil ecosystem services	Soil function	Scoped out	During the operation and maintenance phases. Maintenance activities may impact soil function and quality, but at a much smaller

during operation and maintenance.			scale than construction. Any disturbance to soils during maintenance would also be undertaken in accordance with good practice soil handling methods, therefore no likely significant effects are expected.
Temporary acquisition and permanent loss of agricultural land holdings during operation/maintenance.	Agricultural land holdings	Scoped out	Disturbance to farm businesses should be resolved by design to avoid any operational disruption; therefore, no likely significant effects are expected and can be scoped out. Periodic vehicle access for routine maintenance and emergency repairs may require temporary access tracks and small compound areas but these are likely to be limited in extent and access arrangements will be designed to limit disturbance to landowners; therefore, no likely significant effects are expected.

Table 20.8: Proposed scope of the Traffic and Movement assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Increased traffic or Heavy Goods Vehicle (HGV) volumes and congestion due to construction traffic and increased journey times/distance due to road closures/diversions	Road users	**Scoped in**	Whilst short-term and temporary in nature, it is considered that there is still potential for significant effects on road users as a result of construction traffic and road closures/diversions leading to potential Severance, Driver Delay and Highway Safety effects.
Increased congestion and increased journey times/distance due to road closures/diversions for abnormal load access	Road Users	Scoped out	Abnormal loads would be planned for off peak times when the road network is less busy. Therefore, there is expected to be infrequent and limited impacts on road users and therefore not expected to be a significant effect on road users. In-principle routes will be agreed with the local highway authorities and transport of abnormal loads will be subject to the usual permitting/notification process.
Increased traffic volumes and congestion due to construction traffic and increased journey times/distance due to	Public transport users (bus)	**Scoped in**	Whilst short-term and temporary in nature, it is considered that there is still potential for significant effects on public transport users as a result of construction traffic and road

Impact	Receptor	Proposed to be scoped in or out	Rationale
road closures/diversions.			closures/diversions leading to potential Public Transport Delays.
Increased traffic volumes due to construction traffic, increased journey times/distance due to PRoW closures/diversions and construction works in general.	Pedestrians and cyclists	**Scoped in**	Whilst short-term and temporary in nature, it is considered that there is still potential for significant effects on pedestrians and cyclists as a result of construction traffic leading to Traffic Severance and Pedestrian/Cycle Delay, PRoW closures/diversions leading to Severance and/or Increased Journey Time, and general construction works leading to a decline in Pedestrian and Cycle Amenity and additional Fear and Intimidation.
Increased number of vehicles transporting hazardous loads as a result of construction.	General public	Scoped out	It is considered that there is a low potential for significant effects on the general public as a result of a road traffic accident leading to a Hazardous Load spill.
Closure of the railway line to enable construction of the OHL	Railway users	Scoped out	Methods will be employed when installing OHL to avoid any potential impacts on the railway. This may include overnight blockades/temporary closures to install protection/temporary works.
Closure of waterways to enable construction of the OHL	Waterway users	Scoped out	Where waterways are to be crossed by construction traffic, measures to be applied include the use of

Impact	Receptor	Proposed to be scoped in or out	Rationale
			temporary culverts or temporary spanned bridges. Once the temporary culvert is installed, the area above the temporary culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials, and people. Specific detailed designs for each watercourse crossing, consistent with the design principles set out in the CoCP will be subject to appropriate consent by the relevant drainage authority.
Operational and Maintenance Phase			
Increased traffic volumes and congestion due to operational staff trips.	Road users	Scoped out	The number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Driver Delay and Highway Safety as a result of travelling to the site.
Increased traffic volumes and congestion due to operational staff trips	Public transport users (bus)	Scoped out	The number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Public Transport Delay as a result of travelling to the site.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Increased traffic volumes due to operational staff trips.	Pedestrians and cyclists	Scoped out	The number of operational staff and maintenance trips would be low and there is not therefore expected to be significant effects on Traffic Severance and Pedestrian Delay as a result of travelling to the site.
Increased journey times/distance due to permanent PRoW closures/diversions associated with the substations	Pedestrians and cyclists	**Scoped in**	There is potential for significant effects on pedestrians and cyclists as a result of permanent PRoW closures/diversions leading to potential Increased Journey Time, and a decline in Pedestrian and Cycle Amenity.
Vehicle crossing points (if required)	Railway users	Scoped out	The number of vehicle maintenance trips crossing the railway would be low (if any) and there is not expected to be significant effects on rail passenger delay as a result. Any vehicle crossing points of the railway would be managed to ensure operational rail safety.

