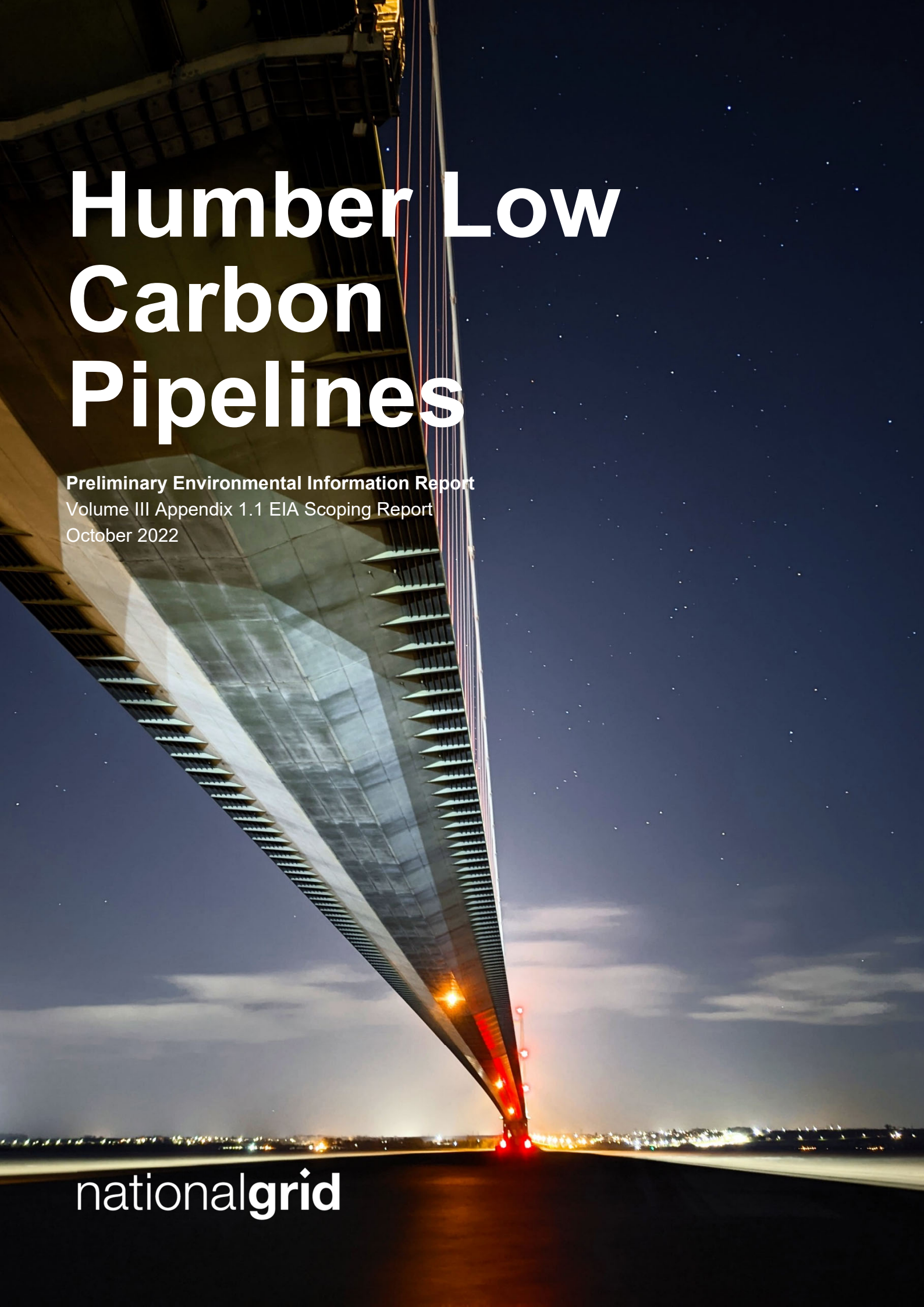


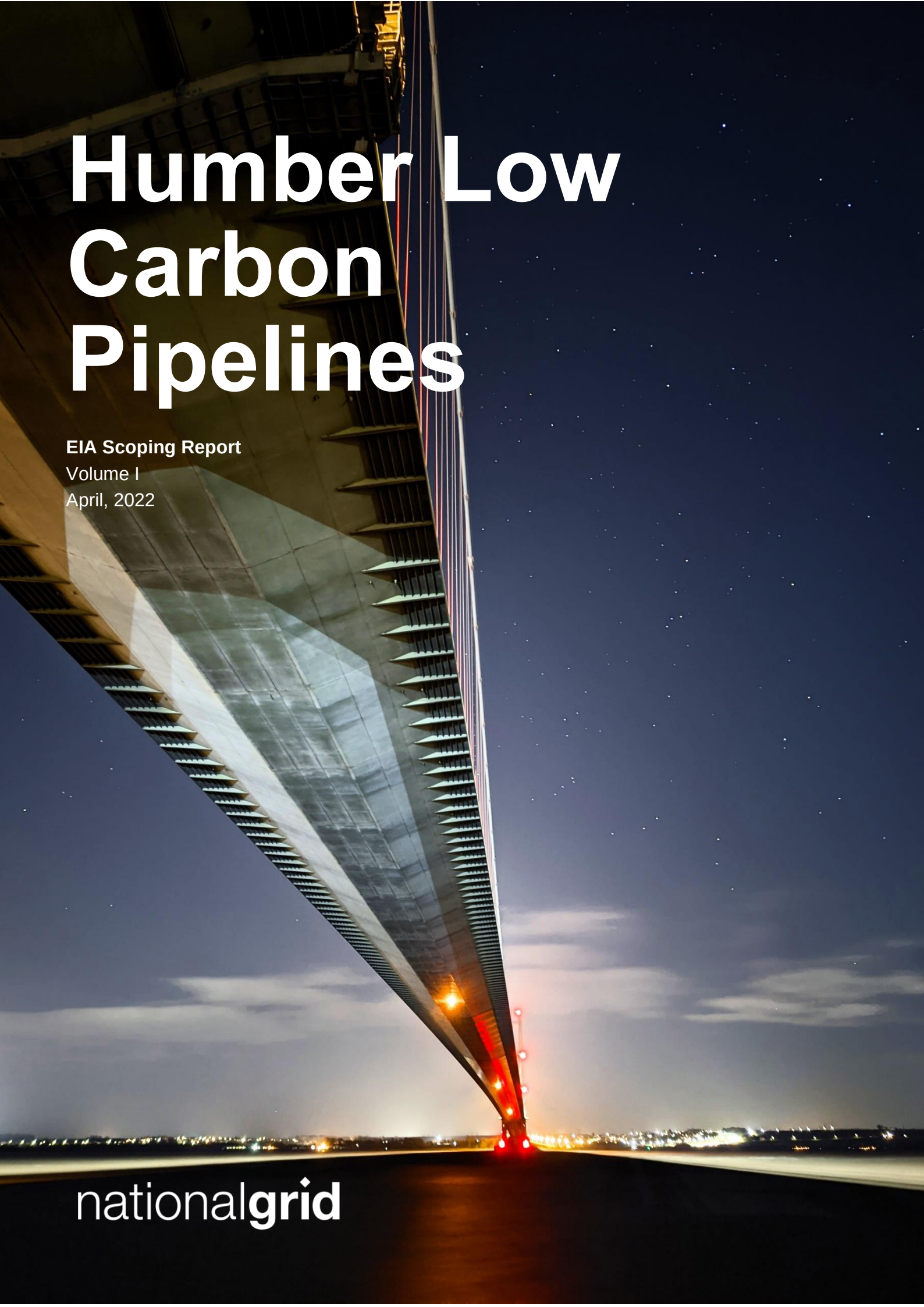
Humber Low Carbon Pipelines

Preliminary Environmental Information Report

Volume III Appendix 1.1 EIA Scoping Report

October 2022

nationalgrid



Humber Low Carbon Pipelines

EIA Scoping Report

Volume I

April, 2022

nationalgrid

Contents

Humber Low Carbon Pipelines
Document control

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Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic
AGI	Above Ground Infrastructure
AIL	Abnormal Indivisible Loads
ALARP	As Low As Reasonably Possible
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ASR	Annual Status Report
ATC	Automatic Traffic Count
BECCS	Bioenergy with Carbon Capture and Storage
BEIS	Department for Business, Energy and Industrial Storage
BEMP	Biodiversity Enhancement and Management Plan
BGS	British Geological Survey
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
BRES	Business Register and Employment Survey
BS	British Standards
BSI	British Standards Institute
CBRN	Chemical, Biological, Radiological or Nuclear
CCGT	Combined Cycle Gas Turbine
CCUS	Carbon Capture, Utilisation and Storage
CDIOF	Chemical and Downstream Oil Industries Forum
CEMP	Construction Environmental Management Plan

CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CITiZAN	Coastal and Intertidal Zone Archaeological Network
CL:AIRE	Contaminated Land Applications in Real Environments
CNI	Critical National Infrastructure
CoCP	Code of Construction Practice
COMAH	Control of Major Accident Hazards
CP	Cathodic Protection
CPNI	Centre for the Protection of National Infrastructure
CPRS	Corridor and Preliminary Routing and Siting
CRTN	Calculation of Road Traffic Noise
CSCS	Construction Skills Certification Scheme
CTMP	Construction Traffic Management Plans
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DEMP	Decommissioning Environmental Management Plan
DLL	District Level Licensing
DMRB	Design Manual for Road and Bridges
DoW:CoP	Definition of Waste: Code of Practice
EA	Environmental Agency
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
EEA	European Economic Area
EIA	Environmental Impact Assessment
EMODnet	European Marine Observation and Data Network
EN-4	National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines
EPUK	Environmental Protection UK
ERYC	East Riding of York Council

ES	Environmental Statement
FCA	Flood Consequence Assessment
FEED	Front End Engineering and Design
FRA	Flood Risk Assessment
GCN	Great Crested Newt
GIS	Geographical Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment 3
GW	Groundwater
HAZID	Hazard Identification
HCA	Homes and Communities Agency
HDD	Horizontal Directional Drilling
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HLCP	Humber Low Carbon Pipeline
HRA	Habitats Regulations Assessment
HSE	Health and Safety Executive
HSWA	Health & Safety at Work Act
HUDU	Healthy Urban Development Unit
IACPC	Impact Assessment and Conservation Payment Certificate
IAQM	Institute of Air Quality Management
ICOMOS	International Council on Monuments and Sites
IDB	Internal Drainage Board
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
IGEM	Institution of Gas Engineers and Managers
IHBC	Institute of Historic Building Conservation
IPC	Infrastructure Planning Commitee

JSNA	Joint Strategic Needs Assessment
LCA	Landscape Character Area
LCC	Lincolnshire County Council
LCT	Landscape Character Type
LDV	Light Duty Vehicle
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LSE	Likely Significant Effects
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
M^3	Metres Cubed
MA&D	Major Accident and Disaster
MAGIC	Multi Agency Geographic Information for the Countryside
MAOP	Maximum Allowable Operating Pressure
MCC	Manual Classified Count
MEDIN	Marine Environmental Data Information Network
MLWS	Mean Low Water Springs
Mm^2	Million Metres Squared
Mm^3	Million Metres Cubed
MMO	Marine Management Organisation
MOP	Maximum Operating Pressure
Mt	Million Tonnes
MTPA	Million Tonnes Per Annum
MW	Megawatt
NEP	Northern Endurance Partnership
NERC	Natural Environment and Rural Communi11ties
NGCL	National Grid Carbon Limited
NHS	National Health Service

NLC	North Lincolnshire Council
NMU	Non-Motorised User
NNIS	Non-native invasive species
NNR	National Nature Reserve
NO_2	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NVC	Nitrate Vulnerable Zone
OHMS	Outline Heritage Mitigation Strategy
ONS	Office for National Statistics
OS	Ordnance Survey
PA2008	Planning Act 2008
PAS	Publicly Available Specification
PEA	Preliminary Ecological Assessment
PEIR	Preliminary Environmental Information Report
PIG traps	Pipeline Inspection Gauge
PIN	Planning Inspectorate
PM_{10}	Particulate Matter less than 10 microns in diameter
$PM_{2.5}$	Particulate Matter less than 2.5 microns in diameter
PPG	Planning Practice Guidance
PRoW	Public Right of Way
R2P2	Reducing Risks Protecting People
RAG	Red, Amber or Green
RIGS	Regionally Important Geological Sites
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SDC	Selby District Council

SEA	Strategic Environmental Assessment
SINC	Site of Important Nature Conservation
SNCI	Site of Nature Conservation Importance
SoCG	Statement of Comment Ground
SPA	Special Protection Area
SPA	Swept Path Analysis
SPZ	Source Protection Zone
SRN	Strategic Road Network
SRP	Soil Resources Plan
SSSI	Site of Specific Scientific Interest
SuDs	Sustainable Urban Drainage
SW	Surface Water
SWMP	Site Waste Management Plan
TA	Transport Analysis
TEMPro	Trip End Model Presentation Programme
TPO	Tree Preservation Order
TW	Tidal Water
UAV	Unmanned Aerial Vehicle
UKHO	UK Hydrographic Office
UXO	Unexploded Ordnance
WFD	Water Framework Directive
WLDC	West Lindsey District Council
WW2	World War 2
YHCCS	Yorkshire and Humber Carbon Capture and Storage
ZCH	Zero Carbon Humber
ZoI	Zone of Influence

Glossary

Term	Definition
Above Ground Installation (AGI)	Structures, buildings and other apparatus such as constituent elements of block valves and pumping facility relating to the carbon dioxide or hydrogen pipeline transportation system that are above the ground.
(Major) Accident	An event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment.
Additionality	HM Treasury Green Book and describes a methodology for defining the additional economic benefits arising from an intervention.
Aerial Photograph	A photograph taken using a plane or satellite which can be used to reveal archaeological or other features within a landscape and aid in assessment.
Agricultural Land Classification (ALC)	A framework for determining the physical quality of the land at national, regional and local levels. This is based on the long-term physical limitations of land for agricultural use. There are a number of factors that affect the grade and the main ones are climate, site and soil characteristics, and the interactions between them.
Air Quality Management Area (AQMA)	Air Quality Management Areas (AQMAs) are areas that are likely to exceed the national air quality objective for a specific pollutant. They are determined by Local Authorities.
Air Quality Strategy	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland describes the plans drawn up by the Government and the Developed Administrations to improve and protect ambient air quality in the UK in the medium-term. The Strategy sets objectives for the main air pollutants to protect health. Performance against these objectives is monitored where people regularly spend time and might be exposed to air pollution.
Allocated Minerals Site	A site allocated for minerals development but not yet developed.
Ancient Woodland	Ancient Woodland is defined as an area that has been wooded continuously since at least 1600 AD. Ancient Woodland is divided into ancient semi-natural woodland and plantations on Ancient Woodland sites. Both types are classed as ancient woods.
Applicant	National Grid Carbon Limited (NGCL) is part of National Grid Ventures (NGV), the competitive division of National Grid plc, responsible for both developing and operating a portfolio of low carbon and renewable energy businesses in the UK and US.

Application	The Application for a Development Consent Order (DCO) that is submitted by the Applicant to the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS).
Archaeological Interest	There will be archaeological interest in a Heritage Asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
Archaeological Remains	Artefacts or physical evidence of past human activity which have been recovered or discovered as part of archaeological investigation.
As Low As Reasonably Practice (ALARP)	For a Risk to be ALARP, the cost, time or effort involved in reducing the Risk further would be grossly disproportionate to the benefit gained.
Asset (Heritage)	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).
A-weighted	See ‘Frequency Weighting Networks’.
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level exceeded for 90% of the specified period ‘T’.
Baseline	A reference level of existing Environmental Conditions against which a project is measured and controlled.
Baseline Studies	Work done to determine and describe the Environmental Conditions against which any future changes can be measured or predicted and assessed.
Bedrock Geology	Term used for the main mass of rocks forming the Earth that are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.
Best Practice Measures	Professional procedures that are accepted or prescribed as being correct or most effective to maintain quality.
Biodiversity	The biological diversity of the earth’s living resources. The total range of variability among systems and organisms at the following levels of organisation: bioregional, Landscape, ecosystem, Habitats, communities, Species, populations, individuals, genes and the structural and functional relationships within and between these different levels.

Biodiversity Net Gain	An approach to development and/or land management that aims to leave the natural environment in a measurably better state than it was beforehand.
Block Valve	Block valves are required for isolation and monitoring of the carbon dioxide or hydrogen pipeline transportation systems. These would include buried pipework, valves, and an instrument building.
Carbon Capture	The capture of carbon dioxide from industrial sources and power stations that would otherwise be emitted into the atmosphere.
Carbon capture, usage and storage (CCUS)	The process whereby carbon dioxide emissions from power stations and industrial facilities are captured at the source before being compressed and transported to be injected under high pressure into depleted oil and gas fields or natural saline geological formations, either onshore or offshore.
Carbon Dioxide Storage	The locations for or act of providing the long-term subsea geological storage of carbon dioxide.
Climate Change	The long-term shift in the Earth's weather patterns or average temperature.
Combined Effects	The interaction and combination of different residual (post-mitigation) environmental effects of the Project affecting the same Receptor. For example, visual and noise effects during construction affecting the same residential dwelling.
Community Infrastructure	Community facilities such as schools, doctor's surgeries, community centres, open space, child's play space, recreation facilities and sports facilities etc.
Compensation	Measures taken to offset the loss of, or permanent damage to, ecological features despite mitigation. Compensation addresses negative effects which are residual, after avoidance and mitigation have been considered. Depending on circumstances, compensation measures may be located within or outside the Site.
Connected Projects	An existing or proposed development that will generate, use or store carbon dioxide or hydrogen, which will be connected to the carbon dioxide and/or hydrogen network provided by the Project.
Connectivity	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.
Conservation Area	An area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.
Conservation Status	The state of a species or habitat including for example, extent, abundance, distribution and their trends.

Conservation Strategy	A live document that aims to: • Set out the Applicant's commitment to net gain (in terms of biodiversity and natural capital) as part of the Project and maximise opportunities for biodiversity enhancement delivered by the Project; • Identify habitats and species across the Project corridor that are of national, regional and local importance and outline a plan of action for their protection, management and enhancement in adherence to the mitigation hierarchy (i.e. firstly seeking to avoid effects etc.); and • Demonstrate how the Applicant will measure its commitments to nature conservation throughout construction and aftercare by providing a framework for maintenance and monitoring. The Conservation Strategy is separated into three Parts: • Part A – Biodiversity Enhancement Strategy; • Part B – Ecology Surveys: Scope and Methodology; and • Part C – Biodiversity Enhancement and Management Plan.
Construction Environmental Management Plan (CEMP)	Document containing the register of environmental actions and commitments setting out methods to avoid, minimise and mitigate Impact on the environment and surrounding area and the protocols to be followed in implementing these measures in accordance with environmental commitments during the Construction Stage.
Construction Stage	The stage during which construction works for the Project will take place.
Consultation Documents	The documents submitted to support the formal pre-application consultation under the Planning Act 2008 (as amended) (PA2008). They included "plans and maps showing the nature and location of the proposed development" as stated in subsection (4) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.
Construction Compound	A secure area from which work is managed and resourced, including, but not limited to, temporary offices, workshops, parking and storage areas.
Cumulative Effects	The effects of the Project in cumulation with other existing development and/or approved development.
Decommissioning	The final process of shutting down the infrastructure comprised in the Project when it is no longer required once it has reached end of life.

Designated Asset	A heritage asset which is protected under legislation such as the Ancient Monuments Act 1979 or the Planning Act 1990. These are nationally important assets which are protected under law.
Development Consent Order (DCO)	Development Consent Order (DCO) is a Statutory Instrument (SI) made by the Secretary of State (SoS) pursuant to the Planning Act 2008 (as amended).
Dewatering	The action of removing groundwater or surface water from a construction site.
Direct Effect	An effect that is directly attributable to the Project.
Disaster	A man-made/external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.
District Level Licensing (DLL)	DLL is a type of strategic mitigation licence for great crested newts (GCN) granted in certain areas at a Local Authority or wider scale with the aim of improved conservation outcomes for GCN. Where a DLL scheme is in place, developers can make a financial contribution to strategic, off-site habitat compensation instead of applying for a separate licence or carrying out individual detailed surveys.
Drinking Water Safeguard Zones	Catchment areas that influence the water quality for their respective Drinking Water Protected Area (Surface Water), which are at risk of failing the drinking water protection objectives.
East Coast Cluster	The East Coast Cluster comprises proposed common offshore infrastructure (to be developed by the Northern Endurance Partnership), and terrestrial infrastructure in each of the Humber and Teeside regions, to decarbonise industry and establish a platform for economic growth. The East Coast Cluster constitutes the Net Zero Teesside, Zero Carbon Humber and Northern Endurance partnerships
Ecological feature	Habitats, species or ecosystems.
Ecological Impact Assessment (EcIA)	The process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the ecological feature in accordance with defined significance criteria.
EIA Directive	Directive 85/337/EEC (as amended). The initial Directive of 1985 and its three amendments have been codified by Directive

	2011/92/EU of 13 December 2011. Directive 2011/92/EU has been amended in 2014 by Directive 2014/52/EU.
EIA Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
EIA Scoping Opinion	The Secretary of State's written opinion as to the scope, and level of detail, of the information to be provided in the environmental statement.
EIA Scoping Report	A report prepared by an applicant to provide the information required under the EIA Regulations to request a Scoping Opinion from the Secretary of State.
Engagement	Dialogue with stakeholders on the Project which occurs in addition to the Statutory Consultation required under the EIA Regulations. The dialogue is technical and associated with the topics in the EIA.
Enhancement	Improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is 'over and above' that required to mitigate/compensate for an impact.
Environmental Impact Assessment (EIA)	A systematic means of assessing the significance of effects from the Proposed Development, undertaken in accordance with The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations).
Environmental Statement (ES)	A statement prepared in accordance with the EIA Regulations that includes the information that is reasonably required to assess the likely effects of a development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile.
Equivalent Continuous Sound Pressure Level, $L_{Aeq,T}$	Average of total sound energy measured over a specific period. It is the equivalent steady, continuous sound level, which has the same energy as a measured fluctuating sound.
External Influencing Factor	A factor which occurs beyond the limits of The Project that may present a risk to The Project, e.g. if an external disaster occurred (e.g. earthquake, Control of Major Accident Hazards (COMAH) site major accident) it would increase the risk of serious damage to an environmental receptor associated with the Project.
Flood Risk Assessment (FRA)	An assessment of the risk of flooding.
Flood Zones	Zones based on the annual probability of flooding from Fluvial and tidal sources, as defined in the Flood Map for Planning. Areas are categorised into one of the following: Flood Zone 1, Flood Zone 2, Flood Zone 3a or Flood Zone 3b.

Flood Zone 2	This zone comprises land assessed as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of flooding from rivers, or between a 1 in 200 (0.5%) and 1 in 1,000 (0.1%) annual probability of flooding from the sea in any year.
Flood Zone 3a	This zone comprises land assessed as having a 1 in 100 (1%) or greater annual probability of flooding from rivers or a 1 in 200 (0.5%) or greater annual probability of flooding from the sea in any year.
Flood Zone 3b	This zone comprises land where water has to flow or be stored in times of flood.
Fragmentation	Breaking up of, for example, an area of land or habitat resulting in difficulties in accessing or using some or all of that land.
Frequency Weighting Networks	A-weighting corresponds to the typical human frequency response to sound. Sound levels measured with an A-weighting are expressed in dB(A).
Functionally Linked Land	Areas of land or sea outside of the boundary of a European site that may be important ecologically in supporting the populations for which the site has been designated or classified. Occasionally impacts to such habitats can have a significant effect upon the species interest of such sites, where these habitats are considered to be functionally linked to the Site.
Future Baseline	The likely evolution of the baseline without implementation of the Proposed Development.
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
Greenhouse Gas (GHG)	Gases that absorb and emit reflected solar radiation which result in the warming of the Earth's atmosphere. It is absorbed and emitted at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere, and clouds. The six main GHGs whose emissions are human caused are: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbon and sulphur hexafluoride. In combination, these GHG emissions are commonly expressed in terms of 'carbon dioxide equivalents' according to their relative global warming potential. For this reason, the shorthand 'carbon' may be used to refer to GHGs.
Greenfield runoff rate	The rate of rainfall runoff that would occur from a site in its undeveloped and therefore undisturbed state.
Groundwater	Groundwater is the store of water present beneath the Earth's surface in rock and soil pore spaces and in the fractures of rock formations.

Groundwater Dependent Terrestrial Ecosystem	Wetlands such as springs, flushes and fens which are fed by groundwater rather than rainfall or surface runoff. They are particularly sensitive to hydrological changes caused by development. Foundations, borrow pits and linear infrastructure such as roads, tracks and trenches can disrupt groundwater flow and impact upon these sensitive habitats.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together.
Habitats Regulations Assessment (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European sites, required under the Habitats Directive and Regulations. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI) and compensatory measures.
Hazard	Anything with the potential to cause harm, including ill-health and injury, damage to property or the environment; or a combination of these.
Hazardous Waste	Waste containing material or substances harmful to humans or the environment.
Heavy Duty Vehicle	Vehicles greater than 3.5 tonnes unladen weight.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
Heritage Asset	A building, monument, site, place, area or Landscape identified as having a degree of significance meriting consideration in planning decisions, because of its Heritage interest. Heritage Assets include Designated Heritage Assets and Non-Designated Heritage Assets.
Historic Environmental Record (HER)	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
Historic Landfill	A known, closed, landfill site.
Historic Landscape	The historic landscape is a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.
HM Treasury Green Book	Her Majesty's Treasury guidance on how to appraise policies, programmes and projects, including principles of economic assessment.

Horizontal Directional Drilling (HDD)	A special steerable drill used to create an arced hole beneath the obstacle being crossed, slightly bigger than the pipe. A winch then pulls the pipe through in a string – a long, welded section of pipe assembled onsite.

Humber Low Carbon Pipelines (the Project)	The development for which a Development Consent Order is sought to cover the terrestrial elements of an onshore pipeline connection network to transport carbon dioxide and hydrogen. The network will start at the Drax Power Station in the east and finish at mean low water spring at a landfall location of the Holderness Coast.
	
	The Project includes the following:
	
	• An onshore pipeline to transport carbon dioxide from industrial and power sector Connected Projects, including proposed hydrogen production plants in the Humber area.
	• An onshore pipeline to transport hydrogen from production plants of Connected Projects to end users (aligned with the carbon dioxide pipeline).
	• A tunnel beneath the Humber Estuary including drive shaft and reception pit.
	• AGIs including:
	  ○ Pumping Facility close to the Holderness coast to increase the pressure of the carbon dioxide for transportation offshore to the storage facility;
	  ○ Pipeline inspection gauge (PIG) traps, strategically located along the pipelines system, to ensure pipelines can be cleaned and inspected;
	  ○ Connection arrangements in the vicinity of the Connected Projects;
	  ○ Multi-junction installations at both sides of the River Humber crossing; and
	  ○ Block valves (nominally located every 16-18km along the Scoping Route Corridor) to allow sections of the pipelines to be isolated for maintenance.
	• A landfall on the Holderness coast which is the 'landing' point for the offshore carbon dioxide pipeline transportation system so it can connect into the Pumping Facility; this is where the carbon dioxide transportation pipeline infrastructure transitions from the onshore to the marine environment.

Hydrology	The movement, distribution and quality of water throughout the earth.
Impact	A physical or measurable change to the environment attributable to the Project.

Important Ecological Features (IEFs)	Ecological features requiring specific assessment within EcIA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat/species rarity).
Indirect Effect	An effect that results indirectly from the Project, as a consequence of a 'Direct Effect', often occurring away from the Site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the Source of the effect.
Inert Waste	Waste that will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter that it comes into contact with, in a way likely to cause environmental pollution or harm to human health.
Institute of Air Quality Management	The Institute of Air Quality Management is the professional body for air quality professionals. It occasionally produces guidance that is widely used and accepted by consultants and councils (dependent on the nature of the project).
Internal Drainage Board	Each internal drainage board is a public body that manage water levels in an area, known as an internal drainage district, where there is a special need for drainage. They undertake works to reduce flood risk to people and property and manage water levels for agricultural and environmental needs within their district.
Internal Influencing Factor	A factor which occurs within the limits of the Project that may present a risk to the Project.
Inter-project cumulative effects	the residual (post-mitigation) environmental effects of the Project combining and interacting with the residual environmental effects of committed development(s) affecting the same Receptor. For example, cumulative construction traffic effects upon a residential dwelling from the Project and a proposed housing development.
Inter-tidal zone	The area where the ocean meets the land between high and low tides.
Intra-project combined effects	The interaction and combination of different residual (post-mitigation) environmental effects of the Project affecting the same Receptor. For example, visual and noise effects during construction affecting the same residential dwelling
Land Cover	The surface cover of the land usually expressed in terms of vegetation cover or lack of it. Related to, but not the same as, Land Use.
Landfall	A 'landing' point on the Holderness coast for connection to the offshore pipeline transportation system where the transportation pipeline infrastructure transitions from the onshore to the marine environment.

Land Use	What land is used for, based on broad categories of functional land cover, such as urban and infrastructure use and the different types of agricultural and forestry.
Landscape	Landscape is about the relationship between people and place. It provides the setting for our day-to-day lives. The European Landscape Convention (ELC) defines landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significant effect of change resulting from development both on the Landscape as an environmental resource in its own right and on people’s views and Visual Amenity.
Landscape Character	A distinct, recognisable and consistent pattern of Elements in the Landscape that makes one Landscape different from another.
Landscape Character Area	These are unique geographical areas of a particular landscape character type. Landscape character areas take on the names of specific places.
Landscape Character Type	Distinct types of landscape which are generic in character in that they may occur in different parts of the country, but wherever they are they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern.
Lead Local Flood Authority (LLFA)	Lead in managing local flood risks (i.e. risks of flooding from surface water, groundwater and ordinary (smaller) watercourses), ensuring co-operation between the Risk Management Authorities in their area under the Flood and Water Management Act 2010.
Light Duty Vehicle	Cars and small vans less than 3.5 tonnes gross vehicle weight.
Likely Significant Effect	The significance of an environmental effect is typically a function of the ‘value’ or ‘sensitivity’ of the receptor and the ‘magnitude’ or ‘scale’ of the impact. Combining the environmental value of the resource or receptor with the magnitude of change produces a significance of effect category. The definition of a significant effect for each environmental topic will be contained within their respective chapters of the Environmental Statement.
Limit of Deviation	These limits show the maximum area within which the Project could be installed. This flexibility is required in order to deal with unforeseen circumstances, such as ground conditions and local features.
Listed Building	Building or structure listed by the Secretary of State as being of ‘special architectural or historic interest’.

Local Development Plan (LDP)	The set of documents and plans that sets out the local authority's policies and proposals for the development and use of land in their area.
Local Nature Reserve (LNR)	A site designated by principal local authorities under Section 21 of the National Parks and Access to the Countryside Act 1949.
Local Planning Authority (LPA)	The local authority or council that is empowered by law to exercise statutory town planning functions for a particular area of the UK.
Local Wildlife Site (LWS)	Non-statutory sites selected against local selection criteria for their nature conservation value.
Low Carbon Hydrogen	Hydrogen which has been produced with minimal atmospheric emissions of carbon dioxide.
Made Ground	Areas where the ground surface has been significantly modified by human activity such as embankments and spoil heaps, on the natural ground surface.
Main River	A watercourse shown as such on the Flood Map for Planning and can include any structure or appliance for controlling or regulating the flow of water in, into or out of a main river. Main Rivers are usually larger streams and rivers, but also include smaller watercourses of strategic drainage importance. Main Rivers are under the jurisdiction of the Environment Agency who have powers to carry out flood defence works to Main Rivers.
Main Works Contractor	Appointed to plan, manage and monitor the construction phase of the Project and coordinate the various contractors associated with this phase.
Magnitude	A combination of the scale, extent and duration of an effect.
Maximum Sound Pressure Level or Maximum Noise Level L_{AFmax}	Maximum sound pressure level occurring within a specified period, with a fast time weighting (0.125s averaging time).
Mean High Water Springs (MHWS)	The highest level which spring tides reach on average over a period of time.
Mean Low Water Springs (MLWS)	The lowest level which spring tides reach on average over a period of time.
Mineral Safeguarding Area	An area designated by Minerals Planning Authorities which covers known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development.
Mitigation Measures	Actions proposed to prevent, reduce and where possible, offset significant adverse effects arising from the whole or specific elements of the Project.

National Nature Reserve (NNR)	Land declared under the National Parks and Access to the Countryside Act 1949 or Wildlife and Countryside Act (1981) as amended.
National Planning Policy Framework (NPPF)	The document that sets out Government's planning policies for England and how these are expected to be applied. The NPPF was last revised on 20 July 2021.
National Policy Statement (NPS)	Overarching policy designated under the Planning Act 2008 (as amended) (PA2008) concerning the planning and consenting of Nationally Significant Infrastructure Projects (NSIPs) in the UK.
Nationally Significant Infrastructure Project (NSIP)	Projects which fall under one of the categories in Part 3 of the Planning Act 2008 (as amended) (PA2008).
Nationally Designated Site	Areas of land subject to protection through UK legislation, including Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR).
Net Gain	Measures which are over and above those implemented to reduce the effects arising from development activities.
Nitrate Vulnerable Zone	They are areas designated as being at risk from agricultural nitrate pollution.
Nitrogen Dioxide	Combustion processes emit a mixture of nitrogen oxides (NO_x) and primarily nitric oxide (NO) which is quickly oxidised in the atmosphere to nitrogen dioxide (NO_2). Nitrogen dioxide has a variety of environmental and health impacts. It is a respiratory irritant which may exacerbate asthma and possibly increase susceptibility to infections.
Non-designated Asset	A heritage asset which is recorded by the local planning authority on the Historic Environment Record. These assets are protected by planning policy and can be deemed of equal value to designated assets thus earning equivalent protection.
Non-hazardous Waste	Waste that is not inert or hazardous. Includes rubbish or recycling that causes no harm to human or environmental health.
Non-native invasive species (NNIS)	Species which have been introduced into areas outside their natural range through human actions and are posing a threat to native wildlife.
Non-road Mobile Machinery	Any mobile machine, item of transportable industrial equipment, or vehicle (with or without bodywork) that is: not intended for carrying passenger or goods on the road and is installed with a combustion engine, either an internal spark ignition petrol engine or a compression ignition diesel engine.
Northern Endurance Partnership	The Northern Endurance Partnership (NEP) was formed in 2020 as the carbon dioxide transportation and storage company which will deliver the onshore and offshore infrastructure needed to capture

	carbon from a range of emitters across Teesside and the Humber and transport to offshore storage in the Endurance store. NEP is a collaboration between BP, Eni, Equinor, National Grid, Shell and Total.
Open Cut	A method of pipeline installation that requires opening up the surface of the ground to the required depth for installing a pipeline. It is typically utilised for installations or crossings where there are minimal obstacles, for example, narrow roads or tracks with a low volume of traffic.
Operational Stage	The stage after which the Project is handed over by the relevant construction contractors and approved for operation. It will remain in its Operational Stage until operations cease.
Order Limits	The outer limits for the Project, including the route and any temporary working areas that would be required to install the pipeline, such as access routes, and working compounds. The limits will be shown on the Works Plans.
Ordinary Watercourse	Any river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows that does not form part of a Main River. The Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) where relevant, has powers for Ordinary Watercourses that are similar to those held by the Environment Agency for Main Rivers.
Parameters	A limit or boundary which defines the scope of a particular process or activity.
Particulate Matter	Airborne Particulate Matter includes a wide range of particle sizes and different chemical constituents. It consists of both primary components, which are emitted directly into the atmosphere, and secondary components, which are formed within the atmosphere as a result of chemical reactions. Of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Air Quality Objectives are in place for the protection of human health for PM10 and PM2.5 – particles of less than 10 and 2.5 micrometres in diameter, respectively.
Patch quality	An approach to ecological management focusing on the quality of discrete habitat patches which contributes to the maintenance of the structure, function and dynamics of the wider ecosystem.
Pathway	Route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses.
Phase 1 Habitat Survey	An ecological survey technique that provides a standardised system to record vegetation and wildlife Habitat. It enables a basic assessment of Habitat type and its potential importance for nature conservation.

Pipeline Inspection Gauge (PIG)	A device used for internal inspection, cleaning and monitoring of a pipeline.
PIG Trap	A PIG trap is an above ground horizontally mounted pipework vessel installed at either end of a section of buried pipeline to allow a pipeline inspection gauge (PIG) to be inserted into the pipeline for the purposes of cleaning, monitoring and inspection. A PIG would be launched from a PIG trap at one end of the pipeline and retrieved from a PIG trap at the other end of the pipeline.
Pipe Trench	The excavated channel within the Route Corridor where the pipeline will be installed.
Planning Inspectorate (PINS)	The Government agency responsible for administering applications for development consent under the Planning Act 2008 (as amended) (PA2008) on behalf of the Secretary of State (SoS).
Preliminary Ecological Appraisal (PEA)	Preliminary ecological surveys have a range of purposes; one key use is to gather data on existing conditions, often with the intention of conducting a preliminary assessment of likely impacts of proposed developments or establishing the baseline for future monitoring. As a precursor to a proposed project, some evaluation is usually made within these appraisals of the ecological features present, as well as scoping for notable Species or Habitats, identification of potential constraints to The Project and recommendations for Mitigation Measures.
Preliminary Environmental Information Report (PEIR)	The Preliminary Environmental Information Report (PEIR) is the report prepared by the Applicant, containing Preliminary Environmental Information (PEI).
Primary Mitigation	Modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken.
Principal Aquifer	These are layers of rock or drift deposits that have high intergranular and / or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, Principal Aquifers are aquifers previously designated as major aquifers.
Priority Habitat Inventory	A spatial dataset that describes the geographic extent and location of Natural Environment and Rural Communities Act (2006) Section 41 Habitats of Principal Importance (HPI).
Project	See Humber Low Carbon Pipeline.
Proximity Principle	Managing waste as near as possible to its place of production.
Pumping Facility	A facility that would re-pressurise the carbon dioxide to maintain the pressure in the pipeline before it is transported offshore by pipeline.

Ramsar Site	A wetland site of international importance designated under the criteria of the Ramsar Convention on Wetlands for containing representative, rare or unique wetland types for their importance in conserving biological diversity.
Rating Level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound (impulsivity, tonality, intermittency)
Reception Pit	An excavated pit to receive the bore or pipeline.
Receptor	A component of the natural, created or built environment such as a human being, water, air, a building, or a plant that has the potential to be affected by the Project.
Recovery	Any operation, the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.
Recycling	Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.
Register of Commitments	The Register of Commitments identifies the design, construction and operational commitments included within the Technical Chapters of the Environmental Statement (ES) to address the potential environmental effects of the Project.
Registered Park and Garden	A site included on the Register of Historic Parks and Gardens in England. Registered parks and gardens are designated heritage assets and subject to the planning policies within the NPPF.
Residual Effects	Effects arising from the Project that cannot be mitigated following implementation of Mitigation Measures.
Reuse	A material is used again for the same purpose as was originally intended.
Risk	The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur.
Risk Event	An identified, unplanned event, which is considered relevant to the Project and has the potential to be a Major Accident and/or Disaster subject to assessment of its potential to result in a significant adverse effect on an environmental receptor.
Rochdale Envelope	The Rochdale Envelope is an acknowledged way of dealing with an application comprising EIA development, where details of a project have not been fully resolved by the time the application is submitted. The term is used to describe those elements of a scheme that have not yet been finalised, but yet can be accommodated within certain limits and parameters allowing the likely significant effects of a project to be presented in the Environmental Statement as a worst case. It also provides the

	opportunity to assess aspects of a development where the detailed design is to be developed post grant of a DCO and approved by the local planning authority under a Requirement.
Scheduled Monument	'Scheduled monument' means any monument which is for the time being included in the schedule compiled and maintained by the Secretary of State for Digital, Culture, Media, and Sport. This is a designated asset which is protected by the 1979 Act.
Scoping	An exercise undertaken pursuant to the EIA Regulations, to determine the topics to be addressed within the Environmental Statement (ES).
Scoping Route Corridor	The parameters of and issues considered within the EIA Scoping Report.
Secondary Aquifer	These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary Aquifers are subdivided into two types: Secondary A – 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. These are generally aquifers formerly classified as minor aquifers; Secondary B – predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers. The term ‘Secondary Undifferentiated’ is also used in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Secondary Mitigation	Actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or through inclusion in the Environmental Statement.
Secretary of State (SoS)	In case of the Project, the Secretary of State for Business, Energy and Industrial Strategy (BEIS).
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 that significance, or may be neutral.
Severance	The extent to which members of communities or habitats are able (or not able) to move around their community and access services/facilities.

Significance	A measure of the importance or gravity of the effect defined by significance criteria specific to the environmental topic.
Site of Importance for Nature Conservation (SINC)	Sites of Importance for Nature Conservation are usually selected within a local authority area and support both locally and nationally threatened Habitats and Species that are priorities under the county or UK Biodiversity Action Plan (BAP).
Site of Special Scientific Interest (SSSI)	A site statutorily notified under the Wildlife and Countryside Act 1981 (as amended) as being of special nature conservation or geological interest. Site of Special Scientific Interest (SSSIs) include Habitats, geological features and Landforms.
Source	Hazardous substance that has the potential to cause adverse impacts.
Source Protection Zone	They are zones which show the level of risk to the abstraction (groundwater) from contamination. This could be from any activity that might cause pollution in the area. For example, storing pollutants like petrol underground, soakaways from septic tanks to the ground. The closer the activity, the greater the risk.
Special Crossing	The crossing of a pipeline of features such as watercourse, rail or road which require particular consideration with regards to the construction methods.
Special Area of Conservation (SAC)	Land designated under the Conservation of Habitats and of Species Regulations 2017 (as amended).
Special Protection Area (SPA)	Protected areas for birds in the UK designated under the Conservation of Habitats and Species Regulations 2017 (as amended)
Species	A group of interbreeding organisms that seldom or never interbreed with individuals in other such groups, under natural conditions; most species are made up of subspecies or populations.
Specific Sound Level, L_S	The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval.
Specific Sound Source	Sound source being assessed.
Statutory Consultation	The Planning Act 2008 (as amended) (PA2008) requires an applicant to undertake public consultation in advance of submitting a Development Consent Order (DCO) application to the Secretary of State (SoS). Statutory consultation must occur with 'statutory consultees' and the formal consultation period will normally last for 21 days.
Statutory Consultees	Planning law prescribes circumstances where the Secretary of State is required to consult specified bodies prior to a decision being made on an application. Includes bodies such as:

	Environment Agency, Highways England, Historic England, Natural England, Parish Councils, among others.
Sterilised	Substantially constrain / prevent existing and potential future use and extraction of materials or minerals.
Superficial Geology	The youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 2.6 million years from the present.
Sustainable Urban Drainage (SuDs)	Sustainable drainage systems designed to manage stormwater locally (as close to its source as possible), to mimic natural drainage and encourage the infiltration, attenuation, and passive treatment of surface water runoff.
Temporary Works	Those parts of the works that allow or enable construction of the Project and which do not remain in place at the completion of the works.
Temporary Vent Stack	A temporary stack which would be installed at a Block Valve Station (BVS) or Above Ground Installation (AGI), to allow the isolated section of the pipe to be depressurised.
Tertiary Mitigation	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 practices used to manage commonly occurring environmental Effects.
Townscape	The character and composition of the built environment including the buildings and the relationships between them, the different types of open urban space, including green spaces, and the relationship between buildings and open spaces.
Trackout	The transport of dust and dirt from the construction site onto the public road network.
Tree Preservation Order (TPO)	An order made by a Local Planning Authority to protect specific trees, groups of trees or woodlands in the interests of amenity. An Order prohibits certain tree works, damage and destruction of trees without the Local Planning Authority's written consent.
Trenchless	Trenchless technology is the science and engineering of installing underground pipes using various techniques which minimise the amount of excavation and associated environmental disturbance associated with Open Cut techniques.
Tunnel Annulus	The region or space between the tunnel wall and the surrounding ground.
Vantage Point	A position or standpoint from which something is viewed or considered.

Visual Amenity	Overall enjoyment of a particular area, surroundings, or views in terms of people's activities - living, recreation, travelling through, visiting, or working.
Visual Effect	An effect on specific views and on the general visual amenity experienced by people.
Visual Receptor	Individuals and / or defined groups of people who have the potential to be affected by the Project.
Waste	Any substance or object which the holder discards or intends or is required to discard.
Waste Hierarchy	Sets out the priorities that must be applied when managing waste.
Water Framework Directive (WFD)	European directive which commits member states to achieve good qualitative status of all water bodies.
Water Body	A discrete body of water forming a physical Feature.
Wetlands	Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.
Wildlife and Countryside Act 1981 (as amended)	UK legislation relating to the protection of wildlife.
Working Width	The temporary boundary within which Pipeline Construction Activities are expected to take place.
Zero Carbon Humber (ZCH)	A consortium of leading energy and industrial companies and academic institutions with a shared vision to transform the Humber region into the UK's first net-zero carbon cluster by 2040, through low carbon hydrogen, carbon capture and carbon removal technology, enabled by shared regional pipelines for hydrogen and carbon emissions and the common offshore NEP infrastructure. Zero Carbon Humber includes ABP, British Steel, Centrica Storage, Drax, Equinor, Mitsubishi Power, National Grid, px Group, SSE Thermal, Triton Power, Uniper and University of Sheffield Advanced Manufacturing Research Centre (AMRC).
Zone of Influence (ZOI)	The areas / resources that may be affected by the changes caused by activities associated with a project.
Zone of Theoretical Visibility (ZTV)	A map, digitally produced, showing areas of land within which, The Project is theoretically visible.