Table 20.9: Proposed scope of the Air Quality assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Increased levels of dust deposition which can cause ecological and health impacts from elevated particulate matter concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary (as per IAQM guidance (Ref 20.1)).	**Scoped in**	There is potential for significant effects if no mitigation was implemented on site.
Increase in local air pollutant concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	Scoped out	It is predicted that there will be no significant impact due to the short-term nature and best practice followed within the CoCP and Non-Road Mobile Machinery standards.
Increase in local air pollutant concentrations and nitrogen deposition rates.	Sensitive ecological and human receptors within 200 m of roads (as per IAQM guidance (Ref 20.1)) that may be affected by the Project.	**Scoped in**	There is a potential for a significant effect if traffic flows are above the Institute of Air Quality Management (IAQM) criteria.
Operational and Maintenance Phase			
Increased levels of dust deposition which can cause ecological and health impacts from elevated particulate matter concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	Scoped out	Due to infrequent, temporary, and transient nature and incorporation of best practice measures.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Increase in local air pollutant concentrations and nitrogen deposition rates.	Sensitive ecological and human receptors within 200 m of roads that may be affected by the Project.	Scoped out	It is predicted that the vehicle trips will not exceed the IAQM criteria. However, full screening of the traffic flows will occur to confirm whether there is a significant effect.
Increase in local air pollutant concentrations.	Sensitive ecological and human receptors within 250 m of the construction boundary.	Scoped out	It is predicted that there will be no significant impact due to the short-term nature and best practice followed within the CoCP and Non-Road Mobile Machinery standards.

Table 20.10: Proposed scope of the Noise and Vibration assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Noise impact from construction activities.	Noise Sensitive Receptors (NSRs) within the Study Area	**Scoped in**	There is the potential for effects due to construction noise within the Study Area. There is a greater likelihood of significant adverse effects from construction noise at static sites, such as construction compounds where the duration of works may be medium to long term. Construction noise hotspots are likely to include in areas where piling may be required and at any trenchless crossing locations where night-time working may be required where certain operations cannot be stopped once started.
Vibration impact from construction activities.	Structures within the Study Area	**Scoped in**	Construction vibration would not be expected to cause damage to buildings or structures unless very high levels of vibration are generated within approximately 10 m. In practice, measures would be put in place to avoid potential damage to structures. However, this would be reviewed during the iterative design process and potential areas of concern would be highlighted.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Vibration impact from construction activities.	Humans within NSRs in the Study Area	**Scoped in**	There is the potential for effects on human receptors (i.e. nuisance) due to construction vibration at NSRs within the Study Area.
Noise impact at NSRs	NSRs within the Study Area	**Scoped in**	There is the potential for significant effects at NSRs close to construction traffic routes.
Vibration impact at NSRs	NSRs within the Study Area	Scoped out	Vibration from traffic on the public highway is caused by irregularities in the road surface. Where the road surface is well maintained, as outlined in TT01 within **Appendix 4A Initial Outline Code of Construction Practice** , and free from irregularities, such as potholes, significant vibration effects would not be expected, even at relatively short distances.
Operational and Maintenance Phase			
Noise impact from overhead lines	NSRs within the Study Area	Scoped out	Operational noise from the overhead lines is not likely to be significant at nearby NSRs under any weather conditions owing to the proposed 'triple Araucaria' conductor bundle (see Section 15.5 of **Chapter 15 Noise and Vibration**) and is therefore proposed to be scoped out of further noise assessment. Should the iterative design process result in