1. Introduction

1.1 Introduction to the Project

1.1.1 The Humber Low Carbon Pipelines (HLCP) project (the 'Project') is being developed by National Grid Carbon Limited (NGCL) ('the Applicant') (NGCL is part of National Grid Ventures (NGV), the competitive division of National Grid plc, responsible for both developing and operating a portfolio of low carbon renewable businesses in the United Kingdom (UK) and United States (US)). It comprises the construction of dual pipelines to transport carbon dioxide (to facilitate carbon capture, usage and storage (CCUS)) and hydrogen between Drax in North Yorkshire to a landfall point on the Holderness coast in East Riding of Yorkshire together with associated above ground installations (AGIs) (see the Project Location in Figure 1.1 (Volume II, Part 1)). The pipelines will connect to other Connected Projects as defined in Chapter 2: Project Description, Table 2.1

1.1.2 At the landfall point the Project will connect to an offshore pipeline for onward transportation of carbon dioxide to the Endurance saline aquifer under the North Sea. This offshore pipeline and associated work forms part of a separate consent for which bp is the project proponent. This project will include works within the intertidal zone down to Mean Low Water Springs (MLWS) to facilitate the connection to the offshore pipeline. Potential impacts and necessary consents for the intertidal zone have been considered within this EIA Scoping Report.

1.1.3 The Humber region has a high concentration of energy intensive industries concentrated in a 'cluster' and is also the UK's most carbon intensive region. The aim of this Project is to aid in the transition to a zero-carbon economy through the deployment of CCUS and hydrogen technology. This would allow the Humber region to make a significant contribution to meeting the Government's climate targets.

1.1.4 The Project includes the following:

- An onshore pipeline to transport carbon dioxide from industrial and power sector Connected Projects, including proposed hydrogen production plants in the Humber area.
- An onshore pipeline to transport hydrogen from production plants of Connected Projects to end users (aligned with the carbon dioxide pipeline).
- A tunnel beneath the Humber Estuary including drive shaft and reception pit.
- AGIs including:
  - Pumping Facility close to the Holderness coast to increase the pressure of the carbon dioxide for transportation offshore to the storage facility;
  - Pipeline inspection gauge (PIG) traps, strategically located along the pipelines system, to ensure pipelines can be cleaned and inspected;
  - Connection arrangements in the vicinity of the Connected Projects;
  - Multi-junction installations at both sides of the River Humber crossing (referred to as Killingholme and Saltend AGIs in Chapter 2: Project Description); and

- Block valves (nominally located every 16-18km along the Scoping Route Corridor) to allow sections of the pipelines to be isolated for maintenance.

- A landfall on the Holderness coast which is the 'landing' point for the offshore carbon dioxide pipeline transportation system so it can connect into the Pumping Facility; this is where the carbon dioxide transportation pipeline infrastructure transitions from the onshore to the marine environment.

1.1.5 A full description of the Project along with a figure setting out the location of the Project is provided in Chapter 2: Project Description.

1.2 Requirement for a Development Consent Order (DCO)

1.2.1 The Project is defined as a Nationally Significant Infrastructure Project (NSIP) as set out in the Planning Act 2008 ('PA2008'), Section 14 (1)(g) and Section 21 (Ref 1.1). As such, the Applicant is required to request a DCO to construct and operate the Project.

1.2.2 The Department for Energy and Climate Change (now the Department for Business, Energy and Industrial Strategy) published a number of National Policy Statements (NPS) in relation to energy infrastructure, which were designated by the Secretary of State for Energy and Climate Change in July 2011.

1.2.3 For the Project, none of the energy NPSs directly apply. Where this is the case, section 105 of the PA2008 applies, and the Secretary of State must have regard to:

"(a) any local impact report (within the meaning given by section 60(3)) submitted to the Secretary of State before the deadline specified in a notice under section 60(2),

(b) any matters prescribed in relation to development of the description to which the application relates, and

(c) any other matters which the Secretary of State thinks are both important and relevant to the Secretary of State's decision."

1.2.4 On this basis the following NPSs may still be relevant considerations in assessing the Project:

- Overarching National Policy Statement for Energy (EN-1) (Ref 1.2); and
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 1.3).

1.2.5 On the 6 September 2021, the Department for Business, Energy and Industrial Strategy released drafts of revised NPSs including EN-1 (Ref 1.4) and EN-4 (Ref 1.5). This is to ensure that the energy NPSs reflect the policies and broader strategic approach as outlined in the Energy White Paper (published in December 2020 (Ref 1.6)) and to ensure that the UK planning policy framework supports the infrastructure required for the transition to net zero. Whilst the revised NPSs are yet to be designated as adopted national policy, the draft policy they contain in relation to the Project merits appropriate consideration.

1.2.6 The Draft EN-1 (Ref 1.4) sets out the need case for hydrogen in paragraph 3.4.11 to 3.4.16. It states that developing low carbon hydrogen will be critical for meeting the UK's legally binding commitment to achieve net zero by 2050. Low carbon hydrogen has the potential to "help decarbonise vital UK industry sectors and provide flexible deployment across heat, power and transport". Draft EN-1 also sets out the need case for carbon capture and storage infrastructure in paragraphs 3.5.1 to 3.5.7. It states that carbon

capture and storage is required to reduce emissions associated with generating electricity from natural gas and to capture and store carbon dioxide emissions from hydrogen production. It states at paragraph 3.5.5 that it is fundamental to the deep decarbonisation of energy intensive industries.

1.2.7 Draft EN-4 (Ref 1.5) states at paragraphs 1.6.4-1.6.5 that the guidance it contains has effect only in relation to natural gas infrastructure, and that whilst it does not have effect for hydrogen or carbon capture and storage infrastructure, it may nonetheless contain information that is important and relevant to the Secretary of State's decisions on applications for both hydrogen and carbon capture and storage infrastructure.

1.2.8 The Marine and Coastal Access Act (MCAA) 2009 (Ref 1.7), Marine Policy Statement (Ref 1.8) and the East Inshore Marine Plan (Ref 1.9) will form part of the policy context and be given appropriate consideration in relation to the intertidal area at the Easington landfall and associated marine licence requirements under part 4 of the MCAA. The project will consult the Marine Management Organisation (MMO) as part of the s.42 consultation requirements and seek to agree the draft (deemed) marine licence with the MMO prior to submitting the DCO application.

1.2.9 Elements of the Project may be consented through additional Town and Country Planning Act 1990 (as amended) (Ref 1.10) planning applications to support the delivery of early construction works. If needed, further detail will be provided in subsequent stages of the application. However, for the purposes of this EIA Scoping Report, it is assumed that all works are consented under the DCO.

1.3 Requirement for an EIA

1.3.1 The term Environmental Impact Assessment (EIA) describes a procedure that must be followed for certain types of projects before they can be granted consent. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the anticipated effects and proposed mitigation for avoiding, preventing, reducing or, if possible, offsetting them are properly understood by the public and the authority before granting consent.

1.3.2 The Project falls under Schedule 1, paragraph 16 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations') (Ref 1.11):

'16. Pipelines with a diameter of more than 800 millimetres and a length of more than 40 km for the transport of–

(a) Gas, oil or chemicals;

(b) Carbon dioxide streams for the purposes of geological storage, including associated booster stations.'

1.3.3 The Project has not been subject to an EIA Screening Request, as all development listed within Schedule 1 is automatically classified as an EIA development under the EIA Regulations.

1.3.4 A Regulation 8(1)(b) (of the EIA Regulations) notification has been submitted to the Secretary of State along with this EIA Scoping Report and confirms that the Applicant intends to submit a DCO Application in Q4 2022.

1.4 Purpose of the EIA Scoping Report

1.4.1 The purpose of this EIA Scoping Report is to ensure that the EIA is focused on the key impacts likely to give rise to significant effects, and to obtain agreement on the EIA approach and scope. As well as identifying elements to be considered in the EIA, this report also identifies those elements that are not considered necessary to assess further. This approach is in line with the general aim to undertake proportionate EIA, as advocated by industry best practice and as set out in paragraph 5.10 of the Planning Inspectorate's (PINS) Advice Note Seven (Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements) (Ref 1.12).

1.4.2 This report seeks to establish the overall framework for the EIA in relation to the environmental factors and associated effects; the Environmental Statement (ES) will be based on the EIA Scoping Opinion received. However, the exact scope of the EIA will be influenced by the on-going design evolution of the Project, baseline data collection (e.g. field surveys etc.) and consultation with stakeholders. Where further evidence justifies a change to the scope of the EIA, this will be explained in the ES along with confirmation of whether the change has been agreed with relevant consultees.

1.4.3 Table 1.1 sets out the information that the EIA Regulations at Regulation 10(3) state a request for an EIA Scoping Opinion must include and indicates where this information can be found in this EIA Scoping Report.

Table 1.1: Information required to accompany a request for an EIA Scoping Opinion (Ref 1.11).

Information Required	Location within this Report
A plan sufficient to identify the land.	Figure 1.1 (Volume II, Part I)
A description of the nature and purpose of the development, including its location and technical capacity.	Chapter 2: Project Description
An explanation of the likely significant effects	Chapter 4 to Chapter 17

1.4.4 Table 1.2 below sets out the suggested information requirements based on PINS Advice Note Seven (Ref 1.12) and identifies where this information can be found.

Table 1.2: Suggested EIA Scoping Report contents taken from PINS Advice Note Seven (Ref 1.12).

Information Required	Location within this Report
• *an explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g. design parameters;*	Chapter 2: Project Description
• *referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development;*	Volume II - Figures
• *an outline of the reasonable alternatives considered and the reasons for selecting the preferred option;*	Chapter 2: Project Description
• *a summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues;*	Chapter 4 to Chapter 17
• *a detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided;*	Chapter 4 to Chapter 17
• *results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters;*	Chapter 4 to Chapter 17
• *aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g. criteria for determining sensitivity and magnitude;*	Chapter 4 to Chapter 17
• *any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects;*	Chapter 4 to Chapter 17
• *references to any guidance and best practice to be relied upon;*	Chapter 4 to Chapter 17
• *evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities); and*	Chapter 4 to Chapter 17

• *an outline of the structure of the proposed ES.*	Chapter 3: EIA Methodology

1.5 References

- Ref 1.1 HM Government (2008) *The Planning Act 2008*. Available at: https://www.legislation.gov.uk/ukpga/2008/29/section/14 (Accessed 23 March 2022)
- Ref 1.2 Department of Energy and Climate Change (2011*) Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 22 March 2022).
- Ref 1.3 Department of Energy and Climate Change (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed: 22 March 2022).
- Ref 1.4 Ministry of Business, Energy and Industrial Strategy (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 13 February 2022).
- Ref 1.5 Department of Energy and Climate Change (2021) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 22 March 2022).
- Ref 1.6 Department for Business, Energy and Industrial Strategy (2020) *Energy White Paper: Powering our Net Zero Future.* Available at: https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future (Accessed: 23 March 2022).
- Ref 1.7 HM Government (2009) *Marine and Coastal Access Act 2009.* Available at https://www.legislation.gov.uk/ukpga/2009/23/pdfs/ukpga_20090023_en.pdf (Accessed: 2 March 2022).
- Ref 1.8 HM Government (2011) *UK Marine Policy Statement.* Available at: https://www.gov.uk/government/publications/uk-marine-policy-statement (Accessed: 5 April 2022).
- Ref 1.9 HM Government (2014) *East Inshore and East Offshore Marine Plan 2014.* Available at: https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans (Accessed: 5 April 2022).
- Ref 1.10 HM Government (1990) *Town and Country Planning Act 1990 (as amended).* Available at: https://www.legislation.gov.uk/ukpga/1990/8/contents (Accessed 5 April 2022).
- Ref 1.11 HM Government (2017) *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations').* Available at:

https://www.legislation.gov.uk/uksi/2017/572/contents/made (Accessed: 23 March 2022).

- Ref 1.12 The Planning Inspectorate (2020). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements*. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/ (Accessed: 23 March 2022).

2. Project Description

2.1 Introduction

2.1.1 This Chapter provides a description of the Project for the purposes of identifying and reporting potential environmental impacts and likely significant environmental effects.

2.1.2 The description of the Project represents the current understanding of the design. The design of the Project is ongoing and therefore the detail provided within this chapter will be further refined and developed, taking into account consultee feedback, for the Preliminary Environmental Information Report (PEIR) and again for the Environmental Statement (ES).

2.2 Project context

2.2.1 The UK Government have set legally binding net-zero carbon dioxide emissions targets. These include an amendment to the Climate Change Act 2008 to commit the UK to achieving net-zero by 2050 (Ref 2.1).

2.2.2 The objective of the Project is to deliver a new onshore pipeline network to transport captured carbon dioxide from the region's emitters for safe subsea storage and to enable industries to fuel-switch from fossil fuels to low carbon hydrogen.

2.2.3 The Project will facilitate the transportation of carbon dioxide in an onshore pipeline up to 600 mm (24") nominal diameter from industrial emitters to a secure offshore carbon dioxide storage facility with a capacity up to 17.8 million tonnes of carbon dioxide per annum (MTPA) and a Maximum Allowable Operating Pressure (MAOP) of 136 barg. Therefore, the Project will facilitate the reduction of carbon dioxide emissions in the region, helping to support the Government's carbon dioxide reduction targets. It will also facilitate the transportation of hydrogen from production facilities to users in a pipeline up to 900 mm (36") nominal diameter, with a capacity up to 10 Giga Watts (GW) and a Maximum Operating Pressure (MOP) between 50 to 75 barg, allowing industrial facilities to use hydrogen in place of fossil fuels.

2.2.4 The Project forms part of Zero Carbon Humber (ZCH), a consortium of leading energy and industrial companies and academic institutions with a shared vision to transform the Humber region into the UK's first net-zero carbon cluster by 2040.

2.2.5 ZCH includes the Connected Projects set out in Table 2.1. Each of the Connected Projects are subject to their own separate application for consent. A more detailed description of the Connected Projects will be included within the PEIR and the ES. Note, the Connected Projects outlined in Table 2.1 are subject to change based on a Department for Business, Energy & Industrial Strategy (BEIS) Cluster Sequencing announcement expected from May 2022.

2.2.6 The Northern Endurance Partnership is made up of bp, Eni, Equinor, National Grid Ventures, Shell and Total and was formed to develop the carbon dioxide transportation and storage infrastructure to serve a diverse range of businesses in the Teesside and Humber regions. This includes an offshore pipeline of approximately 85km long to transport carbon dioxide from Zero Carbon Humber projects to a carbon dioxide storage facility in the Southern North Sea, known as Endurance.

2.2.7 The Northern Endurance Partnership will also serve Net Zero Teesside via a separate offshore pipeline of approximately 145km long connecting to the Endurance storage facility. Net Zero Teesside is a cluster of projects in Teesside that is currently going through the Development Consent Order (DCO) process and is in the examination phase. All projects within Net Zero Teesside will be subject to separate consents.

2.2.8 Together ZCH, Net Zero Teesside and the Northern Endurance Partnership comprise the East Coast Cluster Project.

Table 2.1: Details of the Connected Projects

Connected Project	Applicant	Project description	Consenting regime
East Coast Cluster - Connected Projects			
Drax's bioenergy with carbon capture and storage (BECCS) project.	Drax Limited	The proposal is to install carbon capture technology on up to two of the Drax Power Station's existing biomass generating units to remove up to 95% of the carbon dioxide from the flue gas emitted from those units. Drax Power Station is located 5 km southeast of Selby.	DCO Application.
SSE Thermal's and Equinor's Keadby Clean Power Hub	SSE and Equinor	The Clean Power Hub comprises of Keady 3 and Keadby Hydrogen. Keadby 3 is a low carbon Combined Cycle Gas Turbine (CCGT). The low carbon CCGT generating station will be fuelled by natural gas. It will be designed to operate with a post-combustion carbon capture plant installed and will generally be operated as a dispatchable low carbon generating station. Keadby Hydrogen would be a hydrogen fuelled power station. The Clean Power Hub is set to be located within Keadby in the vicinity of the other Keadby Power Stations (the existing Keadby 1 Power Station and Keadby 2 Power Station, which is under construction).	Keadby 3 - DCO Application currently in examination. Keadby Hydrogen – to be confirmed.
British Steel's Zero Carbon Humber scheme	British Steel	British Steel has developed an internal Low Carbon Roadmap discussion document for achieving a phased reduction of carbon dioxide emissions by 2030, 2035 and 2050. Within this roadmap, British Steel identified low carbon hydrogen as playing a major role in reducing emissions in the steel sector going forward. Subsequently, British Steel has held exploratory discussions with key partners on the potential supply and use of hydrogen from the Zero Carbon Humber dual carbon dioxide and hydrogen pipeline.	To be confirmed

Uniper's blue and green hydrogen hub.	Uniper	Uniper's hydrogen hub at Killingholme is set to be a large-scale hydrogen production hub with up to 700 megawatt (MW) blue hydrogen production and up to 100MW green hydrogen production. Uniper's Killingholme Hydrogen Hub is expected to be located 1.3km east of East Halton.	Town and Country Planning Application.
Equinor's Hydrogen to Humber Saltend or H2H Saltend project.	Equinor	A proposed hydrogen production facility that will convert natural gas to hydrogen whilst capturing the associated carbon dioxide emissions. This is known as blue hydrogen technology. The facility will be a 600MW auto thermal reformer with carbon capture. It will be located at Saltend Chemicals Park just east of Hull on the north bank of the Humber estuary.	Town and Country Planning Application.
Northern Endurance Partnership – Connected Projects			
Northern Endurance Partnership	bp	This includes an offshore pipeline of approximately 85km long to transport carbon dioxide from Zero Carbon Humber projects offshore, and a carbon dioxide storage facility in the Southern North Sea, known as Endurance.	Oil and Gas Authority Storage permit

2.2.9 The East Coast Cluster has the potential to transport and securely store nearly 50% of all UK industrial cluster carbon dioxide emissions – up to 27 million tonnes of carbon dioxide emissions a year - by 2030. On 19 October 2021, the Minister of State for Energy, Clean Growth and Climate Change, the Rt Hon Greg Hands MP, confirmed that the East Coast Cluster had been identified as a 'Track 1' Cluster, meaning that it will be taken forward into Track 1 negotiations and will receive support under the government's Carbon Capture Usage and Storage (CCUS) Programme if they are deemed value for money for the consumer and taxpayer (Ref 2.2).

2.3 Location of the Project

2.3.1 The westernmost extent of the Project is Drax Power Station in Selby, North Yorkshire. The Project extends east before reaching a landfall location at the mean low water spring point on the Holderness Coast in the vicinity of Easington. There will be a crossing of the tidal River Trent and the River Humber Estuary.

2.3.2 The topography of the area is predominantly flat and low-lying, comprising of large-scale arable fields with clusters of urban settlements, including the larger settlements of Hull and Scunthorpe.

2.3.3 A key feature of the area is the Humber Estuary, which is designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), a Special Protection Area (SPA) and a Ramsar site.

2.3.4 Large parts of the Project are within areas of flood risk (Flood Zones 2 and 3). The entirety of the Project between Drax and the River Trent is within areas of high flood risk in addition to a roughly 5km wide area associated with the New River Ancholme and large areas of land adjacent to the River Humber.

2.3.5 There are a number of cultural heritage assets within the area including Brocklesby Park Registered Park and Garden, Thornton Abbey Augustinian Monastery, Roman settlements and Scheduled Monuments along the banks of the River Humber.

2.3.6 The majority of the Project lies in land that is categorised on provisional mapping as Grade 3 agricultural land or higher quality.

2.3.7 The intertidal zone on the Holderness coast is part of a dynamic and eroding coastline with a number of designated protected areas including a SPA (Greater Wash), a SSSI (Dimlington Cliff) and a Marine Conservation Zone (Holderness Inshore).

2.4 Overview of the Project

2.4.1 The Project is expected to comprise the following components:

- An onshore pipeline system to transport carbon dioxide from industrial and power sector Connected Projects, including hydrogen production plants in the Humber area.
- An onshore pipeline system to transport hydrogen from production plants (Connected Projects) to end users (aligned with the carbon dioxide pipeline).
- A tunnel beneath the Humber Estuary including a drive shaft and a reception pit.
- Above ground installations (AGI) including:

- A suitable Pumping Facility next to or close to the Holderness coast, to increase the pressure of the carbon dioxide for transportation offshore to the storage facility;
- Pipeline inspection gauge (PIG) traps, strategically located along the pipeline system, to ensure pipelines can be cleaned and inspected;
- Connection arrangements in the vicinity of the Connected Projects;
- Multi-junction installations at both sides of the River Humber crossing (later referred to as Killingholme and Saltend AGIs); and
- Block valves (nominally located every 16-18km along the Scoping Route Corridor) to allow sections of the pipeline to be isolated for maintenance.

- A landfall on the Holderness coast which is the 'landing' point for the offshore carbon dioxide pipeline transportation system so it can connect into the Pumping Facility and is where the carbon dioxide transportation pipeline infrastructure transitions from the onshore to the marine environment.

2.4.2 The EIA Scoping Report has been informed by the Scoping Route Corridor which contains the land required for the construction and operation of the Project. The Scoping Route Corridor is shown in Figure 2.1 (Volume II, Part 1) with a description provided in Table 2.2. It is anticipated that a refined boundary will be presented at the PEIR and ES stages as the design develops.

2.5 Rochdale Envelope

2.5.1 PINS Advice Note Nine: Using the 'Rochdale Envelope' (Ref 2.3) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be parameters of a scheme's design that are not yet fixed and, therefore, it may be necessary for the ES to assess likely worst-case variations to ensure that the likely significant environmental effects have been assessed. The ES will provide clear parameters against which the EIA will be undertaken. This is likely to include clearly defined limits of deviation where flexibility is required for the design.

2.5.2 Within this EIA Scoping Report, the proposed design reflects the best current assessment of the development and engineering programme for this Project. However, the Project will evolve and there needs to be sufficient flexibility within the design to provide the future contractor with sufficient scope for value engineering through innovative design and/or construction techniques. As such, the Project design presented in the ES and the accompanying assessment will reflect the need for this flexibility and the requirements of Advice Note Nine to ensure that the likely significant effects of the Project are assessed. Furthermore, the design will be informed by the EIA with the design reflecting iterative working between the designers and the environmental specialists. As the Project is developed further through design this will form the basis for the DCO application and any refinement of the proposed Rochdale Envelope.

2.6 Carbon dioxide and hydrogen pipeline route

2.6.1 This section describes the Scoping Route Corridor and therefore the boundary within which the carbon dioxide and hydrogen pipelines would be developed. The information in this section is indicative and subject to further design refinement.

2.6.2 The carbon dioxide and hydrogen pipelines are expected to run from Drax Power Station to the Pumping Facility located adjacent to the Holderness Coast. There will be a section of carbon dioxide pipeline from the Pumping Facility to the landfall site (or MLWS) that will connect to the separate offshore application. This represents a reasonable worst-case scenario for the Project.

2.6.3 The subsequent design refinement process will include an ongoing dialogue with stakeholders to ensure that developments in the area can progress without jeopardising each other. In particular, it will consider recent conversations about emerging proposals in East Riding of Yorkshire.

Table 2.2: Description of the Scoping Route Corridor

Section number	Section name	Approximate section length	Figure number	Description of location	Potential trenchless crossings
1	Drax to Keadby AGI options	25km	Figure 2.1 (Volume II, Part 1)	From the existing Drax Power Station, the route corridor heads south of Drax through arable fields before crossing the River Aire. The route corridor continues south before crossing the A614 Rawcliffe Road and then shortly after (approximately 750m) it crosses the M62 between Junctions 35 and 36. The route corridor then continues south before crossing the Wakefield and Goole Railway Line, the Aire and Calder Navigation Canal and the Dutch River (all within approximately 200m), at which point the route corridor begins heading in a south-easterly direction through arable fields towards Eastoft. Before reaching Eastoft, the route corridor begins heading in a southernly direction, crossing the A161 Crowle Road between Eastoft and Crowle. The route corridor continues southwards through arable fields to the Keadby AGI options.	River Aire A614 Rawcliffe Road M62 Wakefield and Goole Railway Line Aire and Calder Navigation Canal Dutch River A161 Crowle Road
2	Keadby AGI options to British Steel AGI options	17km	Figure 2.1 (Volume II, Part 1)	From the proposed location(s) of the Keadby AGI options, the proposed route heads south through arable fields before crossing the South Humberside Main Railway Line and approximately 30m after, the Sheffield and South Yorkshire Canal. The route corridor then continues through arable fields in a southernly direction until crossing the Three Rivers and	South Humberside Main Railway Line Sheffield and South Yorkshire Canal Three Rivers A18 Althorpe Bypass

Section number	Section name	Approximate section length	Figure number	Description of location	Potential trenchless crossings
				shortly after (approximately 200m), the A18 Althorpe Bypass. The route corridor then takes a short south-easterly trajectory before continuing south again. The route corridor then crosses the M180 and continues south before turning east towards and crossing the River Trent to the south of West Butterwick. The route corridor continues east before crossing the A159 Northfield Road and then continues east through arable fields, running in parallel with the M180 until it reaches the British Steel AGI options.	M180 River Trent A159 Northfield Road
3	British Steel AGI options to Killingholme AGI options	38km	Figure 2.1 (Volume II, Part 1)	From the proposed location(s) of the British Steel AGI options, the route corridor travels south through areas of arable fields and deciduous woodland. The route corridor then turns east through further arable fields before crossing the A15 Ermine Street, continuing in a north-easterly direction. The route corridor continues in a north-eastern direction crossing the B1207 Station Road, the Sheffield to Lincoln Railway Line and then the B1206 Scawby Road. Prior to crossing the New River Ancholme, the route begins to head in an eastern direction. Shortly after crossing the New River Ancholme (approximately 2km), the route returns to a north-easterly trajectory through arable fields before crossing the A1084 Bigby High Road. After continuing in a north-east direction through arable fields for approximately 400m, the route corridor crosses Skegger Beck. Shortly after crossing Skeggers	A15 Ermine Street B1207 Station Road Sheffield to Lincoln Railway Line B1206 Scawby Road New River Ancholme A1084 Bigby High Road Skegger Beck A18 High Street B1210 Brocklesby Road Manchester and Cleethorpes Railway Line A180

Section number	Section name	Approximate section length	Figure number	Description of location	Potential trenchless crossings
				Beck (approximately 290m), the route corridor crosses the Sheffield to Lincoln Railway Line again. The route corridor then continues north-east through arable fields, briefly heading in an eastern direction before returning to a north-eastern trajectory. The route carries on through arable fields before crossing the A18 High Street and B1210 Brocklesby Road and subsequently progresses north through predominantly arable fields, with some pockets of deciduous woodland. The route corridor continues north as it crosses the Manchester and Cleethorpes Railway Line and shortly after, the A180. The route corridor then briefly (approximately 1.5km) heads north-west before crossing the B1211 West End Road. As the route corridor adjusts to a north-eastern trajectory, it crosses the A1077 Wootton Road. The route corridor then turns east continuing through arable fields as it crosses the Barton Railway Line and approximately 1.54km after, East Halton Beck. The route corridor progresses through predominantly arable fields with small areas of deciduous woodlands, it crosses the Killingholme Branch railway line before curving south to reach the Killingholme AGI options.	B1211 West End Road A1077 Wootton Road Barton Railway Line East Halton Beck Killingholme Branch Railway Line
4	Killingholme AGI options to Saltend AGI options	10km	Figure 2.1 (Volume II, Part 1)	From the proposed location(s) of the Killingholme AGI options, the route heads north through arable fields. The route corridor then makes a sharp turn east towards the River Humber, predominantly through arable fields but with areas of lowland	The River Humber (SSSI, SAC, SPA and Ramsar)

Section number	Section name	Approximate section length	Figure number	Description of location	Potential trenchless crossings
	(Humber Crossing)			fen, coastal saltmarsh and mudflats as the route corridor approaches the river. The proposed route will cross the River Humber to the north of Killingholme via a tunnel. Once it has crossed the River Humber, the route corridor heads in a north-easterly direction initially through mudflats and coastal saltmarshes and then arable fields as it reaches the Saltend AGI options.	
5	Saltend AGI options to Easington AGI options	29km	Figure 2.1 (Volume II, Part 1)	From the proposed location(s) of the Saltend AGI options, the route corridor heads north-east across a mixture of arable fields and coastal/floodplain grazing marsh before crossing the A1033 Main Road. Shortly after (approximately 200m), the route corridor crosses the B1240 Thorn Road. The route corridor continues north-east through arable fields before crossing the B1362 Hedon Road. The route corridor then turns to the east and progresses through arable fields, crossing an unmarked road and Burstwick Drain. The proposed route subsequently curves round and progresses in a southern direction before crossing B1362 Causeway Ings Lane. The route corridor continues south before weaving through arable fields crossing Winestead Drain and A1033 Hollym Road. The route corridor then heads to the south-east, continuing across arable fields and undertaking two minor water crossings – namely, Northfield Land Drain and Old Hive Dike – before reaching the Easington AGI options. The	A1033 Main Road B1240 Thorn Road B1362 Hedon Road B1362 Causeway Ings Lane A1033 Hollym Road Beach/intertidal zone

Section number	Section name	Approximate section length	Figure number	Description of location	Potential trenchless crossings
				route corridor then continues towards the coast where it connects to a separate consent at mean low water spring.	

2.7 Above Ground Installations (AGIs)

2.7.1 This section describes the options currently being considered for AGI locations. The information in this section is indicative and subject to further design refinement. The AGIs required as part of this Project are as follows:

- A suitable Pumping Facility next to or close to the Holderness coast, to increase the pressure of the carbon dioxide for transportation offshore to the storage facility;
- PIG traps, strategically located along the pipeline system, to ensure pipelines can be cleaned and inspected;
- Connection arrangements in the vicinity of the Connected Projects;
- Multi-junction installations at both sides of the River Humber crossing (also referred to as Killingholme and Saltend AGIs); and
- Block valves (nominally located every 16-18km along the Scoping Route Corridor) to allow sections of the pipeline to be isolated for maintenance.

2.7.2 Table 2.3 below describes indicative AGI locations currently being considered. A confirmed list of AGI locations, along with relevant design parameters, their footprint and maximum heights will be provided within the ES.

Table 2.3: Description of the AGI options

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
Keadby 3 AGI (Option 1)	480480, 412357	Size of AGI: 200m x 200m Height of security fence: 3m. Height of instrument building: 8m. Height of temporary vent stack: 15m.	Figure 2.1 (sheet 4) (Volume II, Part 1)	• Located within the Parish of Crowle. • Located within a rural location. • The nearest settlement is the village of Ealand located approximately 1.5km west. • There is a public right of way (PRoW) running from the east to the west of the Site. • There is one historic landfill located within 1km, more specifically: at Keadby Power Station.
Keadby 3 AGI (Option 2)	481702, 412058	Size of AGI: 200m x 200m Height of security fence: 3m.	Figure 2.1 (sheet 4) (Volume II, Part 1)	• Located within the Parish of Keadby with Althorpe. • Located within a rural location. • Located adjacent to an industrial area. Keadby Power Station is located directly east of the AGI site (approximately 2m). • The nearest settlement is the village of Keadby, located approximately 1.4km east.

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
		Height of instrument building: 8m. Height of temporary vent stack: 15m.		• The site is located within a historic landfill site, more specifically: at Keadby Power Station.
British Steel AGI (Option 1)	491879, 405940	TBC	Figure 2.1 (sheet 6) (Volume II, Part 1)	• Located within the Parish of Messingham. • Located within a rural location. • The M180 runs to the north of the site. • The nearest settlement is the village of Holme, located approximately 1.2km south. • There are two listed buildings within 1km, the closest of which is the Grade II Listed 'Twigmore Hall', located approximately 200m east. The other – Grade II Listed 'Holme Hall' - is located approximately 710m north-west. • The Manton and Twigmoor SSSI is located approximately 400m east. • There is one PRoW running in parallel with the eastern section of the site, located approximately 400m east.
British Steel AGI (Option 2)	493520, 408607	TBC	Figure 2.1 (sheet 6)	• Located within the Parish of Messingham • The site is situated on arable land which is encompassed by industrial land and the south-east portion of the site contains industrial equipment. British Steel is located

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
			(Volume II, Part 1)	directly east of the site (approximately 40m) and there is a solar farm approximately 420m southeast. • The nearest settlement is the Scunthorpe suburb of Ashby, located approximately 1.3km south-west. • The Gadbury and Lundimore Ancient Woodland is located 900m east. • The Ashbyville LNR is located 900m west. • There are two PRoWs located within 1km of the site, the closest is located approximately 170m to the south-east. • There is one historic landfill located within 1km, more specifically: Scunthorpe Concast.
British Steel AGI (Option 3)	493493, 409071	TBC	Figure 2.1 (sheet 6) (Volume II, Part 1)	• Located within the Parish of Messingham • The proposed AGI site is situated on arable land which is encompassed by industrial land. British Steel is located directly east of the site (approximately 20m) and there is a solar farm located approximately 330m east. • • The nearest settlement is the Scunthorpe suburb Ashby, located approximately 1.3km south-west. • The Far Wood Ancient Woodland is located 900m east. • There are two PRoWs located within 1km of the site, the closest is located approximately 400m to the south-east. • There is one historic landfill located within 1km, more specifically: Scunthorpe Concast.

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
Killingholme AGI	515051, 419680	Size of AGI: 200m x 300m Height of security fence: 3m. Height of instrument building: 8m. Height of temporary vent stack: 15m.	Figure 2.1 (sheet 11) (Volume II, Part 1)	• Located within the Parish of North Killingholme. • The site is situated on arable land and enclosed by an industrial area on both the eastern and southern side. • The nearest settlement is the village of East Halton, located approximately 460m to the west. • There is a Grade I listed building – namely, 'Church of Saint Peter' - located approximately 950m south-west of the proposed AGI site. • There are two Scheduled Monuments within 1km, the closest being 'Manor Farm Moated Site' located approximately 610m north-west. The other is the Moated site and associated earthworks at Baysgarth Farm located approximately 710m south-west. • The North Haven Pits SSSI is located approximately 750m east. • The Humber Estuary SSSI, SAC, SPA and Ramsar is located approximately 880m east. • There are seven PRoWs located within 1km, the closest is located within the site. • There is one historic landfill site located within 1km, more specifically: Clough Lane Borrow Pit Site.
Saltend AGI (Option 1)	517103, 427700	Size of AGI: 220m x 380m. Height of security fence: 3m.	Figure 2.1 (sheet 12) (Volume II, Part 1)	• Located within the Parish of Holderness • Located in a rural location. • The site is in close proximity (approximately 130m) to an industrial area – more specifically, Saltend Chemical Park

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
		Height of instrument building: 8m. Height of temporary vent stack: 15m.		and Saltend Power Station – which runs in parallel to the north-western edge of the Proposed AGI site. • The nearest settlement is the town of Hedon located approximately 1km north-east. The village of Paull is also located approximately 1km south-west. • The Humber Estuary SSSI, SAC, SPA and Ramsar is located approximately 310m east. • There is one ProW that begins by running in parallel with the eastern portion of the Proposed AGI site, working its way around to run alongside the north-western border of the AGI before continuing south and away from the Proposed AGI location (approximately 60m at its closest point).
Saltend AGI (Option 2)	518635, 427519	Size of AGI: 220m x 380m. Height of security fence: 3m. Height of instrument building: 8m. Height of temporary vent stack: 15m.	Figure 2.1 (sheet 12) (Volume II, Part 1)	• Located within the Parish of Holderness. • Located in a rural location. • The A1033 runs near to the northern fringes of the site (approximately 100m). • The nearest settlement is the town of Hedon, located approximately 280m north. • There are 24 listed buildings within 1km, the closest of which is the Grade II Listed 'Harbour Farmhouse', located 200m north. • There is one Scheduled Monuments within 1km – more specifically, 'Hedon Medieval Town' located approximately 280m north.

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
				• There are eight ProWs located within 1km, the closest is located approximately 250m north of the site. • There are three historic landfill sites located within 1km, the closest of which is 'Haven' located approximately 280m north.
Saltend AGI (Option 3)	518858, 427417	Size of AGI: 220m x 380m. Height of security fence: 3m. Height of instrument building: 8m. Height of temporary vent stack: 15m.	Figure 2.1 (sheet 12) (Volume II, Part 1)	• Located within the Parish of Holderness. • Located within a rural location. • The A1033 runs near to the northern fringes of the site (approximately 110m). The nearest settlement is the town of Hedon, located approximately 290m north. • There are 20 listed buildings within 1km, the closest of which is the Grade II Listed 'Harbour Farmhouse', located approximately 350m north. • There is one Scheduled Monuments within 1km – more specifically, 'Hedon Medieval Town' located approximately 320m north. • There are eight PRoWs located within 1km, the closest is located approximately 310m north of the site. • There are three historic landfill sites located within 1km, the closest of which is 'Haven' located approximately 300m north.
Saltend AGI (Option 4)	519711, 426017	Size of AGI: 220m x 380m. Height of security fence: 3m.	Figure 2.1 (sheet 12) (Volume II, Part 1)	• Located within the Parish of Thorngumbald. • Located within a rural location. • The nearest settlement is the village of Thorngumbald, located approximately 370m north-east.

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
		Height of instrument building: 8m. Height of temporary vent stack: 15m.		• There are two listed buildings within 1km, the closest of which is the Grade II Listed 'Stables and Adjoining Coach House East of the Hall', located approximately 840m south-west. The other is the Grade II Listed 'The Hall' located approximately 890m southwest. • There are two PRoWs located within 1km, the closest is located within the site on the eastern fringe.
Saltend AGI (Option 5)	519782, 425392	Size of AGI: 220m x 380m. Height of security fence: 3m. Height of instrument building: 8m. Height of temporary vent stack: 15m.	Figure 2.1 (sheet 12) (Volume II, Part 1)	• Located within the Parish of Thorngumbald. • Located within a rural location. • The nearest settlement is the village of Thorngumbald, located approximately 540m northeast. • There are two listed buildings within 1km, the closest of which is the Grade II Listed 'Stables and Adjoining Coach House East of the Hall', located approximately 630m west. The other is the Grade II Listed 'The Hall' located approximately 670m west. • There are two ProWs located within 1km, the closest is located within the site on the eastern fringe.
Easington Pumping Facility (Option 1)	539035, 420869	Size of AGI: 500m x 350m. Height of security fence: 3m. Building/structure heights up to 10m.	Figure 2.1 (sheet 15) (Volume II, Part 1)	• Located within the Parish of Easington. • Located within a rural location. • An industrial area – namely, Perenco Easington Gas Terminal - is located directly south of the site (approximately 80m away). • The nearest settlement is the village of Easington, located approximately 1.2km south.

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
		Height of station vent stack: 45m.		• The Dimlington Cliff SSSI is located approximately 300m east. • There are four PRoWs located within 1km, the closest is located on the eastern side.
Easington Pumping Facility (Option 2)	538868, 420286	Size of AGI: 500m x 350m. Height of security fence: 3m. Building/structure heights up to 10m. Height of station vent stack: 45m.	Figure 2.1 (sheet 15) (Volume II, Part 1)	• Located within the Parish of Easington. • Located within a rural location. • An industrial area – namely, Perenco Easington Gas Terminal - borders the east of the site. • The nearest settlement is the village of Easington, located approximately 650m southeast. • There is one listed building within 1km – namely, the Grade II Listed 'Rectory Farmhouse', located 980m southeast. • The Dimlington Cliff SSSI is located approximately 530m northeast. • There are two PRoWs located within 1km, the closest of which is located approximately 70m northeast.
Block Valve Installation 1 (between Drax and Keadby)	478104, 417829	Size of AGI: 180m x 180m. Height of security fence: 3m. Height of instrument building: 8m.	Figure 2.1 (sheet 3) (Volume II, Part 1)	• Located within the Parish of Swinefleet. • Located within a rural Location. • The nearest settlement is the village of Eastoft, located approximately 2.3km southeast. • There are two listed buildings within 1km, the closest of which is the Grade II Listed 'Moorend Farmhouse', located approximately 750m north. The other is the Grade II Listed 'Stable/granary Range Approximately 30 Metres

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
		Height of temporary vent stack: 15m.		West Of Moorend Farmhouse' located approximately 760m north.
Block Valve Installation 2 (between British Steel and Killingholme)	498866, 405634	Size of AGI: 180m x 180m. Height of security fence: 3m. Height of instrument building: 8m. Height of temporary vent stack: 15m.	Figure 2.1 (sheet 9) (Volume II, Part 1)	• Located within the Parish of Swaby. • Located within a rural location. • An industrial area is located directly north of the site (approximately 200m away) and a railway line runs in parallel with the eastern portion of the site (approximately 70m away). • The nearest settlement is the village of Scawby, located approximately 1km north. • There is one listed building within 1km, namely the Grade II Listed 'Brook House', located 1km northwest. • There is one historic landfill located within 1km, more specifically: Scawby Brook Riverside. • There are two PRoWs located within 1km, the closest of which is located 510m east. • The River Ancholme is located approximately 510m east of the site.
Block Valve Installation 3 (between British Steel	511422, 412862	Size of AGI: 180m x 180m. Height of security fence: 3m.	Figure 2.1 (sheet 10) (Volume II, Part 1)	• Located within the Parish of Ulceby. • Located within a rural location. • The nearest settlement is the village of Kirmington, located approximately 1.4km southwest.

AGI Name	Approximate location	Maximum parameters	Figure number	Description of location
and Killingolme)		Height of instrument building: 8m. Height of temporary vent stack: 15m.		• There are two listed buildings within 1km, the closest of which is the Grade II Listed 'Brocklesby Station', located 740m northeast. • Located approximately 740m to the east is Brocklesby Park, a Grade I Park and Garden. • There is one historic landfill located within 1km, more specifically: Ulceby Vale Quarry. • There are two PRoWs located within 1km, the closest of which is located directly outside the northern portion of the site and follows the site round, running parallel with the eastern edge.

2.8 Construction

2.8.1 This section summarises the key construction activities of the Project.

2.8.2 Further details on the construction phase will be provided within the ES as follows:

- Details of the nature and quantity of the materials and natural resources to be used to facilitate construction;
- Details of the staff resources (quantities and type) required to facilitate construction and operation of the Project together with details around shifts/hours;
- Details of construction compound size and locations;
- Details of any construction access routes and abnormal indivisible loads; and
- Details of any pre-commissioning/commissioning activities.

Pipeline construction

2.8.3 Construction of the pipelines will be undertaken by a specialist construction company(s) who would work under the management of the Applicant. The general construction methodologies likely to be used are as follows:

Pre-construction activities

2.8.4 Ahead of construction, the route will be surveyed and marked/'pegged' out in consultation with the landowner/occupier. This would establish the precise alignment, particularly in relation to field boundaries and environmentally sensitive sites. Wherever practical, full use would be made of existing gaps in hedgerows and between mature trees, springs, seepage lines and rocky outcrops would be avoided where practicable.

2.8.5 The location and condition of existing land drainage would be established, and a record of its condition compiled. Where necessary, and subject to agreement with the landowner/occupier, new field drains would be installed to:

- Enable the landowner/occupier's current drainage system to continue working throughout the period of pipeline construction;
- Help prevent damage to the soil structure;
- Aid recovery from construction activity; and
- Ensure the site work areas are kept as dry as practically possible.

2.8.6 The design of these drainage schemes would be agreed between the Applicant, the contractor and the landowners/occupiers. A specialist drainage contractor in most instances would carry out the work. Permanent records of the land drainage locations would be produced.

2.8.7 In addition, a number of engineering surveys would be carried out including surveys to locate existing services and geotechnical surveys to establish ground conditions using trial pits, boreholes and cone penetration tests.

2.8.8 If appropriate, bio-security measures would be implemented through liaison with Department for Environment, Food and Rural Affairs (Defra's) Animal Health and Veterinary Laboratories Agency.

Preparation of the construction working width

2.8.9 All construction activities will normally be undertaken within a demarcated strip of land, fenced in places, known as the construction working width. The working width will then be cleared of vegetation. Where possible, established trees will be worked around.

2.8.10 The topsoil will be stripped across the working width, using appropriate earth moving equipment. The width of topsoil to be stripped should generally be that required to contain the pipe trench, the pipe sections, the excavation plant, the temporary running track and the width required for stacking the subsoil. The full depth of the topsoil will be stripped and stored carefully to one side of the working width in such a way that it is not mixed with subsoil or trafficked over by vehicles or construction plant.

2.8.11 In general, access will be restricted to the fenced working width and vehicles will use the temporary running track. Access will be gained to and from the public highway at road crossings and at other agreed points of access.

Pipe stringing and welding

2.8.12 Lengths of pipe (typically around 12-18m long) will be delivered to the working width, unloaded and located along the pipeline route (referred to as ‘stringing’). Sections of pipe may then be bent on site using a bending machine to accommodate horizontal and vertical changes in direction and to mimic the contours of the ground.

2.8.13 The ends of the pipe are prepared, inspected, positioned together and then clamped in place for welding using a suitable welding technique. All welds are then inspected using suitable non-destructive techniques.

2.8.14 Uncoated parts of the pipe are then coated to prevent corrosion.

Trench excavation and pipe installation

2.8.15 The pipe trenches will be dug either with trenching machines or mechanical excavators. The material excavated from the pipe trenches will generally be stored on the opposite side of the working width from the topsoil to prevent the mixing of subsoil and topsoil, which might hinder reinstatement. The depth will be variable but will normally be installed to the contour of the land with a minimum reinstated cover level of 1.2m over the top of the pipelines in agricultural land. The pipe trenches will be left open for the minimum length of time as is practicable. In areas where angular rocks or sharp stones are encountered, the pipe will need to be bedded on and surrounded by sand or similar material to prevent damage to the pipe and external coating.

2.8.16 Dewatering of the pipeline trenches may be required in some areas to stabilise the ground during construction.

2.8.17 Following trench excavation, the welded pipe sections will be carefully lowered into the trench in a continuous operation using specialist pipe laying equipment (i.e. ‘sideboom’ tractors) or equivalent plant. The pipe trenches will then be backfilled, where possible with the material taken from the trenches in the reverse order in which it was excavated preserving the original soil sequence. Sand (or similar material) padding may be used to protect the pipes if the backfill material is particularly unsuitable and in areas of rock.

2.8.18 The backfilled materials will be consolidated in layers by tamping or rolling to ensure consolidation comparable with the adjacent subsoil. Any excess material may be spread within the working width, and to ‘crown’ the trenches to allow for settlement and to aid consolidation.

2.8.19 Where necessary, outfall drains will be re-connected across the trench as part of the backfill operation.

2.8.20 Where necessary additional post construction drainage will be installed within the construction working width to ensure that the integrity of the drainage infrastructure affected by construction is adequately restored. Detailed drainage designs will have regard to soil type, existing drainage systems and land levels.

Reinstatement

2.8.21 The ground will be reinstated with the stored topsoil. All surplus construction materials will be removed upon completion of the work.

2.8.22 Following reinstatement, the restoration of the pipeline's construction working width will commence. Restoration activities will include reseeding of pastureland and reinstatement of field boundaries.

2.8.23 The route of the pipelines will be marked with marker posts at field boundaries. These will be visible from the ground and will be located to minimise interference with agricultural activities.

Special crossings

2.8.24 The crossing of trunk roads, motorways, railways and major watercourses (e.g. the River Trent) will be crossed using trenchless techniques, such as auger bore, horizontal directional drilling, micro-tunnelling etc. Trenchless techniques can install a pipeline underneath major obstructions without disturbance or interruption to the feature being crossed.

2.8.25 Other roads would typically be crossed using open cut techniques requiring an excavated trench. Roads being crossed by open cut techniques would need to be partially or completely closed for a short time during construction of the crossing, with appropriate traffic management measures and temporary diversions being put in place during the works. Crossings of minor watercourses, including rivers, streams and ditches, would typically use open cut techniques.

2.8.26 In addition to the above, the crossing solution for the intertidal zone may also use trenchless techniques such as horizontal directional drilling or micro-tunnelling. If trenchless crossing techniques are deployed, a tunnel will be drilled between a nearshore and onshore location, sufficiently deep below the sediment surface to prevent disturbance. In a horizontal directional drilling solution, the pipe is then fed in directly whereas in a micro-tunnelling solution, the tunnel is first lined with a concrete sleeve and then pipe is introduced. Consideration of alternatives for the crossing of the intertidal zone is underway and will be reported at a later stage. Options currently being considered include the use of a cofferdam in the intertidal zone, although conventional open trench techniques like this will need to take into consideration the degree of coastal erosion and intertidal sediment transport at the Easington landfall.

2.8.27 As part of the design development process, individual crossing locations would be assessed as being appropriate for open cut or trenchless techniques. The ES will identify the locations where trenchless techniques are expected to be used.

River Humber special crossing

2.8.28 The River Humber will be crossed using a trenchless technique. The crossing will be a concrete lined tunnel, under the River Humber with a minimum diameter of 3m and a maximum diameter of 6m (to be confirmed through the design process).

2.8.29 The pipelines will be laid at a depth of a minimum of 6m below the true bed of the river within a tunnel of 3m diameter minimum and 6m diameter maximum.

2.8.30 The tunnel will be constructed by using a Tunnel Boring Machine (TBM) which would be launched from a drive shaft located on the Goxhill side of the River Humber. The selection of the TBM would depend upon the findings of a ground investigation, detailed design and confirmed by the appointed contractor. The TBM could be a Slurry TBM or an Earth Pressure Balance TBM. For the purposes of this EIA Scoping Report, it is assumed that a Slurry TBM would be used as this would result in a greater requirement for processing and, therefore, more infrastructure. The TBM would be powered by onsite generators. Ventilation and intrinsically safe lighting for the machine and workforce would be provided. The TBM would travel forward, boring the diameter required.

2.8.31 Tunnel arisings would be removed from the tunnel by locomotive or by slurry pipes dependent upon the type of TBM used and removed for storage, re-use and disposal as appropriate. A treatment facility is likely to be required and this is likely to be up to 15m in height and potentially consist of a small number of silo structures. This treatment facility would only remain on site for the duration of the tunnelling works – approximately 18 to 24 months. The number of silos required would not be confirmed until the geotechnical surveys have been completed and the soil type has been classified. The tunnel linings would be transported to the rear of the tunnelling machine which would install the segments. The tunnel arisings would be evaluated to determine suitability for possible inclusion within the backfill material. The tunnel segments would be grouted into position as the construction progresses.

2.8.32 Following the completion of the tunnel construction the carbon dioxide and hydrogen pipelines would be installed in the tunnel annulus. The tunnel would be backfilled using either cementitious grout, blown glass or flooded with consideration also currently being given to leaving the tunnel open and sealing off the tunnel onshore.

AGI construction

2.8.33 Construction of the AGIs is anticipated to involve the following sequence of activities:

- Mobilisation, site preparation, establishment of temporary working areas, temporary access and laydown areas;
- Construction of an access road if required or upgrading of an existing access way;
- Installation of below ground works, such as concrete foundations, bases and plinths, below ground pipework and equipment, drainage, ducting, earthing system etc;
- Installation of above ground structures, including above ground pipework and equipment, electrical, instrumentation and telecommunication cabling, buildings and kiosks, corrosion protection arrangements utility apparatus etc;
- Installation of pipeline, mechanical instrumentation and electrical equipment;
- Connection to utilities/services (e.g. electrical, telecommunications etc);

- Provision of site finishes, vehicular access and turning areas, pedestrian access surfacing, installation of fencing, placement of site finishes such as gravel, provision of landscaping and planting as required etc;
- Testing, conducting pre-commissioning activities and commissioning; and
- Demobilisation and reinstatement of temporary works areas.

Construction compounds and site access routes

2.8.34 Temporary construction compounds and accesses to the construction working width will be established before the commencement of the construction works. These will be required for the storage of pipe, materials, mechanical plant and equipment and to facilitate access to the working area. The fenced compounds would include staff welfare facilities, waste storage and wheel washing areas.

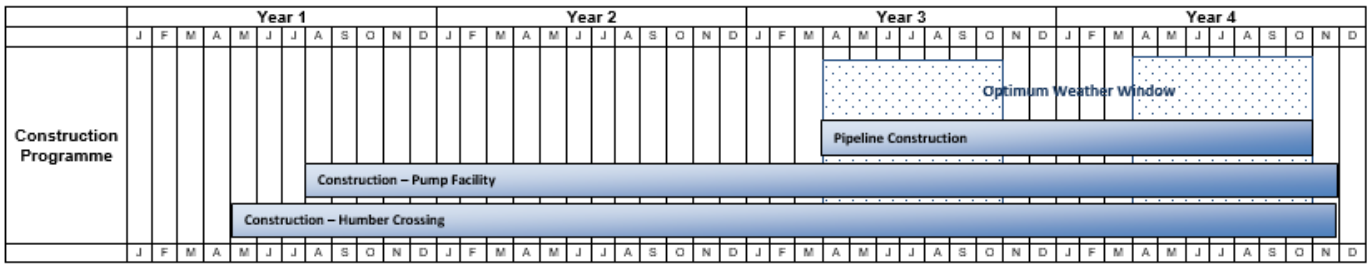
2.8.35 Further work will be undertaken to identify the land that is likely to be required for the temporary construction compounds. Where possible, the temporary construction compounds will be located close to the Project. Locations of the temporary construction compounds will be detailed within the ES.

2.8.36 Temporary haul roads will be provided to facilitate access to the construction working width, where appropriate.

Construction programme

2.8.37 The overall construction period for the Project from the commencement of construction works to the completion of commissioning is anticipated to be approximately 44 months assuming that both the carbon dioxide and the hydrogen pipelines are constructed at the same time (see Insert 2.1).

Insert 2.1: Indicative construction programme



2.8.38 The construction programme presented above may be subject to further refinement at the PEIR and ES stages. The expected construction programme will be assessed within the ES.

2.9 Operation and maintenance

2.9.1 Further information will be provided on the operational and maintenance phase in the ES as follows:

- Details of operational staffing requirements;
- Details of operational lighting;

- Details regarding emergency response plans; and
- Details of vent stacks associated with the AGIs.

2.9.2 The pipelines will be designed, constructed, operated and maintained in accordance with relevant industry codes of practice, standards and recommended practice.

- Carbon dioxide pipeline: British Standards Institution (BSI) code of practice for onshore steel pipelines, PD 8010-1:2015 (Ref 2.4); and
- Hydrogen pipeline: The Institution of Gas Engineers and Managers (IGEM) standard IGEM/TD/1 Edition 6 plus Supplement 2 (Ref 2.5).

2.9.3 The proposed pipelines will be externally coated and have a Cathodic Protection (CP) system to provide protection from corrosion.

2.9.4 Permanent low level lighting will be provided on the AGIs but will only be used when people are on site working in low light conditions.

2.9.5 Once the pipelines are in operation, they will be monitored around the clock, 365 days a year, by a remote fully staffed central control room. The central control room does not form part of this Project.

2.9.6 The pipelines will be monitored by flying or walking the route to check for activities taking place close to the pipeline to prevent pipeline damage (i.e. third party interference). The pipeline and associated AGIs will also be regularly maintained to ensure their continued reliability using trained and competent personnel and all work will be strictly controlled. Where issues are found, these would be corrected by appropriate remedial works. Periodically the pipelines will be internally inspected to check for corrosion and any damage present.

2.9.7 Some maintenance activities will require the venting of carbon dioxide or hydrogen from the AGI locations which could take place in the following circumstances:

- Depressurisation of a pipeline section to allow for maintenance activities, such as the repair of some pipeline damage or replacement of a section of pipeline. This is an infrequent event; and
- As part of routine planned maintenance or inspection activities to facilitate safe working to enable functional checks on equipment, pipeline internal inspection, isolation arrangements for invasive work etc.

2.9.8 A permanent vent stack will be required at the Pumping Facility only. Temporary vent stacks will be used at all other AGI locations.

2.9.9 The carbon dioxide and hydrogen vented will be small in volume, short term, and an infrequent event.

2.9.10 The technical capacity of the carbon dioxide and hydrogen pipelines are subject to further development and refinement during Front End Engineering and Design (FEED) and during detailed design and have not yet been confirmed. Further details will be provided as they become available with the PEIR and the ES.

2.10 Decommissioning

2.10.1 The pipelines will have an operational life of at least 40 years. When the pipelines reach the end of their life, they will be decommissioned safely under a separate consent. The

pipelines will be left in situ. The AGIs will be dismantled, all equipment will be removed, and the land returned to agricultural or other appropriate uses.

2.10.2 Decommissioning will consider all the relevant environmental legislation and technology available at the time. Any necessary licences and permits will be acquired.

2.11 Consideration of alternatives

2.11.1 Regulation 14(2)(d) of the EIA Regulations (Ref 2.6) states that an ES should include:

"a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment."

2.11.2 Design refinement will continue as the Project progresses and a full account of the alternatives considered will be provided in a standalone chapter of the ES. For the purposes of the EIA Scoping Report, a summary of the design process undertaken to date has been provided below.

2.11.3 To date, the Applicant has undertaken four stages of design evolution in which reasonable alternatives have been considered and refined. These were as follows:

- Stage 1: Initial constraints analysis;
- Stage 2: Route corridor constraints study;
- Stage 3: Routeing studies; and
- Stage 4: Route refinement for the EIA Scoping Report.

Stage 1: Initial constraints analysis

2.11.4 This report identified baseline information and constraints within two Study Areas:

- Study Area 1: This was a route originally identified for the Yorkshire and Humber Carbon Capture and Storage (YHCCS) Cross Country Pipeline, which was subject to a previous DCO application under the Planning Act 2008 (submitted in June 2014) (Ref 2.7). Study Area 1 was limited to the original draft Order Limits, totalling 1,138ha, and was studied principally to identify any changes to constraints that were considered as part of the previous application.
- Study Area 2: This Study Area covered an area to the south of the Humber Estuary and extended down the coast to just south of Theddlethorpe. Study Area 2 included the settlements of Scunthorpe, Barton-upon Humber, Grimsby, Cleethorpes, Louth, and Market Rasen. Study Area 2 did not relate to a previous application and was substantially larger than Study Area 1.

Stage 2: Pipeline route corridor constraints study

2.11.5 The purpose of the Stage 2 appraisal was to identify potential route corridor options and possible areas that could be used for landfalls to connect a wide range of Connected Projects.

2.11.6 Seven potential landfall locations, onshore and offshore pipeline route corridor options were identified in separate onshore and offshore constraints studies, allowing a

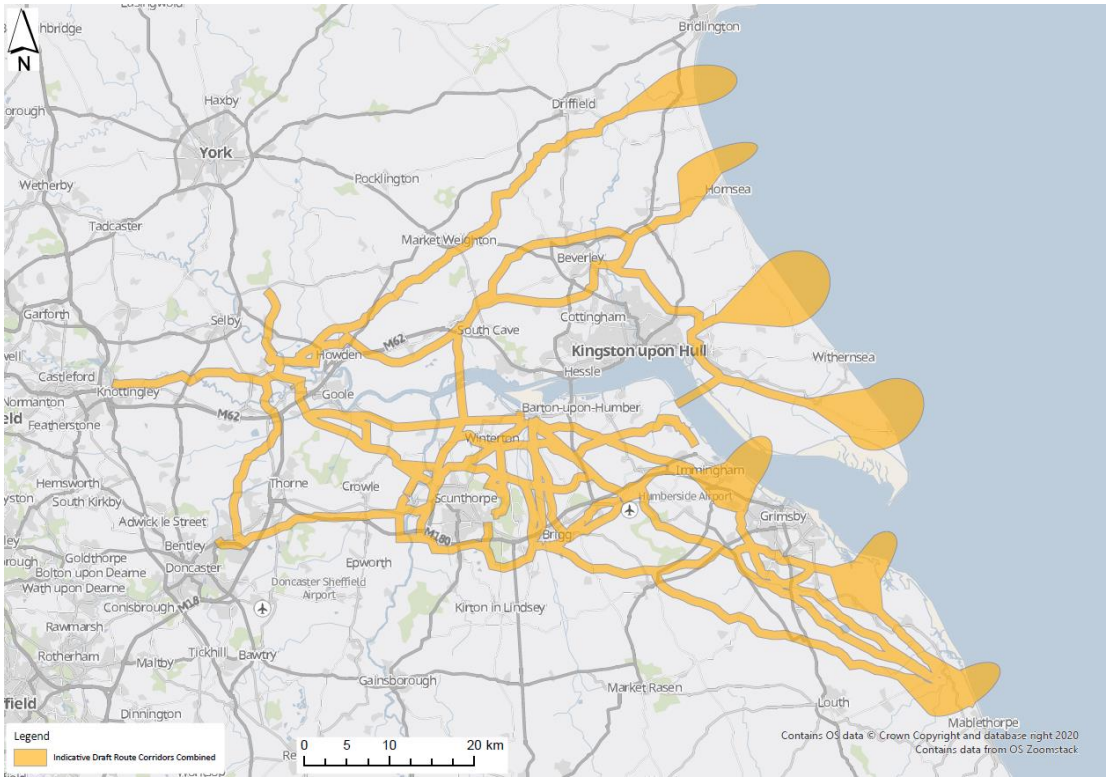
coordinated approach to the consideration of coastal constraints from Theddlethorpe in the south, to Barmston in the north. Onshore 1km wide route corridor options were identified linking Connected Projects in the Humber region to potential landfall points for onward transportation (of carbon dioxide only) to the Endurance saline aquifer under the North Sea.

2.11.7 Route corridors were identified that could link Connected Projects together, rather than each having a separate route corridor connecting back to the landfall location. Routes were identified by working from the coastal landfall locations back towards the closest Connected Project.

2.11.8 When developing routeing options, care was taken to avoid any key constraints wherever feasible, and the route corridor options were devised directed towards less constrained areas, though this was balanced with an overarching need to keep pipeline route corridors as short as practicable.

2.11.9 This work resulted in the identification of a large network of potential route corridor connections (see Insert 2.2).

Insert 2.2: Network of potential route corridor connections



Stage 3: Route corridor study

2.11.10 The Routeing Study built upon the previous stages of work by identifying a discrete set of pipeline route corridor and landfall options, and then appraising those options to inform the selection of route corridor options to present in the first round of non-statutory consultation.

2.11.11 At the commencement of the study, it was considered that there are two principal ways to connect the potential Connected Projects to the north and to the south of the Humber Estuary. These are as follows and shown in Insert 2.3:

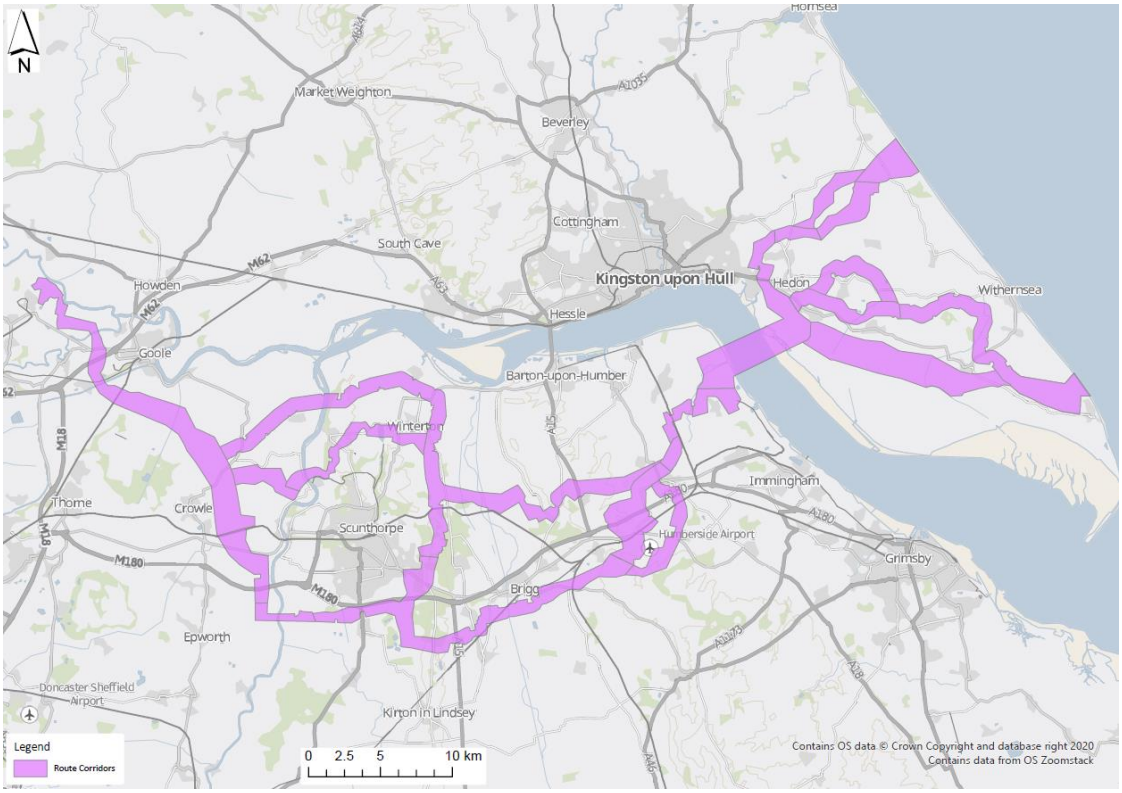
- Corridor and Preliminary Routing and Siting (CPRS) Indicative Route A: This is the shortest, most direct route, running mostly in a west to east direction, requiring a longer tunnel crossing close to the mouth of the Humber Estuary south of Paull. Most of the route corridor would be to the south of the Humber Estuary; and
- CPRS Indicative Route B: This would be a longer route with the emitters to the south of the Humber being connected via a route initially running east to west, then crossing the River Ouse with an additional section of pipeline running in a west to east direction towards the landfall.

Insert 2.3: CPRS Indicative Route A and B

2.11.12 An appraisal was undertaken on the options that make up CPRS Indicative Routes A and B. The results of this appraisal informed the preliminary recommendation to select CPRS Indicative Route A as the preferred general arrangement. This was due to the slightly lower cost to connect the Connected Projects to Saltend and the landfall options on the Holderness Coast and a shorter route leading to fewer environmental constraints.

2.11.13 Following the decision to proceed with CPRS Indicative Route A, its constituent options were reviewed in further detail. Additional route corridor options were identified through more rural areas, avoiding larger settlements, and facilitating a more viable connection to British Steel as a potential Connected Project. The overall preferred route corridors are shown in Insert 2.4 below.

Insert 2.4: Route options for first round of non-statutory consultation



Stage 4: Route refinement for the EIA Scoping Report

2.11.14 In September 2021, the Applicant published the Route Corridor Report in support of a non-statutory consultation exercise.

2.11.15 Following the non-statutory consultation exercise, a series of workshops were held to review the route corridors against feedback from the non-statutory exercise and additional information available on the environmental, socio-economic, technical and planning constraints. This refinement exercise led to the identification of a single option and a narrowing of the Scoping Route Corridor. The output of the workshops was the route on Figure 1.1 (Volume II, Part 1).

2.11.16 A series of workshops and a ground truthing exercise was also undertaken to identify potential AGI locations for further assessment. These accounted for environmental and engineering constraints. The AGI locations identified are shown on Figure 2.1 (Volume II, Part 1).

2.11.17 More detail regarding the alternatives considered within these workshops will be provided within a standalone consideration of alternatives chapter at the PEIR and ES stage.

2.12 References

- Ref 2.1 Dray (2021) *Climate change targets: the road to net zero?* Available at: https://lordslibrary.parliament.uk/climate-change-targets-the-road-to-net-zero/ (Accessed: 24 January 2022).

- Ref 2.2 Department for Business, Energy and Industrial Strategy (2021) *Climate Change Update.* Available at: https://questions-statements.parliament.uk/written-statements/detail/2021-10-19/hcws325 (Accessed: 24 January 2022).
- Ref 2.3 The Planning Inspectorate (2018) *Advice Note Nine: Rochdale Envelope.* Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/ (Accessed: 24 January 2022).
- Ref 2.4 British Standards Institute (2015) *Pipeline Systems. Steel pipelines on land – code of practice (+A1:2016).* Available at: https://www.thenbs.com/PublicationIndex/documents/details?Pub=BSI&DocID=315849 (Accessed: 26 January 2022).
- Ref 2.5 Institution of Gas Engineers (2021) *IGEM/TD/1 Edition 6 Supplement 2.* Available at: https://www.igem.org.uk/technical-services/technical-gas-standards/transmission-and-distribution/igem-td-1-edition-6-steel-pipelines-for-high-pressure-gas-transmission/ (Accessed: 25 January 2022).
- Ref 2.6 HM Government (2017) *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations').* Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made (Accessed: 23 March 2022).
- Ref 2.7 Secretary of State (2008) *Planning Act 2008.* Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents (Accessed: 26 January 2022).

3. EIA methodology

3.1 Introduction

3.1.1 This Chapter sets out the overall approach to the Environmental Impact Assessment (EIA) for the Project. Detailed methodologies adopted for each environmental topic are provided within the respective chapters of this report. The approach to the assessment has been informed by best practice guidance, as set out within Planning Inspectorate (PINS) Advice Note Seven (Ref 3.1).

3.1.2 The Environmental Statement (ES) will contain the information specified in Regulation 14(2)(a)-(f) and Schedule 4 of the EIA Regulations 2017 (Ref 3.2). In line with Regulation 14(4)(a) of the EIA Regulations 2017, the EIA will be undertaken by a suitably qualified project team and the qualifications and experience of the team will be set out in the ES. The Institute of Environmental Management & Assessment (IEMA) has awarded Arcadis the EIA Quality Mark in recognition of our commitment to excellence in EIA activities. We have continued to maintain this following annual examination in relation to our products, staff, innovation and promotion of EIA within the industry.

3.2 Consultation and engagement

3.2.1 As part of the EIA, technical engagement will be undertaken with a range of statutory and non-statutory consultees. It is anticipated at this stage that consultees will include:

- North Lincolnshire Council;
- Lincolnshire County Council;
- East Riding of Yorkshire Council;
- North Yorkshire County Council;
- Selby District Council;
- West Lindsey District Council;
- Natural England;
- Environmental Agency;
- Historic England;
- National Highways;
- Humber Nature Partnership;
- Internal Drainage Boards; and
- Marine Management Organisation.

3.2.2 Technical engagement has already commenced with the consultees detailed above with the aim of introducing the Project, seeking baseline data and agreeing the scope of the technical assessments. Any items agreed will be identified within the technical chapters

and in draft Statements of Common Ground (SoCG). Draft, work in progress, SoCGs have been shared with relevant consultees and will be updated as the technical engagement continues. Technical engagement will continue throughout the EIA process and the SoCGs will be updated as appropriate.

3.2.3 Non-statutory consultation was undertaken in September and October 2021 and statutory consultation is expected to take place in Q3 2022. The statutory consultation will be supported by a Preliminary Environmental Information Report (PEIR) which will be developed to help consultees take an informed view of the likely significant environmental effects of the Project.

3.3 Defining the Study Area

3.3.1 The Study Area for each environmental topic is set out within the respective chapters of this report (see Chapters 4 to 17).

3.4 Establishing baseline conditions

3.4.1 Likely significant environmental effects will be described in the ES in relation to the extent of changes to the existing baseline environment as a result of the construction, operation and/or decommissioning of the Project. The baseline environment includes the existing environmental characteristics and conditions, based on surveys undertaken and information available at the time of the assessment.

3.4.2 Baseline conditions will be established by:

- Site visits and surveys;
- Data from third party sources;
- Desk based studies; and
- Modelling.

3.4.3 The baseline conditions used in the ES will vary depending on the timing of surveys or the date at which data sources have been produced/assessed. It is anticipated that information required to inform the baseline environment for the assessments will be based on data obtained or surveys completed between September 2021 and September 2022. Where appropriate, existing baseline data collected prior to this may be used to inform the assessment if it is deemed to remain relevant.

3.4.4 Data obtained from third party sources may be older, but the origins of all third-party data will be clearly outlined, alongside any limitations and assumptions.

3.4.5 Baseline data which is deemed to be confidential in nature, such as that relating to protected species, will be provided in separate confidential appendices to the ES, due to the sensitivity of such species records.

Limitations

3.4.6 The period of validity for each set of baseline data collected will be set out in the ES and, where appropriate, the requirement for any repeat surveys will be specified, such as for species data.

3.4.7 It will be necessary to collect some baseline data on site. Where it is not possible to access private land, data will be collected from publicly accessible land only.

3.5 Establishing future baseline conditions

3.5.1 The ES will include an outline of the likely evolution of the existing baseline without implementation of the Project based on available information and knowledge. The future baseline scenario will be clearly set out and described within the ES.

3.6 Approach to mitigation

3.6.1 IEMA issued 'Shaping Better Quality Development' in November 2015 (Ref 3.3) and 'Delivering Better Quality Development' in July 2016 (Ref 3.4). In accordance with these guidance documents, three types of mitigation will be identified and used within the ES:

- Primary mitigation – modifications to the location or design made during the pre-application phase that are an inherent part of the Project;
- Secondary mitigation – commitments made by the Applicant that will require further activity to achieve the anticipated outcome. The effectiveness of such measures will be assessed within the ES and appropriate mitigation will be secured by the Development Consent Order (DCO) or other suitable mechanism; and
- Tertiary mitigation – actions that would occur with or without input from the EIA. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are standard practices used to manage commonly occurring environmental effects. These measures are treated as an inherent part of the Project and, where appropriate, will be set out in the draft Construction Environmental Management Plan (CEMP).

3.6.2 The primary mitigation measures will be outlined in the description of the Project chapter in the ES, and secondary and tertiary mitigation will be presented within the ES chapter for each environmental topic and draft CEMP where appropriate. The assessment of potential likely significant environmental effects will take primary and tertiary mitigation into account.

3.6.3 Following assessment of the effects of the Project, any further mitigation measures (secondary mitigation) will be outlined within the technical chapters. These mitigation measures will further reduce any adverse effects or enhance beneficial effects. The assessment of residual effects will take the secondary mitigation into account.

3.6.4 A Register of Commitments will document all mitigation to ensure suitable identification and monitoring of mitigation beyond the submission of the DCO. This will include mitigation presented in this EIA Scoping Report that is relied on to scope out issues from subsequent stages of the EIA. The delivery of these mitigation measures will be secured through requirements in the draft DCO and other suitable mechanisms, as appropriate. A draft Register of Commitments is appended to this report (Volume III, Appendix F).

3.6.5 Protective provisions are a further mechanism by which mitigation measures to protect the interests of utility owners will be secured. Relevant protective provisions will be included within the draft DCO as required.

Construction environmental management plan

3.6.6 The draft DCO will contain a requirement for a CEMP to secure the relevant mitigation items contained within the draft Register of Commitments (commitment 1). The CEMP will be the means of controlling the construction works and set out monitoring requirements, with the objective of ensuring that the effect of the construction works on people and the natural environment are reduced insofar as reasonably practicable. It will provide a detailed description of the actions required during construction and identify the party responsible. The CEMP will be based on the draft CEMP to be submitted with the Application, which will bring together relevant environmental mitigation measures identified in the ES.

3.6.7 The draft CEMP will also include good practice required during construction planning, prior to commencement and during construction such as Best Practical Means (BPM) to reduce noise and vibration and dust suppression measures.

Decommissioning environmental management plan

3.6.8 The Decommissioning Environmental Management Plan (DEMP) will set out a series of measures, based on environmental best practice guidance from a range of environmental disciplines, to control the environmental effects of the decommissioning of the Project. The DEMP will be secured through a requirement in the draft DCO.

Monitoring

3.6.9 The EIA Regulations require, where appropriate, the monitoring of potential significant adverse effects. Where monitoring arrangements are proposed as part of the mitigation set out, this will be detailed within each of the topic chapters of the ES and detailed within the draft Register of Commitments, secured by requirements in the draft DCO, and the results of any monitoring will be shared with the relevant organisations as appropriate.

3.7 Assessment of likely significant effects

3.7.1 The ES will report on the likely significant environmental effects for the construction, operational (including maintenance) and decommissioning phases of the Project and will report an estimate, by type and quantity, of expected residues and emissions.

3.7.2 The design of the Project will continue to be progressed and there will be a need to continue refining the design up to the detailed design stage, requiring a certain level of flexibility to be maintained within the draft DCO. Therefore, in line with PINS Advice Note Nine (Using the Rochdale Envelope) (Ref 3.5), a parameter-based approach (the ‘Rochdale Envelope’ approach) will be adopted to define the envelopes within which the construction and operation of the Project would be undertaken.

3.7.3 These parameters will be defined within the Application drawings and the draft DCO. The parameters approach presents the maximum envelope within which the built development may be undertaken, and an assessment of the parameters ensures a 'worst case' assessment of the full area within which the Project could be brought forward. This ensures the assessment of environmental effects associated with the Project will be the worst case, and that the actual development to be carried out within the parameters would be no worse than the effects reported in this ES.

3.7.4 The detailed design and construction methodology for the Project will be developed within these parameters without the need for further assessment (though design approvals will be required to confirm compliance with the assessed parameters).

3.7.5 The ES will present potential likely significant effects taking into account primary and tertiary mitigation followed by the residual likely significant effects taking secondary mitigation into account.

3.7.6 The following criteria will be considered when determining significance:

- Likelihood of occurrence;
- Geographical extent;
- Adherence of the proposals to legislation, planning and marine policy;
- Adherence of the proposals to legislation and planning policy;
- Adherence of the proposals to international, national and local standards;
- Sensitivity of the receiving environment or other receptor;
- Value of the affected resource;
- Whether the effect is temporary or permanent (to be defined within the ES);
- Whether the effect is short, medium, or long-term in duration (to be defined within the ES);
- Inter-relationship between effects (both cumulatively and in terms of potential effect interactions); and
- The outputs of stakeholder and public engagement.

3.7.7 The methodology for assessing the significance of an effect will vary between environmental factors but in principle, will be based on the environmental sensitivity (or value / importance) of a receptor and the magnitude of change from baseline conditions. Where topic-specific guidance requires that specific criteria or scales for determining significance are to be used this will be outlined in the relevant chapter.

3.7.8 In the absence of topic-specific guidance, both the magnitude of change and sensitivity (or value / importance) will be assessed on a scale of high, medium, low and negligible. The significance of each effect will be assessed against the magnitude of change and the sensitivity (or value / importance) of the receptor or receiving environment using the matrix in Table 3.1.

Table 3.1: Matrix for determining the significance of effect

		Sensitivity of Receptor / Receiving Environment to Change			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	Major	Major to Moderate	Moderate	Negligible
	Medium	Major to Moderate	Moderate	Minor to Moderate	Negligible

	Low	Moderate	Minor to Moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

3.7.9 When a range has been included in Table 3.1, professional judgment will be used to define the significance. Only Moderate and Major effects are considered to be significant.

3.7.10 Tables which summarise the likely significant effects will be provided. These tables will outline sensitive receptors, mitigation measures and residual effects. A distinction will be made between direct and indirect; short, medium and long-term; permanent and temporary; and positive and negative effects.

3.7.11 The ES will include details of difficulties (for example technical deficiencies) encountered compiling the required information and the main uncertainties involved.

3.8 Assessment of cumulative effects

3.8.1 The consideration of cumulative effects is an integral part of undertaking an EIA and understanding the potential changes perceived by receptors. It plays an important role in considering the wider picture of potential significant environment effects that may arise as a result of the Project.

3.8.2 There is no widely accepted methodology or best practice for the assessment of cumulative effects, although there are several guidance documents available including PINS Advice Note Seventeen (Ref 3.6).

3.8.3 The assessment will consider the following types of cumulative effects:

- Intra-project combined effects - the interaction and combination of different residual (post-mitigation) environmental effects of the Project affecting the same Receptor. For example, visual and noise effects during construction affecting the same residential dwelling; and
- Inter-project cumulative effect - the residual (post-mitigation) environmental effects of the Project combining and interacting with the residual environmental effects of committed development(s) affecting the same Receptor. For example, cumulative construction traffic effects upon a residential dwelling from the Project and a proposed housing development.

Intra-project cumulative effects

3.8.4 The approach to the assessment of intra-project combined effects for the Project will consider the changes in baseline conditions at common sensitive receptors. It will be based on the information and Study Areas within the technical chapters and will consider residual effects only.

3.8.5 The assessment will initially review the ES chapters to identify the receptors which are predicted to be subject to residual effects from more than one environmental topic. A qualitative assessment will then be undertaken upon these receptors, using professional judgement and the information provided within the technical chapters, to determine the overall intra-project combined effect significance.

Inter-project cumulative effects

3.8.6 The assessment methodology for inter-project cumulative effects will be based on PINS Advice Note Seventeen (Ref. 3.6) and will follow the following stages.

Stage 1: Establishing the long list of 'other existing development and/or approved development'

3.8.7 The Zone of Influence (ZoI) for each environmental aspect covered within the ES will be identified. This ZoI will form the search area for an initial long list of 'other developments' which will be identified through a search of the local authorities' planning registers, the PINS planning register, the Marine Management Organisation's (MMO) marine licence public register and local plans.

3.8.8 A level of certainty from Tier 1 (most certain) to Tier 3 (least certain), as defined within PINS Advice Note Seventeen (Ref 3.5), will be applied to each development.

3.8.9 As outlined within Chapter 2: Project Description, the Project forms part of a portfolio of projects known as the East Coast Cluster. At the time of writing, it is assumed that the East Coast Cluster includes an offshore carbon dioxide transportation pipeline, an offshore carbon dioxide storage facility and various onshore carbon capture or hydrogen projects within the Zero Carbon Humber (ZCH) cluster and the Net Zero Teesside cluster. The inter-project cumulative assessment long list will include all known projects within the East Coast Cluster (see Table 2.1 within Chapter 2: Project Description for projects within the East Coast Cluster). These will then be further assessed using the staged approach set out below.

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

3.8.10 Threshold criteria will be applied to the long list to produce a shortlist of developments to be scoped into the next stages of the assessment. This will ensure a proportionate approach to the inter-projects cumulative assessment.

3.8.11 Each of the developments identified will then be evaluated to determine whether the following criteria are met:

- Would the construction or operational phase overlap with the Project?
- Is there potential that the Project shares common sensitive receptors with the other development?
- Does the other development have environmental assessment information that is publicly available and is sufficient to allow the identified receptors and residual effects to be understood? Other developments that have no, or insufficient environmental assessment information, will typically not be considered as it will not be possible to accurately identify common receptors or cumulative effects.

3.8.12 Following the above review, the results will be further filtered to identify suitable projects to be taken forward to the inter-project cumulative assessment. The criteria will be as follows:

- Residential developments must comprise 200+ dwellings and lie within 1km of the Project;
- NSIPs must lie within 5km of the Project;

- A wider Study Area will be applied to cover all Connected Projects (details of which are contained within Table 2.1 within Chapter 2: Project Description), as outlined within Paragraph 3.8.9 above. In particular, this includes the Northern Endurance Partnership, an offshore pipeline of approximately 85km long to transport carbon dioxide from ZCH projects offshore and a carbon dioxide storage facility in the Southern North Sea, known as Endurance;
- Retail or commercial developments must be over 500sqm and within 1km of the Project;
- Mineral and waste developments must be within 1km of the Project; and
- Transport and infrastructure developments must be within 1km of the Project.

3.8.13 Professional judgement and a review of criteria applied for other NSIPs has been applied to develop the above criteria.

Stage 3: Information gathering

3.8.14 Information will then be gathered on the other developments scoped into the inter-project cumulative assessment at Stage 2. In line with PINS Advice Note Seventeen (Ref 3.6), the information captured will include:

- Proposed design and location information;
- Proposed programme of construction, operation and decommissioning; and
- Environmental assessments that set out baseline data and effects arising from the other developments.

Stage 4: Assessment

3.8.15 The approach to the assessment of inter-project cumulative effects will consider the deviation from the baseline conditions at common sensitive receptors as a result of changes brought about due to the Project in combination with other developments.

3.8.16 The assessment will be based upon the residual effects identified in the technical chapters of the ES, as well as available environmental information for the other developments.

3.8.17 Through a combination of the qualitative evaluation presented in the ES, conclusions will be drawn as to the likelihood for significant inter-project cumulative environmental effects (over and above, or different to, those identified for the Project on its own). The ES will describe measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant inter-project cumulative effects and, where appropriate, any proposed monitoring arrangements. The means of securing delivery of these measures will be explained.

3.9 Assessment of transboundary impacts

3.9.1 Regulation 32 of the EIA Regulations sets out the procedural duties required where the Secretary of State deems that an NSIP is likely to have significant effects on the environment in a European Economic Area (EEA) State; or where an EEA State deems that its environment is likely to be significantly affected by an NSIP. Further guidance is provided in PINS Advice Note Twelve (Ref 3.7).

3.9.2 As such, a description of any transboundary impacts that will be experienced as a result of the Project will be provided in the ES and this assessment of transboundary effects will be of effects experienced in other EEA States as a consequence of the Project. However, it is not anticipated that the Project will have significant transboundary effects.

3.10 Structure of the ES

3.10.1 At this stage it is anticipated that the ES will be structured as follows:

- Volume I: Non-Technical Summary
- Volume II: Main Text;
  - Chapter 1: Introduction
  - Chapter 2: Project description
  - Chapter 3: Consideration of alternatives
  - Chapter 4: Approach to EIA
  - Chapter 5: Agriculture and soils
  - Chapter 6: Air Quality
  - Chapter 7: Ecology and Biodiversity
  - Chapter 8: Climate
  - Chapter 9: Geology and hydrogeology
  - Chapter 10: Heritage
  - Chapter 11: Landscape
  - Chapter 12: Noise and vibration
  - Chapter 13: Socio-economics
  - Chapter 14: Human health and wellbeing
  - Chapter 15: Traffic and transport
  - Chapter 16: Waste and materials
  - Chapter 17: Hydrology and land drainage
  - Chapter 18: Major accidents and disasters
  - Chapter 19: Cumulative effects
  - Chapter 20: Summary
- Volume III: Supporting technical appendices
- Volume IV: Supporting figures and plans

3.11 Coordination of assessments

3.11.1 A number of additional assessments that will not directly form part of the ES but will be relied upon and referred to within the ES, will be completed. Relevant documents will be submitted in support of the Application.

Biodiversity Net Gain Assessment

3.11.2 For information regarding the Biodiversity Net Gain assessment, please refer to Section 6.6 of Chapter 6: Ecology and Biodiversity.

Habitats Regulations Assessment

3.11.3 The overarching aim of the Habitats Regulations Assessment (HRA) is to determine, in view of a site's conservation objectives and qualifying interests, whether a plan, either in isolation and / or in-combination with other plans or projects, could lead to adverse effects on the integrity of an International Site. Given the proximity of the Project to several International Sites, a HRA will be prepared. This will provide the consenting authority with sufficient information to decide whether the Project will lead to Likely Significant Effects (LSE) on International Sites.

3.11.4 Where LSE are identified, a detailed assessment will be provided to assess whether the proposals could result in adverse effects on the integrity of relevant international sites. Whilst the over-arching objectives of EIA and HRA are similar, their scope, level of detail and terminology vary. As such, these processes will be undertaken separately. However, the scope presented within this EIA Scoping Report has been developed to ensure that the needs of these processes have been considered to ensure a coordinated assessment.

Water Framework Directive Screening Report

3.11.5 The Water Framework Directive (WFD) Screening Report will screen for both the potential construction and operational impacts of the Project upon the relevant WFD quality elements for several surface waterbodies, a transitional waterbody, a coastal waterbody and objectives of the Humber River Basin Management Plan, and groundwater resources.

3.11.6 This includes identifying likely risks to biodiversity, the biological, physio-chemical and hydromorphological quality of watercourses and groundwater quality and quantity, and the likely ability of good-practice methods to manage risks associated with pollutants typically experienced during construction and during the operational phase.

3.11.7 The WFD Screening Report will determine the need for a full WFD assessment. If required, the scope for a WFD assessment will be discussed with the Environment Agency.

Flood Risk Assessment

3.11.8 A Flood Risk Assessment (FRA) will be prepared to support the EIA in accordance with the National Planning Policy Framework (NPPF) (Ref 3.8). The FRA will assess the potential implications of the Project on flood risk to people and property elsewhere, as well as assessing the potential risk of flooding to the Project.

3.11.9 A strategic approach to the potential impacts and sensitive receptors along the route will be undertaken due to the scale of the Project. However, a more detailed assessment will be undertaken if required at specific locations of the proposals (e.g., AGIs) depending on the expected level of flood risk and potential receptors.

3.12 Assessment of Heat, Light and Radiation

3.12.1 Schedule 4 of the EIA Regulations requires a consideration of the likely significant effects of the Project resulting from the emission of heat, light and radiation.

3.12.2 The pipelines will be below ground, and no relevant pathway or receptors have been identified that could lead to significant effects from the temperature of the carbon dioxide or hydrogen stream. It is, therefore, proposed to scope out heat from the ES.

3.12.3 Lighting will be considered in terms of effects on ecology and landscape and visual impact.

3.12.4 No significant sources of radiation are anticipated and as such it is proposed to scope this topic out of the ES.

3.13 References

- Ref 3.1 The Planning Inspectorate (2020). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements.* Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/ (Accessed: 25 March 2022).
- Ref 3.2 HM Government (2017) *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations').* Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made (Accessed: 25 March 2022).
- Ref 3.3 Institute of Environmental Management and Assessment (IEMA) (2015). *Environmental Impact Assessment Guide to Delivering Quality Development.*
- Ref 3.4 Institute of Environmental Management and Assessment (IEMA) (2016). *Guide to Shaping Better Quality Development.*
- Ref 3.5 The Planning Inspectorate (2018) *Advice Note Nine: Rochdale Envelope.* Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/ (Accessed: 24 January 2022).
- Ref 3.6 The Planning Inspectorate (2019). *Advice Note Seventeen: Cumulative Effects Assessment* Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/ (Accessed: 25 March 2022).
- Ref 3.7 The Planning Inspectorate (2020). *Advice Note Twelve: Transboundary Impacts and Process*. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-

notes/advice-note-twelve-transboundary-impacts-and-process/ (Accessed: 25 March 2022).

- Ref 3.8 Ministry of Housing Communities and Local Government (2021*) National Planning Policy Framework*. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 13 February 2022).

4. Agriculture and soils

4.1 Introduction

4.1.1 This Chapter details the proposed approach to assessing the likely significant effects (during construction, operation and decommissioning) on Agriculture and Soils. The effects on Agriculture and Soils may result from land being taken out of agricultural production and from the disturbance to soils, either through direct stripping of the soil resource to enable construction works to take place or through surface activity (for example compaction from vehicle movement across the surface). This Chapter has links with other chapters, in particular, Chapter 6: Ecology and Biodiversity; Chapter 8: Geology and Hydrogeology; Chapter 12: Socio-Economics and Chapter 16: Hydrology and Land Drainage.

4.2 Legislation, policy and guidance

4.2.1 The assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

4.2.2 There is no legislation relating to agriculture and soils relevant to this assessment.

Policy

- National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 4.1) and draft EN-4 (Ref 4.2).
  - Section 2.23 of the National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 4.1) and the current draft (Ref 4.2), which sets out policy on the protection of soil and geological resources, states that it is important for applicants to understand the soil types present and to take account of impacts on soil quality, with mitigation measures to include the appropriate treatment of soil resources during construction which should be in line with the Defra Construction Code of Practice for the Sustainable Management of Soils on Construction Sites (Ref 4.3).
- National Policy Statement for Energy (EN-1) (Ref 4.4) and draft EN-1 (Ref 4.5).
  - Section 5.10 of the Overarching National Policy Statement for Energy (EN-1) (Ref 4.4) requires applicants to seek to minimise impacts on best and most versatile (BMV) land and preferably use land in areas of poorer quality except where this would be inconsistent with other sustainability considerations. EN-1 also requires applicants to identify any effects and seek to minimise impacts on soil quality, taking into account any mitigation measures proposed. The current draft EN-1 (Ref 4.5) also encourages applicants to develop and implement a Soil Management Plan as well as stating the requirement, as outlined above, to minimise impacts on BMV land (in Section 5.11.8 for the current draft).
- National Planning Policy Framework (NPPF) (2021) (Ref 4.6).

- Relevant policies from the East Riding Local Plan (2016) (Ref 4.7), the North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 4.8) and the Selby District Core Strategy Local Plan (2013) (Ref 4.9).

Guidance

- Department for Environment, Food and Rural Affairs (Defra) (2009) Safeguarding our Soils: A Strategy for England (Ref 4.10).
- Natural England (2012). Technical Information Note 049. Agricultural Land Classification (ALC): Protecting the Best and Most Versatile Agricultural Land (Ref 4.11).
- British Standard Specification for Topsoil and Requirements for Use (BS3882:2015) (Ref 4.12).
- Defra (2009). Construction Code of Practice for the Sustainable Re-use of Soils on Construction Sites (Ref 4.3).
- National Highways et al. (2019). DMRB LA 109: Geology and Soils (Ref 4.13).
- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Good Practice Guide for Handling Soils. Cambridge: The Farming and Rural Conservation Agency (Ref 4.14).
- MAFF (1988) Agricultural Land Classification of England and Wales. Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (Ref 4.15).