Impact	Receptor	Proposed to be scoped in or out	Rationale
			alternative conductor types being used, consideration for this would be assessed within the noise and vibration assessment. Technical information would be submitted as part of the application for development consent to support scoping out noise associated with overhead lines from the noise and vibration assessment.
Noise from substation reactive plant (e.g., transformers) and associated cooling plant	NSRs within the Study Area	**Scoped in**	There is the potential for significant effects at NSRs close to substations where they contain reactive plant, such as transformers, and their associated cooling plant. Transformer noise is almost constant, with a hum occurring at exact harmonics of the supply frequency; 100 Hz and 200 Hz components are usually dominant. Transformers generally run continuously except for occasional maintenance and fault outages. Transformer coolers typically emit a broadband noise; however, their operation depends on temperature and loading.
Noise from substation switchgear and auxiliary plant	NSRs within the Study Area	Scoped out	Switchgear noise is generated, in the main, by the operation of circuit breakers, for which the noise

Impact	Receptor	Proposed to be scoped in or out	Rationale
			emissions are ‘impulsive’ in character (i.e., of short duration). Switchgear operations would be very infrequent. Modern switchgear operates with a dull ‘thud’. Switchgear would operate infrequently and is therefore proposed to be scoped out. Auxiliary plant may comprise standby diesel generators and air compressors to provide emergency back-up power to cooling plant. When present and operating, these may contribute to the broadband noise climate. They do not run continuously, and in any case, would be housed in a building or outdoor acoustic enclosure. Noise from such assets is therefore not considered significant, given its emergency function and as such is proposed to be scoped out.
Vibration impact at NSRs	NSRs within the Study Area	Scoped out	There are no sources of operational vibration proposed as part of the Project and substation plant would include vibration isolation measures within the design (see Section 15.5 of **Chapter 15 Noise and Vibration**).

Impact	Receptor	Proposed to be scoped in or out	Rationale
Noise or vibration impact from maintenance activities	NSRs within the Study Area	Scoped out	Maintenance of the overhead lines, and substations would be infrequent and localised and short term in duration. Maintenance activities would follow standard measures to reduce noise and vibration where required.

Table 20.11: Proposed scope of the Socioeconomics, Recreation and Tourism assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Potential employment and training benefits within the local labour market, including supply chain opportunities, as well as opportunities for training and skills development.	The local labour market	**Scoped in**	The Project will generate beneficial direct and indirect temporary employment, training and apprenticeship opportunities both on site and indirectly in the supply chain during the construction phase, which could be significant.
Potential disruption to local users of promoted recreational routes and PRoW of significance in the local area.	Users of recreational routes within 500 m of the Scoping Boundary.	**Scoped in**	Disruption to promoted recreational routes and PRoW of significance in the local area during the construction phase will be avoided as far as possible and considered with a PRoW Management Plan. However, there is the potential for significant effects during construction due to the possible need for temporary or permanent suitable diversions to be agreed with relevant bodies, and so this has been scoped in for further consideration at this stage.
Potential temporary or permanent loss of development land.	Development land, utilities and renewables infrastructure	**Scoped in**	The Project has been designed to avoid development land, utilities and renewables infrastructure as far as possible, however there may be the potential for land take which could result in the potential for significant effects and so this has been scoped

Impact	Receptor	Proposed to be scoped in or out	Rationale
			in for further consideration at this stage.
Potential temporary or permanent loss of open space.	Open space	**Scoped in**	The Project has been designed to avoid open space as far as possible, however there may be the potential for land take which could result in the potential for significant effects and so this has been scoped in for further consideration at this stage.
Potential disruption (indirect effects) during construction based activities	Affected communities, community facilities, visitor attractions and businesses	**Scoped in**	The Project has been designed to avoid direct effects on these receptors as far as possible. However, there is the potential for indirect temporary effects to arise from construction activities that may give rise to significant effects, so this has been scoped in for further consideration at this stage.
Potential temporary or permanent loss of or impact on receptors (direct effects).	Affected communities, community facilities, visitor attractions and businesses	Scoped out	The Project has been designed to avoid direct effects on these receptors as far as possible. Should this position change between Scoping and Preliminary Environmental Information Report or Environmental Statement stage, and any communities, community facilities, visitor attractions and businesses be likely to be directly impacted, those would be included in the assessment as appropriate.