4.3 Engagement

4.3.1 Engagement has been undertaken with the relevant local authorities to agree the scope and extent of Agricultural Land Classification (ALC) and landowner surveys within the Study Area, as summarised in Table 4.1. Engagement will continue throughout the Environmental Impact Assessment (EIA) process. This will include consultation with Natural England. There has not been any engagement with Natural England to date (as they have advised that they are unable to provide pre-application advice at this time). However, moving forward, engagement with Natural England will be important.

Table 4.1: Summary of engagement

Consultee	Date (method of engagement)	Summary of engagement
North Lincolnshire Council	28 February 2022 (letter circulated via email)	Scope of survey and assessment work presented as set out in this Chapter. On the 8 March 2022 North Lincolnshire Council agreed with the proposed methodology and no concerns were raised.
East Riding Council	28 February 2022 (letter circulated via email)	Scope of survey and assessment work presented as set out in this Chapter.

		On the 14 and 15 March East Riding Council officers confirmed they had no concerns or comments to raise on the scope.
North Yorkshire County Council Selby District Council Lincolnshire County Council West Lindsey District Council	28 February 2022 (letter circulated via email)	Scope of survey and assessment work presented as set out in this Chapter. Responses are awaited from these Local Authorities.

4.4 Study Area

4.4.1 The Study Area for soils and ALC comprises the land which would be directly affected by the Project (through disturbance or temporary covering of the soils). This will be based on the Order Limits for the Environmental Statement (ES), but for the purposes of Scoping the Study Area extends 1km around the Scoping Route Corridor (see Chapter 2: Project Description and Figures 4.1- 4.5 (Volume II: Part 1)) in order to provide context within which to assess the information. This is considered an appropriate Study Area based on technical knowledge of similar projects (for example, Bramford to Twinstead Reinforcement). In relation to farm businesses, the Study Area comprises the agricultural land which is likely to be directly affected by the Project (through, for example, disturbance, temporary covering of the ground or access restrictions) and will be extended where required to provide context to the businesses affected. The extent of this will be confirmed during engagement with the landowners.

4.5 Receptors

4.5.1 Key agriculture and soils receptors comprise:

- The presence of best and most versatile (BMV) land (as defined by the ALC system in guidance published by MAFF in 1988 (Ref 4.15) as land comprising Grades 1, 2 and 3a);
- The soil resources and the soil ecosystem services they provide (which relates to the health of the soil and soil functions); and
- The landholdings in agricultural use, including any specific aspects that make them sensitive in regard to fragmentation, biosecurity risks or the presence of land under agri-environmental, woodland or forestry schemes.

4.6 Baseline conditions

4.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary

Environmental Information Report (PEIR) and Environmental Statement (ES). Additionally, a summary of the baseline data collected to date has been provided.

4.6.2 The baseline assessment will be informed by a desk study which has drawn on the following key information sources:

- Ordnance Survey mapping and aerial imagery to establish land use (Ref 4.16);
- Soilscape mapping showing the distribution of main soil types was assessed on the Land Information System website (Ref 4.17);
- ALC mapping, including provisional and (where available) detailed ALC mapping from the MAGIC website (Ref 4.18);
- The extent of agri-environmental and woodland/forestry schemes from the MAGIC website (Ref 4.18); and
- ALC surveys at the Above Ground Installation (AGI) locations

4.6.3 Given the extent of the Study Area and the range of geology (solid and drift) present, the soils which have developed in these parent materials vary across the Study Area (Figure 4.1 (Volume II: Part 1)). In the coastal flats and within the floodplains, the soils are described as comprising loamy and clayey soils with naturally high groundwater levels, developed in the alluvial deposits. Where the drift geology comprises glacial till, the soils are described as comprising slowly permeable, seasonally wet slightly acid but fertile loamy and clayey soils. Some parts of the Study Area do have drift deposits and as such, the soils are developed in the solid geology which is chalk. These soils are described as comprising freely draining lime-rich soils. The Provisional ALC mapping (Figure 4.2 (Volume II: Part 1)) shows that the soils formed in the alluvial deposits and those formed on the chalk geology are of a high grade, predominantly Grade 2 with some areas of Grade 1 land (i.e. comprising BMV land). Grade 3 land is mapped in the other areas, where the solid or drift geology impose some limitations to the land quality (likely to predominantly be a wetness limitation). Some detailed ALC mapping is available (Figure 4.3 (Volume II: Part 1)) and confirms the presence of BMV agricultural land within or in close proximity to the Study Area. Land use within the Study Area appears from aerial imagery (Ref 4.16) to be predominantly arable. Some of this land is under Entry Level plus Higher Level Stewardship schemes (Figure 4.4 (Volume II: Part 1)). Occasional woodland blocks are present, some of which are under Woodland Grant Schemes (Figure 4.5 (Volume II: Part 1)).

4.7 Design, mitigation, and enhancement measures

4.7.1 Key mitigation measures are summarised below. The temporary nature of many construction activities and the subsequent reinstatement of the land is likely to result in the avoidance of long-term impacts on agricultural and soil receptors. A range of measures would be adopted to achieve this, as follows:

- The sustainable re-use of the soil resource would be undertaken in line with the Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (Ref. 4.3) and the MAFF Good Practice Guide for Soil Handling (Ref. 4.14).
- An outline Soil Resources Plan (SRP) would be developed and a detailed SRP would be required to be in place prior to any soil handling operations commencing. The SRP would include information on the soil resources present and on the handling methods and measures which would be implemented, including (but are not limited to):

- Development of a detailed SRP by the Main Works Contractor, which would include detail on existing soil information, proposed storage locations and management measures;
- Ensuring soils are stripped and handled in the driest condition possible;
- Ensuring topsoil and subsoil resources are stripped and stockpiled separately;
- Protection of stockpiles from erosion through establishment of a grass cover and from being driven or 'tracked' over;
- Confining vehicle movements to defined routes until all the soil resource has been stripped; and
- Ensuring the physical condition of the replaced soil profile is sufficient for the post-construction use (agriculture, landscape planting or habitat creation/restoration).

- All soils would be stored away from watercourses (or potential pathways to watercourses), and any potentially contaminated soil would be stored on an impermeable surface and covered to reduce leachate generation and potential migration to surface waters.
- Industry standard measures would be put in place to control pollution, including from fuel or chemical stores, silt-laden runoff or dust as detailed in the following: Chapter 5: Air Quality, Chapter 8: Ground Conditions and Chapter 16: Hydrology and Land Drainage.
- Toolbox talks would be used to inform all those working on the site of the requirements for soil handling and minimisation of disturbance to agricultural activities to minimise potential impacts on the remainder of the landholding and on neighbouring landholdings during the construction phase. Details of the proposed toolbox talks would be presented in the SRP.
- All fencing would be sufficient to resist damage by livestock (where appropriate) from adjacent land and will be regularly checked and maintained in a suitable condition. Any damage to boundary fencing would be repaired in a timely manner.
- Measures contained in relevant Defra and Environment Agency best practice guidance on the control and removal of invasive weed species (Ref. 4.19) would be implemented where appropriate, such as through the appropriate use of herbicides or removal/burial of plant materials.
- During construction, should livestock bones be discovered which may indicate a potential burial site, works would cease, and advice would be sought from the Animal Health Regional Office on how to proceed, relevant to the origin and age of the materials found.
- All movement of construction plant and vehicles between fields would cease in the event of a notification by Defra of disease outbreak in the vicinity of the Project requiring the cessation of activities. Advice and guidance from Defra would be followed to minimise the biosecurity risk associated with the continuation of works.
- Whilst the permanent effects on the land holdings are not considered to be significant, further consultation with the landowners would be undertaken to reduce the impacts on the farm businesses, as far as practicable, especially during the construction phase. This will include agreement of assurances and obligations that the Applicant would accept upon entering the land.

4.7.2 The Agriculture and Soils assessment will rely on commitments 1 and 2 outlined in the draft Register of Commitments in Volume III, Appendix F.

4.8 Description of likely significant effects

4.8.1 This section sets out the likely significant effects of the Project on Agriculture and Soils. It assumes that the relevant embedded measures and good practice measures set out within the Construction Environmental Management Plan (CEMP) are in place before assessing the effects.

Construction

Soils and ALC during construction

4.8.2 During construction there would be a potential temporary loss of BMV land (ALC Grades 1, 2 and 3a) from agricultural productivity. There would also be disturbance to soils due to the excavation and soil stripping from associated working areas for the pipelines installation and associated infrastructure. There would also be the potential for impacts on the ecosystem services the soils provide. The good practice measures which will be set out within the CEMP and the good practice soil management measures which will be set out within the SRP for soil handling, storage and reinstatement, would reduce the effects on soils.

4.8.3 By the end of construction, all land required temporarily would be reinstated and there would be no significant effects on soils or ALC. Therefore, construction effects on ALC are scoped out of the ES. Potential construction effects on soils, and the functions they provide, will be scoped in given the extent of soils which will be disturbed.

Land use during construction

4.8.4 During construction there would be potential temporary impacts on agricultural operations due to disturbance (in particular where livestock are present), fragmentation, access restrictions or disruption to water supplies or land drainage. The measures set out within the CEMP would reduce the effects to agricultural land use. Effects on land drainage are covered in Chapter 16: Hydrology and Land Drainage.

4.8.5 By the end of the construction phase, all land required temporarily would be reinstated. As the footprint of the permanent infrastructure is limited and as impacts on agricultural operations will be dealt with through agreements (which lie outside of the EIA process) it is considered that, on completion of the reinstatement of the land required temporarily, there would be no significant effects on agricultural landholdings. However, as there is the potential for disruption during construction the effects are scoped into the ES, taking a proportionate approach to the assessment.

Operation

Soils and ALC during operation

4.8.6 During operation, there would be a permanent loss of relatively small areas of agricultural land and associated soils for the AGIs, i.e. the Pumping Facility, Pipeline Inspection Gauge Traps (PIG Traps) and Block Valves (as detailed in Chapter 2: Project Description). It is unlikely that this would give rise to a significant effect; however, the

land grades and soil types affected would be confirmed through the assessment process and as such permanent impacts on soils and ALC will initially be scoped into the assessment. This would be informed by a survey following published guidelines (Ref 4.15). However, if the site survey confirms that the permanent land affected is not BMV land or that the cumulative loss is below the magnitude threshold for a likely significant effect, then permanent loss of agricultural land during operation would be scoped out of the ES. Any maintenance or repair works required which would result in disturbance to soils during operation of the Project would be undertaken in accordance with good practice soil handling methods. No likely significant effects on soils or ALC during operational maintenance or repair activities are therefore concluded and this aspect is scoped out of the ES.

Land use during operation

4.8.7 During operation, there would be limited effects on agricultural operations. Limited areas of agricultural land would be lost permanently and there is the potential for restrictions to activities immediately over or adjacent to buried pipelines; however, these will be dealt with through compensation agreements (which lie outside of the EIA process). Any maintenance or repair works required which would result in disturbance to agricultural operations would be undertaken in accordance with good practice soil handling methods. Therefore, there are no likely significant effects on agricultural landholdings during operation and this aspect is scoped out of the ES. The majority of any financial consequences on individual landowners and farmers will be temporary, as most of the land will be reinstated by the end of the construction phase and any claims regarding compensation will be addressed outside of the EIA process. As such, potential economic effects on individual landowners and farmers are scoped out of the ES.

Decommissioning

Soils and ALC during decommissioning

4.8.8 During decommissioning, the AGIs would be removed (but the pipelines will be left in situ) and the land returned to agricultural use. There could be some disturbance to soils due to temporary works (such as construction compounds) and thus the potential for impacts on the ecosystem services the soils provide. The good practice measures set out within the CEMP and the good practice soil management measures set out within the SRP for soil handling, storage and reinstatement, would reduce the effects on soils and the return of land to agricultural use would be a positive change.

4.8.9 By the end of decommissioning, all land required temporarily would be reinstated and there would be positive effect on soils and ALC (in relation to the operational phase) through land being returned to agricultural use. Therefore, decommissioning effects on ALC are scoped out of the ES. Potential decommissioning effects on soils, and the functions they provide, will be scoped in given the potential extent of soils which will be disturbed. A Decommissioning Environmental Management Plan (DEMP) will be implemented during the decommissioning phase, this shall identify and mitigate the potential impacts of decommissioning activities which could harm sensitive receptors.

Land use during decommissioning

4.8.10 During decommissioning there would be potential impacts on agricultural operations due to disturbance (in particular where livestock are present), fragmentation, access restrictions or disruption to water supplies or land drainage. The measures set out within

the CEMP would reduce the effects to agricultural land use. Effects on land drainage are covered in Chapter 16: Hydrology and Land Drainage.

4.8.11 By the end of the decommissioning phase, all land required temporarily would be reinstated and the footprint of the AGIs would be returned to agricultural use. As the footprint of the permanent infrastructure is limited, the pipelines will not be removed and impacts on agricultural operations will be dealt with through agreements (which lie outside of the EIA process) it is considered that, on completion of the reinstatement of land there would be no significant effects on agricultural landholdings. Therefore, decommissioning effects on land use are scoped out of the ES.

Matters scoped in or out of further assessment

4.8.12 The matters scoped in or out of further assessment for Agriculture and Soils are outlined in Table 4.2.

Table 4.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Temporary loss of agricultural land (incl. BMV land)	Construction		✓	Land required temporarily for the construction of the pipelines will be fully reinstated to its pre-construction condition. The assessment will detail, as embedded mitigation, the requirements for soil handling and reinstatement.	North Lincolnshire Council East Riding of Yorkshire Council
	Decommissioning		✓		
Permanent loss of agricultural land (incl. BMV land)	Operation	✓		The permanent loss of BMV land in relation to the AGIs (Pumping Facility, PIG Traps and Block Valves), and any land required for Biodiversity Net Gain, will be fully assessed.	North Lincolnshire Council East Riding of Yorkshire Council
Agricultural landholdings	Construction	✓		There is the potential for disruption during construction; a proportionate approach will be taken, focusing on the most sensitive land uses.	North Lincolnshire Council East Riding of Yorkshire Council
	Operation		✓	The majority of land required for construction, with the exception of the land required for the permanent AGIs, will be returned to its pre-construction land use and so impacts on landholdings across the Project are likely to be limited.	North Lincolnshire Council East Riding of Yorkshire Council
	Decommissioning		✓	There is the potential for disruption during decommissioning of the AGIs; a proportionate approach will be taken, focusing on the most sensitive land uses.	North Lincolnshire Council East Riding of Yorkshire Council
Soil quality and	Construction	✓		Stripping and stockpiling soils will have a temporary effect on the soil ecosystem services provided. Successful	North Lincolnshire Council

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
associated ecosystem services				reinstatement will be critical in ensuring these functions are restored.	East Riding of Yorkshire Council
	Operation		✓	The majority of land required for construction will be returned to its pre-construction land use and so impacts on soil ecosystem functions are likely to be limited.	North Lincolnshire Council East Riding of Yorkshire Council
	Decommissioning	✓		Stripping and stockpiling soils will have a temporary effect on the soil ecosystem services provided. Successful reinstatement will be critical in ensuring these functions are restored.	North Lincolnshire Council East Riding of Yorkshire Council
Economic effects on landowners	Construction		✓	The economic effects on landowners will be addressed through agreements which lie outside the scope of the Environmental Statement.	North Lincolnshire Council East Riding of Yorkshire Council
	Operation		✓		
	Decommissioning		✓		

4.9 Proposed assessment methodology

4.9.1 This section sets out the proposed methodology for the agriculture and soils assessment.

4.9.2 Apart from the EIA Regulations there are no legislative requirements governing the assessment of agricultural matters, and the framework of any assessment is derived from a combination of EU and national agricultural and land use policies and measures, along with expert judgement. The key elements of these can be summarised as:

- The conservation of the best and most versatile resources of agricultural land;
- Retention of a competitive and sustainable agricultural industry;
- The diversification of individual farm businesses into supplementary non-agricultural activities; and
- The more positive engagement of individual farm businesses with the delivery of environmental benefits.

4.9.3 As published guidance relating to soils and land grade (as defined by the ALC system) is limited the approach which will be followed is based on technical knowledge and previous experience. This will take account of the only existing guidance as set out in the Design Manual for Roads and Bridges (DMRB), LA 109 (Ref 4.13) and the recently published Institute of Environmental Management and Assessment (IEMA) guidance (Ref 4.20).

4.9.4 Agricultural and soils receptors will be identified within the Study Area through a review of existing available information. A site walkover and targeted soil and ALC surveys will be undertaken at the locations of the AGIs and the information used to support the Environmental Assessment. The ALC survey will be undertaken in accordance with the published guidelines from the Ministry of Agriculture Fisheries and Food (Ref 4.13) at a density of at least one auger per hectare.

Future baseline

4.9.5 The baseline in relation to soils and ALC grades is unlikely to change from that described over the timescales considered in the assessment. The UK Climate Projections (Met Office, 2021) provide an assessment of likely climate change trends for the 21st century, with potential changes including wetter winters and drier summers (with higher intensity rainfall), that could affect soil conditions, land grade and farming practices. However, these are unlikely to manifest as noticeable changes in land grade or land management over the time period of the construction phase.

4.9.6 There could potentially be changes to land management practices and business approaches across the landowners/land managers. The relevance of any potential future changes to the assessment of impacts will be covered in the ES.

Ascribing Value/Sensitivity

4.9.7 The criteria used to determine the value and sensitivity of receptors specific to agriculture and soils are set out in Table 4.3. These values are based on technical knowledge and previous experience.

Table 4.3: Criteria for Determining Value/Sensitivity

Sensitivity/Value	Criteria
Very high	Soils directly supporting an internationally designated site (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar).
High	Soils supporting nationally designated sites like National Nature Reserve/Site of Special Scientific Interest. ALC grade 1, 2 and 3a land (i.e. BMV land). Soils with low or no wetness limitation affecting workability (wetness class I or II), where drought is not also a limitation. Soils with a high susceptibility to structural damage and soil erosion throughout the year, including heavily textured, poorly structured soils.
Medium	Soils supporting non-statutory designated sites (e.g. Local Nature Reserve, County Wildlife Site, Sites of Nature Conservation Importance). ALC Grade 3b land. Soils with low wetness limitation affecting workability (wetness class II), where drought is not also a limitation. Soils with some seasonal susceptibility to structural damage and soil erosion.
Low	Soils supporting non-designated notable or priority habitats. ALC grade 4 land. Soils with moderate wetness limitation affecting workability (wetness class III or IV). Soils with medium to course textures and some resistance to structural damage for most of the year.
Negligible	ALC grade 5 land. Soils with high wetness limitation affecting workability (wetness class V or VI). Soils in which susceptibility to drought is a limitation to crop growth. Course textured and stony soils with little potential for structural damage.

Impact magnitude

4.9.8 The criteria used to determine the magnitude of change for agriculture and soils are set out in Table 4.4. These values are based on DMRB LA 109 (Ref 4.13) and professional judgement.

Table 4.4: Criteria for Determining Magnitude

Magnitude	Description
Large	Physical removal of soil resources or permanent covering of subsoil over an area of greater than 20ha. Loss of more than 20% of farmed land associated with an agricultural farm holding. Permanent loss of entire area of land under agri-environment or Woodland Grant scheme. No access possible to severed land. Existing land-use across land holding would not be able to continue.
Medium	Physical removal of soil resources or permanent covering of subsoil over an area of 5 – 20ha. Permanent loss/reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource). Loss of more than 10–20% of farmed land associated with an agricultural farm holding. Long-term, reversible, loss of entire area or majority of land under agri-environment or Woodland Grant scheme. Access possible to severed land via the public highway. Existing land-use across land holding would be able to continue but with major changes such as loss of yield, additional land management or increased use of fertilisers and herbicides.
Small	Physical removal of soil resources or permanent covering of subsoil over an area of between 1 – 5ha. Temporary loss/reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource). Loss of more than 5–10% of farmed land associated with an agricultural farm holding. Short- to medium-term reversible loss, or permanent loss of small areas, of land area under agri-environment or Woodland Grant scheme. Access possible to severed land via private ways. Existing land-use across land holding would be able to continue but with some changes such as loss of yield, additional land management or increased use of fertilisers and herbicides.

Negligible	Physical removal of soil resources or permanent covering of subsoil over an area of less than 1ha. No discernible loss/reduction of soil function(s) that restrict current or approved future use. Loss of less than 5% of farmed land associated with an agricultural farm holding. No severance. Short-term impacts to receptors with no impact on integrity. No material changes to existing land-use.

Significance

4.9.9 Significance will be derived using the matrix set out in Table 3.1, Chapter 3: EIA Methodology. This may be supplemented by technical judgement which, where used, will be explained to give the rationale behind the values assigned. Overall significance will also be concluded for each aspect of agriculture and soils, taking into consideration the potential for the Project to affect more than one attribute of soils or a landholding.

4.10 Limitations and assumptions

4.10.1 There are no identified limitations associated with undertaking the assessment as set out in this Chapter.

4.11 References

- Ref 4.1 Department for Business, Energy and Industrial Strategy (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed: 24 March 2022).
- Ref 4.2 Department for Business, Energy and Industrial Strategy (2021) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 23 March 2022).
- Ref 4.3 Defra (2009) *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.* Available at: https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites (Accessed: 23 March 2022).
- Ref 4.4 Department of Energy & Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 24 March 2022).

- Ref 4.5 Department of Energy & Climate Change (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 23 March 2022).
- Ref 4.6 Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework.* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 23 March 2022).
- Ref 4.7 East Riding of Yorkshire Council (2016) *East Riding Local Plan.* Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/east-riding-local-plan/ (Accessed: 22 March 2022).
- Ref 4.8 North Lincolnshire Council (2011) *North Lincolnshire Local Development Framework Core Strategy.* Available at: https://www.northlincs.gov.uk/planning-and-environment/planning-policy-the-north-lincolnshire-local-plan/ (Accessed: 23 March 2022).
- Ref 4.9 Selby District Council (2013) *Selby District Core Strategy Local Plan*. Available at: https://www.selby.gov.uk/selby-district-core-strategy-local-plan (Accessed: 22 March 2022).
- Ref 4.10 Defra (2009) *Safeguarding our Soils: A Strategy for England.* Available at: https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england (Accessed: 23 March 2022).
- Ref 4.11 Natural England (2012) *Natural England Technical Information Note 049. Agricultural Land Classification: protecting the best and most versatile agricultural land.* Available at: http://publications.naturalengland.org.uk/publication/35012 (Accessed: 23 March 2022).
- Ref 4.12 British Standards Institution (2015) *BS 3882:2015. Specification for Topsoil and Requirements for Use.* Available at: https://shop.bsigroup.com/products/specification-for-topsoil/tracked-changes (Accessed: 22 March 2022).
- Ref 4.13 National Highways (2019*) Design Manual for Roads and Bridges: Geology and Soils (LA109).* Available at: https://standardsforhighways.co.uk/dmrb/search/adca4c7d-4037-4907-b633-76eaed30b9c0 (Accessed: 23 March 2022).
- Ref 4.14 Ministry of Agriculture, Fisheries and Food (2000) *Good Practice Guide for Handling Soils. Cambridge: The Farming and Rural Conservation Agency*. Available at: https://viking-link.com/media/1572/cda31-maff-agricultural-land-classification-in-england-and-wales-a-good-practice-for-handling-soils-april-2000.pdf (Accessed: 22 March 2022).
- Ref 4.15 Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. Available at: http://publications.naturalengland.org.uk/publication/6257050620264448 (Accessed: 23 March 2022).
- Ref 4.16 Google (2022) *Google Maps*. Available at: https://www.google.co.uk/maps (Accessed: 16 Feb 2022).

- Ref 4.17 Cranfield University/Department of Environmental, Food and Rural Affairs (2022) *Land Information System (LandIS) website.* Available at: www.landis.or.uk/soilscapes (Accessed: 17 Feb 2022).
- Ref 4.18 Defra (2022) *Multi-Agency Geographical Information System (MAGIC).* Available at: http://magic.defra.gov.uk (Accessed: 17 Feb 2022).
- Ref 4.19 Environment Agency (2019) *Treatment and disposal of invasive non-native plants: RPS 178.* Available at: https://www.gov.uk/government/publications/treatment-and-disposal-of-invasive-non-native-plants-rps-178 (Accessed: 17 Feb 2022).
- Ref 4.20 Institute of Environmental Management and Assessment (2022*) A new perspective on Land and Soil in Environmental Impact Assessment.* Available at: iema.net/articles/land-and-soil-in-environmental-impact-assessment (Accessed: 13 February 2022).

5. Air Quality

5.1 Introduction

5.1.1 This Chapter addresses the proposed scope of the Environmental Impact Assessment (EIA) with respect to air quality. It includes a summary of relevant engagement to date, baseline data sources and the proposed methodology for the assessment of possible construction, operational and decommissioning effects. Matters that are to be scoped in and out of the assessment are identified. It considers all air quality sensitive receptors within the Study Area including human receptors and ecological sites.

5.2 Legislation, policy, and guidance

5.2.1 The assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance:

Legislation

- EU Framework Directive 96/62/EC (Ref 5.1);
- Directive 2008/50/EC on ambient air quality and cleaner air for Europe (Ref 5.2);
- Part IV of the Environment Act (1995, amended 2021) (Ref 5.3); and
- Air Quality Standards Regulations (Ref 5.4).

Policy

- Overarching National Policy Statement for Energy (EN-1) (Ref 5.5).
  - Section 5.2 of the Overarching National Policy Statement for Energy (EN-1) (Ref 5.5) suggests that if a project is likely to have adverse effects on air quality an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 5.2.7 puts forth a number of aspects associated with the assessment of air quality that should be included in the ES, for example, "*existing air quality levels and the relative change in air quality from existing levels*" (Ref 5.5).
- Draft Overarching National Policy Statement for Energy (EN-1) (Ref 5.6).
  - Within Section 5.2 of the Draft Overarching National Policy Statement for Energy (EN-1) (Ref 5.6) the information surrounding the air quality assessment outlined in the previous bullet is reiterated. The Draft EN-1 points to the use of the Air Quality Standards Regulations (Ref 5.4) for information surrounding the level of pollutants in ambient air. These are outlined in the legislation section above and will be utilised within the assessment of air quality.
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 5.7).

- Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 5.8).
- National Planning Policy Framework (Revised) (NPPF) (Ref 5.9).
- Selby District Core Strategy Local Plan (Ref 5.10).
- East Riding Local Plan (Ref 5.11).
- North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 5.12).
- Central Lincolnshire Local Plan (2017) (Ref 5.13).

Guidance

- National Planning Practice Guidance (update) (NPPG) (Ref 5.14).
- Institute of Air Quality Management Guidance on the assessment of dust from demolition and construction, 2014 (Ref 5.15).
- Institute of Air Quality Management and Environmental Protection UK: Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London (Ref 5.16).

5.3 Engagement

5.3.1 Engagement has been undertaken with relevant local authorities to agree the proposed methodology and approach for the air quality assessment. These local authorities included East Riding of Yorkshire, North Lincolnshire Council, Selby District Council and West Lindsey District Council. Lincolnshire County Council and North Yorkshire County Council were not consulted with regards to Air Quality as they do not have a remit with regards to the topic, instead it is dealt with by the District Councils. Engagement will continue throughout the EIA process. A summary of engagement to date has been provided in Table 5.1.

Table 5.1: Summary of engagement

Consultee	Date (method of engagement)	Summary of engagement
East Riding of Yorkshire Council	26 November 2021 (letter issued via email). Response received 29 November 2021.	A note outlining the methodology for the Air Quality assessment was provided. East Riding of Yorkshire agreed with the proposed approach and provided confirmation of the most recent baseline air quality monitoring data.
North Lincolnshire Council	26 November 2021 (letter issued via email). Response received 1 December 2021.	A note outlining the methodology for the Air Quality assessment was provided. North Lincolnshire Council agreed with the proposed approach. They requested that details of vehicle trips and screening criteria are included in future reports in order to confirm vehicle emissions can be scoped out.
Selby District Council	26 November 2021 (letter issued via email). Response received 3 December 2021.	A note outlining the methodology for the Air Quality assessment was provided. Selby District Council agreed with the proposed approach. They would like to see justification for the siting of construction compound areas where / if in close proximity to sensitive receptors. They confirmed that scoping out of vehicle emissions is dependent on potential for impact along New Street Air Quality Management Area (AQMA) in Selby, anticipated to be negligible upon review of traffic data. They requested that an acknowledgement of cumulative impacts from the Drax Bioenergy with Carbon Capture and Storage Project at Drax Power Station was included in the assessment.

Consultee	Date (method of engagement)	Summary of engagement
West Lindsey District Council	26 November 2021 (letter via email). Response received 17 February 2022.	A note outlining the methodology for the Air Quality assessment was provided. West Lindsey District Council agreed with the proposed methodology and approach for air quality assessment with no queries or comments.

5.4 Study Area

5.4.1 The Institute of Air Quality Management (IAQM) construction dust guidance (Ref. 5.15) requires that construction dust impacts are assessed up to 350m from the locations of demolition, construction and earthworks activities. The construction phase Study Area also includes the first 50m of any local road within 500m from the main site entrance(s) used by the site construction vehicles, as per IAQM construction dust guidance (Ref 5.15).

5.4.2 The number of vehicles associated with the construction phase of the Project is not yet confirmed; however, it is anticipated that detailed assessment of construction vehicle emissions will be scoped out as traffic flows are expected to be below the IAQM screening criteria (Ref 5.16). This will be confirmed upon receipt and screening of construction traffic data. If construction Heavy Duty Vehicle (HDV) flows are expected to be greater than 100 Annual Average Daily Traffic (AADT) flows on a road during the construction phase or 25 AADT within an AQMA, then exhaust emissions from construction vehicles will be modelled at receptors within 200m of these roads.

5.4.3 The IAQM development control guidance (Ref. 5.16) details its own indicative criteria with respect to change as a result of a project's operational phase that, if met, highlight the need for an assessment, rather than necessarily defining the boundaries of a Study Area. The criteria are:

- A change in Light Duty Vehicle (LDV) flows of >100 AADT within or adjacent to an AQMA, or >500 AADT elsewhere;
- A change in HDV flows of >25 AADT within or adjacent to an AQMA, or >100 AADT elsewhere;
- Where a road is realigned by 5m or more and is within an AQMA;
- Where a junction is added or removed close to existing receptors; and
- Where there are one or more substantial combustion processes where there is a risk of impacts at relevant receptors.

5.4.4 The same screening criteria will be used to define the Study Area should the operational phase be scoped in for assessment. However, operational phase traffic flows are expected to be below these screening criteria and therefore it is proposed to scope out the assessment of operational vehicle emissions as air quality impacts will be negligible.

5.5 Receptors

5.5.1 Construction dust impacts may affect human and ecological receptors. The IAQM construction dust guidance (Ref. 5.15) defines a human receptor as:

"[…] any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM10 over a time period relevant to the Air Quality Objectives. In terms of annoyance effects, this will most commonly relate to dwellings, but may also refer to other premises such as buildings housing cultural heritage collections (e.g. museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (e.g. salad or soft-fruit production)."

5.5.2 An ecological receptor is defined as:

"[…] any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats)".

5.5.3 The following high sensitivity human receptors have been identified:

- Residential properties, schools, care homes and hospitals within 350m of the locations of demolition, construction and earthworks activities and within 50m of the highway up to 500m from site entrances and exits.

5.5.4 The following designated ecological sites that are potential air quality sensitive receptors have been identified:

- Humber Estuary – Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site;
- Greater Wash – SPA;
- Ashbyville – Local Nature Reserve (LNR); and
- Manton and Twigmoor – SSSI.

5.5.5 The following nationally designated ecological site that has potential sensitive receptors in the intertidal, has been identified:

- Holderness Inshore – Marine Conservation Zone (MCZ).

5.6 Baseline conditions

5.6.1 4.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

5.6.2 Baseline data will be collated to determine the existing air quality conditions in the area that is likely to be affected by the Project. A review of the existing baseline will be undertaken to establish an understanding of the baseline air quality environment, to identify areas that are likely to be sensitive to changes in emissions as a result of the Project. Baseline information on air quality will be collected from the following sources:

- Defra UK Air website (Ref 5.17) – to establish predicted background concentrations for NO2, PM10 (10µm) and PM2.5 (2.5µm).
- Local authority websites and annual Air Quality Status Reports – to determine existing AQMAs and local air quality monitoring results:
  - Selby District Council 2020 Air Quality Annual Status Report (Ref 5.18);
  - East Riding of Yorkshire Council 2021 Air Quality Annual Status Report (Ref 5.19);
  - North Lincolnshire Council 2020 Air Quality Annual Status Report (Ref 5.20); and
  - West Lindsey District 2021 Air Quality Annual Status Report (Ref 5.21).
- MAGIC website (Ref 5.22) – to identify ecological sites within the air quality Study Area.

5.7 Design, mitigation, and enhancement measures

5.7.1 Construction phase mitigation measures will be proposed as a function of the dust soiling and human health risk ratings allocated by following the IAQM construction dust guidance (Ref 5.15). The IAQM construction dust guidance also details an extensive list of potential mitigation measures by construction activity. Appropriate mitigation measures identified from the construction dust risk assessment will be secured through a draft Construction Environmental Management Plan (CEMP), that will be secured as a requirement in the draft Development Consent Order (DCO). A draft CEMP will be provided with the DCO application.

5.7.2 During construction, mitigation measures will be employed to ensure that dust emissions are minimised to a negligible impact. At this stage it is assumed that best practice mitigation measures for medium risk sites will be employed based on IAQM construction dust guidance (Ref 5.15).

5.7.3 Construction dust mitigation measures are considered tertiary mitigation i.e., actions that are standard best practices used to manage commonly occurring environmental effects.

5.7.4 The Air Quality assessment will rely on commitments 1 and 2 outlined in the draft Register of Commitments in Volume III, Appendix F.

5.8 Description of likely significant effects

Construction

5.8.1 Construction phase activities associated with the Project such as earthworks and trackout (the transport of dust and dirt from the construction site onto the public road network) can give rise to adverse impacts from fugitive emissions of dust such as nuisance and health impacts if left unmitigated. Additionally, the movement of materials and waste to and from the site by construction vehicles can lead to adverse impacts from increased exhaust emissions of air pollutants, such as nitrogen dioxide and particulate matter. These impacts are likely to be temporary in nature and have the potential to be well controlled through best practice mitigation measures. There may also be increases in nitrogen dioxide, particulate matter less than PM10 and particulate matter less than PM2.5 concentrations due to emissions from non-road mobile machinery (NRMM) used during construction (specific plant used during construction will be detailed within the ES). However, it is proposed for construction vehicle emissions to be scoped out and this will be confirmed with relevant consultees following screening of construction traffic flow data.

5.8.2 Relevant Connected Projects will be considered cumulatively within the construction phase assessment.

Operation

5.8.3 Traffic trips associated with the operation and maintenance of the Project are anticipated to be below the IAQM indicative criteria (Ref 5.16) for potential significant effects. Therefore, air quality impacts associated with operational phase vehicle emissions will be negligible and are proposed to be scoped out of further assessment.

5.8.4 There may be venting of carbon dioxide and hydrogen from above ground installations (AGIs) during maintenance works; however, these would be infrequent and temporary in nature and therefore negligible in terms of air quality impacts and significance. There are no other operational phase emissions sources or air quality impacts associated with the Project anticipated for inclusion in the air quality assessment.

Decommissioning

5.8.5 Activities associated with the decommissioning phase of the Project such as demolition, earthworks and trackout have the potential for fugitive dust emission impacts and potential impacts from vehicle emissions. These impacts are likely to be temporary in nature and have the potential to be well controlled through best practice mitigation measures. A Decommissioning Environmental Management Plan (DEMP) will be a requirement within the draft DCO. The DEMP will contain similar dust control measures as set out within the CEMP.

Matters scoped in or out of further assessment

5.8.6 The matters scoped in or out of further assessment for Air Quality are as follows outlined in Table 5.2.

Table 5.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Fugitive dust emissions	Construction and decommissioning	✓		Construction and decommissioning works have the potential to generate dust. Potential dust emission effects on receptors include: • Annoyance due to dust soiling; • Harm to ecological receptors; and • The risk of health effects due to a significant increase in exposure to PM10.	Selby District Council, East Riding of Yorkshire Council, North Lincolnshire Council and West Lindsey District Council.
Emissions from Non-Road Mobile Machinery (NRMM)	Construction and decommissioning		✓	NRMM emissions will represent a small source of emissions relative to ambient local conditions in the vicinity of the locations of demolition, construction and earthworks activities. Potential impacts would be temporary in nature and considered to be negligible. Suitable mitigation measures will be incorporated into the CEMP to comply with NRMM standards.	Selby District Council, East Riding of Yorkshire Council, North Lincolnshire Council and West Lindsey District Council.
Vehicle emissions	Construction, operation and decommissioning		✓	Traffic trip generation anticipated to be less than IAQM guidance criteria. Best practice mitigation measures incorporated in CEMP.	Selby District Council*, East Riding of Yorkshire Council, North Lincolnshire Council*

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
				Impact considered to be negligible.	and West Lindsey District Council. *agreed in principle to be confirmed upon review of traffic data once available

5.9 Proposed assessment methodology

5.9.1 The potential impacts from dust emissions arising from activities during the construction and decommissioning phase of the Project will be considered following IAQM construction dust guidance (Ref 5.15). This is a risk-based qualitative assessment approach and is applied to air quality assessments throughout the UK.

5.10 Limitations and assumptions

5.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- Assumes construction dust Study Area to include up to 350m from construction working width for demolition, construction and earthworks activities (instead of full application site boundary).

5.11 References

- Ref 5.1 European Union (1996) *The Air Quality Framework Directive (96/62/EC).* Official Journal of the European Communities.
- Ref 5.2 European Union (2008) *Ambient Air Quality and Cleaner Air for Europe (2008/50/EC).* Official Journal of the European Union.
- Ref 5.3 The Stationery Office Ltd. (1995) *Part IV of the Environment Act (Air Quality) (amended 2021)*.
- Ref 5.4 The Stationery Office Ltd. (2010) *The Air Quality Standards Regulations* 2010, Statutory Instruments No. 1001.
- Ref 5.5 Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 22 March 2022).
- Ref 5.6 Ministry of Business, Energy and Industrial Strategy (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 13 February 2022).
- Ref 5.7 Department of Energy and Climate Change (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed: 22 March 2022).
- Ref 5.8 Department of Energy and Climate Change (2021) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 22 March 2022).
- Ref 5.9 Ministry of Housing Communities and Local Government (2021) *National Planning Policy Framework.* Available at:

https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 13 February 2022).

- Ref 5.10 Selby District Council (2013) *Core Strategy Local Plan.* Available at: https://www.selby.gov.uk/core-strategy-2013 (Accessed: 18 February 2022).
- Ref 5.11 East Riding of Yorkshire Council (2016) *East Riding Local Plan.* Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/ (Accessed: 17 February 2022).
- Ref 5.12 North Lincolnshire Council (2011) *Local Development Framework Core Strategy.* Available at: https://www.northlincs.gov.uk/planning-and-environment/planning-policy-the-north-lincolnshire-local-plan/ (Accessed: 16 February 2022).
- Ref 5.13 Central Lincolnshire Joint Strategic Planning Committee (2017) *Central Lincolnshire Local Plan.* Available at: https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan/ (Accessed: 17 February 2022).
- Ref 5.14 Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Guidance: Air Quality.* Available at: https://www.gov.uk/guidance/air-quality--3 (Accessed: 13 February 2022).
- Ref. 5.15 Institute of Air Quality Management (2014) *IAQM Guidance on the assessment of dust from demolition and construction*. Institute of Air Quality Management, London.
- Ref. 5.16 Institute of Air Quality Management and Environmental Protection UK (2017) *Land-use Planning & Development Control: Planning for Air Quality. v1.2*. Institute of Air Quality Management, London.
- Ref 5.17 Department of Environment, Food and Rural Affairs (2022) *UK Air*. Available at: https://uk-air.defra.gov.uk/ (Accessed: 18 February 2022).
- Ref 5.18 Selby District Council (2020) *2020 Air Quality Annual Status Report*. Available at: https://www.selby.gov.uk/local-air-quality-management (Accessed: 17 February 2022).
- Ref 5.19 East Riding of Yorkshire Council (2021*) 2021 Air Quality Annual Status Report*. Available at: https://www.eastriding.gov.uk/environment/pollution/air-pollution/air-quality-monitoring/ (Accessed: 16 February 2022).
- Ref 5.20 North Lincolnshire Council (2020) *2020 Air Quality Annual Status Report (ASR)*. Available at: https://www.nlincsair.info/Files/Reports/ASR%202020%20FINAL.pdf (Accessed: 16 February 2022).
- Ref 5.21 Bureau Veritas (2021) *West Lindsey District Council Annual Status Report 2021*. Available at: https://www.west-lindsey.gov.uk/_resources/assets/attachment/full/0/120987.pdf (Accessed; 17 February 2022).
- Ref 5.22 Department of Environment, Food and Rural Affairs (2022) *Multi-Agency Geographic Information for the Countryside Maps.* Available at: https://magic.defra.gov.uk/ (Accessed: 17 February 2022).

6. Ecology and Biodiversity

6.1 Introduction

6.1.1 This Chapter considers the impact of the Project on Ecology and Biodiversity and sets out the proposed methodology for the assessment of effects. It considers all possible Important Ecological Features (IEFs) within the Study Area (see Section 6.3 for definition) including designated sites, ancient woodland, habitats and protected, notable and non-native invasive flora and fauna, and identifies those features that can be scoped out of the Environmental Impact Assessment (EIA).

6.2 Legislation, policy, and guidance

6.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

- Environment Act 2021 (Ref 6.1).
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Habitats Regulations) (Ref 6.2).
- Wildlife and Countryside Act 1981 (as amended) (Ref 6.3).
- Countryside and Rights of Way (CROW) Act 2000; (Ref 6.4).
- Natural Environment and Rural Communities (NERC) Act 2006 (Ref 6.5).
- The Hedgerows Regulations 1997 (Ref 6.6).
- Protection of Badgers Act 1992 (Ref 6.7).
- Marine and Coastal Access Act (MCAA) 2009 (Ref 6.8).

Policy

- National Policy Statement for Energy (EN-1) (Ref 6.9).
  - Sections 4.3 (Habitats and Species Regulations), 4.10 (Pollution control and other environmental regulatory regimes) and 5.3 (Biodiversity and geological conservation);
- Draft National Policy Statement for Energy (EN-1) (Ref 6.10).
  - Sections 4.2 (Environmental Principles), 4.5 (Environmental and Biodiversity Net Gain (BNG)), 4.11 (Pollution Control and Other Environmental Regulatory Regimes) and 5.4 (Biodiversity and Geological Conservation).
  - EN-1 states that *'although achieving biodiversity net gain is not currently an obligation on applicants, a proposed amendment to the Environment Bill, would mean the Secretary of State may not grant an application for Development Consent Order (DCO) unless satisfied that a biodiversity gain objective is met in*

relation to the development to which the application relates. The biodiversity gain objective will be set out in a biodiversity gain statement. Normally these statements will be included within National Policy Statements (NPS) but the amendment allows for the statement to be published separately where a review of an NPS has begun before the proposed amendment comes into force. This would be the case with the energy NPS, should the amendment come into force'. The Project is therefore intending to deliver BNG as outlined in the Conservation Strategy (Volume III, Appendix A). Any additional biodiversity gain objectives will be incorporated into the Project (where practicable) as and when published.

  - EN-1 also states that '*sites identified, or required, as compensatory measures for adverse effects on other Habitat Regulation Assessment (HrA) sites*' should be '*given the same protection as sites covered by the Habitat's Regulations*', implying that any land identified/used by other Projects to compensate for impacts to European Sites should be included within the HRA. This will be taken into account when producing the HRA.
  - EN-1 also states that the applicant should demonstrate that '*the timing of construction has been planned to avoid or limit disturbance to birds during the breeding season*'. This will be taken into account during Project design.

- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 6.11).
  - Section 2.21 (Gas and Oil Pipelines Impacts: Biodiversity, Landscape and Visual) which states that '*in circumstances where the habitat to be crossed contains ancient woodland, trees subject to a Tree Preservation Order, or hedgerows subject to the Hedgerows Regulations 1997, the applicant should consider whether it would be feasible to use horizontal direct drilling under the ancient woodland or thrust bore under the protected tree or hedgerow and the Infrastructure Planning Commission (IPC) should consider requiring this, where not included in the proposal*'. This will be taken into account during Project design.
- Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 6.12).
  - Section 2.21 (Gas and Oil Pipelines Impacts: Biodiversity, Landscape and Visual) which states that '*in circumstances where the habitat to be crossed contains ancient woodland, ancient or veteran trees, trees subject to a Tree Preservation Order, or hedgerows subject to the Hedgerows Regulations 1997, the applicant should consider whether it would be feasible to use horizontal direct drilling under the ancient woodland or thrust bore under the protected tree or hedgerow and the Secretary of State should consider requiring this, where not included in the proposal*'. This will be taken into account during Project design.
- The National Planning Policy Framework (NPPF) 2019 (Ref 6.13).
- A Green Future: Our 25 Year Plan to Improve the Environment (Ref 6.14).
- The UK Post-2010 Biodiversity Framework (2011-2020) (Ref 6.15).
- East Riding Local Development Plan 2021 – 2029 (Ref 6.16).
- North Lincolnshire Core Strategy 2011 (Ref 6.17).
- Central Lincolnshire Local Plan 2012 – 2036 (Ref 6.18).
- Selby District Core Strategy Local Plan 2013 (Ref 6.19).

Guidance

- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: terrestrial, freshwater, coastal and marine (Ref 9.20).

6.3 Engagement

6.3.1 Engagement has been undertaken with relevant statutory bodies, nature conservation organisations and local authorities to agree the scope and methods for proportionate ecology surveys, matters that can be scoped out of further assessment and the approach of the Conservation Strategy. Engagement and technical consultation will continue throughout the EIA process. A summary of engagement to date is provided in Table 6.1.

Table 6.1: Summary of engagement

Consultee	Date (method of engagement)	Summary of engagement
Humber Nature Partnership	27 April 2021 (Meeting)	Discussed approach to proportionate surveys and use of District Level Licensing (DLL) for great crested newt (GCN) (*Triturus cristatus*) mitigation both of which the consultee agreed with.
Natural England (Yorkshire and North Lincolnshire Team)	14 June 2021 (Phone call)	Discussed approach to proportionate surveys (particularly in relation to badgers (*Meles meles*), water vole (*Arvicola amphibius*) and bats), wintering bird constraints and use of DLL for GCN mitigation. Natural England identified wintering birds and the Humber Estuary to be the main considerations. Natural England advised that in relation to wintering birds, in-combination effects with other developments across the Humber Estuary needed the greatest consideration. Natural England advised further advice should be sought from the licensing team with regard to potential impacts on bats. No feedback was provided on the approach to surveys for water vole and badgers.
Natural England (Yorkshire and North Lincolnshire Team)	28 June 2021 (Email)	Project shared the wintering and passage bird surveys scope and methodology for review and feedback.
Natural England (Yorkshire and North Lincolnshire Team)	21 July 2021 (Email)	Natural England provided comments on winter bird survey scope and method including: • Request to undertake surveys in August 2022 to capture early passage species; • Advice to clarify why vantage point surveys are being undertaken; and • A suggested approach for identifying areas for winter bird survey.

Consultee	Date (method of engagement)	Summary of engagement
		These comments were incorporated into the winter bird survey methodology and reissued.
Natural England (Yorkshire and North Lincolnshire Team)	26 July 2021 (Email)	Natural England provided further comments/justification for comments on the proposed methodology, including around survey period.
Natural England (Yorkshire and North Lincolnshire Team)	18 August 2021	Project shared an updated wintering and passage bird surveys scope and methodology incorporating changes to address comments raised by Natural England.
Natural England (Yorkshire and North Lincolnshire Team)	9 September 2021 (Email)	Natural England provided further comments on winter bird survey scope and methods which were used to finalise the document. The Project sought clarification of comments on frequency of survey visits.
Natural England (Yorkshire and North Lincolnshire Team)	13 September 2021 (Email)	Natural England confirmed agreement with number of survey visits for winter bird surveys. This has been incorporated into the winter bird survey methodology. The final version is included within Part B of the Conservation Strategy (Volume III, Appendix A).
Royal Society for the Protection of Birds (RSPB)	22 October 2021 (Email)	Response to non-statutory consultation. RSPB advised their response focuses primarily on potential impacts to designated sites but that they also identified opportunities for biodiversity enhancement and multi-functional natural solutions to tackle the climate emergency. In relation to the non-statutory consultation route corridor options in Section A (Drax to Scunthorpe), the RSPB advised: • The options pass close to Thorne Moors SAC/SPA and that impacts on this site (including hydrology, pollution and noise disturbance) would need to be considered. The Project has taken this into account in preparing this EIA Scoping Report and concluded that these sites are designated for their habitat features and no direct or indirect impacts on the SAC or SPA are anticipated due to lack of hydrological connectivity (see Table 6.3).

Consultee	Date (method of engagement)	Summary of engagement
		• The Humber Estuary SPA/SAC which is crossed by the Project, holds significant numbers of wintering wildfowl and wading birds over autumn and winter which will need consideration. The Project will consider impacts on the designating features of the Humber Estuary SPA/SAC (and other designated sites) in the HRA. • Non statutory consultation option A4 is likely to have less direct impact on the Humber Estuary SAC/SPA/Ramsar site. The Project has acknowledged this and the crossing of the River Trent is outside of any designated sites. • Non statutory consultation routes A1 and A4 are largely through lowland farmland used by large numbers of feeding wading birds, notably lapwing (*Vanellus vanellus*), golden plover (*Pluvialis apricaria*), ruff (Philomachus pugnax) and curlew (*Numenius arquata*). This land is considered functionally linked to Thorne Moors SPA and Humber SPA. Both sites have held significant numbers of wintering pink-footed geese (*Anser brachyrhynchus*) in recent years and impacts on this species will need to be assessed. Wintering birds are scoped into further assessment within the EIA and pink-footed geese will be considered within this (see Table 6.4). • Thorne and Hatfield Moors SPA supports important populations of breeding nightjars (*Caprimulgus europaeus*), a species which often forages several kilometres from their territories and impacts on nightjar should be considered. The Project has acknowledged this and reviewed impacts on the SPA in relation to the Scoping Route Corridor and concluded that breeding and foraging nightjar are unlikely to be present within the Scoping Route Corridor due to lack of suitable habitat (see Table 6.3) • Common Crane (*Grus grus*) regularly breed in the Humberhead peatlands and use farmland surrounding Thorne Moors during the breeding season. Cranes are particularly sensitive to disturbance when breeding and although are not protected as part of the designated sites, should be considered. Breeding

Consultee	Date (method of engagement)	Summary of engagement
		birds are scoped into further assessment within the EIA (see Table 6.3) and the Project will consider impacts on cranes within this. • Non-statutory consultation route A2 passes through/close to Alkborough Flats which supports breeding species including bittern (*Botaurus stellaris*), marsh harrier (*Circus aeruginosus*) and bearded tits (*Panurus biamicus*). Impacts on these as well as non-breeding species should be considered. In addition, the RPSB has recently acquired 100 acres of farmland at Island Farm and plans to turn this into wetland habitat and impacts on these plans will need to be considered. Route A2 is not included within the Scoping Route Corridor and therefore no impacts on Alkborough Flats or species associated with this site, or land at Island Farm are anticipated. • Eastoft Meadow SSSI is managed by the RSPB and would potentially be damaged (either directly or indirectly due to pollution). The Project has acknowledged this and determined there will be no direct impacts to Eastoft Meadow SSSI are anticipated as the site is situated approximately 120m west of the Scoping Route Corridor. However, Eastoft Meadow SSSI has been scoped into further assessment within the EIA (see Table 6.3). In relation to non-statutory consultation route corridor options in Section B (Scunthorpe to Killingholme), the RSPB advised: • Non-statutory consultation route B1 passes through the Ancholme Valley, land which is functionally linked to the Humber Estuary SPA, supporting waders such as lapwing and golden plover. The area around East Halton is also important functionally linked land for non-breeding SPA bird species. Impacts of this route will need proper consideration, particularly in relation to cumulative impacts with projects such as Able Marine Energy Park and Able Logistics Park. The Project will consider cumulative impacts on these sites and their qualifying features as part of the HRA and also the EIA assessment.

Consultee	Date (method of engagement)	Summary of engagement
		In relation to non-statutory consultation route corridor options in Section C (Killingholme to the Holderness coast), the RSPB advised: • A thorough assessment of impacts on the Humber Estuary SSSI and SAC will be required, including cumulative impacts with other developments such as Able Marine Energy Park. Tunnelling beneath the estuary is less likely to cause significant impact than trenching. The Project includes trenchless techniques for construction beneath the Humber Estuary and will consider cumulative impacts within the HRA and EIA assessment. • Non-statutory consultation route C1 passes through farmland functionally linked to the SPA. Cumulative impacts will need consideration. The RPSB also advised there are several nesting Schedule 1 species including marsh harrier within old clay pits on the south bank. The Project will consider cumulative impacts as part of the HRA and EIA assessment. Breeding birds are also scoped into further assessment within the EIA (see Table 6.3). The RSPB also advised: • They hope the Applicant utilise biodiversity net gain to provide high quality landscape specific habitat enhancement to link the rich and important wildlife features of this area. The Project has developed (and continues to refine) a Conservation Strategy which will address this. • Non statutory consultation section A1 acts as a corridor linking three internationally important wetlands (Lower Derwent, Humberhead Levels Peatlands and Humber Estuary). The RSPB queried if there are opportunities to create wetland features on the edge of Thorne Moors and near the Trent along Sections A2, A3 and A4. The Project will consider this as the Conservation Strategy is developed.

Consultee	Date (method of engagement)	Summary of engagement
		• Non statutory consultation sections A4 and A5 provide potential opportunities for heathland creation on areas of coversand. The Project will consider this as the Conservation Strategy is developed. • Non statutory consultation section B1 provides potential opportunities for wetland/scrub creation to link existing wildlife and mitigation sites. The Project will consider this as the Conservation Strategy is developed. • Non statutory consultation section C provides potential opportunities to enhance farmland to link existing mitigation sites in the area. There are also opportunities for wildlife corridors (including wetland habitat) through the farmland of Holderness. The Project will consider this as the Conservation Strategy is developed. • They hope the Applicant are also considering more nature-base solutions for tackling carbon emissions. The RSPB advised that the Humber region offers multiple opportunities for this e.g., saltmarsh and wetland creation which will also provide long-term cost-effective coastal defence protection. The Project will consider this as the Conservation Strategy is developed.
Natural England (Yorkshire and North Lincolnshire Team)	1 November 2021 (Email)	Natural England advised they are not able to provide any further pre-submission advice due to resourcing constraints. Natural England confirmed that advice would be provided during statutory stages of the Project.
Environment Agency	25 November 2021 (Meeting)	Introduction to the Project. Environment Agency welcomed client commitment to BNG and advised that BNG habitats should be secured for at least 30 years in line with the Environment Bill. The client accepts this principle in line with the latest guidance. Environment Agency requested an opportunity to review Conservation Strategy and this will be further discussed with the Environment Agency as the Project progresses.

Consultee	Date (method of engagement)	Summary of engagement
		Environment Agency provided a number of biodiversity opportunity areas across the Project. This information will be taken into consideration as the Conservation Strategy is developed.
Buglife	2 December 2021 (Meeting)	The Scoping Route Corridor overlaps with approximately 24km of Buglifes B-Lines and a meeting was held to discuss the Conservation Strategy approach with regards to bees/pollinators and how the Project could contribute towards this national recovery project.
Natural England (District Level Licensing Team)	7 December 2021 (Email)	Natural England provided the Project with copies of GCN risk zones.
Marine Management Organisation (MMO)	27 January 2022 (Microsoft Teams call)	Introduction to the Project. MMO advised statutory designations and level of offshore wind development should be considered. Marine conservation, migratory fish and birds should be considered.
Environment Agency	2 February 2022 (Email)	Consultee provided the Project with a list of locations for potential opportunities for biodiversity enhancement.
Local Planning Authority ecologists/representatives (North Lincolnshire Council, North Yorkshire County Council (also supporting Selby District Council), East Riding of Yorkshire Council, West Lindsey District Council (also supporting Lincolnshire	1 March 2022 (Microsoft Teams call)	The consultees were updated on the following information and provided the following feedback: • Overview of Project and update on the Scoping Route Corridor; • Overview of the Conservation Strategy that is underpinned by a strategic, landscape-scale approach which promotes compensation rather than survey and mitigation where greater benefit can be demonstrated. Overview of the keystone habitats and species contained within the Conservation Strategy – Humber Nature Partnership and North Lincolnshire Council confirmed they are in broad agreement with the habitats/species proposed;

Consultee	Date (method of engagement)	Summary of engagement

County Council)) and Humber Nature Partnership		• Overview of standard ecology survey approach – consultees raised no concerns with standard survey approaches. East Riding Council, North Lincolnshire Council, North Yorkshire County Council agreed with the approach to undertake Phase 2 botanical surveys as and when required to inform DCO and to scope out dormice (*Muscardinus avellanarius*) as geographically isolated from Project.
		• West Lindsey District Council advised they do not currently have in house ecology expertise, therefore intend to draw in external support but this is not yet in place. West Lindsey District Council confirmed there are white-clawed crayfish (*Austropotamobius pallipes*) reintroduction projects in Lincolnshire but not near the Project. North Lincolnshire Council agreed that white-clawed crayfish are absent in the county, however, did advise that the Environment Agency discovered white-clawed crayfish near Crowle (close to the Project) in 2021 and suggested further consultation with the Environment Agency on this matter. This has been undertaken (see below) and their response has been taken into account in writing this EIA Scoping Report.
		• Overview of alternative ecology survey approach (i.e., avoiding surveys for species where improving patch quality will deliver enhancements). Subject to further review of the route corridor, East Riding Council, North Lincolnshire Council and North Yorkshire County Council agreed in principle with the following:
		  ○ Surveys for fish and bat roosts to be undertaken as/when required to inform DCO.
		  ○ Invertebrates, reptiles, breeding birds, badger, bat activity, otters, water voles will be assessed using ad hoc recordings, desk study and patch quality. Habitat measures will be provided to demonstrate greater benefit. Surveys may be undertaken if known presence or high-quality habitat affected.

Consultee	Date (method of engagement)	Summary of engagement
		• West Lindsey District Council also agreed in principle with these matters, pending further discussion with technical specialist once appointed. • North Yorkshire County Council advised cumulative impacts will need careful consideration. • Humber Nature Partnership advised they are developing a database of cumulative impacts and it was agreed to discuss after the meeting if/how this information could be made available to inform ecological assessment. • Overview of Biodiversity Enhancement and Management Plan (BEMP), commitment to net gain and maximising opportunities for biodiversity enhancement delivered by the Project. Habitats affected in areas of temporary habitat loss will be reinstated in equal or better condition than existing. Consultees raised no concerns.
Natural England	1 March 2022 (Email)	Natural England were invited to attend the above meeting with Local Planning Authority ecologists/representatives and Humber Nature Partnership but were unable to attend. Project shared slides from the meeting.
Environment Agency	1 March 2022 (Email)	Consultee confirmed a single white-clawed crayfish was found on a berm adjacent to the North Soak Drain approximately 1.7km west of the Project in May/June 2021. Several follow-up surveys were undertaken in 2021 using traditional traps, artificial refuge traps and environmental DNA (eDNA) surveys all of which were negative for white-clawed crayfish. Consultee concluded the results are inconclusive and may return during 2022 survey season to carry out further surveys using artificial refuge traps. The Project has requested that the results of these surveys are forwarded on to inform ecological assessment.
Local Planning Authority ecologists/representatives (North Lincolnshire Council, North Yorkshire County	7 March 2022 (Email)	Project issued minutes of the 1 March 2022 meeting to all attendees and Natural England – no concerns were raised and minutes are accepted as an accurate reflection of the meeting.

Consultee	Date (method of engagement)	Summary of engagement
Council (also supporting Selby District Council), East Riding of Yorkshire Council, West Lindsey District Council), Humber Nature Partnership and Natural England		
Yorkshire Wildlife Trust and Humber Nature Partnership	29 March 2022 (Microsoft Teams call	Consultees were provided the following information and provided the following feedback: • Overview of Project and update on the Scoping Route Corridor; • Overview of the Conservation Strategy that is underpinned by a strategic, landscape-scale approach which promotes compensation rather than survey and mitigation where greater benefit can be demonstrated. Overview of the keystone habitats and species contained within the Conservation Strategy – Yorkshire Wildlife Trust supported the approach of the Conservation Strategy and use of keystone habitats and umbrella species to target mitigation. Yorkshire Wildlife Trust suggested expanding “lapwing” umbrella species to “farmland birds” in general. This feedback will be taken into account as the Conservation Strategy is developed. • Humber Nature Partnership advised that Biodiversity Opportunity Maps have been produced for Lincolnshire. The Project will request these to further inform the Conservation Strategy. • Overview of standard ecology survey approach – consultees raised no concerns with standard survey approaches. Yorkshire Wildlife Trust queried the format of data collection for Phase 1 habitat survey and whether this would include UK Habitat Classification data. The Project confirmed that data collection would initially be to Phase 1 habitat standard but that data would be converted to UK Habitat Classification as the route corridor is refined.

Consultee	Date (method of engagement)	Summary of engagement

		• Overview of alternative ecology survey approach (i.e., avoiding surveys for species where improving patch quality will deliver enhancements). Consultees raised no concerns with the approach to:
		  ○ Survey for fish and bat roosts as/when required to inform DCO.
		  ○ Assess impact on invertebrates, reptiles, breeding birds, badger, bat activity, otters, water voles using ad hoc recordings, desk study and patch quality. Habitat measures will be provided to demonstrate greater benefit. Surveys may be undertaken if known presence or high-quality habitat affected.
		• Yorkshire Wildlife Trust suggested recording the decision-making process with regard to how/why areas have been scoped in/out for further survey. The Project advised that the Scoping Route Corridor has been red/amber/green (RAG) rated for areas requiring ecology surveys (red: areas proposed to be removed from the Scoping Route Corridor to avoid impacts; amber: areas for further discussion with client (including areas for biodiversity improvement and areas for potential trenchless techniques to avoid/minimize impacts); and green: areas of expected low ecological impact (e.g. agricultural fields)). The Project advised a log to record survey area scoping process (i.e., how/why areas are scoped in/out for particular surveys) will be considered.
		• Yorkshire Wildlife Trust suggested impacts on European Eel (*Anguilla anguilla*) should be considered. The Project confirmed this species would be considered in the EIA under the “fish” heading and that impacts would be avoided where possible, using fish rescues where required. Yorkshire Wildlife Trust noted that trenchless techniques can require a larger working area than open cut and possible wider impacts on bankside/adjacent habitats. The Project confirmed no decisions will be made regarding crossing techniques until each watercourse has been assessed individually.

Consultee	Date (method of engagement)	Summary of engagement
		• Overview of Biodiversity Enhancement and Management Plan (BEMP), commitment to net gain and maximising opportunities for biodiversity enhancement delivered by the Project. Habitats affected in areas of temporary habitat loss will be reinstated in equal or better condition than existing. Consultees raised no concerns. • Yorkshire Wildlife Trust advised that cumulative impacts, particularly at either end of pipelines, should be considered carefully. The Project will take note of this and address cumulative impacts in the Environmental Statement. • Yorkshire Wildlife Trust queried the construction period and phases of working. The Project confirmed the construction programme is not yet decided and decisions have not yet been made about phasing or works. The Project advised that this will be important information for the HRA e.g., potential displacement of wintering birds. • The Project requested that Yorkshire Wildlife Trust reviews the Scoping Route Corridor to identify potential opportunities for enhancement – are there areas Yorkshire Wildlife Trust would be suggest are targeted for construction to facilitate land-use change? Yorkshire Wildlife Trust advised this would discuss be discussed with colleagues. • Humber Nature Partnership reiterated their support for the "*refreshing and ambitious*" approach outlined in the Conservation Strategy and early engagement with stakeholders.
RSPB	16 March 2022 (Email)	RSPB were invited to attend the above meeting with Yorkshire Wildlife Trust and Humber Nature Partnership but were unable to attend. Project will share slides from the meeting.
RSPB and Lincolnshire Wildlife Trust	4 April 2022 (Microsoft Teams call)	Consultees were provided the following information and provided the following feedback: • Overview of Project and update on the Scoping Route Corridor.

Consultee	Date (method of engagement)	Summary of engagement
		• Overview of the Conservation Strategy that is underpinned by a strategic, landscape-scale approach which promotes compensation rather than survey and mitigation where greater benefit can be demonstrated. Overview of the keystone habitats and species contained within the Conservation Strategy. • Lincolnshire Wildlife Trust supported the consideration of open mosaic habitat, noting that this is important near Scunthorpe. The Project will take note of this as the Conservation Strategy is developed. • Lincolnshire Wildlife Trust supported the principle of putting back 'messy habitats' but felt that education and information sharing around this would be really important, to explain to landowners and the public why this was intentional and what the benefits are. The Project will take note of this as the Conservation Strategy is developed. • RSPB emphasised that the study area is a varied landscape and the importance of focusing on different habitats in different areas. Lincolnshire Wildlife Trust supported this view. The Project will take note of this as the Conservation Strategy is developed. • Lincolnshire Wildlife Trust noted that there is currently an American mink (*Neovison vison*) control project in south Lincolnshire which is intending to extend north. Lincolnshire Wildlife Trust felt that the Project should tie into this strategy. RSPB noted a similar project undertaken by the Wildlife Trust on the north banks of the Humber. The Project will investigate both mink control projects with a view to incorporating these into the Conservation Strategy where appropriate. • RSPB would be keen that the assessment recognises the importance of the Humber estuary for non-breeding SPA species. The Project advised that extensive wintering bird surveys have been undertaken.

Consultee	Date (method of engagement)	Summary of engagement

		• Overview of standard ecology survey approach. Consultees raised no concerns.
		• Lincolnshire Wildlife Trust queried the format of data collection for Phase 1 habitat survey and whether this would include UK Habitat Classification data. The Project confirmed that data collection would initially be to Phase 1 habitat standard but that data would be converted to UK Habitat Classification as the route corridor is refined.
		• Overview of alternative ecology survey approach (i.e. avoiding surveys for species where improving patch quality will deliver enhancements). Consultees raised no concerns with the approach to:
		  ○ Survey for fish and bat roosts as/when required to inform DCO;
		  ○ Assess impact on invertebrates, reptiles, breeding birds, badger, bat activity, otters, water voles using ad hoc recordings, desk study and patch quality. Habitat measures will be provided to demonstrate greater benefit. Surveys may be undertaken if known presence or high-quality habitat affected.
		• RSPB noted that crane is an important local species, nesting on Thorne Moor and taking chicks to arable land to feed. RSPB requested mitigation during construction, e.g., areas of temporary grassland between nest sites and the pipeline to allow feeding. The Project acknowledged that the mitigation likely to be required for SPA species would also benefit crane. The RSPB agreed.
		• Lincolnshire Wildlife Trust encouraged the Project to look at innovative mitigation and design for AGIs, referring to multi-functional barn owl (*Tyto alba*) towers and shingle/grass roofs on structures. The Project will investigate this.

Consultee	Date (method of engagement)	Summary of engagement
		• Lincolnshire Wildlife Trust suggested future joint meetings with LPA ecologists, Natural England, Wildlife Trusts and RSPB. The Project will consider this. • Overview of BEMP, commitment to net gain and maximising opportunities for biodiversity enhancement delivered by the Project. Habitats affected in areas of temporary habitat loss will be reinstated in equal or better condition than existing. Consultees raised no concerns.

6.3.2 Further consultation throughout the EIA process will be undertaken with Natural England, MMO, Humber Nature Partnership, Environment Agency, Buglife, Yorkshire Wildlife Trust, Lincolnshire Wildlife Trust, RSPB and local authorities. During the assessment phase, requests will be made to obtain relevant additional desk study data to further inform our understanding of the baseline conditions and potential opportunities for enhancement.

6.3.3 The Project will continue to consult with these statutory bodies and key stakeholders to further update them on the survey scope (e.g. where the alternative ecology survey approach requires species-specific surveys to inform impact assessment), inform them of preliminary survey results and to ensure that statutory consultees and key stakeholders are in agreement with the approach that has been adopted for ecological appraisal for the project, particularly with regard to proposed mitigation measures and the approach to biodiversity enhancements documented in the Conservation Strategy.

6.3.4 The Natural England Yorkshire and North Lincolnshire Team continue to receive information relating to survey scopes and methods, impact assessment, mitigation measures and biodiversity enhancements in anticipation that they can respond when resources become available.

6.4 Study Area

6.4.1 The CIEEM 2018 guidelines (Ref 6.20) require the assessment to be focused on 'Zones of Influence' (ZoI) - the area over which changes arising from construction, operation and decommissioning could lead to ecologically significant impacts.

6.4.2 The ZoI varies between different IEFs and was formalised through professional judgement of perceived impact pathways, best practice guidelines and consultation with stakeholders. The ZoI for any IEF may be refined as more information becomes available regarding the potential ecological effects of the Project and through consideration of presence, distribution and abundance. For the purpose of this EIA Scoping Report, a precautionary ZoI has been identified for each IEF and is shown in Table 6.2 and on Figures 6.1 - 6.3 (Volume II: Part 2).

Table 6.2: Zones of Influence

Important Ecological Feature	Zone of Influence
Internationally designated nature conservation sites e.g. Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar sites	2km buffer around the Scoping Route Corridor, extending to 5km for sites designated for bats and wintering/passage birds
Nationally designated nature conservation sites e.g. National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) and Local Nature Reserve (LNR) and Marine Conservation Zones (MCZ)	2km buffer around the Scoping Route Corridor, extending to 5km for sites designated for bats and wintering/passage birds
Non-statutory designated nature conservation sites	2km buffer around the Scoping Route Corridor

Priority habitats (including ancient woodland), protected, notable and non-native invasive species (NNIS)	2km buffer around the Scoping Route Corridor
Arboricultural features (Tree Preservation Orders (TPOs) and veteran trees)	Scoping Route Corridor

6.5 Receptors (Ecological Features)

6.5.1 A Conservation Strategy (included in Volume III, Appendix A) has been produced detailing the approach to ecological surveys and the delivery of BNG. The Conservation Strategy has identified the following ecological features:

- Statutory designated sites – Ramsar sites, SPAs, SACs, NNRs, SSSIs, LNRs and MCZs;
- Non-statutory designated sites – Local Wildlife Sites (LWS), Sites of Importance for Nature Conservation (SINCs) and Wildlife Trust Reserves;
- Arboricultural features –TPOs and veteran trees;
- Habitats, including Priority habitats and ancient woodland;
- Intertidal and marine ecology;
- Invertebrates, including white-clawed crayfish;
- Fish;
- Reptiles;
- Birds (wintering/passage and breeding);
- Badger;
- Bats (roosting and activity);
- Otter (*Lutra lutra*);
- Water vole;
- Amphibians, including GCN;
- Other notable mammals, including dormouse, brown hare (*Lepus europaeus*), hedgehog (*Erinaceus europaeus*), polecat (*Mustela putorius*), pine marten (*Martes martes*) and harvest mouse (*Micromys minutus*); and
- NNIS.

6.6 Baseline conditions

6.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

Sources of information

6.6.2 The data sources that inform the ecological baseline within the Study Area are detailed in Part B of the Conservation Strategy (Volume III, Appendix A, Table 3.1).

Baseline conditions

6.6.3 The production of a Preliminary Ecological Appraisal (PEA) (including draft Phase 1 Habitat Survey plan based on a review of aerial imagery) is underway but has not yet been finalised. The baseline information received from data sources has not yet been fully reviewed, therefore ecological conditions summarised within this EIA Scoping Report are based upon designated sites, TPO, Priority Habitat information and partial assessment of desk study data (please refer to Part B of the Conservation Strategy within Volume III, Appendix A).

6.6.4 Passage and wintering bird surveys have commenced; however, surveys are ongoing, and the results have not yet been analysed to inform this EIA Scoping Report.

6.6.5 No further field surveys have been undertaken so far. However, the Conservation Strategy includes a section on ecology survey scope and methods (Part B; attached as Volume III, Appendix A), with justification for which further field survey and assessment will be undertaken and the proposed methodology. Results from these ecological surveys (once completed) will provide a robust baseline for the PEIR and ES.

Statutory designated sites

6.6.6 A total of 24 statutory designated sites are present within the ZoI of which five are within the Scoping Route Corridor: Humber Estuary Ramsar, Humber Estuary SAC (including marine components), Humber Estuary SPA (including marine components), Greater Wash SPA (marine) and Humber Estuary SSSI. These sites are summarised in Volume III, Appendix B and shown on Figure 6.1 (Volume II, Part 2).

Non-statutory designated sites

6.6.7 A total of 102 non-statutory designated sites have been identified within the ZoI of which 20 are within the Scoping Route Corridor. These sites are summarised in Volume III, Volume III, Appendix C and shown on Figure 6.2 (Volume II, Part 2).

Arboricultural features

6.6.8 A total of 11 TPOs (three groups of trees and eight standalone trees) have been identified within the Scoping Route Corridor. These features are shown on Figure 6.3 (Volume II, Part 2).

Habitats (including Priority habitats) and Ancient Woodland

6.6.9 There are nine areas of ancient woodland within the Study Area, but none within the Scoping Route Corridor. These sites are detailed in Volume III, Appendix D and shown on Figure 6.3 (Volume II, Part 2).

6.6.10 Several recognised areas of priority habitats (deciduous woodland, mudflats, coastal and floodplain grazing marsh, lowland dry acid grassland, good quality semi-improved grassland, coastal saltmarsh and maritime cliff and slope) are present within the Scoping Route Corridor. These areas are shown on Figure 6.3 (Volume II, Part 2).

6.6.11 The habitats within the Scoping Route Corridor are predominantly arable and grazed pasture fields bordered by hedgerows or ditches. The Scoping Route Corridor crosses several watercourses, most notably the River Humber and its associated estuarine habitats, also the River Trent and the River Aire (see Section 16.6). Small woodland copses occur infrequently throughout the Scoping Route Corridor.

6.6.12 A field survey of the habitats identified in the draft Phase 1 Habitat Survey plan is scheduled to take place between April and September 2022 (see Part B of the Conservation Strategy attached as Volume III, Appendix A).

Protected, notable and NNIS

6.6.13 Baseline data relating to protected, notable and NNIS is yet to be reviewed in detail. However, the following has been determined:

- GCN are widespread throughout the region (Ref 6.21);
- The Scoping Route Corridor and its ZoI are perceived to be outside the current natural range for dormouse (Ref 6.22 and Ref 6.23) and there is no publicly available information to indicate there are any nearby release sites for dormice; and
- The Scoping Route Corridor and its ZoI are perceived to be outside the current natural range for white-clawed crayfish (Ref 6.22 and Ref 6.23). There is a recent record of a single individual approximately 1.7km west (upstream) of the Scoping Route Corridor although this is currently considered an anomaly (see Table 6.1).

6.6.14 Targeted protected, notable and NNIS surveys are scheduled to take place during the 2022 survey season as detailed in the Conservation Strategy (Volume III, Appendix A). Proposed survey methodologies are detailed in Part B of the Conservation Strategy.

6.7 Design, mitigation, and enhancement measures

6.7.1 The Project design will follow the principles of the mitigation hierarchy – preference will be given first to avoiding impacts, then reducing remaining effects before applying targeted mitigation where required. Where residual effects remain, compensation will be provided.

6.7.2 Based on the results of surveys, avoidance, mitigation and compensation measures leading to a reduction in adverse effects will be identified prior to an evaluation of the effects of impacts (i.e. these measures will constitute ‘embedded mitigation’).

6.7.3 Any residual impacts will be identified following consideration of embedded mitigation measures. Monitoring requirements will also be considered, and details determined once full survey results have been interpreted and full details of the Project are known.

6.7.4 The Applicant is committed to adopting a sustainable approach to development by pro-actively taking measures to ensure that the Project leaves the environment in a better condition than it was before development, i.e. delivering Net Gain. Net Gain measures include enhancements to biodiversity and natural capital which are over and above the measures which would be implemented to reduce the effects arising from development (i.e. requirements for avoidance, mitigation and compensation). Net Gain includes BNG, and for this Project focuses on strategic habitat enhancement and creation, aiming to identify and implement opportunities to improve patch quality and habitat connectivity and align with national nature recovery objectives and projects.

6.7.5 Part A of the Conservation Strategy (attached as Volume III, Appendix A) provides further information on the mitigation hierarchy approach to the Project and Part C documents the commitments to biodiversity enhancement which include the improvement of habitat quality and connectivity across the Project through reinstating habitats identified as IEFs to a condition of ecological value equal to or above the baseline.

6.7.6 It is intended that the Conservation Strategy is a 'live' document that is updated throughout Project evolution as a greater understanding of IEFs is achieved and through consultation with stakeholders.

6.7.7 DLL is a type of strategic mitigation licence for GCN granted in certain areas at a Local Authority or wider scale with the aim of improved conservation outcomes for GCN. It is intended that the Project opts into DLL by making a financial contribution to strategic, off-site habitat compensation.

6.7.8 The Ecology and Biodiversity assessment will rely on commitments 1 and 2 outlined in the draft Register of Commitments in Volume III, Appendix F.

6.8 Description of likely significant effects

6.8.1 As a largely below-ground development (excluding AGI locations), the Project will result in predominantly short-term and temporary impacts to facilitate construction. As such the majority of IEFs will only be subject to potential effects during construction. Operational effects are considered to be limited to AGI locations only. At the time of writing, lighting, noise and vibration disturbances have not been defined and have therefore been scoped into further assessment.

Construction

6.8.2 The potential impacts as a result of construction activities are:

- Direct habitat loss and potential damage, degradation and/or fragmentation of habitats during site clearance and excavation;
- Potential killing/injury of protected species;
- Acoustic, visual and vibration disturbance, particularly during piling and tunnelling activities;
- Disturbance from temporary lighting;
- Pollution impacts caused by (for example) plant emissions, dust, sediment run-off, silt dispersal, break-out during horizontal directional drilling or micro tunnelling, and chemical or fuel spills affecting terrestrial, aquatic, intertidal and marine habitats and species; and
- The spread of NNIS within and beyond the Scoping Route Corridor.

Operation

6.8.3 As the pipelines will be below ground, operational impacts are restricted to AGI locations and include lighting, noise (at the Pumping Facility only (see Section 11.7)), and emissions from carbon dioxide and hydrogen venting (see Section 2.9).

Decommissioning

6.8.4 Decommissioning activities will be largely restricted to AGI locations as the pipelines will remain in-situ. Potential impacts as a result of decommissioning include:

- Pollution impacts caused by (for example) plant emissions, dust, sediment run-off, chemical or fuel spills affecting terrestrial and aquatic habitats and species.

6.8.5 A Decommissioning Environmental Management Plan (DEMP) will be implemented during the decommissioning phase, this shall identify and mitigate the potential impacts of decommissioning activities which could harm sensitive receptors.

Matters scoped in or out of further assessment

6.8.6 The matters scoped in or out of further assessment for Biodiversity are outlined in Table 6.3.

6.8.7 Table 6.3 should be read in conjunction with Part B of the Conservation Strategy (Volume III, Appendix A).

Table 6.3 Matters scoped in or out of further assessment

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
Statutory designated sites scoped in to all phases: Greater Wash SPA	Construction, Operation and Decommissioning	✓		The Greater Wash SPA is within the Scoping Route Corridor and has been scoped in due to the potential for direct impacts (e.g. loss of habitat) and/or indirect impacts (e.g. pollution events) during construction and decommissioning. A HRA will be undertaken to determine any significant effects on the Greater Wash SPA and this will include an assessment of any land that is 'Functionally Linked' to the site. The pumping facility will be located in close proximity to the Greater Wash SPA. This site is scoped in due to the potential for operational lighting and noise impacts from the pumping facility to negatively affect bird features for which the SPA is designated.	To be agreed.
Statutory designated sites scoped in to construction and decommissioning phases: Humber Estuary Ramsar site;	Construction and Decommissioning	✓		A trenchless technique will be used to cross the Humber Estuary (see Section 2.8), avoiding many potential impacts to statutory designated sites in this area, although entry/exit points are not known at this stage. All statutory designated sites within the Scoping Route Corridor (Humber Estuary Ramsar site, SAC, SPA and SSSI) have been scoped in due to the potential for direct impacts (e.g. loss of habitat) and/or indirect impacts (e.g. pollution events) during construction. Proposed AGI locations are hydrologically connected to these designated sites which could also be impacted by	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
Humber Estuary SAC; Humber Estuary SPA; Humber Estuary SSSI; River Derwent SAC; and River Derwent SSSI				pollution events during decommissioning (dismantling of AGIs and activities to return land to another use/s). A HRA will be undertaken to determine any significant effects on the Humber Estuary Ramsar site, SPA and SAC and this will include an assessment of any land that is 'Functionally Linked' to them. Although upstream of the Project, the River Derwent SAC and SSSI are scoped in for further assessment as any pollution events during construction or decommissioning affecting the Rivers Ouse or Humber could impact migratory fish species which the SAC and SSSI are designated for (e.g. river lamprey (*Lampetra fluviatilis*), bleak (*Alburnus alburnus*), ruffe (*Gymnocephalus cernuus*) and burbot (*Lota lota*)).	
	Operation		✓	There are no perceivable pathways to impact any of these statutory designated sites during operation.	To be agreed.
Statutory designated sites scoped in to construction phase only: Eastoft Meadow SSSI; River Derwent SAC;	Construction	✓		Eastoft Meadow SSSI and Messingham Sand Quarry SSSI are located approximately 120m west and 185m west respectively from the Scoping Route Corridor. However, the SSSI impact risk zones for pipelines construction in relation to both of these sites extend into the Scoping Route Corridor. In addition, drains within the Scoping Route Corridor flow into Messingham Sand Quarry SSSI creating a further potential impact pathway. These sites may be impacted by potential pollution events during construction and have been scoped in for further assessment on a precautionary basis.	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
River Derwent SSSI; Messingham Sand Quarry SSSI; Lower Derwent Valley Ramsar site; and Lower Derwent Valley SPA				The Lower Derwent Valley Ramsar site and SPA are scoped in for further assessment on the basis that land within the Scoping Route Corridor may be utilised by wintering/passage bird species for which these sites are designated and may therefore be 'Functionally Linked' to these sites. A HRA will be undertaken to determine any significant effects on the Lower Derwent Valley Ramsar site and SPA and this will include an assessment of any land that is 'Functionally Linked' to them.	
	Operation and Decommissioning		✓	There are no perceivable pathways to impact any of these statutory designated sites during operation or decommissioning.	To be agreed.
Statutory designated sites scoped out of all phases: Manton and Twigmoor SSSI; North Killingholme Haven Pits SSSI; Ashbyville LNR; Thorne Moor SAC;	Construction, Operation and Decommissioning		✓	Thorne Moor SAC, Humberhead Peatlands NNR (designated for raised bog habitat), Thorne, Crowle and Goole Moors SSSI (the designating features of this site being almost exclusively associated with the sites mire habitat), Hatfield Chase Ditches SSSI and Crowle Borrow Pits SSSI are located upstream of the Scoping Route Corridor. The Project is not anticipated to impact upstream hydrology and is therefore unlikely to impact the conservation objectives and designating features of these sites. These sites are scoped out of further assessment. Thorne and Hatfield Moors SPA, designated for its breeding nightjar population is 1.1km south of the Scoping Route Corridor. Nightjar are a predominantly heathland species and the habitats within the Scoping	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
Thorne and Hatfield Moors SPA; Thorne, Crowle and Goole Moors SSSI; Sugar Mills Ponds LNR; Cleatham Quarry SSSI; Crowle Borrow Pits SSSI; Humberhead Peatlands NNR; Messingham Heath SSSI; Eskamhorn Meadows SSSI; and Hatfield Chase Ditches				Route Corridor are largely sub-optimal for this species (i.e. open agricultural land) and are unlikely to represent land that is 'Functionally Linked' to the SPA. No perceived effects on breeding nightjar have been identified and this site is scoped out of further assessment. All other statutory designated sites (Manton and Twigmoor SSSI, North Killingholme Haven Pits SSSI, Messingham Heath SSSI, Eskamhorn Meadows SSSI, Cleatham Quarry SSSI, Ashbyville LNR and Sugar Mills Ponds LNR) lack perceivable impact pathways such as hydrological connectivity or are located more than 300m from the Scoping Route Corridor. It is considered that any effects on statutory designated sites as a result of a potential pollution event during construction are unlikely to be significant given the distance pollutants would need to travel to reach the sites and all other statutory designated sites are therefore scoped out of further assessment. There are no perceivable pathways to impact any of these statutory designated sites during operation or decommissioning.	
Non-statutory designated sites scoped in to construction and	Construction and Decommissioning	✓		Proposed AGI locations are hydrologically connected to several non-statutory designated sites within and beyond the Scoping Route Corridor, creating a potential impact pathway. These designated sites could be impacted by pollution events during construction and/or	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
decommissioning phases only: All non-statutory designated sites within the Scoping Route Corridor and with hydrological connectivity to AGI locations (see full list in Volume III, Appendix C)				decommissioning (dismantling of AGIs and activities to return land to another use/s). These sites have been scoped in for further assessment.	
	Operation		✓	There are no perceivable pathways to impact any of these non-statutory designated sites during operation.	To be agreed.
Non-statutory designated sites scoped into construction phase only: All non-statutory designated sites within the Scoping Route Corridor or with hydrological connectivity to the Scoping Route Corridor (excluding AGI locations) (see	Construction	✓		All non-statutory designated sites within the Scoping Route Corridor could be impacted directly (e.g. loss of habitat) or indirectly (e.g. pollution events) during construction. Several non-statutory designated sites outside of the Scoping Route Corridor are hydrologically connected to the Scoping Route Corridor and could be impacted by pollution events during construction. These sites have been scoped in for further assessment.	To be agreed.
	Operation and Decommissioning		✓	There are no perceivable pathways to impact any of these non-statutory designated sites during operation or decommissioning.	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
full list in Volume III, Appendix C).					
Non-statutory designated sites scoped out of all phases: All non-statutory designated sites outside the Scoping Route Corridor and without hydrological connectivity or other potential impact pathway to the Project (see full list in Volume III, Appendix C).	Construction, Operation and Decommissioning		✓	All non-statutory designated sites that lack perceivable impact pathways such as hydrological connectivity to the Scoping Route Corridor have been scoped out of further assessment.	To be agreed.
Arboricultural features (TPOs and veteran trees)	Construction	✓		TPOs are present within the Scoping Route Corridor (see Section 6.5) and Veteran trees may be present within/close to the construction working width. It is intended that established trees would be fenced off and worked around (see Section 2.8) although this is not yet confirmed. The potential exists for direct physical impacts (e.g. direct loss of habitat) and indirect impacts	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				on arboricultural features during construction and this feature is therefore scoped in on a precautionary basis.	
	Operation and Decommissioning		✓	There are no perceivable pathways to impact arboricultural features during operation and decommissioning.	To be agreed.
Ancient woodland	Construction, Operation and Decommissioning		✓	Areas of recognised ancient woodland are located at least 550m beyond the Scoping Route Corridor with no hydrological connectivity to the Scoping Route Corridor. Indirect effects (e.g. pollution from dust/machinery emissions during construction and decommissioning) are unlikely to be significant at this distance and ancient woodland sites have therefore been scoped out of further assessment.	To be agreed.
Priority Habitats	Construction and Decommissioning	✓		The Project (including AGI locations) will pass through and in close proximity to Priority Habitats, e.g. sections of hedgerow will require removal to facilitate an open cut method of pipelines installation. The potential therefore exists for direct physical impacts during construction (e.g. direct loss of habitat) and indirect impacts (e.g. pollution events) during construction and decommissioning and Priority Habitats are therefore scoped in for further assessment.	To be agreed.
	Operation		✓	There are no perceivable pathways to impact Priority Habitats during operation.	To be agreed.
Intertidal ecology	Construction and Decommissioning	✓		The Project extends into the intertidal zone at the landfall location and at the River Humber crossing. The Project will seek to avoid any areas/habitats of high	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				ecological value identified in the PEA (Volume III, Appendix A) although this is not yet confirmed and there is, therefore, potential for direct impacts during construction (e.g. habitat loss/fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction and decommissioning. This feature is therefore scoped in for further assessment.	
	Operation		✓	There are no perceivable pathways to impact intertidal ecology during operation.	To be agreed.
Marine Ecology	Construction	✓		Marine mammals are known to be present within the Study Area, notably grey seal (*Halichoerus grypus*) that feature in the designations for Humber Estuary SAC and Ramsar site. Within the Humber Estuary Ramsar site, breeding grey seals are present at Donna Nook (approximately 20km south of the Scoping Route Corridor). Grey seals were screened out of a HRA for a similar project (the River Humber Gas Pipeline Replacement Project) on the basis of a) no works taking place within the boundaries of these designated sites; and b) grey seal were considered unlikely to be present within the ZoI of the Project (Ref 6.24). It is proposed that the same justifications apply to this Project which will also avoid works within the boundaries of these designated sites by adopting trenchless methods (e.g. bored tunnel) to cross the River Humber. However, as the construction method has not been confirmed at the landfall (trenchless, e.g. Horizontal Directional Drilling (HDD), or via cofferdam), direct impacts during construction (e.g. habitat	To be agreed.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				loss/fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction cannot be scoped out for subtidal features of benthic marine ecology.	
	Operation and Decommissioning		✓	There are no perceivable pathways to impact marine ecology during operation and it is considered that any effects on marine ecology as a result of a potential pollution event during construction are unlikely to be significant given the dispersal of pollutants once in the sea and marine ecology is therefore scoped out of further assessment.	To be agreed.
Invertebrates (excluding White-clawed crayfish)	Construction, Operation and Decommissioning	✓		The Project extends through a largely agricultural landscape which is considered unsuitable for large invertebrate populations, protected species or notable assemblages (Volume III, Appendix A). The Project will seek to avoid any areas/habitats of high value for invertebrates identified in the PEA (Volume III, Appendix A) although this is not yet confirmed and there is, therefore, potential for direct impacts during construction (e.g. habitat loss/fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction and decommissioning. Nocturnal species may also be adversely affected by operational lighting at AGI locations and temporary lighting required during construction and decommissioning. The Project aims to deliver an increase in patch quality for invertebrates and ensure that these habitats are well-connected to the wider landscape (Volume III, Appendix	Approach agreed with non-statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				A). This could lead to an overall positive impact on invertebrates. This feature is scoped in for further assessment.	
White-clawed crayfish	Construction, Operation and Decommissioning	✓		Although the Project is situated outside the known natural range of white-clawed crayfish, an individual was recently discovered close to the Scoping Route Corridor. If present, this species could be impacted as a result of pollution events during construction and decommissioning and lighting of AGI locations during operation. This species is therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.
Fish	Construction and Decommissioning	✓		The Project crosses several watercourses (see Section 6.5). It is anticipated that major watercourses will be crossed using trenchless techniques while crossings of minor watercourses will typically use open cut techniques (see Section 2.8). However, the exact nature and location of watercourse crossings are unknown at the current time. At open-cut locations there is a risk of direct impacts during construction as a result of, for example, dewatering while indirect impacts and disturbance due to increased noise and vibration and/or pollution events may be experienced at trenchless crossings and AGI locations during decommissioning. Fish are therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
	Operation		✓	There are no perceivable pathways to impact fish during operation.	Approach agreed with non- statutory stakeholders listed in Table 6.1.
Reptiles	Construction	✓		Widespread presence and large populations of reptiles are thought to be unlikely due to the unsuitable nature of the majority of the habitats (predominately structurally poor agricultural fields) within the Scoping Route Corridor (Volume III, Appendix A). However, reptile species are anticipated to be present within suitable habitat (where present) and are therefore at risk of direct impacts during construction (e.g. habitat loss/fragmentation). In the absence of appropriate mitigation, reptiles are also at risk of killing/injury during construction. This would constitute a breach of legislation. Reptiles are therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.
	Operation and Decommissioning		✓	There are no perceivable pathways to impact reptiles during operation and decommissioning.	To be agreed.
Breeding birds	Construction	✓		It is anticipated that a range of habitats within the Scoping Route Corridor will be suitable to support nesting birds, particularly those associated with farmland. In the absence of appropriate mitigation, habitat removal to facilitate construction could lead to a breach of legislation in relation to breeding birds (e.g. killing/injury of individuals and damage/destruction of nests/eggs).	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				The Project aims to deliver an increase in patch quality for breeding birds and ensure that these habitats are well-connected to the wider landscape (Volume III, Appendix A). This could lead to an overall positive impact on breeding birds. Breeding birds are therefore scoped in for further assessment.	
	Operation and Decommissioning		✓	There are no perceivable pathways to impact breeding birds during operation and decommissioning.	To be agreed.
Wintering/ passage birds	Construction, Operation and Decommissioning	✓		The Project crosses beneath the River Humber in an area which is designated as a SPA and Ramsar site and extends into the Greater Wash SPA. Wintering/passage birds are a designating feature of all of these sites. Construction and decommissioning in/close to these areas and within suitable habitat in the wider landscape has the potential to result in impacts on wintering/passage bird populations as a result of, for example, habitat loss (construction phase only), increased noise and visual disturbance. Operational lighting and noise impacts from the pumping facility could negatively affect passage/wintering birds within the nearby Greater Wash SPA. Wintering/passage birds are therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
Badger	Construction, Operation and Decommissioning	✓		Based on the habitats present and rural location of the Project, it is anticipated that badgers are widespread throughout the Scoping Route Corridor. Badgers may be impacted during construction through, for example, habitat loss/fragmentation and loss of/damage to/disturbance of setts which would constitute a breach of legislation. Badgers may also be adversely affected by lighting at AGI locations during operation. Badgers are therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.
Bats	Construction, Operation and Decommissioning	✓		Given the rural location of the Project and wider landscape connectivity, bats are anticipated to forage/commute within the Scoping Route Corridor and may roost in trees within the Scoping Route Corridor. Bats are therefore at risk of direct impacts during construction (e.g. habitat loss/fragmentation). However, negative impacts to foraging/commuting bats from habitat removal to facilitate construction are not expected to be significant, as it is anticipated that hedgerow severance will be minimised by narrowing construction corridors at hedgerow crossings to 20m or less (Volume III, Appendix A), although this is currently unconfirmed. Replacement hedgerow planting would ensure no net loss of foraging/commuting habitat in the long-term (Volume III, Appendix A).	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				Site clearance to facilitate construction has the potential to result in the loss of tree roosts, which would constitute a breach of legislation. Bats may also be impacted by operational lighting and any temporary lighting required during construction and decommissioning. In the absence of appropriate mitigation, breaches of legislation are possible e.g. loss of a tree(s) containing roosting bats during site clearance, killing/injury of reptiles, damage/destruction of bird nests/eggs and loss/disturbance of/damage to badger setts during construction. In line with assessment guidelines (Ref 6.19) these features are therefore scoped in for further assessment. Bats are therefore scoped in for further assessment.	
Otter	Construction, Operation and Decommissioning	✓		The Project crosses several watercourses (see Section 6.5) and otters are likely to be widespread throughout the Scoping Route Corridor and wider landscape (Volume III, Appendix A). It is anticipated that major watercourses will be crossed using trenchless techniques while crossings of minor watercourses will typically use open cut techniques (see Section 2.8). However, the exact nature and location of watercourse crossings are unknown at the current time. At open-cut locations there is a risk of direct impacts during construction as a result of, for example, loss/damage to holts/couches during construction (which would constitute a breach of legislation) while indirect disturbance due to increased noise and vibration and/or pollution events (impacting prey availability) may be	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				experienced at trenchless crossings and AGI locations during decommissioning. Otters may also be impacted by operational lighting and any temporary lighting required during construction and decommissioning. Otters are therefore scoped in for further assessment.	
Water vole	Construction and Decommissioning	✓		The Project crosses several watercourses (see Section 6.5) and water voles are known to be widespread throughout the Scoping Route Corridor (Volume III, Appendix A). It is anticipated that major watercourses will be crossed using trenchless techniques while crossings of minor watercourses will typically use open cut techniques (see Section 2.8). However, the exact nature and location of watercourse crossings are unknown at the current time. At open-cut locations there is a risk of direct impacts during construction as a result of, for example, loss/damage to burrows (which would constitute a breach of legislation) while indirect disturbance due to increased noise and vibration and/or pollution events may be experienced at trenchless crossings and AGI locations during decommissioning. The Project aims to deliver an increase in patch quality for water voles and the strategic creation and/or enhancement of wetland habitat (Volume III, Appendix A). This could lead to an overall positive impact on water voles. This feature is therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
	Operation		✓	There are no perceivable pathways to impact water voles during operation.	To be agreed.
Amphibians (excluding GCN)	Construction, Operation and Decommissioning	✓		Amphibians may be negatively affected by direct impacts during construction (e.g. habitat loss/fragmentation) and indirect impacts (e.g. as a result of pollution events) during construction and decommissioning. During operation, lighting at AGI locations may affect the dispersal of amphibians at night. The Project aims to deliver an increase in patch quality for amphibians and the strategic creation and/or enhancement of wetland habitat (Volume III, Appendix A). This could lead to an overall positive impact on amphibians. Amphibians are therefore scoped in for further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.
GCN	Construction, Operation and Decommissioning		✓	GCN are widespread throughout the region and therefore licensing and mitigation will be required to minimise impacts to this species. This will be implemented via a DLL scheme and will be documented within an Impact Assessment and Conservation Payment Certificate (IACPC), prepared by Natural England. When the Project enters into the DLL scheme, Natural England will undertake an impact assessment and determine the likelihood of significant effect on GCN. This approach includes strategic area assessment and a mechanism to ensure adequate compensation is provided and by obtaining an IACPC (or equivalent),	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				GCN can therefore be scoped out of further assessment.	
Other notable mammals (dormouse, brown hare, hedgehog, polecat, pine marten and harvest mouse)	Construction, Operation and Decommissioning		✓	The Project is situated outside the natural range of the dormouse and this species is considered to be absent from the Study Area. Given the rural location of the Project and wider landscape connectivity, terrestrial mammals such as hedgehog and brown hare are anticipated to be present within the Scoping Route Corridor. Pine marten, polecat and harvest mouse have all been previously recorded within the Study Area (Volume III, Appendix A). Negative impacts to these species could occur during construction as a result of habitat removal/fragmentation. In addition, nocturnal species may also be impacted by operational lighting and any temporary lighting required during construction and decommissioning. These impacts are anticipated to be largely temporary and as habitats will be reinstated to equal or better condition, impacts are not anticipated to be significant. As a result, other notable mammals are scoped out of further assessment.	Approach agreed with non- statutory stakeholders listed in Table 6.1.
NNIS	Construction	✓		Given the extent of the Scoping Route Corridor and numerous watercourses it contains, there is potential for terrestrial and aquatic NNIS to be present. In the absence of appropriate mitigation, the Project has the potential to cause these NNIS to spread during	Approach agreed with non- statutory stakeholders listed in Table 6.1.