Impact	Receptor	Proposed to be scoped in or out	Rationale
Potential temporary or permanent loss of residential property (direct or indirect effects).	Residential properties	Scoped out	The emerging preferred corridor for the Project and substation siting areas avoid acquisition or over-sail of residential properties. Indirect effects such as access and noise will be managed through the CTMP and CEMP, and appropriate management will reduce the potential for significant effects.
Potential for impacts on the availability of tourism accommodation due to use by the construction workforce (indirect effects).	Tourism accommodation	**Scoped in**	Impact of the construction workforce on bedspace availability is scoped in due to the potential scale of employment generated during the construction phase and the cumulative impact of National Grid projects in the region.
Operational and Maintenance Phase			
Potential employment and training benefits across the supply chain.	The local labour market	Scoped out	The scale of operational employment generated is likely to be very limited, and this has therefore been scoped out of further consideration.
Potential disruption to local users from temporary closure or diversions of promoted recreational routes.	Users of recreational routes within 500 m of the Scoping Boundary.	Scoped out	Any temporary or permanent effects on promoted recreational routes and PRoW of significance in the local area would arise during the construction period and would therefore be assessed as construction effects. No significant effects on promoted recreational

Impact	Receptor	Proposed to be scoped in or out	Rationale
			routes and PRoW of significance in the local area are anticipated during operation. Disruption to promoted recreational routes and PRoW of significance in the local area during maintenance will be avoided as far as possible, managed with a PRoW Management Plan, and it is not considered that there is the potential for significant effects.
Potential temporary or permanent loss of development land.	Development land, utilities and renewables infrastructure	Scoped out	Any temporary or permanent effects on development land, utilities and renewables infrastructure would arise during the construction period and would therefore be assessed as construction effects. No significant effects on development land are anticipated during operation. Disruption to development land during maintenance will be avoided as far as possible and it is not considered that there is the potential for significant effects.
Potential temporary or permanent loss of open space.	Open space	Scoped out	Any temporary or permanent effects on open space would arise during the construction period and would therefore be assessed as construction effects. No significant effects on open space are anticipated during operation. Disruption to open space during

Impact	Receptor	Proposed to be scoped in or out	Rationale
			maintenance will be avoided as far as possible and it is not considered that there is the potential for significant effects.
Potential temporary or permanent loss of or impact on receptors (direct effects).	Affected communities, community facilities, visitor attractions and businesses	Scoped out	The Project has been designed to avoid direct effects on these receptors as far as possible. Should this position change between Scoping and Preliminary Environmental Information Report or Environmental Statement stage, and any communities, community facilities, visitor attractions and businesses be likely to be directly impacted, those would be included in the assessment as appropriate.
Potential temporary or permanent loss of access and impact on amenity (indirect effects).	Affected communities, community facilities, visitor attractions and businesses	Scoped out	Access to these receptors will be reinstated post construction and their ongoing use will be unaffected during operation and maintenance activities.

Table 20.12: Proposed scope of the Health and Wellbeing assessment

Impact	Receptor	Proposed to be scoped in or out	Rationale
Construction Phase			
Increased employment for the construction workforce, leading to improved health outcomes.	Local residents and workers	**Scoped in**	Increased employment opportunities for the construction workforce.
Potential temporary changes in neighbourhood quality leading to worsened health outcomes.	Local residents within 500 m of Scoping Boundary	**Scoped in**	Potential for health related effects based on how people feel about their local environment, determined through the topic specific assessment, but expected to include air quality, noise and vibration, visual amenity and traffic and transport effects.
Impact on local residents' access to promoted recreational routes within 500 m of the Scoping Boundary affecting health outcomes.	Local residents and users of promoted routes within 500 m of Scoping Boundary	**Scoped in**	Disruption to promoted recreational routes affecting opportunities to engage in physical exercise.
Potential temporary and permanent changes in access to open space within 500 m of the Scoping Boundary	Local residents and users of open spaces within 500 m of Scoping Boundary	**Scoped in**	Disruption to open space affecting opportunities to engage in physical exercise