Matters	Phase	Scoped in	Scoped out	Justification	Agreed
				construction (a breach of legislation) and this feature is therefore scoped in for further assessment.	
	Operation and Decommissioning		✓	There are no perceivable pathways to impact NNIS during operation and decommissioning.	Approach agreed with non- statutory stakeholders listed in Table 6.1.

6.9 Proposed assessment methodology

6.9.1 The Ecological Impact Assessment (EcIA) will be undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (Ref 6.20) (herein referred to as the 'CIEEM guidelines'). The CIEEM guidelines represent the current best practice for assessing the ecological impact of development projects.

Determining importance

6.9.2 The CIEEM guidelines (Ref 6.20) state the ecological features should be considered within a 'defined geographical context' (i.e. spatial scale) and recommends the following frame of reference:

- International and European;
- National;
- Regional;
- Metropolitan, County, vice-county or other Local Authority-wide area;
- River Basin District;
- Estuarine system/Coastal cell; and
- Local.

6.9.3 Assigning importance to ecological features is based on professional judgement informed by available guidance and information and (where necessary) expert advice.

6.9.4 Those ecological features of sufficient value to be considered in decision-making (i.e. those considered to be of 'Local' importance or above), and which it is considered could experience significant effects as a result of the Project (i.e. effects that could adversely affect the integrity of the habitat or the favourable conservation status of a species' population), will be classified IEF and thus will be considered in the detailed assessment as outlined in the CIEEM Guidelines (Ref 6.20). Other ecological features (i.e. those which are of less than 'Local' importance will be scoped out, and not subject to any further assessment within the impact assessment.

6.9.5 In accordance with the CIEEM guidelines, where there is the potential for a breach of legislation in relation to protected species (regardless of their importance), those species are also considered an IEF.

6.9.6 Following identification and valuation of the IEF, it is then necessary to investigate potential impacts on those features to understand how they might be affected by the Project.

Characterising effects

6.9.7 The EcIA will be based on an understanding of the likely activities associated with the Project, the biophysical changes that are predicted as a result of these activities and the area over which such effects might be experienced by different IEFs.

6.9.8 When describing ecological impacts and effects, reference will be made to the following characteristics:

- Positive or negative;
- Extent;
- Magnitude;
- Duration (assessed as either 'short-term' (up to 1 year), 'medium-term' (1-10 years) or 'long-term' (greater than 10 years));
- Frequency and timing; and
- Reversibility.

Determining significance of effects

6.9.9 The assessment of likely significant environmental effects as a result of the Project will consider the construction, operational and decommissioning phases.

6.9.10 The assessment of significant effects on IEFs will be made using:

- Consideration of best practice/guidance;
- Professional judgement;
- Consideration of the baseline information obtained, the Project details and comments raised through stakeholder consultation;
- Prediction of potential effects based on baseline information and the Project details;
- Quantification of potential effects;
- Identification of appropriate mitigation measures; and
- Prediction of residual effects based on baseline information, the Project details and mitigation measures.

6.9.11 The significance of an effect on an IEF will be determined following an analysis of the factors that characterise the effect. The CIEEM guidelines (Ref 6.20) define significant effects as those that:

'…either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general... In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).'

6.9.12 Significant effects, as defined by the CIEEM guidelines (Ref 6.20), are determined by assessing any deviation in baseline conditions of an IEF that may occur as a result of individual and cumulative impacts during the construction and operational phases of the Project.

6.9.13 Significance will be determined on the basis of a likely effect on the integrity or favourable conservation status of a feature, at a given geographic scale. The geographical scale at which an effect is significant can vary from the geographical importance of the ecological feature being assessed and in accordance with the CIEEM guidelines (Ref 6.20), this will be a function of the assessment.

6.10 Limitations and assumptions

6.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The impact assessment will be based on the likely ecological conditions at the time of construction, operation and decommissioning;
- The desk study and survey data collected is sufficiently robust for informing the impact assessment with requirements for species-specific surveys determined by completion of the PEA and confirmation of the Project design;
- Baseline surveys will be implemented as per the Conservation Strategy (Volume III, Appendix A) unless otherwise agreed with relevant stakeholders; and
- In the event that health and safety restrictions prevent a full ecological baseline assessment, a precautionary principle will be applied to the assessment of ecological features. The precautionary principle will assume a 'reasonable worst-case' scenario informed by professional experience and knowledge, desk-based information and available field-based evidence for any ecological feature unable to be fully surveyed. Utilising this approach will ensure that appropriate recommendations and/or mitigation are provided even though these may not be required.

6.11 References

- Ref 6.1 HM Government (2021) *Environment Act 2021*. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted (Accessed: 11 February 2022).
- Ref 6.2 HM Government (2019) *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.* Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176573 (Accessed: 12 February 2022).
- Ref 6.3 HM Government (2021) *Wildlife and Countryside Act 1981 (as amended).* Available at: https://www.legislation.gov.uk/ukpga/1981/69 (Accessed: 13 February 2022).
- Ref 6.4 HM Government (2000) *Countryside and Rights of Way Act 2000.* Available at: https://www.legislation.gov.uk/ukpga/2000/37/contents (Accessed: 13 February 2022).
- Ref 6.5 HM Government (2006) *Natural Environment and Rural Communities Act 2006.* Available at: https://www.legislation.gov.uk/ukpga/2006/16/contents (Accessed: 12 February 2022).
- Ref 6.6 HM Government (1997) *The Hedgerows Regulations 1997.* Available at: https://www.legislation.gov.uk/uksi/1997/1160/contents/made (Accessed: 13 February 2022).
- Ref 6.7 HM Government (1992) *Protection of Badgers Act 1992.* Available at: https://www.legislation.gov.uk/ukpga/1992/51/contents (Accessed: 13 February 2022).

- Ref 6.8 HM Government (2009) *Marine and Coastal Access Act.* Available at: https://www.legislation.gov.uk/ukpga/2009/23/contents (Accessed: 05 April 2022).
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- Ref 6.10 Department for Business, Energy and Industrial Strategy (2021*) Draft National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 15 February 2022).
- Ref 6.11 Department of Energy and Climate Change (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed: 11 February 2022).
- Ref 6.12 Department for Business, Energy and Industrial Strategy (2021) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 12 February 2022).
- Ref 6.13 Ministry of Housing, Communities and Local Government (2021) *National Planning Policy Framework.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf (Accessed: 10 February 2022).
- Ref 6.14 HM Government (2018) *A Green Future: Our 25 Year Plan to Improve the Environment.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf (Accessed: 12 February 2022).
- Ref 6.15 JNCC and Defra (on behalf of the Four Countries' Biodiversity Group) (2012) *UK Post-2010 Biodiversity Framework*. Available at: https://data.jncc.gov.uk/data/587024ff-864f-4d1d-a669-f38cb448abdc/UK-Post2010-Biodiversity-Framework-2012.pdf (Accessed: 6 February 2022).
- Ref 6.16 East Riding of Yorkshire Council (2016) *East Riding Local Plan 2012 – 2029 Strategy Document*. Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/east-riding-local-plan/ (Accessed: 6 February 2022).
- Ref 6.17 North Lincolnshire Council (2011) *North Lincolnshire Local Development Framework – Core Strategy Adopted June 2011*. Available at: https://m.northlincs.gov.uk/public/planningreports/corestratergy/adopteddpd/FullCoreStrategy.pdf (Accessed: 10 February 2022).
- Ref 6.18 North Kesteven District Council (2017*) Central Lincolnshire Local Plan 2012-2036.* Available at: https://www.n-kesteven.gov.uk/residents/planning-and-

building/planning/planning-policy/central-lincolnshire-local-plan/ (Accessed: 9 February 2022).

- Ref 6.19 Selby District Council (2013) *Selby District Core Strategy Local Plan.* https://www.selby.gov.uk/sites/default/files/Documents/CS_Adoption_Ver_OCT_2013_REDUCED.pdf (Accessed 8 February 2022).
- Ref 6.20 Chartered Institute of Ecology and Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1.* Available at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1Update.pdf. (Accessed: 14 February 2022).
- Ref 6.21 Natural England (2022) *GCN Risk Zone modelling maps for South and East Yorkshire (and North Lincolnshire), North East Yorkshire and North West Yorkshire.*
- Ref 6.22 Greater Lincolnshire Nature Partnership (2022*). Lincolnshire Environmental Records Centre Search.* Available at: https://search.glnp.org.uk/ (Accessed: 21 January 2022).
- Ref 6.23 North and East Yorkshire Environmental Data Centre (2021*) Ecological Data Search (as part of Data License – E05914).* Available at: https://www.neyedc.org.uk/ecologists (Accessed: 19 January 2022).
- Ref 6.24 National Grid (2015) *River Humber Gas Pipeline Replacement Project - HRA Screening Matrix (updates appendix 3 of Habitats Regulations Assessment).* Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN060004/EN060004-000701-National%20Grid%20Gas%20plc%20-%20HRA%20Screening%20Matrix.pdf (Accessed: 9 February 2022).

7. Climate

7.1 Introduction

7.1.1 This Chapter addresses the proposed scope of the Environmental Impact Assessment (EIA) with respect to Climate Change. It includes a summary of proposed consultation, details regarding how baseline conditions will be collected and the proposed approach to the assessment of possible construction, operational and decommissioning effects. Matters that will be scoped in and out of the assessment are identified.

7.1.2 The Climate assessment will be divided into the following three subsections:

- Greenhouse Gas Emissions (GHG) - quantifies the potential GHG emissions associated with the construction, operation and the decommissioning/end-of-life process of the Project and identifies measures to reduce the GHG emissions from each of these stages;
- Climate change adaptation - presents the vulnerability of the Project to climate change and how climate change will potentially manifest itself in the future in the geographic region of operation. It also evaluates the effectiveness and feasibility of adaptation measures integrated into the Project to increase the resilience of the Project to climate change impacts; and
- In-combination climate change impact - evaluates the combined effect of the Project and potential climate change impacts on the receiving environment during the construction, operation and decommissioning of the Project.

7.1.3 There may be interrelationships between the potential effects on climate and other disciplines, for example, greenhouse gases will be dependent on the assessment of Waste and Materials, or Biodiversity may be impacted by worsening climate. Therefore, please also refer to the following Chapters:

- Chapter 5: Air Quality;
- Chapter 6: Ecology and Biodiversity;
- Chapter 8: Ground Conditions;
- Chapter 9: Cultural Heritage;
- Chapter 10: Landscape;
- Chapter 12: Socio-economic;
- Chapter 13: Human Health and Wellbeing;
- Chapter 15: Waste and Materials;
- Chapter 15: Hydrology and Land Drainage; and
- Chapter 17: Major Accidents & Disasters.

7.2 Legislation, policy and guidance

7.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

- Paris Agreement (2015) (Ref. 7.1).
  - The purpose of the Paris Agreement is to strengthen the global response to the threat of climate change by holding the global temperature increase well below 2°C above pre-industrial levels.
- Glasgow Climate Pact (2021) (Ref. 7.2).
  - The Glasgow Climate Pact's main elements are:
    - The number of countries pledged to reach net-zero emissions passed 140. This target includes 90% of current global greenhouse gas emissions;
    - An agreement to re-visit emission reduction plans in 2022 in order to try to keep the 1.5°C Paris Agreement target achievable; and
    - A commitment to climate finance for developing countries.
- The Climate Change Act 2008 (2019 Amendment) (Ref 7.3).
  - This sets up a framework for the UK to achieve its long-term goals of reducing GHG emissions by 100% from 1990 baseline by 2050, with intermediate goals set by the UK Carbon Budgets, and to ensure steps are taken towards adapting to the impact of climate change. The Act introduces a system of carbon budgeting which constrains the total amount of emissions in a given time period and sets out a procedure for assessing the risks of the impact of climate change for the UK, and a requirement on the Government to develop an adaptation programme.
  - The Government has published a list of those bodies that must report under the reporting power. This includes transport bodies, energy and water utilities and environmental agencies.
- Carbon Budgets (Climate Change Committee) (Ref 7.4).
  - Under a system of carbon budgets, every tonne of greenhouse gases emitted between now and 2050 will count. Where emissions rise in one sector, the UK will have to achieve corresponding falls in another.

Policy

- Overarching National Policy Statement for Energy (EN-1) (Ref. 7.5).
  - This National Policy Statement (NPS) sets out national policy for the energy infrastructure. It has effect for the decisions by the Secretary of State on applications for energy developments that are nationally significant under the Planning Act 2008.
- Draft Overarching National Policy Statement for Energy (EN-1) (Ref. 7.6).

- This policy statement sets out that all proposals for energy infrastructure projects should include a carbon assessment as part of their Environmental Statement (ES) (see Section 4.2 of the draft NPS). This should include:
    - A whole life carbon assessment showing construction, operational and decommissioning carbon impacts;
    - An explanation of the steps that have been taken to drive down the climate change impacts at each of those stages;
    - Measurement of embodied carbon impact from the construction stage;
    - How reduction in energy demand and consumption during operation has been prioritised in comparison with other measures;
    - How operational emissions have been reduced as much as possible through the application of best available technology for that type of technology;
    - Calculation of operational energy consumption and associated carbon emissions; and
    - Where there are residual emissions, the level of emissions and the impact of those on national and international efforts to limit climate change, both alone and where relevant in combination with other developments at a regional or national level, or sector level, if sectoral targets are developed.
- In addition, the document sets out that Applicants should assess the impacts on and from their proposed energy project across a range of climate change scenarios, in line with appropriate expert advice and guidance available at the time. Applicants should be able to demonstrate that proposals have a high level of climate resilience built-in from the outset. They should also be able to demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario. These results should be considered alongside relevant research which is based on the climate change projections.

- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 7.7).
- Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 7.8).
    - The draft NPS EN-4 has been drafted in respect of, and has effect only in relation to, natural gas infrastructure. However, it will be considered within the Climate assessment as it may contain information that is important and relevant to the Secretary of State's decision on applications for hydrogen and carbon capture and storage infrastructure.
- National Planning Policy Framework (NPPF) 2021 (Ref 7.9).
    - The NPPF sets out government planning policy for England and describes ways in which the challenge of climate change can be met. Chapter 10 of the NPPF highlights that planning plays a key role in mitigation against climate change. The Policy also includes the requirements for local authorities to adopt proactive strategies to mitigate and adapt to climate change in line with the provisions and objectives of the Climate Change Act 2008 and co-operate to deliver strategic priorities which include climate change. The policy also states that local authorities should:

        - Adopt proactive strategies to mitigate and adapt to climate change taking full account of flood risk, coastal change and water supply and demand considerations;
        - Limit inappropriate development in areas at risk of flooding, but where development is necessary, making it safe without increasing flood risk elsewhere;
        - Support the move to a low carbon future, by supporting energy efficient improvements to existing buildings and set out requirements consistent with zero carbon building policy; and
        - Help to increase the use and supply of renewable and low carbon energy.
    - The policy also avails radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to impacts of climate change, and support the delivery of renewable and low carbon energy and associated infrastructure. It also puts emphasis on driving and supporting sustainable development and good design.
- Net Zero Strategy: Build Back Greener 2021 (Ref 7.10).
    - Power: Implement the Dispatchable Power Agreement (DPA) to support the deployment of first of a kind power Carbon Capture, Usage and Storage (CCUS) plant(s).
    - Fuel Supply and Hydrogen: An ambition for 5 GW UK low carbon hydrogen production capacity by 2030; and The UK Government have set up the Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) scheme to fund our new hydrogen and industrial carbon capture business models. We will be providing up to £140m to establish the scheme, including up to £100m to award contracts of up to 250MW of electrolytic hydrogen production capacity in 2023 with further allocation in 2024.
    - Industry:
        - Ambition to deliver 6 MtCO2 per year of industrial CCUS by 2030, and 9 MtCO2 per year by 2035; and
        - Set up the Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) Scheme to fund our new industrial carbon capture and hydrogen business models.
- Yorkshire & Humber Climate Action Plan (Ref 7.11).
    - The Plan contains a regional target of reduction to net zero by 2038 from baseline of year 2000 with intermediate targets of:
        - 68% by 2025;
        - 84% by 2030;
        - 92% by 2035; and
        - 100% by 2038.
    - The Project will help to achieve those net zero reduction targets in the region.

Guidance

- The Green Construction Board Publicly Available Specification 2080:2016 Carbon Management in Infrastructure (Ref 7.12) - PAS 2080:2016.
  - The first publicly available specification in the world that specifically addressed managing carbon in infrastructure. The purpose of the PAS 2080:2016 specification is to:
    - Provide governance and leadership;
    - Quantify GHG emissions;
    - Integrate emissions management into infrastructure delivery processes;
    - Provide targets, baselines, and monitoring methods;
    - Assist with reporting and managing information;
    - Spread responsibility across the asset value chain (designers, constructors, suppliers, managers); and
    - Encourage continuing improvement.
  - PAS 2080:2016 provides a common framework for all infrastructure sectors and value chain members on how to manage whole life carbon when delivering infrastructure assets and programmes of work. PAS 2080:2016 promotes reduced carbon, reduced cost infrastructure delivery, more collaborative ways of working and a culture of challenge in the infrastructure value chain through which innovation can be fostered.
  - It includes requirements for all value chain members to show the right leadership and to establish effective governance systems for reducing whole life carbon through the use of a detailed carbon management process. All value chain members can claim conformity to the PAS 2080:2016 by demonstrating that the requirements in the PAS 2080:2016 that are relevant to them have been met.
- Capture for Growth: A Roadmap for the World's First Zero Carbon Industrial Cluster (Ref 7.13).
  - The Humber has ambition to become the first zero carbon industrial cluster in the world. Relevant steps are:
    - Developing a hydrogen demonstrator and test facility in the Humber;
    - Building a carbon dioxide transport and storage system across the region that industry can connect to;
    - Safely storing carbon dioxide deep under the seabed in the Southern North Sea;
    - Unlocking a cutting-edge hydrogen economy – providing a low carbon fuel to decarbonise industry, power, heat, transport and maritime across the North of England; and
    - Creating the conditions for new industries which use the CCUS pipeline or low carbon hydrogen to develop in the region – creating new jobs and opportunities locally and across the country.

- Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance' (Updated Feb 2022) (Ref 7.14).
  - This provides guidance on assessment and mitigation of GHG emissions within an EIA context and is the primary source of guidance for assessing GHG emissions. It includes a focus on proportionate and robust assessment. The Institute of Environmental Management and Assessment (IEMA) guidance is based on the five IEMA Principles on Climate Change Mitigation and EIA:
    - *"The GHG emissions from all projects will contribute to climate change; the largest inter-related cumulative environmental effect;*
    - *The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive – e.g. population, fauna, soil etc;*
    - *The UK has legally binding GHG reduction targets – EIA must therefore give due consideration to how a project will contribute to the achievement of these targets.*
    - *GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant; and*
    - *The EIA process should, at an early stage, influence the location and design of projects to optimise GHG performance and limit likely contribution to GHG emissions."*
  - The 2022 update states that "The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Five distinct levels of significance which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero."
  - The GHG assessment will assess the impact of the Project by contextualising against local and national carbon targets.

7.3 Engagement

7.3.1 Engagement will be undertaken throughout the EIA process with the following consultees:

- Climate change officers/Sustainability Managers/Low Carbon Project Officers at:
  - East Riding of Yorkshire Council;
  - North Lincolnshire Council;
  - Lincolnshire County Council;
  - Selby District Council;
  - West Lindsey District Council;
  - North Yorkshire County Council; and
  - Yorkshire & Humber Climate Commission.

7.3.2 Engagement will seek to agree matters such as scope, methodology, approach, and any emphasise that needs to be given to any stage of design or carbon stage. In addition, engagement will include queries with regards to the following:

- Details of any future development that could also potentially produce substantial quantities of GHG emissions during the construction of the Project as the cumulative impacts on the local area from other major projects should be evaluated. Details on forecast GHG emissions and construction dates of other projects would also be requested; and
- Details of any future development in the proximity of the Project that might affect it in terms of increasing climate change risks, such as drainage issues.

7.4 Study Area

7.4.1 The Study Areas applied for the GHG assessment are not spatial study areas, rather parameters around what the assessment will consider. The Study Areas applied for the GHG assessment will be as follows:

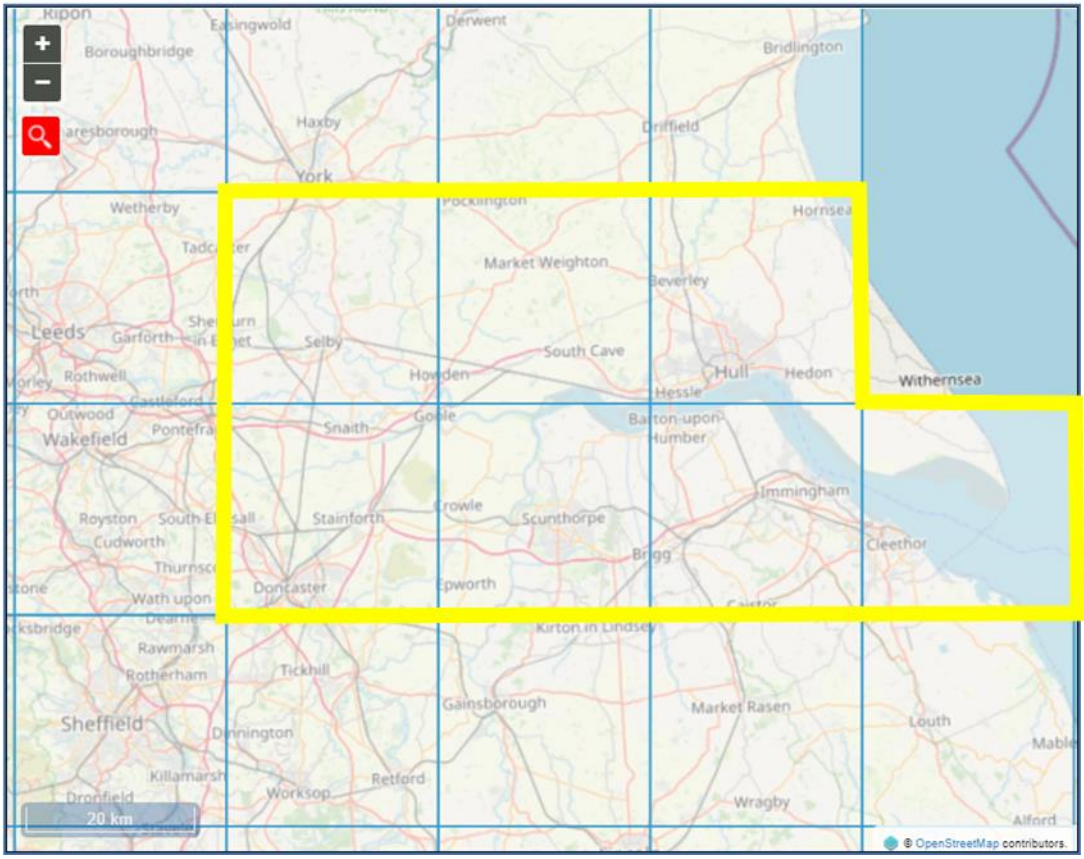
- Primary Study Area - construction emissions within the Scoping Route Corridor;
- Secondary Study Area - emissions associated with the new pipelines, as well as benefits associated with the Project's operation; and
- Tertiary Study Area - emissions associated with the manufacturing of construction materials, transportation of those materials to and from the Project and the disposal of materials.

7.4.2 The climate vulnerability assessment will consider the impact of the climate on the Project as the receptor, rather than the impacts of the Project on the climate. Therefore, the Study Area for the climate vulnerability assessment is the Project. The climate vulnerability Study Area for each phase of the Project is set out below:

- Construction phase - the Project's construction footprint;
- Operational phase - the Above Ground Installations (AGIs) only. As the pipelines are buried underground, they are not considered vulnerable to the climate during the operational phase; and
- Decommissioning - the Project's decommissioning footprint.

7.4.3 The choice of climate projections to use in the assessment also informs the Study Area. The UK Climate Projections (UKCP)18 provides probabilistic projections for the whole of the UK at 25km^2 resolution. The Study Area of the assessment is limited to the seven 25km2 UKCP18 grid square(s) which encompasses the Project, as shown in Insert 7.1 below.

Insert 7.1: probabilistic projections (25km) over UK, 1961-2100, UKCP18 (2022)



7.5 Receptors

7.5.1 For the GHG emissions, the receptor is the global atmosphere.

7.5.2 For the climate vulnerability assessment, the receptors will be different at each phase of the Project. The receptors that will be considered in this assessment are as follows:

- Construction (N.B.: due to the relatively short duration of the construction phase, the assessment of the climate vulnerability of the construction phase is scoped out of this assessment.):
  - Construction staff;
  - Construction compounds; and
  - Construction plant and machinery.
- Operation:
  - The AGIs (including buildings and structures, drainage systems);
  - The underground pipelines and other related buried infrastructure; and
  - Operational maintenance workers.
- Decommissioning:

- Staff involved with decommissioning activities;
- Decommissioning compounds; and
- Decommissioning plant and machinery.

7.6 Baseline conditions

7.6.1 The detailed baseline assessment for Climate will be set out within the Preliminary Environmental Information Report (PEIR) and the Environmental Statement (ES). This section sets out the baseline information that will be collected and the sources of information that will be drawn on to collect this information.

7.6.2 Baseline data will be collected for both current and future baseline conditions.

7.6.3 For the GHG emissions, the current baseline GHG emissions will be collected for both the Humber Region and the UK. The data will be collected from the Department for Environment, Food & Rural Affairs (Defra) website as well as relevant regional information sources such as the Yorkshire and Humber Climate Commission.

7.6.4 It is anticipated that GHG emissions both regionally and in the UK will decrease over the operational lifetime of the Project in line with UK Government targets. Projections of future GHG emissions will be considered in the future baseline scenario.

7.6.5 For climate resilience, to establish the current baseline, data will be collected on the current climatic conditions for both the region and the UK. This data will include information on temperature trends, precipitation trends (snow, ice and rainfall), sea level rise and the frequency/occurrence of extreme climatic events. This data will be taken from the Met Office website. The future baseline information will be taken from the climate change projections (UKCP18) on the Met Office website.

7.7 Design, mitigation, and enhancement measures

7.7.1 Primary mitigation for the Project is its inherent climatic purpose, as this Project intends in its concept to reduce the region's carbon impact in two ways: by transporting captured carbon dioxide from Connected Projects to the seabed deposit and by allowing industry to use hydrogen instead of carbon-based fossil fuels.

7.7.2 Secondary mitigation are any measures intended to reduce embodied carbon during construction and operation, such as using low carbon materials, lean structural design, and energy efficiency measures. This will be explored further as the design develops.

7.7.3 A Construction Environmental Management Plan (CEMP) will be prepared for the Project and will be secured through a requirement in the Development Consent Order (DCO). A draft CEMP will also be provided in support of the DCO application. The CEMP will detail the environmental controls, environmental protections and environmental safety measures that will be adopted during construction. The CEMP will set out a series of measures, based on best practice guidance to control the environmental effects of the construction of the Project. It will identify climatic risks such as floods, higher temperature and incorporate mitigation measures in the CEMP.

7.7.4 Protection from flooding that may lead to possible block valve in installation sites has already been embedded in the design.

7.7.5 A Construction Traffic Management Plan (CTMP) will be prepared and secured through a requirement in the DCO. This will detail measures to be implemented to reduce traffic during the construction phase.

7.7.6 The assessment of Climate will rely on the commitments 1 and 11 set out within the draft Register of Commitments in Volume III, Appendix F.

7.8 Description of likely significant effects

Construction

7.8.1 Likely significant effects on GHG emissions during construction will be the embodied carbon in materials used, specifically structural materials such as steel and concrete, transport of materials/workers/waste to and from the Project.

7.8.2 Likely significant effects from climate change during construction are higher average temperatures and changes to the local precipitation regime. Extreme weather events such as prolonged heatwaves, floods due to heavy rainfall and storm events with strong winds may also hinder construction operations.

7.8.3 Thermal actions (loads) could be caused by an increase in extreme temperatures and may require the use of more expensive components like joints, bearings, paint systems etc. Also, greater care would be required to set the gaps, to ensure that movement does not cause a problem.

7.8.4 An increase in winter precipitation and a decrease in summer precipitation has the potential to change the ground water level. This could mean that additional drainage and stronger materials would be required.

Operation

7.8.5 There are not anticipated to be any likely significant effects associated with the operational phase. GHG emissions sources will be limited to infrequent maintenance and repair activities.

7.8.6 Likely significant effects associated with climate resilience will be limited to the AGIs. As the pipelines are underground, they are not anticipated to be susceptible to impacts associated with climate change. Therefore, potential likely significant effects are as follows:

- Effects on the operational performance of the Project associated with sea level rise;
- Frequent or permanent flooding of the AGIs; and
- Failure of the electrical systems of the AGIs due to an extreme weather event such as a heat wave.

Decommissioning

7.8.7 Potential significant effects of the decommissioning phase on GHG emissions are likely to be the decommissioning operations themselves, and the transport of waste to landfill, waste processing and disposal.

7.8.8 Potential significant effects of climate change impacts on the decommissioning phase are higher temperatures, changing land conditions and extreme climatic events such as storms with strong winds and high precipitation in a short time.

Matters scoped in or out of further assessment

7.8.9 The matters scoped in or out of further assessment for climate are outlined in Table 7.2 below.

7.8.10 Table 7.2 below makes reference to the carbon life stages codes shown in Insert 5.2 which is taken from the Royal Institute for Chartered Surveyors (RICS).

Insert 7.2: Carbon Life Stages Codes

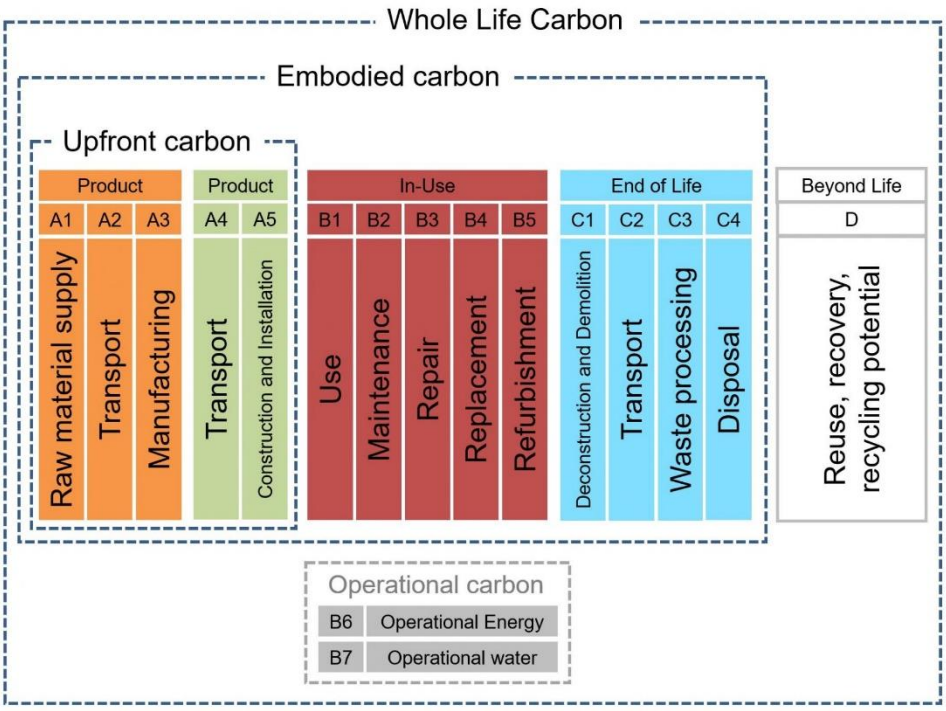


Table 7 2: Matters scoped in or out of further assessment

Matters		Phase	Scoped In	Scoped Out	Justification	Agreed with
Greenhouse gases emissions	Product stage (manufacture and transportation of raw materials to suppliers) A1-3	Construction	✓		Raw materials required for the Project will result in embodied emissions and have the potential to be large.	To be discussed.
	Transport of materials A4	Construction	✓		Construction phase emissions from fuel/energy consumption due to the delivery of material to Project have the potential to be large.	To be discussed.
	Plant and equipment use during construction A5	Construction	✓		Fuel/energy consumption of plant and equipment used during construction would generate GHG emissions.	To be discussed.
	Disposal of waste A5	Construction	✓		Emissions associated with the transportation of construction waste for disposal should be minimised during the design stage but could still be large.	To be discussed.

	Land use, land use change and forestry A5	Construction		✓	As the Project is mainly underground pipelines with minimal land impact, current emissions from land use and future emissions arising from a change in land-use are to be insignificant. In decommissioning, AGIs are to be cleared and the land restored.	To be discussed.
Climate adaptation and resilience	Climate risks during the construction phase	Construction		✓	Due to the short duration of the construction period (up to 44 months) the construction period will not be susceptible to climatic changes.	To be discussed.
Greenhouse gases emissions	Maintenance B2-5	Operation		✓	Maintenance associated with the Project is not considered to be a large emissions source, as maintenance will be infrequent and relatively minor in nature.	To be discussed.
	Replacement and refurbishment B2-5	Operation		✓	The replacement and refurbishment of the Project is expected to be insignificant, for the intended design life of 40 years.	To be discussed.
	Operational energy of the pipelines B6	Operation	✓		The energy required for the operation of the pipelines, that can include pump work, control systems and lighting of facilities has the potential of being large.	To be discussed.
	End of Life	Decommissioning	✓		Carbon associated with the deconstruction operations, as well	To be discussed.

	C1-C4				as transportation of waste materials from site, waste processing and disposal.	
	Benefits D	Operation	✓		The use of hydrogen instead of fossil fuel gas and the capture of carbon emissions instead of releasing emissions to the atmosphere will have significant positive carbon impact. These are considered external benefits to the operation of the pipelines.	To be discussed.
Climate adaptation and resilience	Climate risks during the operational phase	Operation	✓		As this Project is concerned mainly with underground pipelines, climatic risks for the operational phase are considered minor. It will be considered whether AGIs associated with the pipelines are to be vulnerable to the changing climatic conditions expected. Effects on the buried infrastructure will be scoped out.	To be discussed.

7.9 Proposed assessment methodology

GHG Emissions

7.9.1 Construction, operational and decommissioning phases of the Project would be considered for the GHG assessment. The GHG emissions assessment would take an approach consistent with the principles set out in PAS 2080:2016 Carbon Management in Infrastructure (Ref. 7.10). The GHG emissions associated with the construction and operation of the Project would be reported in the form of the 'carbon footprint' - reported in tonnes of carbon dioxide equivalent (tCO2e).

7.9.2 Direct and indirect emissions would be considered in line with GHG reporting and the total carbon footprint is reported in carbon dioxide equivalents (CO2e). This would allow for the emissions of the six key GHGs: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride; to be expressed in terms of their equivalent global warming potential in mass of CO2e.

7.9.3 The assessment of GHG emissions associated with the Project would be considered through the following stages:

- Construction, including material supply, transportation, manufacturing, and construction process:
  - The GHG emitted through the materials used to construct the Project, and the significance of the effects of this; and
  - The GHG emitted through the construction activities associated to the Project, calculated in line with PAS 2080:2016 Carbon Management in Infrastructure (Ref. 7.10) methodology.
- Operation of the Project, including:
  - Energy use for regular operation;
  - Emissions associated with maintenance and refurbishment; and
  - Wider benefits from the Project.
- Decommissioning/end-of-life
  - Deconstruction operations;
  - Transport of waste from site;
  - Waste processing; and
  - Emissions related to disposal.

7.9.4 The significance of effects would be assessed by comparing the estimated GHG emissions arising from the Project with UK carbon budgets and the associated reduction targets. The overall negative carbon of the Project, from construction and operation, will be compared to the overall positive carbon contribution of the Project arising from its contribution to the industries it serves by lowering their industrial emissions.

7.9.5 As the new 2nd edition of the IEMA Guide: 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (February 2022) states, when evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG

profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible.

7.9.6 GHG emissions are not geographically limited. They have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The receptor for GHG emissions is the global atmosphere. The receptor has a high sensitivity, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources.

Climate Change Adaptation

7.9.7 A four-stage framework would be adopted for the assessment, which would look at the likelihood and consequence of the impact occurring to each receptor, leading to evaluation of the significance of the effect.

7.9.8 Stage 1 would involve the assessment of climate effects on the Project using the lifespan of the Project (taken as 40 years) and the long-term lifecycle stage (2080s) over which the baseline projections will be presented within the PEIR.

7.9.9 The UKCP programme provides probabilistic projections for the whole of the UK, at regional level and at local level. To identify the future changes to the climate baseline, the following factors would be identified and used in the assessment:

- The lifespan of the Project (including timescales for construction and operational life cycle stages, and decommission in the end of life);
- Climate trends associated with the UKCP high emissions scenario (50% probability) projection; and
- UKCP09 and UKCP18 projections include a range of different climate variables (e.g. mean daily temperature for summer and winter, mean daily maximum temperatures for summer and mean daily minimum temperatures for winter).

7.9.10 Stage 2 would involve the identification of receptors which are vulnerable to climate change. These could be:

- Buildings and infrastructure receptors (including equipment and building operations);
- Human health receptors (e.g. construction workers);
- Environmental receptors (e.g. habitats and species); and/or
- Climatic systems.

7.9.11 Stage 3 would involve the identification of the impacts (hazards and opportunities) for each receptor using the UKCP18 data, including the vulnerability of the Project to both normal weather and extreme weather-related disaster scenarios.

7.9.12 Stage 4 of the framework would include an assessment of the identified impacts. The assessment would be undertaken using the categories in Table 7.4. The sensitivity of receptors will be measured against these criteria:

- High Sensitivity - receptor is directly dependent on existing/prevailing climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions;

- Medium sensitivity - receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK but is not found in southern Spain);
- Low sensitivity - climatic factors have little influence on the receptors; and
- Negligible - Climatic factors have no influence on the receptors.

7.9.13 Magnitude of change/impact will be assessed under these criteria:

- High Impact - With high probability, the receptor will not be able to function properly under the impact and/or loss of life and/or heavy financial loss are highly likely;
- Medium impact - The receptor may not be able to function properly under the impact/receptors has some limited ability to withstand/not be altered by the projected changes to the existing/prevailing climatic conditions; and
- Low impact - receptor has the ability to withstand/not be altered much by the projected changes to the existing/prevailing climatic factors.

Table 7.4: Criteria for assessing significance of effects

		Sensitivity of receptor/receiving environment to change			
		High	**Medium**	**Low**	**Negligible**
Magnitude of change/impact	**High**	Major	Major to moderate	Moderate	Negligible
	Medium	Major to moderate	Moderate	Minor to moderate	Negligible
	Low	Moderate	Minor to moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

7.10 Limitations and assumptions

7.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The calculations of benefits will be based on external data provided by third parties and the accuracy of the carbon balance will depend on its reliability.