Impact	Receptor	Proposed to be scoped in or out	Rationale
affecting health outcomes.			
Potential temporary and permanent changes in access to healthcare and social infrastructure within 500 m of the Scoping Boundary potentially leading to worsened health outcomes.	Local residents within 500 m of Scoping Boundary	**Scoped in**	Disruption to routes offering access to community services and social infrastructure.
Operational and Maintenance Phase			
Increased employment for the operational workforce, leading to improved health outcomes.	Local residents and workers	Scoped out	The scale of operational employment generated is likely to be very limited, and this has therefore been scoped out of further consideration.
Potential permanent changes in neighbourhood quality leading to potentially worsened health outcomes.	Local residents within 500 m of Scoping Boundary	**Scoped in**	Potential for health related effects, based on how people feel about their local environment, determined through the topic specific assessment, but expected to include noise and vibration and visual amenity effects.
Potential permanent impacts on local residents and workers	Local residents within 500 m of Scoping Boundary	Scoped out	The Project will be designed to comply with existing National Grid standards and the guidelines and policies detailed in NPS-EN5

Impact	Receptor	Proposed to be scoped in or out	Rationale
associated with the generation of EMFs.			including the International Commission on Non-Ionizing Radiation Protection guidelines for electric and magnetic fields (EMFs) and associated precautionary policy. An EMF report will be prepared as part of the Project. This is separate to the EIA process.
Potential temporary changes in neighbourhood quality leading to worsened health outcomes.	Local residents within 500 m of Scoping Boundary	Scoped out	Due to the scale of maintenance activities, there is little potential for health-related effects.
Impact on local residents' access to promoted recreational routes adjacent to Project infrastructure, potentially leading to worsened health outcomes.	Local residents and users of promoted routes adjacent to Project infrastructure	Scoped out	Disruption is not expected to promoted recreational routes affecting opportunities to engage in physical exercise.

Table 20.13: Proposed scope of the Climate Change assessment

Project Phase and PAS 2080 module	Module description/Pathway	Proposed to be scoped in or out	Rationale
Construction Phase			
A1-3	Raw material supply, transport and manufacture The product stage captures the Greenhouse Gas (GHG) emissions attributable to cradle to gate processes: raw material extraction and supply, transport, and manufacturing. The GHG emissions resulting from these processes are often referred to as embodied carbon.	**Scoped in**	A1-A3 emissions (i.e. from raw material extraction, product processing, and final product manufacture, its energy use, and waste management within these processes, transportation within the supply chain, and manufacture) will be quantified to understand the emissions associated with the construction of the Project, for example, the use of steel or concrete in pylon design.
A4 -A5	Transport to works site and construction/installation processes This construction stage captures the GHG emissions associated with the transportation of the materials and components from the factory gate to the Project site. As well, all the GHG emissions associated from any on-site construction-related activities must be considered	**Scoped in**	A4 and A5 emissions will be quantified to understand the emissions associated with the transportation of materials required for the construction of the Project and construction activities undertaken.
D - Supplementary information beyond the infrastructure lifecycle	Boundary of benefits and loads beyond the infrastructure life cycle Land use change	**Scoped in**	A qualitative assessment will be provided to understand the potential

Project Phase and PAS 2080 module	Module description/Pathway	Proposed to be scoped in or out	Rationale
			impact of removal of any vegetation due to construction of the Project.
Operation and Maintenance Phase			
B1	This use stage captures carbon emitted directly from the fabric of products and materials once they have been installed as part of the Project and it is in normal use. This includes GHG emissions from the use of sulphur hexafluoride (SF6) in switch gear equipment installed as part of the Project.	**Scoped in**	The use of SF6 within switchgear equipment is a potential source of GHG emissions during operation of the Project. It is anticipated that associated GHG emissions will be estimated as part of the GHG assessment.
B2	Maintenance of the built asset components and systems over the Project design life.	Scoped out	The Project is not designed with the expectation of any significant plant maintenance and repair activities, or refurbishment being required, and therefore emissions due to these activities are expected to be minimal
B3 and B4	Repair and Replacement B3 and B4 captures the GHG emissions associated with repair and replacement of the built asset components and systems over the Project design life.	**Scoped in**	B3 and B4 emissions will be quantified using the same method as the construction works and supply chain carbon emissions. At this stage it is assumed this will cover the new overhead line and five proposed substations.