7.11 References

- Ref 7.1 United Nations Framework Convention on Climate Change (2015) *Paris Agreement*. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (Accessed: 7 April 2022).
- Ref 7.2 United Nations Framework Convention on Climate Change (2021) *Glasgow Climate Pact.* Available at: https://unfccc.int/documents/310475 (Accessed: 7 April 2022).
- Ref 7.3 HM Government (2008) *The Climate Change Act (2008) (2019 Amendment).* Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111187654 (Accessed: 7 April 2022).
- Ref 7.4 The Climate Change Committee (2020) *Carbon Budgets.* Available at: https://www.theccc.org.uk/publication/sixth-carbon-budget/ (Accessed: 7 April 2022).
- Ref 7.5 Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 7 April 2022).
- Ref 7.6 Ministry of Business, Energy and Industrial Strategy (2021*) Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 7 April 2022).
- Ref 7.7 Department of Energy and Climate Change (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed: 7 April 2022).
- Ref 7.8 Ministry of Business, Energy and Industrial Strategy (2011) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 7 April 2022).
- Ref. 7.9 Ministry of Housing, Communities and Local Government (2021) *National Planning Policy Framework (NPPF).* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 7 April 2022).
- Ref. 7.10 HM Government (2021) *Net Zero Strategy: Build Back Greener 2021.* Available at: https://www.gov.uk/government/publications/net-zero-strategy (Accessed: 7 April 2022).
- Ref 7.11 Yorkshire and Humber Climate Commission (2021) *Yorkshire & Humber Climate Action Plan.* Available at: https://yorksandhumberclimate.org.uk/climate-action-plan (Accessed: 7 April 2022).
- Ref 7.12 The Green Construction Board (2016) *PAS 2080:2016 Carbon Management in Infrastructure.* Available at: https://www.carbontrust.com/what-we-do/assurance-and-certification/pas-2080-carbon-management-in-infrastructure (Accessed: 7 April 2022).

- Ref 7.13 Zero Carbon Humber Partnership (Drax Group, Equinor and National Grid Ventures) (2019) *Capture for Growth: A Roadmap for the World's First Zero Carbon Industrial Cluster*. Available at: https://www.zerocarbonhumber.co.uk/wp-content/uploads/2019/11/Capture-for-Growth-Zero-Carbon-Humber-V4.9-Digital.pdf (Accessed: 7 April 2022).
- Ref 7.14 Institute of Environmental Management and Assessment (2017) *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their significance.* Available at: https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance (Accessed: 7 April 2022).

8. Geology and Hydrology

8.1 Introduction

8.1.1 This Chapter considers the initial baseline for Geology and Hydrogeology, an overview of the assessment methodology to be followed for the Environmental Impact Assessment (EIA) and identifies the potential effects of the Project. The Chapter describes the data collation which will be followed to determine the existing ground conditions with respect to Geology and Hydrogeology, the identified Study Area, the assessment method which will be adopted to identify possible effects posed by the existing ground conditions and the identification of effects of the Project, and how the significance of effects will be determined. The effects of the Project on the agricultural quality of soils are considered in Chapter 4: Agriculture and Soils.

8.2 Legislation, policy, and guidance

8.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

- The Water Framework Directive (2000/60/EC) (Ref 8.1).
- The Groundwater Directive (2006/118/EC) (Ref 8.2).
- Classification Labelling & Packaging (CLP) Regulation (2008/1272/EC) (Ref 8.3), replacing The Dangerous Substances Directive (67/548/EEC) in 2016 (Ref 8.4).
- The Priority Substances Directive (2008/105/EC) (Ref 8.5).
- Environmental Protection Act, 1990 (Ref 8.6).
- The Environment Act, 2021 (Ref 8.7).
- The Contaminated Land (England) Regulations, 2006 SI 1380 (Ref 8.8).
- Groundwater (England and Wales) Regulations, 2009 SI 2902 (Ref 8.9).
- Environmental Damage (Prevention and Remediation) (England) Regulations, 2015 SI 810 (Ref 8.10).
- The Water Act 2003 (Ref 8.11).
- The Water Resources Act 1991 (as amended) (Ref 8.12).
- The Land Drainage Act 1991 (as amended) (Ref 8.13).
- The Environmental Permitting (England and Wales) Regulations 2016 SI 1154 (Ref 8.14).
- The Water Environment (Water Framework Directive) Regulations 2017 SI 407 (Ref 8.15).

Policy

- Draft Overarching National Policy Statement for Energy (EN-1) (2021) (Ref 8.16).
  - Section 5.4 of the Draft Overarching National Policy Statement for Energy (EN-1) (Ref 8.16) suggests that if a project is likely to have adverse effects on designated sites of ecological or geological conservation importance, an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 5.4.11 puts forth a number mitigations that should be considered if the assessment finds that there will be an impact.
  - Section 5.16 of the Draft Overarching National Policy Statement for Energy (EN-1) (Ref 8.16) suggests that if a project is likely to have adverse effects on the water environment, including groundwater, an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 5.15.8 recommends the "*Secretary of State should consider whether mitigation measure are needed above and beyond any which may form part of the project*".
- Overarching National Policy Statement for Energy (EN-1) (2011) (Ref 8.17).
  - Section 5.3 of the Overarching National Policy Statement for Energy (EN-1) (Ref 8.37) suggests that if a project is likely to have adverse effects on designated sites of ecological or geological conservation importance, an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 5.3.18 puts forth a number mitigations that should be considered if the assessment finds that there will be an impact.
  - Section 5.15 of the Overarching National Policy Statement for Energy (EN-1) (Ref 8.37) suggests that if a project is likely to have adverse effects on the water environment, including groundwater, an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 5.15.8 recommends the "*IPC should consider whether mitigation measure are needed above and beyond any which may form part of the project*".
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (2011) (Ref 8.18).
  - Section 2.22 of the National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 8.38) suggests that if a project is likely to have adverse effects on water resources or water quality, an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 2.22.6 and Paragraph 2.22.7 puts forth a number mitigations that should be considered to protect the water environment and water quality respectively.
  - Section 2.23 of the National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 8.38) suggests that if a project is likely to have adverse effects on the soil and geology, an assessment of the impacts should be included in the Environmental Statement (ES). Paragraph 2.23.7 puts forth a number mitigations that should be considered to minimise adverse effects on soil and geology.
- Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (2021) (Ref 8.19).
- National Planning Policy Framework (2021) (Ref 8. 20).
- North Lincolnshire Council Local Plan (2020) (Ref 8.21).

- East Riding of Yorkshire Council Local Plan (2016) (Ref 8.22).
- Selby District Council Local Plan (2005) (Ref 8.23).
- Central Lincolnshire Council Plan (2017) (Ref 8.24).

Guidance

8.2.2 No specific guidance documents will be relied upon for the Geology and Hydrogeology assessment.

8.3 Engagement

8.3.1 Engagement has been undertaken with the Environment Agency, East Riding of Yorkshire Council, North Lincolnshire Council, Selby District Council and West Lindsey District Council to agree the assessment methodology. Engagement will continue throughout the EIA process. A summary of engagement to date has been provided in Table 8.1.

8.3.2 The Yorkshire Contaminated Land and Groundwater team, Yorkshire Integrated Environmental Planning team, Lincolnshire and Northamptonshire Planning team and the National Requests team at the Environment Agency have been consulted along with Contaminated Land (or the appropriate Environmental Health) Officers from the local authorities through which the Project advances.

Table 8.1: Summary of Engagement

Consultee	Date (method of engagement)	Summary of engagement
Environment Agency	11 November 2021 (email correspondence)	A method note was shared that detailed the proposed methodology for the assessment of Geology and Hydrogeology. The method note covered the methodology for the consideration of baseline conditions and the assessment of potential effects, as well as the criteria for determining significance. The Environment Agency stated they are comfortable with the methodology but to ensure to assess the need for abstraction licence if dewatering is required and that they are applied for in plenty of time (received 1 December 2021).
East Riding of Yorkshire Council	01 December 2021 (email correspondence)	A method note was shared that detailed the proposed methodology for the assessment of Geology and Hydrogeology. The method note covered the methodology for the consideration of baseline conditions and the assessment of potential effects, as well as the criteria for determining significance. East Riding of Yorkshire Council stated assessment methodology approach for the EIA in relation to Geology and Hydrogeology was acceptable and no comments to make (received 4 February 2022).
North Lincolnshire Council	1 December 2021 (Email correspondence)	A method note was shared that detailed the proposed methodology for the assessment of Geology and Hydrogeology. The method note covered the methodology for the consideration of baseline conditions and the assessment

Consultee	Date (method of engagement)	Summary of engagement
		of potential effects, as well as the criteria for determining significance. North Lincolnshire Council stated no objections to proposal in principle (received 1 December 2021).
Selby District Council	11 November 2021 (Email correspondence)	A method note was shared that detailed the proposed methodology for the assessment of Geology and Hydrogeology. The method note covered the methodology for the consideration of baseline conditions and the assessment of potential effects, as well as the criteria for determining significance. Selby District Council stated "*methodology follows best practice guidance, so I am pleased to advise that it is acceptable*." (received 4 February 2022).
West Lindsey District Council	15 November 2021 (email correspondence)	A method note was shared that detailed the proposed methodology for the assessment of Geology and Hydrogeology. The method note covered the methodology for the consideration of baseline conditions and the assessment of potential effects, as well as the criteria for determining significance. West Lindsey District Council stated the assessment methodology approach for the EIA in relation to Geology and Hydrogeology was acceptable and no comments to make (received 9 February 2022).

8.4 Study Area

8.4.1 The Study Area for the scoping of the Geology and Hydrogeology assessment for the Project is 500m either side of the Scoping Route Corridor as agreed with stakeholders. Interaction between the Project and receptors, or sources, of contamination beyond 500m generally would not occur as a result of the ground conditions present in and around the Project.

8.4.2 The receptors, and sources of contamination, have been identified within the Scoping Route Corridor. Where relevant for specific subtopics, such as groundwater Source Protection Zones, the Study Area extends to 500m either side of the Scoping Route Corridor.

8.5 Receptors

8.5.1 The following sensitive receptors have been identified and assessed within this Chapter:

Human Health

- Onsite users – maintenance staff working with AGIs;
- Onsite users – owners of land used for the pipelines working width;
- Offsite neighbours; and
- Construction workers.

Geology

- Superficial deposits (Breighton Sand Formation, Warp, Alluvium, Sutton Sand Formation Head, Till, Glaciofluvial, Beach and Tidal Flat deposits); and
- Bedrock geology (Sherwood Sandstone Group, Mercia Mudstone Group, Scunthorpe Mudstone Formation, Welton Chalk Formation, Burnham Chalk Formation, Kimmeridge Clay Formation, West Walton Formation, Oxford Clay Formation, Kirkton Cemenstone Beds, Frodingham Ironstone Member, Charmouth Mudstone Formation, Marlstone Rock Formation and Flamborough Chalk Formation).

Hydrogeology

- Underlying aquifers (Principal, Secondary A & B and undifferentiated) – controlled waters.

Hydrology

- Surface water features (for example the tidal River Trent and Humer Estuary) – controlled waters.

Infrastructure

- Development infrastructure – ground conditions may impact the newly built infrastructure.

8.6 Baseline conditions

8.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

8.6.2 Initial data collection to date has been undertaken by contacting stakeholders such as the Environmental Agency, East Riding of Yorkshire Council, North Lincolnshire Council, Selby District Council and West Lindsey District Council.

8.6.3 Other available information sources that will be used to establish the baseline conditions include:

- Aerial imagery and mapping;
- MAGIC.gov.uk (Defra) (Ref 8.25);
- British Geology Survey Online Viewer (Geo-Index) (Ref 8.26);
- Zetica UXO Risk Maps (Ref 8.27);
- The Coal Authority (Ref 8.28);
- UKradon (UK Health Security Agency) (Ref 8.29);
- Environmental database information (such as Landmark Envirocheck or Groundsure);
- Coal Mining Report prepared by the Coal Authority, where applicable.
- Records and geo-environmental data held by LPAs relating to current and historical contaminative land uses, including waste sites, where provided;
- Records and geo-environmental data held by LPAs relating to RIGS and quarrying/mining sites, where provided;
- Records held by local authorities of water abstractions and Private Drinking Water supplies, where provided;
- Site walkover of areas of interest such as the intertidal area at Easington landfall, and areas of potential sources of contamination (i.e coal mining areas etc); and
- Existing ground investigation information, if available.

8.6.4 The following section provides a summary of the existing ground conditions within the Study Area.

Geology

8.6.5 Published geological maps and the GIS data sourced from the British Geological Survey (BGS) (Ref 8.30- Ref 8.33) indicate that the Project is underlain by the geological succession which is shown on Figure 8.1 (Volume II, Part 3) (superficial geology) and Figure 8.2 (Volume II, Part 3) (bedrock geology).

8.6.6 The following geological units have been identified underlying the Scoping Route Corridor:

- **Superficial deposits**: Breighton Sand Formation, Warp, Alluvium, Sutton Sand Formation Head, Till, Glaciofluvial, Beach and Tidal Flat deposits; and

- **Bedrock geology**: Sherwood Sandstone Group, Mercia Mudstone Group, Scunthorpe Mudstone Formation, Welton Chalk Formation, Burnham Chalk Formation, Kimmeridge Clay Formation, West Walton Formation, Oxford Clay Formation, Kirkton Cemenstone Beds, Frodingham Ironstone Member, Charmouth Mudstone Formation, Marlstone Rock Formation and Flamborough Chalk Formation.

Geological Sites of Special Scientific Interest and Regionally Important Geological Sites

8.6.7 A review of currently available information from MAGIC (Ref 8.25) identified one Geological SSSI which falls within the Scoping Route Corridor. This is Dimlington Cliff SSSI and it is situated at the landfall location at Easington. No Regionally Important Geological Sites (RIGS) or Local Geological Sites were identified within the Scoping Route Corridor.

8.6.8 Further information was requested from local councils. Selby District Council indicates there are three RIGS listed within the Scoping Route Corridor which are covered by their council:

- ‘quarrying sand/clay’ dated 1981, filled in 1996 (502719E, 406606N);
- ‘quarrying sand + clay operation’ dated 1891, unknown filled ground in 1988 (503309E, 407405N); and
- ‘quarrying sand +clay’ dated 1948, unknown filled ground in 1996 (503896E, 407302N).

Coal Mining and Shallow Mining

8.6.9 Available Coal Authority records (Ref 8.28) show two sections of the Study Area fall within Coal Mining Reporting Areas; this includes the initial stretch of the Scoping Route Corridor between Drax and Scunthorpe and then a stretch of the Scoping Route Corridor crossing the Humber.

Mineral Sites and Designations

8.6.10 Information obtained from Lincolnshire Minerals and Waste Local Plan (Adopted 2016) (Ref 8.34) identifies Safeguarded Mineral Sites.

8.6.11 From the Lincolnshire Plan, there are the following mineral safeguarding polices:

- Policy M12: Safeguarding of Existing Mineral Sites and Associate Minerals Infrastructure – Kettleby Quarry; and
- Policy SL2: Safeguarding Mineral Allocations – an extension of Kettleby Quarry.

8.6.12 The exemptions set out in Policies M12 and SL2, the application for non-minerals development should be accompanied by a Minerals Assessment to determine if the proposed development would prejudice or jeopardise the future operation of the minerals site and extraction of the allocated resources.

8.6.13 According to Defra’s ‘MAGIC’ mapping portal (Ref 8.25), the Scoping Route Corridor is located within 500m of the area subject to the following mineral safeguarding policies:

- ‘Sand and Gravel Superficial 250m Buffer’;

- ‘Limestone MSA 500m Buffer’;
- ‘Chalk 500m Buffer’; and
- ‘Brick Clay Safeguarding’.

Hydrogeology

Aquifer Classifications

8.6.14 Aquifer classification maps on Defra’s ‘MAGIC’ (Ref 8.25) mapping portal indicates that the bedrock aquifers underlying the Scoping Route Corridor from Drax to Goole and then from Scunthorpe until Easington are Principal Aquifers. The section of Scoping Route Corridor between Goole and Scunthorpe is classified as both Secondary A and Secondary B aquifers.

8.6.15 The superficial deposits underlying the Scoping Route Corridor up to the River Humber are all classified as Secondary A aquifers. The superficial deposits along the remainder of the Scoping Route Corridor are classified as Secondary (Undifferentiated) aquifers.

Water Framework Directive Groundwater Bodies

8.6.16 The following seven Water Framework Directive (WFD) groundwater bodies have been identified within the Scoping Route Corridor (Ref 8.35):

- Wharfe & Lower Ouse Sherwood Sandstone;
- Aire & Don Sherwood Sandstone;
- Idle Torne – Secondary Mudrocks;
- Lower Trench Erewash – Secondary Combined;
- Grimsby Ancholme Louth Limestone Unit;
- Grimsby Ancholme Louth Chalk Unit; and
- Hull & East Riding Chalk.

Abstraction Data

8.6.17 The Environment Agency was contacted in relation to abstractions within the Scoping Route Corridor. They have provided a detailed list of abstractions within the Scoping Route Corridor which includes abstractions name, license number, description, use, source and easting and northings.

Other Additional Hydrogeological Classifications and Features

8.6.18 Additional hydrogeological classifications and features such as private water supplies (both groundwater and surface water), Source Protection Zones, drinking water safeguard zones and nitrate vulnerable zones have all been recorded within the Scoping Route Corridor.

Current and Historic Potentially Contaminative Land Uses

8.6.19 Current land use within the Scoping Route Corridor and the surrounding Study Area is predominantly agricultural land. The Scoping Route Corridor starts east of Drax Power

Station and then migrates south intersecting the M62 and Aire and Calder Navigation Knottingley & Goole Canal, travelling further south and intersecting the Sheffield and South Yorkshire Navigation Stainforth and Keadby Canal and Three Rivers before cutting east across the River Trent. The Scoping Route Corridor then follows the M180 before cutting north and across the River Humber north of Immingham where it migrates across agricultural land until reaching Easington.

8.6.20 According to Selby District Council, several potentially contaminative sites have been identified within the Scoping Route Corridor. The contaminative land uses include the following:

- Power Stations;
- Agricultural Land;
- Haulage;
- Agriculture;
- Sewage Works;
- Tanks;
- Railway; and
- Landfills.

Current and Historic Landfills

8.6.21 Recorded current and historic landfills identified through correspondence with the relevant local authorities have been collated. Within the Study Area of the Scoping Route Corridor nine Environment Agency Historic Landfills were identified. 14 landfills were identified within the Scoping Route Corridor itself. No Environment Agency Permitted Waste Site Authorised Landfills were identified within the Scoping Route Corridor or the Study Area.

Ground Gas

8.6.22 Ground gas, including methane and carbon dioxide, associated with the natural strata and Made Ground deposits, may be present. Ground gas may also be associated with identified historical landfills, as well as unregistered infilled land (e.g. backfilled sand and chalk pits).

Radon

8.6.23 Published radon data from UK Health and Security Agency (Ref 8.29) indicates that the majority of the Scoping Route Corridor has a maximum radon potential of 1%. However, a section of the Scoping Route Corridor between Scunthorpe and Brigg has a maximum radon potential of between 10-30%.

Unexploded Ordnance Potential

8.6.24 Online Zetica Unexploded Ordnance (UXO) risk mapping (Ref 8.27) shows ‘Low Risk’ (15 bombs per 1,000 acres or less) for the entirety of the Scoping Route Corridor.

8.7 Design, mitigation, and enhancement measures

8.7.1 Where possible, the Project will be designed to avoid important geological features or resources, and sources of contamination, through careful routeing and site selection.

8.7.2 The main mitigation measure to prevent adverse effects on soils, geology and hydrogeology, during all phases of the development of the Project will be to ensure good site practice and management and adherence to a Construction Environmental Management Plan (CEMP). A draft CEMP will be submitted with the Development Consent Order (DCO) application and the CEMP will be secured through a requirement in the draft DCO.

8.7.3 Desk study work may identify areas of soil and/or groundwater contamination and there may be a requirement to undertake ground investigation and risk assessment of potential contaminant linkages. If areas of the Scoping Route Corridor are shown to pose a risk, infrastructure will be moved to a different location where feasible. However, if it is not possible to move the infrastructure, remedial measures would be implemented.

8.7.4 A remediation strategy will be devised and discussed with the regulatory authorities (including relevant local authorities and the EA) prior to any remedial works. Contaminated material that is considered to pose a risk would be remediated in line with the remediation strategy or disposed of appropriately.

8.7.5 A more detailed hydrogeological assessment will be undertaken where trenchless techniques or dewatering is required in high sensitivity groundwater environments or where dewatering is required to facilitate open cut installation. Where dewatering is required, a dewatering scheme will be developed prior to construction (in consultation with the EA) to demonstrate that there is an effective strategy to manage water arising from the operations and, where required, sufficient proposals to treat the water prior to controlled discharge. Any such assessment will consider the effects of any draw down or impacts on nearby abstractions or resources.

8.7.6 The Geology and Hydrogeology assessment will rely on the commitments 1, 3, 4 and 5 outlined in the draft Register of Commitments in Volume III, Appendix F.

8.8 Description of likely significant effects

8.8.1 The following summarises potential likely significant effects identified based on the current preliminary assessment. The most sensitive receptors are considered to be, underlying aquifers, human health and uncontaminated soils and geology.

Construction

8.8.2 The following potential significant effects have been identified however the likelihood of them occurring will be reduced by the design, mitigation and enhancement measures outlined in Section 8.6:

- Pollution of ground and/or groundwater from chemical spillages and leaks from plant, machinery and chemicals and other contaminants stored on site due to construction activities;

- Changes in the upper levels of the underlying superficial geology structure and reduction of quality due to compaction or erosion during storage due to construction activities;
- Compaction of the upper levels of the underlying superficial geology due to construction vehicle movements degrading soil quality and causing potential waterlogging due to construction activities;
- Reduction in flow to groundwater supported sites, abstractions and surface water bodies and changes to hydrology locally due to the requirement for dewatering due to construction activities;
- Reduction in quality or levels of groundwater supporting sites protected under European and UK habitat legislation, such as a RAMSAR Ste or a SSSI due to dewatering due to construction activities;
- Geologically important sites could be compromised due to disturbance of ground conditions caused by construction activities;
- Construction workers, groundwater and geology including the inter tidal zone could be compromised due to disturbance of potentially contaminated soils, sediments and waters caused by construction activities;
- Human health and underlying geology and groundwater compromised due to importation of contaminated aggregates during construction activities;
- Sensitive groundwater and surface water receptors at risk from drilling fluids or other fluids used during construction activities where pathways are created such as excavations and drilling;
- Human health for construction workers and underlying geology could be compromised due to the requirement to remove spoil from tunnelling operations (including tunnel shafts) during construction activities; and
- Human health for construction workers and underlying geology could be compromised due to the importation of backfill material for tunnel shafts during construction activities.

Operation

8.8.3 During operation the following effects could occur if appropriate mitigation is not implemented:

- Non-contaminated soils, geology and groundwater compromised due to migration of contaminants along preferential pathways created along the foundations of structures and pipelines caused by the operational activities;
- Pipeline condition compromised due to aggressive ground contaminants; and
- Reduction in flow to groundwater abstractions and surface water bodies and changes to soil hydrology due to requirement for dewatering during operation.

Decommissioning

8.8.4 The pipelines will be left in-situ and therefore the decommissioning will include the removal of the AGIs only. It is assumed that the works to decommission the Project will

be similar to those of construction. Refer to Paragraph 8.8.2 for potential likely significant effects.

Matters scoped in or out of further assessment

8.8.5 The matters scoped in or out of further assessment for Geology and Hydrogeology are outlined in Table 8.2 below.

Table 8.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Geology	Construction	✓		Potential for effects on geological receptors and for effects on the Project (development infrastructure) from land contamination.	Regulators (Environment Agency and Local Authorities Contaminated Land/Environmental Health Officers)
	Operation	✓		Potential for effects on geological receptors and for effects on the Project (development infrastructure) from land contamination.	Regulators (Environment Agency and Local Authority Contaminated Land/Environmental Health Officers)
	Decommissioning	✓		Potential for effects on geological receptors.	Regulators (Environment Agency and Local Authority Contaminated Land/Environmental Health Officers)
Hydrogeology	Construction	✓		Potential for effects on hydrogeological receptors and for effects on the Project (development infrastructure) from land contamination.	Regulators (Environment Agency and Local Authority Contaminated Land/Environmental Health Officers)
	Operation	✓		Potential for effects on hydrogeological receptors and for effects on the Project (development infrastructure) from land contamination.	Regulators (Environment Agency and Local Authority Contaminated Land/Environmental Health Officers)

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
	Decommissioning	✓		Potential for effects on hydrogeological receptors.	Regulators (Environment Agency and Local Authority Contaminated Land/Environmental Health Officers)

8.9 Proposed assessment methodology

8.9.1 Utilising baseline information and consultation with statutory consultees, a combination of qualitative and quantitative risk assessment will be undertaken to assess the potential effects of the existing ground conditions on the Project, and the potential effects of the Project on the Geology and Hydrogeology.

8.9.2 In relation to ground contamination, the risk assessment will be based on the source-pathway-receptor methodology outlined in Land Contamination Risk Management (LCRM) (Ref 8.36) and promoted by Defra and the Environment Agency. For there to be an identifiable risk, not only must there be contaminants present (source) there must also be a receptor and a viable pathway which allows the source to impact on the receptor.

8.9.3 The overall assessment methodology is summarised in Chapter 3: EIA Methodology. However, the assessment of the significance of the potential effects on Geology and Hydrogeology will be based on guidance in the Design Manual for Roads and Bridges (DMRB) LA 109 Geology and Soils (geology) (Ref 8.37) and LA 113 Road Drainage and the Water Environment (groundwater) (Ref 8.38). There is no specific guidance in relation to carbon transportation schemes for assessing Geology and Hydrogeology, therefore, DMRB has been used as it is considered to be the most appropriate methodology for the Project because it is designed for assessing effects on linear schemes (including ‘point’ features), albeit road schemes. It is also a well-established and tested methodology, familiar to the statutory consultees. Examples of magnitude of effects impacts, sensitivity of receptors and significance in the context of DMRB assessment are presented below in Table 8.3.

Table 8.3: Criteria to determine the sensitivity of Potential Effect to receptors

Sensitivity / Value	Description / Criteria	Typical Examples
High	Geology Very rare and of international importance with no potential for replacement. Hydrogeology Nationally significant attribute of high importance.	Geology United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Sites; SSSIs of international importance; or Global Geoparks. Contamination Very high sensitivity land use (e.g. residential). Hydrogeology Principal aquifer providing a regionally important resource and/ or supporting site protected under European and UK habitat legislation; Source Protection Zone 1; or Groundwater supports Groundwater Dependent Terrestrial Ecosystem (GWDTE).
Medium	Geology Rare and of national importance with little potential for replacement. Hydrogeology Locally significant attribute of high importance.	Geology SSSIs; or National Nature Reserves. Contamination High sensitivity land use (e.g. public open space). Hydrogeology

		Principal aquifer providing a locally important resource or supporting a river ecosystem; Source Protection Zone 2; or Groundwater supports Groundwater Dependent Terrestrial Ecosystem (GWDTE).
Low	<u>Geology</u> Of regional importance with limited potential for replacement. <u>Hydrogeology</u> Of moderate quality and rarity.	<u>Geology</u> RIGS. <u>Contamination</u> Medium sensitivity land use (e.g. commercial). <u>Hydrogeology</u> Aquifer providing water for agricultural or industrial use with limited connection to surface water; or Source Protection Zone 3.
Negligible	<u>Geology</u> Of local importance / interest with potential for replacement or little/ no local interest. <u>Hydrogeology</u> Lower quality.	<u>Geology</u> Non-designated geological exposures, former quarries / mining sites. No geological exposures. <u>Contamination</u> Low sensitivity land use (e.g. highways and rail); or No sensitive land use proposed. <u>Hydrogeology</u> Unproductive strata.

Magnitude

The magnitude of an impact considers the scale of the predicted change to the baseline condition taking into account its duration (i.e. the magnitude may be moderated by the impacts being temporary rather than permanent, short term rather than long term). Definitions for effect impact magnitude are described in. It is unlikely that any effects on geology and soils will be beneficial, so the examples of magnitude all relate to adverse effects.

Table 8.4: Criteria to determine the magnitude of impact

Magnitude	Criteria	Typical Examples
High	<u>Geology</u> Loss of feature/ designation and/ or quality and integrity, severe damage to key characteristics. <u>Hydrogeology</u> Loss of attribute and/or quality and integrity of the attribute.	<u>Geology</u> Destruction of features at a protected site; i.e. SSSIs of international importance; or Global Geoparks. <u>Contamination</u> Significant contamination identified; Contaminant concentrations significantly exceed background levels and relevant screening. criteria; Potential for significant harm to human health; or Contamination heavily restricts future use of land. <u>Hydrogeology</u> Loss of, or extensive change to, an aquifer; Loss of regionally important water supply; Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies; and Reduction in water body WFD classification; or Loss or significant damage to major structures through subsidence or similar effects.
Medium	<u>Geology</u> Partial loss of feature / designation, potentially adversely affecting integrity;	<u>Geology</u> Partial loss of features at a protected site; i.e. SSSIs; National Nature Reserves.

Magnitude	Criteria	Typical Examples
	partial loss of/damage to key characteristics, features or elements. Hydrogeology Results in effect on integrity of attribute, or loss of part of attribute.	Contamination Contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria; and Significant contamination can be present; or Control/remediation measures are required to reduce risks to human health / make land suitable for intended use. Hydrogeology Partial loss or change to an aquifer; Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies; Partial loss of the integrity of GWDTE; Contribution to reduction in water body WFD classification; or Damage to major structures through subsidence or similar effects or loss of minor structures.
Low	Geology 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. Hydrogeology	Geology Minor measurable change of features at Geological sites; i.e. RIGS Contamination Contaminant concentrations are below relevant screening criteria; Significant contamination is unlikely with a low risk to human health; or Best practice measures can be required to minimise risks to human health. Hydrogeology

Magnitude	Criteria	Typical Examples
	Results in some measurable change in attributes, quality or vulnerability.	Minor effects on an aquifer, GWDTEs, abstractions and structures.
Negligible	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. Hydrogeology Results in effect on attribute, but of insufficient magnitude to affect the use or integrity.	Geology Very minor change of features at sites of local importance, i.e. non-designated geological sites. Contamination Contaminant concentrations substantially below relevant screening criteria; or No requirements for control measures to reduce risks to human health/make land suitable for intended use. Hydrogeology No measurable impact upon an aquifer and/or groundwater receptors.

Significance

8.9.4 The significance of environmental effect is typically a function of the sensitivity of a receptor and the magnitude of an impact. An indicative matrix for the determination of significance is provided in Table 3.1 in Chapter 3: EIA Methodology.

8.10 Limitations and assumptions

8.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The assessment will rely on available data, and reasonable endeavours will be made to ensure that the data is accurate and up to date, however the accuracy of third-party information cannot be confirmed.

8.11 References

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9. Cultural Heritage

9.1 Introduction

9.1.1 This Chapter considers the impact of the Project on Cultural Heritage. It sets out the proposed methodology for the cultural heritage assessment and identifies those impacts and matters that can be scoped out of the Environmental Impact Assessment (EIA). It considers all possible types of receptors within the Study Area including terrestrial archaeology, built heritage, historic landscape character and intertidal and marine archaeology and designated and non-designated heritage assets.

9.2 Legislation, policy, and guidance

9.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

9.2.2 No specific legislation will be relied upon for the Cultural Heritage assessment

Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) Section 5.8 (Ref 9.1).
  - The assessment of the historic environment is addressed under section 5.8 of EN-1. Section 5.8 discusses the need for an applicant to provide an understanding of the extent of impact of a proposed development on the significance of any heritage assets affected. An applicant is to carry out a desk-based assessment, including the consultation of the relevant Historic Environment Record (as a minimum) to assess the archaeological interest of heritage assets within a development site. Where the desk-based assessment is insufficient to properly assess interest, a field evaluation should be carried out. Following assessment, where the loss of the whole or a material part of a heritage asset is justified, the Infrastructure Planning Commission should require the developer to record and advance understanding of the significance of the heritage asset before it is lost. This recording should be undertaken in accordance with a written scheme of investigation and provide appropriate procedures are in place for the identification and treatment of previously unknown assets being discovered during construction.
- Draft Overarching National Policy Statement for Energy (EN-1) (2021), Section 5.9 (Ref 9.2).
  - The historic environment is addressed under section 5.9. Under the draft statement, much of the wording remains the same as the extant EN-1. However, the ability to record evidence of the asset is not adequate mitigation of any harm and should not be a factor in deciding whether consent should be given.
- National Planning Policy Framework (2021) (Ref 9.3).

- Selby District Core Strategy Local Plan (2013) (Ref 9.4).
- Selby District Local Plan (2005) (Ref 9.5).
- North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 9.6).
- East Riding Local Plan 2012-2029 Strategy Document (2016) (Ref 9.7).
- Central Lincolnshire Local Plan (2017) (Ref 9.8).

Guidance

- Standard and guidance for historic environment desk-based assessment (2014), Chartered Institute for Archaeologists (CIfA) (Ref 9.9).
- Principles of Cultural Heritage Impact Assessment in the UK (2021), CIfA, Institute of Environmental Management and Assessment, Institute of Historic Building Conservation (IHBC) (Ref 9.10).
- Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment (2008), Historic England (Ref 9.11).
- The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (2017), Historic England (Ref 9.12).
- Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011), International Council on Monuments and Sites (ICOMOS) (Ref 9.13).

9.3 Engagement

9.3.1 Engagement has been undertaken with heritage officers from each local authority affected by the Project, and Historic England, forming the ‘heritage working group’. Engagement will continue throughout the EIA process and is intended to be principally in the form of a heritage working group that brings all consultees together. This is to ensure a consistent approach to methodology and project communication. A methodology document, outlining the approach to assessment, has been prepared and shared with consultees to aid discussions. It is acknowledged individual discussions will be more appropriate when issues arise affecting the historic environment in a specific local authority area. A summary of engagement to date has been provided in Table 9.1.

Table 9 1: Summary of engagement

Consultee	Date (method of engagement)	Summary of Engagement
Archaeological Officer and Conservation Officer to North Lincolnshire Council	07 October 2021 (Microsoft Teams Call)	The same presentation was given to each individual local authority heritage officer outlining the overall methodology proposed, alongside a high-level introduction to the Project. The proposed methodology was discussed, and the comments received have informed this Chapter. The proposed approach to desk-based assessment was agreed. However, further comments from consultees focused on the need for further archaeological assessment to inform the EIA.
Archaeological Officer and Conservation Officer to East Riding of Yorkshire Council	12 October 2021 (Microsoft Teams Call)	
Historic England	14 October 2021 (Microsoft Teams Call)	
Archaeological Officer to Lincolnshire County Council	20 October 2021 (Microsoft Teams Call)	
Conservation Officer to West Lindsey District Council	20 October 2021 (Microsoft Teams Call)	
Archaeological Officer to North Yorkshire County Council	27 October 2021 (Microsoft Teams Call)	
Heritage Working Group	23 November 2021 (email)	Methodology document was issued to heritage consultees on 23 November 2021.
First meeting of the Project's Heritage working group	9 December 2021 (Microsoft Teams Call)	A specific call was held to discuss the proposed methodology and approach to assessment. Comments were focused on the standalone methodology document shared. Key comments include:

Consultee	Date (method of engagement)	Summary of Engagement
		Agreement of the proposed scope of the assessment as presented in this Chapter; including the scoping out of historic landscape character assessment and assessment of the marine and intertidal environment of the River Humber. The approach to the desk-based assessment was agreeable, including a targeted walkover survey, supported by an aerial survey; A level of commitment to further assessment, beyond a purely desk-based approach was required. This included the request for a geoarchaeological assessment and use of metal detecting, alongside geophysical survey and trial trench evaluation. Further comments raised included the assessment of curtilage by the East Riding Conservation Officer, alongside the assessment of setting for built heritage. The project believes that curtilage matters would need to be considered on a case-by-case basis. However, based on the design principle to avoid direct impacts to buildings, including listed buildings, it is anticipated there will be a limited number of cases where curtilage may be appropriate, if any at all.
Conservation Officer to Selby District Council	2 March 2022 (Microsoft Teams Call)	A call was held to discuss the project background and the methodology document, previously shared. The conservation officer had no objections to the proposed methodology.
Heritage Working Group	23 March 2022 (email)	The updated version of the standalone methodology document has addressed certain comments and was circulated to all heritage consultees on 23 March 2022. This includes the commitment for a geoarchaeology assessment to be carried out to allow for the requested geoarchaeologically led approach to assessment.

Consultee	Date (method of engagement)	Summary of Engagement
		Following the results of the geoarchaeological assessment and terrestrial archaeology baseline report, the Project proposes to hold further discussion on what targeted fieldwork may be proportionate and appropriate to further assessment and aid the Development Consent Order (DCO) process. The Project, however, does not see value in metal detecting as an approach to further fieldwork, as it would not provide sufficient evidence to characterise the nature and or significance of any archaeological remains. A second meeting of the heritage working group is planned to discuss the updated methodology document.

9.4 Study Area

9.4.1 The Project will use a 500m Study Area from the Scoping Route Corridor for both designated and non-designated heritage assets, as agreed through engagement. Due to the linear nature of the Project, it is believed that 500m will provide adequate information to understand the archaeological potential of the Project, while also characterising and contextualising the historic environment within the Project's wider environs. Given the nature of construction activity and the final appearance of the Project, this is also felt to encompass the area within which any significant effects arising due to a change to setting that affect an asset's significance could occur.

9.4.2 There are a small number of designated assets (four listed buildings) located outside the 500m Study Area that have been included in the baseline due to their historical, functional relationship with an asset located within the Study Area. They are included to ensure that the settings assessment considers any potential for significant effects. They are:

- The grade II listed Moorend Farmhouse, due to its relationship with the grade II listed stable/granary range approximately 30m west of Moorend Farmhouse; and
- The grade I listed Abbot's Lodge, grade II listed coach house/granary approximately 20m north of Abbot's Lodge and grade II listed ruins of Thornton Abbey south precinct gateway approximately 180m south of Abbot's Lodge as they are located within the scheduled area of Thornton Abbey, which is largely within the 500m Study Area.

9.4.3 The Scoping Route Corridor and 500m Study Area are shown on Figure 9.1 (Volume II, Part 3).

9.5 Receptors

Terrestrial archaeology

9.5.1 In the 500m Study Area there are 12 scheduled monuments, from east to west these are:

- Drax Augustinian priory;
- Scurff Hall moated site;
- Raventhorpe medieval settlement earthworks immediately south west of Raventhorpe Farm;
- Romano-British settlement near Staniwells Farm;
- Thornton Abbey Augustinian monastery;
- Manor Farm moated site;
- Second World War QF bombing decoy, known as East Halton, East Marsh, East Marsh Road, Goxhill, 900m south-east of Lynton Stud;
- Paull Point Battery, coastal artillery battery and Submarine Mining Establishment
- Paull Holme moated site and tower;

- World War II decoys for Hull docks, 1580m south east, 600m west and 90m south west of Little Humber;
- Hedon medieval town; and
- Burstwick Castle.

9.5.2 There are no scheduled monuments within the Scoping Route Corridor. Non-designated archaeological assets, dating from the prehistoric to the modern periods, are recorded within the Scoping Route Corridor and 500m Study Area. Within the Scoping Route Corridor, 169 non-designated archaeological assets are recorded. Further details on all recorded heritage assets in the Route Corridor and 500m Study Area will be provided in the Environmental Statement (ES).

Built Heritage

9.5.3 There are five grade II listed buildings within the Scoping Route Corridor. Thorngumbald Clough Low Lighthouse and Thorngumbald Clough High Lighthouse are within the Scoping Route Corridor in the area where the pipelines would be located beneath the River Humber. Chapel Farmhouse and the Stable/Granary approximately 20m northeast of Chapel Farmhouse are located on the western edge of the Scoping Route Corridor near Goxhill. Abbey Lane Gatehouse is located on the southern edge of the Scoping Route Corridor near Thornton Abbey.

9.5.4 In the 500m Study Area there are eight grade I listed buildings, two grade II* listed buildings, 57 grade II listed buildings, three conservation areas and one grade I registered park and garden. Non-designated built heritage assets in the Scoping Route Corridor and 500m Study Area predominantly date to the post medieval period. The Isle of Axholme area of special historic landscape will be considered within the built heritage section of future reporting.

9.5.5 There are no world heritage sites, registered battlefields or protected wrecks within the Scoping Route Corridor or 500m Study Area. The locations of all designated heritage assets are shown on Figure 9.1 (Volume II, Part 3). The scheduled monuments, conservation areas and registered park and garden are labelled with their names and the listed buildings with their Historic England list entry numbers.

Intertidal archaeology

9.5.6 There are no designated or protected wrecks and no scheduled monuments within the intertidal zone. There are, however, a number of heritage assets recorded on the beach and intertidal zone at the landfall location, including several findspots (ranging in date from Prehistoric – Romano-British) and a number of Second World War beach defences, typical of the area. A paleo-channel is also recorded just to the south of Eastington in the Historic Environment Record; further details on all recorded heritage assets within the intertidal zone will be provided in the ES.

9.6 Baseline conditions

9.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES). Data will be drawn from a range of sources and managed through a Project specific GIS system. These will include:

- Historic Environment Record (HER) data for known archaeological sites, monuments, find spots and events;
- Data from the Historic England Archives (HEA) for known cultural heritage assets within the intertidal zone only;
- Archaeological reports (grey literature) on archaeological interventions within the route corridors and above ground installation (AGI) locations, including the Rapid Coastal Zone Assessment (Yorkshire and Lincolnshire;
- Published archaeological journals and monographs, local history books and pamphlets, including local history websites as appropriate;
- Historic maps, including Ordnance Survey (OS), estate maps, enclosure maps, tithe maps and military plans, all available scales of OS maps will be utilised;
- Available aerial photographs, including a Project commissioned UAV/drone aerial survey;
- LiDAR data;
- Data sets of designations from Historic England's National Heritage List for England;
- Data from the Coastal and Intertidal Zone Archaeological Network (CITiZAN);
- UK Hydrographic Office (UKHO) reviews of cartography, historic charts and sailing directions;
- Relevant Strategic Environmental Assessment (SEA) reports (e.g. UK continental shelf SEA archaeological baseline) and coastal survey assessment reports;
- Data held by the European Marine Observation and Data Network (EMODnet) and the Marine Environment Data Information Network (MEDIN);
- OceanWise wrecks and obstructions database and data held within wrecksite.eu;
- Conservation areas have recently become available as a data download from Historic England. Data for conservation areas will be cross referenced with the local authority websites to ensure accurate data is used;
- Targeted walkover survey, areas to be surveyed will be scoped based on records of designated and non-designated heritage assets, analysis of the aerial imagery provided by the Project commissioned Unmanned Aerial Vehicle (UAV)/drone aerial survey, presence of existing infrastructure, buildings or dense vegetation and previous archaeological investigation. The purpose of the walkover is to increase understanding of the historic environment conditions for the baseline;
- Setting assessment will be undertaken during site visits for designated heritage assets (scheduled monuments, listed buildings, registered parks and gardens and conservation areas) located within the 500m Study Area and additional designated or non-designated built heritage assets located within the Zone of Theoretical Visibility (ZTV) established for the AGIs; and
- A specialist geoarchaeological desk-based assessment will be undertaken. The geoarchaeology assessment will include a deposit model, to identify deposit sequences across the landscape of the Project. The characterisation of the deposit sequences will support the baseline understanding of the historic environment, particularly the assessment of potential for archaeological and paleoenvironmental remains. Following completion of the geoarchaeological assessment and terrestrial

archaeology baseline, further discussion with the heritage working group will be held. The discussion will consider where a phase of proportionate and targeted fieldwork may be appropriate to further understanding and aid in the determination of the DCO application.

9.7 Design, mitigation, and enhancement measures

9.7.1 Proposed mitigation measures will be proportionate to the level of impact and the value of the heritage asset. An Outline Heritage Mitigation Strategy (OHMS) will be submitted and produced as part of the CEMP as an appendix to the ES. The heritage working group will be consulted on the proposed mitigation. It is intended that the OHMS will remain a live document throughout the examination phase of the DCO application, to capture any changes in baseline understanding, impact and therefore required mitigation following delivery of any fieldwork results post-DCO submission. The final heritage mitigation strategy will be secured as a requirement of the DCO.

9.7.2 The Scoping Route Corridor has sought to avoid designated heritage assets, to avoid any physical impacts to these assets.

9.7.3 The Cultural Heritage assessment will rely on commitments 1, 2, 6 and 7 outlined in the draft Register of Commitments in Volume III, Appendix F.

9.8 Description of likely significant effects

Construction

9.8.1 Likely construction effects comprise:

- Permanent effects to archaeological assets, including those within the intertidal zone, through construction activity that breaks ground and physically impacts the asset;
- Probable temporary and reversible effects but may be significant while they occur due to change to settings that affect the significance of designated and non-designated heritage assets (archaeology and built heritage) in the Study Area resulting from introduction of construction works including machinery/lighting; and
- Physical impact to small proportion of the Isle of Axholme and change to setting of a proportion of the area of special historic landscape.

Operation

9.8.2 Likely operational effects comprise change to settings that affect the significance of designated and non-designated heritage assets (archaeology and built heritage) in the Study Area in proximity to the AGIs. The majority of the Project is not expected to cause any change to settings during operation as land within the Scoping Route Corridor would be reinstated following construction, where the Project comprises the buried pipelines.

Decommissioning

9.8.3 Decommissioning is unlikely to cause significant effects to cultural heritage. As the pipelines will be left in situ, no further impact to archaeology would occur as any impacts

to archaeology in these locations would have occurred during construction by removing the archaeological assets affected. Equally, the dismantling of the AGIs is unlikely to cause further physical impacts to archaeology for the same reason. Any impacts to archaeology during the decommissioning phase will be minimised through the implementation of a Decommissioning Environmental Management Plan (DEMP), to be submitted with the DCO. In addition, when the pipelines reach the end of their life, they will be decommissioned safely under a separate consent.

9.8.4 The works required to decommission the AGIs would introduce temporary activity, including machinery/lighting. Any change to aspects of an asset's setting that contribute to its significance resulting from these works would be temporary and reversible and the outcome of the decommissioning would reverse any negative effects experienced due to change to setting occurring during the AGIs construction and operation.