Project Phase and PAS 2080 module	Module description/Pathway	Proposed to be scoped in or out	Rationale
			The following list provides a summary of key asset components and replacement requirements. See **Chapter 4 Description of the Project** for further information: • Overhead Lines: 40 years for overhead line circuits and 20-40 years for insulators • Pylons: 80 years, although there are options available for re-use at the end of the design life, including use of pylons for new replacement conductors. • Substations: 40 years
B5	Refurbishment	Scoped out	It is unusual for elements of National Grid's transmission system to be decommissioned and the site reinstated. In general, assets will be replaced towards the end of an assets design life (which will vary depending on the asset and the asset condition throughout its operational life). See **Chapter 4 Description of the Project** for further information.

Project Phase and PAS 2080 module	Module description/Pathway	Proposed to be scoped in or out	Rationale
B6- B7	Operational energy use and operational water use. This use stage captures the GHG emissions associated with regulated energy consumption including heating, cooling, ventilation, domestic hot water, lighting, and auxiliary systems as projected over the life cycle of the Project.	Scoped out	Minimal operational energy use or water use expected and therefore emissions will not be material to the assessment conclusions. This follows the approach stated in Institute of Environmental Management and Assessment (IEMA) guidance (Ref 20.2) states that "*Where expected emissions are less than 1% of total emissions, and where all such exclusions total a maximum of 5% of total emissions; all exclusions should be clearly stated'.*
B8	Other operational processes. This use stage captures the GHG emissions associated with other operational processes. For this Project, it captures indirect emissions associated with transmission and distribution (T&D).	**Scoped in**	When electrical currents travel on a network, some energy is dissipated in the form of heat, and is "lost" due to the electrical resistance in the network. This energy is known as network losses. A portion of the electricity purchased from the power generators will be consumed during its transmission and distribution to end-customers. A qualitative assessment of emissions from network losses will be included. It is not considered feasible to quantify these losses and the nature of the Project is such that

Project Phase and PAS 2080 module	Module description/Pathway	Proposed to be scoped in or out	Rationale
			it largely transmits rather than uses energy.
B9	Users utilisation of infrastructure. This use stage captures the activities associated with user's utilisation of the infrastructure.	Scoped out	The Project is not expected to have any direct and quantifiable impact on GHG emissions from electricity use that is distinct from wider national trends on grid decarbonisation.
C1- C4	Deconstruction, Transport, Waste processing for recovery and disposal	Scoped out	End of life (C1-C4) impacts will not be considered due to the long design life of the Project. It is unusual for elements of National Grid's transmission system to be decommissioned and the site reinstated. Note that parts of the existing Grimsby West Substation are planned to be decommissioned as part of the construction of the Project, and emissions associated with this will be considered at the construction phase.
D	Benefits and loads beyond the system boundary: Exported utilities (i.e. electric energy)	**Scoped in**	Reduction in GHG emissions from non-renewable energy generation sources once the proposed renewable energy generation can connect to the reinforced network. A qualitative assessment will be provided as there is no practical mechanism to quantify the carbon impact without carrying out a time-

Project Phase and PAS 2080 module	Module description/Pathway	Proposed to be scoped in or out	Rationale
			based analysis of relative grid carbon emissions factors over the operational life of the Project, seeking to identify over what period electricity will be supplied to UK at grid intensities above/below the grid average.
D	Benefits and loads beyond the system boundary: Ongoing land use emissions and sequestration.	**Scoped in**	A qualitative assessment will be provided to understand the potential impact of landscaping and habitat creation proposed as part of the design (which has the potential to change GHG sequestration).

Table 20.14: Proposed scope of the Major Accidents and Disasters assessment

Receptor	Proposed to be scoped in or out	Rationale
All Project Phases		
The Project	Scoped out	No potential vulnerability of the Project to a major accident or disaster as set out in **Appendix 19A Major Accidents and Disasters Scoping Table**.
Receptors listed in **Table 19.2** in **Chapter 19 Major Accidents and Disasters**	Scoped out	No potential for the Project to exacerbate existing hazard as set out in **Appendix 19A Major Accidents and Disasters Scoping Table.**

20.2 References

Ref 20.1 Institute of Air Quality Management (2024). Guidance on the Assessment of Dust from Demolition and Construction. [online] Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf [Accessed May 2024].

Ref 20.2 Institute of Environmental Management and Assessment (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance, London: IEMA [online]. Available at: https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance [Accessed: 21 May 2024].

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