Matters scoped in or out of further assessment

9.8.5 The matters scoped in or out of further assessment for Cultural Heritage are as outlined in Table 9.2.

Table 9.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Terrestrial archaeology	Construction and operation	✓		There is known archaeology present within the Scoping Route Corridor, and it crosses landscapes of known historic activity which have not been tested archaeologically. The assessment will include consideration of archaeological potential, to consider potential impacts to yet unknown archaeological remains of all archaeological periods. Impacts that would arise due to change to the setting of archaeological assets, that affect their significance, will also be considered.	Archaeological advisors for North Yorkshire County Council, North Lincolnshire Council, Lincolnshire County Council, East Riding of Yorkshire Council and Historic England.
Intertidal and marine archaeology at the Humber Estuary	Construction and operation		✓	The Project will include a trenchless crossing of the Humber Estuary. The locations of the tunnel portals will be a sufficient distance from the banks of the Humber Estuary to avoid impact to the riverbanks and archaeology that may be present at low or high tide. It is assumed that the tunnel portals will be no closer to the riverbanks than those for the Humber Estuary Gas Pipeline Replacement Project, which scoped out impact to this matter. Therefore, it is	Archaeological advisors for North Yorkshire County Council, North Lincolnshire Council, Lincolnshire County Council, East Riding of Yorkshire Council and Historic England.

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
				proposed to scope out assessment of impacts to intertidal and marine archaeology in this location.	
Intertidal archaeology at the Holderness Coast	Construction and operation	✓		The Project will cross the intertidal zone before connecting to a pipeline offshore that is subject to a separate consent. The design solution in the intertidal zone is still under consideration and depending on the final solution selected there may be impacts on intertidal archaeology. Therefore, the Project proposes to scope in assessment of impacts to intertidal archaeology in this location. Impact to the historic environment, including marine archaeology, associated with offshore storage and associated pipes are not within the remit of this Project and subject to separate consents.	To be discussed.
Built heritage	Construction and operation	✓		The proposed AGIs, particularly the Pumping Facility at landfall in the east of the Project, represent introductions of permanent structures that have the potential to change the setting of a built heritage asset long term, into operation. There are no impacts anticipated to the physical fabric of built heritage assets but due to the proximity of built heritage	Archaeological advisors and Conservation Officers for North Yorkshire County Council, North Lincolnshire Council, Lincolnshire County Council, East Riding of Yorkshire Council, Selby District Council, West Lindsey District Council and Historic England.

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
				(with some present within the Scoping Route Corridor), impacts resulting from changes to setting during construction and operation will be considered.	
Historic landscape character	Construction and operation		✓	Following construction of the pipelines, the landscape will be reinstated, and the Project will therefore not introduce a permanent, substantial change of character to the landscape. AGIs will be predominantly located next to established industrial emitters and will be an addition to the industrial character of the area. Therefore, it is proposed to scope out assessment of impacts to historic landscape character.	Archaeological advisors and Conservation Officers for North Yorkshire County Council, North Lincolnshire Council, Lincolnshire County Council, East Riding of Yorkshire Council, Selby District Council and West Lindsey District Council and Historic England.
Isle of Axholme	Construction and operation	✓		The Scoping Route Corridor crosses the Isle of Axholme, an area of special historic landscape interest subject to Policy HE2p of the North Lincolnshire Local Plan (Ref 9.14). While this does not warrant the scoping in of Historic Landscape Character in general, there is an acknowledgement of the sensitivities of the area. Therefore, it is proposed to scope in assessment of impact to the Isle of Axholme as an	Archaeological advisor for North Lincolnshire Council.

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
				individual heritage asset (considered under Built Heritage).	
Terrestrial archaeology, intertidal and marine archaeology, built heritage, historic landscape character	Decommissioning		✓	Decommissioning is not likely to cause significant effects to cultural heritage. The proposed works to decommission the pipelines and AGIs are not expected to cause further physical impacts to heritage assets (beyond any impacts experienced during construction). Any change to aspects of an asset's setting that contribute to its significance resulting from these works would be temporary and reversible and the outcome of the decommissioning would reverse any negative effects experienced due to change to setting occurring during the AGIs construction and operation. For these reasons it is proposed to scope decommissioning out of assessment.	To be discussed.

9.9 Proposed assessment methodology

9.9.1 The assessment of cultural heritage receptors comprises assessing the value of the heritage asset, the magnitude of impact (change in the baseline conditions) it would experience because of the Project and the resulting significance of effect, which is determined by comparing the value and impact. Where there is any potential for an impact to a heritage asset resulting from the Project, these assets will be assessed in full in the ES. This assessment will utilise the assessment of value assigned to heritage assets in the baseline study and will assign a magnitude of impact in line with the most up to date design information for the Project.

9.9.2 The value of a heritage asset derives from the asset's ability to illustrate one or more of the Conservation Principles, described in 'Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment' (Ref 9.11). The contribution of setting to the significance of a heritage asset will also be considered as part of the assessment of value, as per 'The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition)' (Ref 9.12). The following criteria in Table 9.3 will be used for assigning value.

Table 9.3: Heritage Value Assessment Criteria

Value	Criteria for HLCP
Very High	World Heritage Sites (including nominated sites) inscribed for their cultural heritage importance. Assets that can contribute significantly to acknowledged international research objectives. Assets of acknowledged international importance.
High	Scheduled Monuments (including proposed sites). Grade I and II* Listed Buildings. Grade I and II* Registered Parks and Gardens. Registered Battlefields. Protected Wrecks. Conservation Areas containing buildings of predominantly high value. Non-designated assets of the quality and importance to be designated. Assets that can contribute significantly to acknowledged national research objectives.
Medium	Grade II listed buildings. Grade II Registered Parks and Gardens.

Value	Criteria for HLCP
	Conservation Areas containing buildings of predominantly medium value. Assets that contribute to regional research objectives and/or have exceptional quality in their fabric or historical associations.
Low	Locally listed buildings, or those of equivalent quality in their fabric or historical associations. Assets of local importance. Assets compromised by poor preservation and/or poor survival of contextual associations. Assets of limited value, but with potential to contribute to local research objectives.
Negligible	Assets with very little or no surviving archaeological/historical interest Buildings of no architectural or historical note; buildings of an intrusive character
Unknown	The importance of the resource has not been ascertained/is inaccessible

9.9.3 Drawing on the guidance from ICOMOS on 'Heritage Impact Assessments for Cultural World Heritage Properties' (Ref 9.13 ICOMOS, 2011) and 'Principles of Cultural Heritage Impact in the UK' (Ref 9.10 CIFA, IEMA, IHBC, 2021) the following terminology in Table 9 4 will be applied to describe the magnitude of impact.

Table 9.4: Criteria for quantifying the magnitude of impact to heritage assets

Magnitude of Impact (term)	Criteria of impact
High	Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting of archaeology or built heritage. Change to key historic building elements, such that the resource is totally altered.
Medium	Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the character of the asset. Change to many key historic building elements, such that the resource is significantly modified.

	Changes to the setting of an historic building, such that it is significantly modified.
Low	Changes to key archaeological materials, such that the asset is slightly altered. Slight changes to setting. Change to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.
Negligible	Very minor changes to archaeological materials, or setting Slight changes to historic building elements or setting that hardly affect it.
No change	No change.

9.9.4 The significance of effect will be assessed against the value of the heritage asset and the magnitude of impact it would experience as a result of the Project. The significance will be expressed as major, moderate, minor, negligible or neutral and can be adverse or beneficial. The matrix for reporting of significance of effect is shown in Table 9 5, adapted from 'Heritage Impact Assessments for Cultural World Heritage Properties' (Ref 9.13 ICOMOS, 2011).

9.9.5 The matrix (Table 9.5) will be used as a check to ensure that judgements on value, magnitude of impact and significance of effect are balanced, but in all cases professional judgement will be used and the value and impact judgements will be revisited if the significance of effect is unreasonable. In EIA terms a significant effect is a moderate or major effect.

Table 9.5: Significance of effects matrix

		Value of Heritage Asset				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude of impact	**High**	Major	Major	Major to moderate	Moderate to Minor	Minor
	Medium	Major to Moderate	Major to Moderate	Moderate	Minor	Negligible
	Low	Major to Moderate	Moderate to Minor	Minor	Negligible	Negligible

	Negligible	Minor	Minor	Negligible	Negligible	Neutral
	No Change	Neutral	Neutral	Neutral	Neutral	Neutral

9.10 Limitations and assumptions

9.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- Heritage data will be obtained from third-party sources which are assumed to be accurate. However, this information will be supplemented by archaeological walkover, archive research and a Project-commissioned UAV/drone survey and therefore is considered to present a robust basis for assessment;
- The archaeological record can contain evidence of varying reliability. Antiquarian excavations (excavations carried out prior to the establishment of modern scientific methods) were conducted to standards that differ from modern investigations. The results of these investigations can no longer be verified where the remains no longer exist; and
- Due to the nature of archaeological remains, their identification and assessment necessarily requires an element of assumption. In particular, the nature, extent, survival and even the precise location of buried archaeological remains are often uncertain, as the majority of such sites have never been subject to archaeological investigations to modern standards.

9.11 References

- Ref 9.1 Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 1 February 2022).
- Ref 9.2 Department of Energy and Climate Change (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 2 February 2022).
- Ref 9.3 Ministry of Housing, Communities & Local Government (2021) *National Planning Policy Framework.* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 1 February 2022).

- Ref 9.4 Selby District Council (2013) *Selby District Core Strategy Local Plan.* Available at: https://www.selby.gov.uk/selby-district-core-strategy-local-plan (Accessed: 2 February 2022).
- Ref 9.5 Selby District Council (2005) *Selby District Local Plan.* Available at: https://www.selby.gov.uk/selby-district-local-plan-sdlp-2005 (Accessed: 2 February 2022).
- Ref 9.6 North Lincolnshire Council (2011) *North Lincolnshire Local Development Framework Core Strategy.* Available at: https://www.northlincs.gov.uk/planning-and-environment/planning-policy-local-development-framework/ (Accessed: 2 February 2022).
- Ref 9.7 East Riding of Yorkshire Council (2016*) East Riding Local Plan 2012-2029 Strategy Document.* Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/east-riding-local-plan/ (Accessed: 1 February 2022).
- Ref 9.8 North Kesteven District Council, City of Lincoln Council, West Lindsay District Council, Lincolnshire County Council (2017) *Central Lincolnshire Local Plan.* Available at: https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan/ (Accessed: 3 February 2022).
- Ref 9.9 Chartered Institute for Archaeologists (2014) *Standard and guidance for historic environment desk-based assessment.* Available at: https://www.archaeologists.net/codes/cifa (Accessed: 3 February 2022).
- Ref 9.10 CIFA, IEMA, IHBC (2021) *Principles of Cultural Heritage Impact Assessment in the UK.* Available at: https://www.iema.net/articles/principles-of-cultural-heritage-impact-assessment (Accessed: 2 February 2022).
- Ref 9.11 Historic England (2008) *Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment.* London: English Heritage (Re-branded Historic England).
- Ref 9.12 Historic England (2017) *The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition).* London: Historic England.
- Ref 9.13 ICOMOS (2011) *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.* Paris, France: International Council on Monuments and Sites.
- Ref 9.14 North Lincolnshire Council (2021) North Lincolnshire Local Plan: *Managing our Historic Environment.* Available at: https://localplan.northlincs.gov.uk/stages/3/10-historic-environment (Accessed: 31 January 2022).

10. Landscape

10.1 Introduction

10.1.1 This Chapter sets out the approach to identifying potential significant Landscape and Visual effects which may arise from the Project, during the construction, operational and decommissioning phases. It sets out the methodology which will be used to undertake the Landscape and Visual Impact Assessment (LVIA) for the Project, including published guidance to be referenced, the extent of the Study Area considered, the significance criteria to be used and any limitations or assumptions that informed the assessment.

10.2 Legislation, policy and guidance

10.2.1 A summary of the legislation, policy and guidance documents relevant to the Landscape and Visual assessment is provided below:

Legislation

10.2.2 No specific Landscape and Visual legislation will be relied upon for the Landscape and Visual assessment.

Policy

- National Policy Statement for Energy (EN-1) (Ref 10.1) and Draft National Policy Statement for Energy EN-1 (Ref 10.2).
  - Section 5.9 of the National Policy Statement for Energy (EN-1) (Ref 10.1) and section 5.10 of the Draft National Policy Statement for Energy EN-1 (Ref 10.2), sets out generic considerations to be given to landscape and visual impacts. Section 5.9 of EN-1 (Ref 10.1) states the following relevant advice:

    "The landscape and visual assessment should include reference to an landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the proposed project."

    "The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include light pollution effects, including on local amenity, and nature conservation."

    "The assessment should also demonstrate how noise and light pollution from construction and operational activities on residential amenity and on sensitive locations, receptors and views, will be minimised."

    "It may be helpful for applicants to draw attention, in the supporting evidence to their applications, to any examples of existing permitted infrastructure they are aware of with a similar magnitude of impact on sensitive receptors."

"Within a defined site, adverse landscape and visual effects may be minimised through appropriate siting of infrastructure within that site, design including colours and materials, and landscaping schemes, depending on the size and type of the proposed project. Materials and designs of buildings should always be given careful consideration."

- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines EN-4 (Ref 10.3) and Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines EN-4 (Ref 10.4).
  - Section 2 of National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines EN-4 (Ref 10.3) and Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines EN-4 (Ref 10.4) sets out principles to be applied in the assessment and mitigation design specific to Gas and Oil Pipelines. The assessment and any mitigation design will incorporate these principles and the following relevant advice will be considered:

    "Additional considerations apply during the construction of a pipeline (which, without mitigation, can affect both landscape and ecology). These comprise the effect upon specific landscape elements within and adjacent to the pipeline route, such as grasslands, field boundaries (hedgerows, hedgebanks, drystone walls, fences), trees, woodlands, and watercourses. There will also be temporary visual impacts caused by the need to access the working corridor and to remove flora and soil."

    "The applicant should also include proposals for reinstatement of the pipeline route as close to its original state as possible and take into account any requirements for agreements with the landowner to access areas for aftercare and management work. Where it is unlikely to be possible to restore landscape to its original state, the applicant should set out measures to avoid, mitigate, or employ other landscape measures to compensate for, any adverse effect on the landscape."

Guidance

- Landscape Institute & Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment,3rd Edition, (GLVIA3) (Ref 10.5).
- Landscape Institute (2013) GLVIA3 Statement of Clarification 1/13; (Ref 10.6).
- Landscape Institute (2019) Technical Guidance Note 06/19: Visual Representation of Development Proposals; (Ref 10.7).

10.3 Engagement

10.3.1 Engagement has been undertaken with the relevant local authorities to agree the proposed scope and parameters of the assessment. Initial engagement was undertaken in the form of a joint local authority presentation in December 2021 and followed by another presentation in more detail in February 2022.

10.3.2 The engagement to date has helped inform the approach to the LVIA based on the initial draft Route Corridor and AGI locations. The general approach to the scoping, criteria for selecting representative viewpoints and their locations along the corridor and

near Above Ground Installation (AGI) locations, initial Zone of Theoretical Visibility (ZTV) modelling and assessment methodology was agreed acceptable at this stage.

10.3.3 Engagement with local authorities will continue throughout the Environmental Impact Assessment (EIA) process. A summary of engagement is provided in Table 10.1.

Table 10.1: Summary of engagement

Consultee	Date (method of engagement)	Summary of engagement
West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council	9 December 2021 (Microsoft teams meeting)	General approach to scoping and methodology was acceptable at this stage. It was discussed that detailed comments would be provided once local authorities have more detail on the Scoping Route Corridor and AGIs. Attention was drawn to potential cumulative impacts within the Drax area as several energy scheme applications are being proposed in this area.
	17 February 2022 (Microsoft teams meeting)	An update on the Project and its parameters were provided. The presentation with tentative representative viewpoint locations was also shared with local authorities. It was agreed that comments would be provided by local authorities upon receipt of presentation and proposed AGI representative viewpoint locations*. Matters agreed for the LVIA scoping include: • 1km radius Study Area for Scoping Route Corridor and 1.5km radius for AGIs (with exception of Easington which is 5km due to 45m stack height); • In absence of definitive layout, ZTV methodology to progress with a 'worst case' scenario by placing maximum heights of building points within the AGI location but offsetting a 100m buffer as the buildings will be set away from boundary; and • Representative viewpoints will assume 15-18 viewpoint locations along the Scoping Route Corridor and approximately 3-5 viewpoint locations per AGI. Some of the viewpoint locations cover the

Consultee	Date (method of engagement)	Summary of engagement
		Scoping Route Corridor as well as the AGI locations. The following are to be scoped in and were discussed in both meetings: • Changes to landscape character during construction of pipelines within 1km radius; • Changes to landscape character during construction and operation of AGIs within 1.5km radius (5km radius for Easington due to 45m stack height); • Changes to visual amenity during construction of pipelines within 1km radius; and • Changes to visual amenity during construction and operation once AGIs are in place within 1.5km radius (5km radius for Easington due to 45m stack height). The following are to be scoped out: • Changes to landscape character during operation once the pipelines are in place (as they will be buried); • Changes to visual amenity during operation once the pipelines are in place (as they will be buried); • Receptors beyond 1.5km radius for AGIs (5km radius for Easington due to 45m stack height) during construction and operation. Desk top review concluded that the 1.5 km Study Area is appropriate to the type of Project. It is unlikely that

Consultee	Date (method of engagement)	Summary of engagement
		receptors beyond 1.5 km / 5km would experience significant effects and therefore scoped out; and • Receptors beyond 1km radius for pipelines during construction and operation. Desktop review concluded that, the 1km Study Area is appropriate to the type of Project. It is unlikely that receptors beyond 1km radius would experience significant effects and therefore are scoped out.
	24 February 2022 email	Slides from meeting of 17 February 2022 were shared to promote further discussion and invite responses*.
	25 February 2022 email	North Yorkshire Landscape Architect response to proposed viewpoints – recommending consideration of cumulative impacts at Drax and offering to comment further on viewpoints once details of the AGI at Drax are further progressed*.
	15 March 2022 email	Provided further detail on proposed viewpoints with maps shared along with notes of meeting from 17 February 2022 to promote further discussion and invite responses*.
North Yorkshire County Council	15 March 2022	North Yorkshire Landscape Architect confirmed no further comments on viewpoints and provided some advice regarding good practice for viewpoint photography. These were taken onboard for the selection of representative viewpoint locations*.

*Note: details of the viewpoint photography locations agreed will be provided within the Preliminary Environmental Information Report (PEIR).

10.4 Study Area

10.4.1 The Guidelines for Landscape and Visual Impact Assessment 3 (GLVIA 3) (Ref 10.5) provides guidance on defining a Study Area. Paragraph 5.2 of GLVIA 3 states the Study Area should be *"… based on the extent of Landscape Character Areas likely to be significantly affected either directly or indirectly" or "on the extent of the area from which the development is potentially visible, defined as the Zone of Theoretical Visibility, or a combination of the two"*.

10.4.2 Based on the above guidance, the Study Area proposed is proportionate to the following factors:

- The Project components, which include the underground and hidden nature of the pipelines (once operational) and the AGIs;
- The Scoping Route Corridor;
- The open, low-lying character of the landscape, and the typical extensive open nature of the views;
- Location of the AGIs. Table 2.3 in Chapter 2: Project Description, describes indicative AGI locations currently being considered. A confirmed list of AGI locations, along with relevant design parameters, their footprint and maximum heights will be provided within the ES;
- The wider landscape setting within which the Project has the potential to influence landscape character;
- The extent of the area where the Project is likely to be visible/discernible in the view; and
- The full extent of adjacent or affected designations landscape receptors of special value (e.g. designated landscapes) which may be influenced by the Project – see Landscape and Environmental Designations Plan (Figure 10.1 (Volume II, Part 4)). There are no designated landscapes within or close to the Study Area.

10.4.3 The maximum height of Project Components considered for the ZTV modelling and for defining the Study Area is set out based on the heights of the AGIs. These AGIs include Pipeline Inspection Gauge (PIG) traps, Block Valves, multi-junction installations and the Pumping Facility (as described in detail in Chapter 2: Project Description) and are as follows:

- For the Block Valves, the security fence height is 3m and the maximum height of the instrument building is 8m. The maximum footprint size is 180m X 180m;
- For the Pumping Facility, the security fence height is 3m and the maximum height of the instrument building is 10m. The height of the station vent stack is 45m. The maximum footprint size considered is 500m X 350m; and
- For the other AGIs (including PIG traps), the security fence height is 3m and the maximum height of the instrument building is 8m. The footprint size ranges from being 200m X 200m to a maximum size of 220m X 380m.

10.4.4 The above dimensions for the AGIs are currently realistic maximum parameters.

10.4.5 The Study Area has therefore initially been set at a maximum of 1km radius from the centre of the pipelines and 1.5km radius from the centre of the AGIs (except the

Pumping Facility) to include all likely sensitive receptors that might potentially be affected by the Project. This Study Area is based on the results of the ZTV modelling as well as consideration of the following project specific factors:

- In the case of the Pumping Facility at Easington, the Study Area will be extended to a 5km radius considering the 45m height of the station vent stack;
- It is considered that this Study Area is therefore proportionate to the nature of the Project and the type of structures proposed. Beyond this distance it is likely that the Project would be difficult to be seen in the view and any visible features would blend in with its existing landscape context to the extent that significant landscape character and/or visual effects would be unlikely; and
- This Study Area could be refined further in agreement with Selby District Council, East Riding of Yorkshire Council, North Lincolnshire Council, West Lindsey District Council and other relevant bodies when heights, extent and location of structures are confirmed. This approach would also be followed for refining the selected representative viewpoint locations.

10.5 Receptors

10.5.1 Potential effects which may arise as a result of the Project include:

10.5.2 Effects on the landscape character of the Project and its immediate environs;

- Effects on landscape features and elements within the Scoping Route Corridor, such as trees and hedgerows;
- Effects on the landscape character of the wider area surrounding the Scoping Route Corridor;
- Effects on the character and setting of designated landscapes and listed buildings within the Zone of Visual Influence (ZVI) for the Project; and
- Effects on local visual amenity more generally within the ZTV for the Project, including effects on visual receptors, such as:
  - Users of the local Public Rights of Way (PRoW) network, including national or regionally promoted trails, Coastal Paths etc.;
  - Occupiers of residential properties, including individual properties and groups of properties/settlements;
  - People engaged in outdoor sport and recreation;
  - Road and rail users; and
  - People at their place of work.

10.5.3 Receptors would generally be broadly similar for effects arising from both the construction and operational phases, though the effects arising from the different phases would be different and would therefore be assessed separately.

10.6 Receptors

10.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the PEIR and

Environmental Statement (ES). Additionally, a summary of the baseline data collected to date has been provided.

Landscape Designations

10.6.2 There are no National Parks or Areas of Outstanding Natural Beauty (AONB) within the Study Area. The nearest being the Lincolnshire Wolds AONB which is over 7km to the south of the Scoping Route Corridor. The potential future Yorkshire Wolds AONB (currently under consideration by Natural England) would be over 10km to the north of the Scoping Route Corridor near Hull. See Figure 10.1 (Volume II, Part 4) for Landscape Designations.

Landscape Character

10.6.3 Published and site-specific Landscape Character Assessments (LCAs) supplemented by field work, will inform the identification of landscape character receptors for use in the LVIA. The existing character assessments and guidance documents that will be used in the preparation of the LVIA include National Character Area (NCA) profiles and Local Landscape Character Area Assessment publications. See Figure 10.2 (Volume II, Part 4) for Landscape Character Areas.

Visual Baseline

10.6.4 The Study Area lies within a generally open, expansive and low-lying landscape interspersed with large and medium infrastructure elements, with varying levels of tree cover and built form which serve to limit inter-visibility in some locations and directions.

10.6.5 In areas of landfall such as Easington along the Spurn Heritage Coast land-use is predominantly arable farmland with large infrastructure associated with the Natural Gas Terminal.

10.6.6 Based on desk-study, it has been identified that there will be opportunities for views from sensitive receptors such as PRoWs, private and public roads, places of work and recreational areas (including the beach at Easington), nearby residential properties and any local landscape and heritage designations.

10.6.7 Initial ZTV modelling has been undertaken to show the maximum theoretical visibility taking into account topography and woodlands and settlements and provides additional detail to identify areas in landscape where there is potential visibility of the Project. The ZTVs have been modelled using ArcGIS Pro 2.7. The ZTVs are not included within the EIA Scoping Report but it is anticipated that they will be presented in the PEIR and ES as the Project design is developed further.

Other baseline information to be obtained / surveys to be undertaken

10.6.8 A winter site visit was undertaken in February / March 2022 which provided ‘ground truthing’ for the initial ZTV models to enable assessment of the baseline visual amenity.

10.6.9 The receptors area represented by the viewpoints are shown in Figure 10.2 (Volume II, Part 4) along the pipelines corridor and AGI locations. The approximate positions of these publicly accessible locations were agreed with the relevant local authorities as part of the engagement process. These will be refined during the detailed assessment when the AGI locations and layouts are confirmed.

10.7 Design, mitigation, and enhancement measures

Mitigation during construction phase

10.7.1 The Project has been designed to be undertaken using methods intended to minimise environmental impacts. Good practice construction methodologies will form part of the draft Construction Environmental Management Plan (CEMP). Specifically, in landscape and visual terms, this includes:

- The sympathetic setting out and operation of the temporary construction compounds;
- The precise alignment of the pipelines would be marked out in agreement with the landowners/occupiers to minimise field boundary and other vegetation losses, making use of existing gaps in hedgerows, with features such as mature trees, springs, seepage lines and rocky outcrops avoided;
- Topsoil and subsoil from excavation/working areas would be stripped and stored separately within designated storage areas in order to maintain the soils in good condition, ready for their use in backfilling and restoration;
- The reinstatement (and ongoing management) of any sections of hedgerow and/or other vegetation required to be removed to facilitate the pipelines installation; and
- The dismantling and restoration of the area of temporary works compounds.

10.7.2 Any night-time lighting would be directional to minimise glare beyond the construction working area or compound.

10.7.3 The routeing of pipelines would be aligned to avoid mature features such as individual trees and their root systems. Where it is necessary to impact on features such as field and roadside boundary hedgerows and ditches the working areas should be kept to the minimum to limit the length to be removed or disrupted.

10.7.4 On completion of a single construction activity or a sequential series of activities in a particular location the re-instatement of affected landscape features, including re-instatement of ground contouring, would be implemented as soon as practically possible during the next favourable season, so that restoration works would be carried out over a phased implementation programme. The reinstated features would as a minimum be of similar quality to the feature removed or where practical to do so every opportunity would be considered to provide new features of enhanced quality.

Mitigation after completion

10.7.5 Following construction, the only permanent works would comprise the buried pipelines and the AGIs. In landscape and visual terms, land within the pipelines spread would be returned to its original use with hedgerows and trees reinstated. The reinstated hedgerows would take up to five years to become established and develop to a comparable size and density as the hedgerows which were removed.

10.7.6 Landscape and visual effects will be considered as an inherent part of the design process. The main areas for mitigation will be associated with the AGIs where screening and planting proposal pertinent to landscape character would be effective and would be part of the design process. Along the pipeline corridors, loss of hedgerow and tree planting would need to be avoided and will be part of the design process. Any proposed mitigation will be part of a landscape and biodiversity strategy.

10.7.7 The Landscape assessment will rely on commitments 1, 2, 8 and 9 outlined in the draft Register of Commitments in Volume III, Appendix F.

10.8 Description of likely significant effects

10.8.1 The potential effects of the Project would arise during the construction and operational phase resulting in some localised effects. These have been discussed below.

Construction

10.8.2 The main construction activities and associated features located within the low lying, typically flat, open arable landscape, would result in the potential loss of local, commonplace and replaceable rural features such as hedgerows, ditches, crops, as a result of the site clearance. This would result in some potential temporary and short-term effects on views from scattered isolated rural receptors. It is possible that these could potentially be discernible from views up to 1km in distance from the Project.

10.8.3 Construction phase effects on landscape character and visual amenity may specifically arise from:

- Short term nature of movement activity of equipment and traffic (including associated vessels in nearshore waters) to, from and within the Scoping Route Corridor;
- Removal of vegetation and soil stripping as part of site clearance and preparation;
- Tunnelling activities; excavations and temporary stockpiling and storage of excavated materials resulting in on-site changes to landform;
- Construction working areas, storage areas and temporary structures associated with construction;
- Construction roads, fencing, temporary lighting and security features;
- Construction activities within the intertidal zone; and
- Construction of the Project and associated access routes and infrastructure.

Operation

10.8.4 Once operational, all the landscape features lost to the construction of the pipelines would have been replaced and reinstated. Although some of these replaced features, such as the hedgerows, may take over five years to fully achieve their baseline state, their overall importance would be relatively minor in the context of the wider landscape character and views. As such, at this stage, it is anticipated there would be no significant impacts either on character or on views during operation other than to the areas affected by the AGIs. It is possible that the AGIs could potentially be discernible from views up to 1.5km in distance from the Project, with the exception of the Pumping Facility at Easington which is likely to be seen beyond 1.5km.

10.8.5 Operational phase effects may arise from:

- The proposed AGIs and associated infrastructure:
- Lighting within and outside the AGIs compounds, and within the vehicle circulation and parking areas;

- Proposed access roads other associated infrastructure within the AGIs site; and
- Movement of vehicles to, from and within the AGIs.

10.8.6 Note: Effects on heritage assets within the surrounding area would not be considered in the LVIA, except in terms of potential effects on their landscape setting where this might be affected by the Project. This will be considered in more detail within Environmental Statement (ES) Chapter 10: Heritage.

Matters scoped in or out of further assessment

10.8.7 The matters scoped in or out of further assessment within the LVIA are presented in Table 10.2 below.

Table 10.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Changes to landscape character within the Study Area due to construction activities for pipelines and AGIs (including landfall area at Easington).	Construction	✓		The construction activities have the potential to create temporary effects on landscape features.	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Changes to landscape character within the Study Area due to the pipelines.	Operation		✓	Once the pipelines have been laid, the disturbed/affected area will be reinstated to its previous state (where this is not feasible appropriate mitigation measures will be implemented).	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Changes to landscape character within the Study Area due to AGIs (including landfall area at Easington).	Operation	✓		The Project will introduce new permanent AGIs that will affect the existing (and future) baseline landscape character of the site and Study Area.	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Changes to existing visual amenity of surrounding sensitive receptors due to construction activities for new pipelines and AGIs (including landfall area at Easington).	Construction	✓		The construction activities have the potential to create temporary effects on visual amenity.	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council

Changes to existing visual amenity of surrounding sensitive receptors around the pipelines.	Operation		✓	Once the pipelines have been laid, the disturbed/affected area will be reinstated to its previous state (where this is not feasible appropriate mitigation measures will be implemented).	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Changes to existing visual amenity of sensitive receptors surrounding the AGIs (including landfall area at Easington).	Operation	✓		The AGIs have the potential to create permanent effects on visual amenities due to new built form and landscaping.	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Receptors beyond 1.5km radius for AGIs (except Pumping Facility at Easington where the radius is 5km).	Construction and Operation		✓	Upon initial desk top review, the 1.5km Study Area is appropriate to the type of Project. It is unlikely that receptors beyond 1.5km (or 5km for the Pump Facility) would experience significant effects and are therefore scoped out.	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Receptors beyond 1km radius for pipelines	Construction and Operation		✓	Upon initial desk top review, the 1km Study Area is appropriate to the type of Project. It is unlikely that receptors beyond 1km radius would experience significant effects and are therefore scoped out.	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire County Council and North Yorkshire County Council
Residential Visual Amenity Assessment	Construction and Operation		✓	Assessment of views only taken from publicly accessible areas. Therefore, any assessment of views from private properties is	West Lindsey District Council; East Riding Council; North Lincolnshire Council; Lincolnshire

				based on using representative viewpoints in the locality and applying professional judgement. A residential visual amenity assessment is therefore scoped out.	County Council and North Yorkshire County Council

10.9 Proposed assessment methodology

10.9.1 The LVIA would follow guidance described in GLVIA published by the LI and IEMA, 3rd Edition (2013) (Ref 10.5)

10.9.2 The LVIA will be undertaken drawing upon structured, informed and reasoned professional judgement, taking into account a combination of quantitative and qualitative data derived from desk study and fieldwork. This will comprise the following:

- Review of national and local planning policy;
- Analysis of Ordnance Survey (OS) mapping and publicly available aerial imagery;
- Analysis of published national, regional and local landscape character assessments, together with a detailed analysis of the local landscape character within the Scoping Route Corridor and local landscape designations to identify potential sensitive landscape receptors;
- Analysis of the modelled ZTV to identify potential sensitive visual receptors and allow the selection of a range of publicly accessible representative viewpoints to be used for the detailed analysis of effects on visual amenity. The selection of representative viewpoints would be agreed with the relevant local authorities;
- Site/field survey, including collation of baseline winter photography;
- Professional assessment by a Chartered Member of the Landscape Institute;
- An assessment of landscape and visual receptor sensitivity;
- Consideration of the likely magnitude of impact on the identified receptors that would arise from the Project;
- An assessment of the overall scale of effect upon such receptors;
- Development of an integrated landscape mitigation strategy for the Project, and assessment of any residual effects;
- Consideration of the potential effects on landscape character and visual amenity that might arise from lighting within/near the Project boundary i.e. for AGIs;
- A cumulative assessment to consider the effects of the Project in combination with other major developments within the ZVI; and
- The necessity for annotated photos/photo wirelines from agreed viewpoints will be determined in consultation with the local authorities.

10.9.3 All photographs and visualisations will be produced in line with Landscape Institute Technical Guidance Note (TGN) 06/19 (2019) (Ref 10.7); 'Visual Representation of Development Proposals'. Annotated photo-panoramas (to TGN 06/19 Type 1) of the Project showing Scoping Route Corridor and Photowirelines (TGN 06/19 Type2/3) for each AGI would be produced.

10.9.4 At this initial stage, a maximum of 49 viewpoint locations are assumed and these will be refined and agreed with the relevant local authorities as part of further consultation. It is likely the viewpoint numbers could be reduced once the exact layout of the AGIs is confirmed.

10.9.5 The indicative criteria for the assessment of the likely significant effects for both landscape and visual amenity would be informed by:

- The sensitivity of the landscape receptor (value of the receptor combined with susceptibility to specific change) and the magnitude and nature of effects on the landscape (with change being considered in terms of scale, extent and duration);
- The sensitivity of a visual receptor (value of the view combined with susceptibility of receptors to specific changes in the view) and magnitude and nature of effects on visual amenity (with change being considered in terms of scale, extent, duration); and
- The assessment of likely magnitude and nature of effect on landscape character and landscape features will use professional judgement to consider factors such as size/scale, geographical extent, duration and reversibility. Consideration of these factors to determine the magnitude and nature of change will be further guided by the criteria set out in Chapter 5 of GLVIA3.

10.9.6 The effects on landscape character, landscape features and elements and visual amenity will be assessed for the following scenarios:

- Construction Phase effects will consider the worst-case situation whereby construction activity is at its peak and the height of the Project is near or at its maximum;
- Year 1 - a winter's day in the year that the Project becomes fully operational, reflecting the maximum visibility/worst case scenario;
- Year 15 – a summer's day in the 15th year after the Project becomes fully operational, reflecting the scenario with likely maximum mitigation from planting (where implemented); and
- Decommissioning Phase - This will assess a situation whereby the AGI's are removed (pipelines will remain in-situ) and the landscape is returned to its former use.

10.9.7 The significance of effect will be assessed by comparing the sensitivity of the receptor relative to the magnitude of change, and by considering the indicative criteria set out in paragraph 10.9.5, based upon the guidance within GLVIA3.

10.9.8 Significance of effect for landscape and visual amenity will be clearly defined and expressed as transparently as possible. Reasoned professional judgement is to be applied to determine the significance of each effect in line with the GLVIA3 (Ref 10.5). The significance ratings indicate a 'sliding scale' of the relative importance of the landscape effect, with 'Major' being the most important and 'Minor' being the least. Effects that are toward the higher level of the scale (Major) are those judged to be most important, whilst those towards the bottom of the scale are of lesser concern.

Table 10.3: Landscape and Visual Amenity Effect Significance Scale

		Sensitivity of the Receptor (indicative)		
		High	Moderate	Low
Magnit	Very Large	Major	Major/ Moderate	Moderate/ Major

	Large	Major/ Moderate	Moderate/ Major	Moderate
	Moderate	Moderate/ Major	Moderate	Moderate/ Minor
	Small	Moderate	Moderate/ Minor	Minor/ Moderate
	Very Small	Moderate/ Minor	Minor/ Moderate	Minor
	Negligible/None	Minor/ Moderate	Minor	None

10.9.9 Landscape mitigation proposals would identify potential effects that could reasonably be mitigated through appropriate design and plans. Landscape mitigation plans will be prepared where necessary.

10.10 Limitations and assumptions

10.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- This Chapter is based on assumed heights of the AGIs as the exact heights of the Project are not known;
- The Study Area and viewpoint locations may be subject to changes as further refinement of the route and AGI layouts is being confirmed;
- The ZTV is based on maximum height parameters and is a worst case scenario;
- Assessment of views from private properties is based on using representative viewpoints and professional judgement. A residential visual amenity survey is not proposed; and
- Photography for assessment will be carried out in winter season to reflect worst case scenario. As the design progresses further viewpoints may be needed, and photography could be outside the winter months.

10.11 References

- Ref 10.1 Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1).* London: Her Majesty's Government (UK). Available at: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure (Accessed 3 February 2022).
- Ref 10.2 Department for Business, Energy & Industrial Strategy (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 26 January 2022).

- Ref 10.3 Department of Energy and Climate Change (2011*) National Policy Statement for Energy (EN-4).* Available at: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure (Accessed 4 February 2022).
- Ref 10.4 Department for Energy and Climate Change (2021) *Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 27 January 2022).
- Ref 10.5: Landscape Institute & Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment (GLVIA3).* Oxfordshire: Routledge.
- Ref 10.6: Landscape Institute (2013) *GLVIA3 Statement of Clarification 1/13*. Available at: https://www.landscapeinstitute.org/technical-resource/glvia3-clarifications/#:~:text=As%20advised%20in%20the%20LI's,judged%2C%20for%20example%2C%20by%20determining (Accessed: 9 February 2022).
- Ref 10.7: Landscape Institute (2019) *Technical Guidance Note: Visual Representation of Development Proposals.* Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: 10 February 2022).

11. Noise and Vibration

11.1 Introduction

11.1.1 This Chapter considers the impact of the Project in respect of noise and vibration. It sets out the proposed methodology for the noise and vibration assessment and identifies those impacts that can be scoped out of the Environmental Impact Assessment (EIA).

11.2 Legislation, policy, and guidance

11.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance..

Legislation

- The Control of Pollution Act (Ref 11.1).
- The Environmental Pollution Act (Ref 11.2).

Policy

- Overarching National Policy Statement for Energy (EN-1) (Ref 11.3).
  - In Section 5.11 of the Overarching National Policy Statement for Energy (EN-1) (Ref 11.3) a proportionate approach to the assessment of noise and vibration is outlined. This puts forth a number of facets to be included within the noise assessment, for example, *"identification of noise sensitive premises and noise sensitive areas that may be affected"* (Ref 11.3). Section 5.11 also states that operational noise, with respect to human receptors, should be assessed using the principles of relevant British Standards and other guidance. Further, Section 5.11 outlines the necessity to consider British Standards (BS) and other guidance to predict, assess and manage construction noise. Appropriate guidance – including those relevant BS – is outlined in the guidance section below and taken into consideration within the assessment of noise and vibration. Section 5.12 of the Draft Overarching National Policy Statement for Energy (EN-1) (Ref 11.4) reiterates this approach.
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 11.5).
  - Section 2.20 of the National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 11.5) outlines several specific noise and vibration considerations that apply to gas pipelines during pre-construction, construction and operational phases. Section 2.20 of the Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 11.6) outlines the same specific noise and vibration considerations. Where relevant, these will be considered within the assessment of noise and vibration effect.
- National Planning Policy Framework (Ref 11.7).

- Noise Policy Statement for England (Ref 11.8).

Guidance

- BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound (Ref 11.9).
- BS 5228-1:2009+A1:2014 - Code of Practice for Noise and Vibration Control on Construction and Open Sites – noise (Ref 11.10).
- BS 5228-2:2009+A1:2014 - Code of Practice for Noise and Vibration Control on Construction and Open Sites – vibration (Ref 11.11).
- BS 7445-1:2003 - Guide to quantities and procedures (Ref 11.12).
- BS EN IEC 60942:2018 - Electroacoustics – Sound calibrators (Ref 11.13).
- BS EN 61672-1:2013 - Electroacoustics – Sound calibrators (Ref 11.14).
- Calculation of Road Traffic Noise Memorandum (Ref 11.15).
- Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration (Ref 11.16).
- ISO 9613-2:1996 - Acoustics. Attenuation of sound during propagation outdoors. Part 2: General method of calculation (Ref 11.17).
- World Health Organisation, 1999. Guidelines for community noise (Ref 11.18).
- World Health Organisation, 2009. Night Noise Guidelines for Europe (Ref 11.19).

11.3 Engagement

11.3.1 Engagement has been undertaken with the various local authorities affected by the Project to agree the methodology for the noise and vibration assessment. Consultation will continue throughout the EIA process. A summary of Engagement to date has been provided in Table 11.1.

Table 11.1: Summary of engagement

Consultee	Date (method of engagement)	Summary of Engagement
East Riding of Yorkshire Council (ERYC) - Public Protection Team Lincolnshire County Council – Environmental Protection Team North Lincolnshire Council (NLC) – Environmental Protection Team Selby District Council (SDC) - Environmental Protection Team West Lindsey District Council (WLDC) – Environmental Protection Team	30 November 2021 (Email containing assessment methodology note issued to all listed local authorities with the exception of ERYC) 04 February 2022 (Email to ERYC containing assessment methodology note)	Method note shared for comment. This provided an overview of Project components that have the potential to generate noise and/or vibration impacts provided, which included: • Construction phase activities, including traffic flows; • Commissioning Phase activities; • Operational phase (Pumping Facility only); • Operational phase traffic movements (if Above Ground Installations (AGI) are manned); • Decommissioning phase activities; and • Cumulative impacts. The following elements were noted to not be significant in terms of noise and vibration and would therefore be scoped out of the assessment: • Operational phase – Pipeline Inspection Gauge (PIG) traps & block valves; • Operational phase - buried pipelines; and • Operational phase - vibration. Strategy outlined for noise monitoring to inform the assessment, as follows:

Consultee	Date (method of engagement)	Summary of Engagement
		• At noise sensitive receptors in the vicinity of Pumping Facility; and • At noise sensitive receptors at locations where there is potential for construction activities to be undertaken beyond core daytime hours. Construction activities undertaken during core daytime hours to be assessed against the lower bound cut-off value in BS5228-1 and therefore would not require baseline measurement data. For the construction and decommissioning phases, noise and vibration levels to be predicted and assessed in accordance with BS5228:2009+A1:2014. Operational phase noise levels from Pumping Facility to be assessed in accordance with the methodology set out in BS 4142:2014+A1:2019. Traffic flows to be calculated using CRTN, with predicted variance in road traffic noise levels assessed using the short-term criteria provided in the DMRB document ref. LA 111. Mitigation measures for all phases of the Project to be recommended in the event that the assessment identifies potential significant adverse effects.
East Riding of Yorkshire Council - Public Protection Team	07 March 2022 (Email response from ERYC)	Agreement with the proposed assessment methodology.
Lincolnshire County Council – Environmental Protection Team	03 December 2021 (Email response from LCC)	Agreement with the proposed assessment methodology; however, it was noted that this is more likely to fall within the remit of West Lindsey District Council.

Consultee	Date (method of engagement)	Summary of Engagement
North Lincolnshire Council – Environmental Protection Team	04 February 2022 (Email response from NLC) 04 February 2022 (Email response to NLC) 04 February 2022 (Email response from NLC)	Agreement in principle with the proposed assessment methodology, with clarification sought on certain items. Query raised by NLC regarding monitoring carried out to verify noise levels during the construction, commissioning, or operational phases. In response, it was noted that the requirement for monitoring during the various phases of the Project would be dependent on the outcome of the impact assessment. Query raised by NLC regarding an assessment of low frequency noise effects, particularly during the operational stage. In response, it was noted that a low frequency assessment would be undertaken if the spectral noise data for the plant/equipment installations will contain significant levels of low frequency noise. For operational noise, it was noted that NLC require BS 4142 (Ref 11.9) rating noise levels to be equal to or below measured background levels. NLC was satisfied with the responses.

Consultee	Date (method of engagement)	Summary of Engagement
Selby District Council - Environmental Protection Team	03 December 2021 (Email response from SDC)	Agreement in principle with the proposed assessment methodology. Justification would be required if siting construction compounds near sensitive receptors and recommendation for use of acoustic screening if that occurs. Details of proactive compliance monitoring is to be well defined for construction works. Assessment to adopt shorter $L_{Aeq,T}$ averaging periods when assessing construction works that are of an impulsive nature e.g. percussive piling. Cumulative impacts with the Connected Project, Drax's Bioenergy with Carbon Capture and Storage project, should be considered. For operational noise, SDC require BS 4142 (Ref 11.9) rating noise levels to be below measured background levels.
West Lindsey District Council – Environmental Protection Team	17 February 2022 (Email response from WLDC)	Agreement with the proposed assessment methodology.

11.4 Study Area

11.4.1 The Study Area for the construction and decommissioning phase assessments will consider noise and vibration sensitive receptors that are located within 300m of the Scoping Route Corridor, as indicated in Figure 11.1 (Volume II, Part 4). This has been determined based on the guidance set out in BS 5228-1 (Ref 11.10), BS 5228-2 (Ref 11.11) and using professional judgement. At distances of more than 300m, noise predictions have to be treated with caution due to the increasing importance of meteorological effects.

11.4.2 For the assessment of operational phase noise levels, the Study Area will extend out to the nearest or most exposed noise sensitive receptors surrounding the Pumping Facility.

11.5 Receptors

11.5.1 The assessment will account for sensitive receptors within the Study Area which have the potential to be adversely affected by a variation in the noise and vibration level resulting from the Project. Sensitive receptors will be identified via a variety of sources including but not limited to aerial imagery, mapping, Ordnance Survey (OS) AddressBase data and the Planning Portal.

11.5.2 Typical examples of receptors sensitive to noise and vibration include dwellings, hospitals, healthcare facilities, education facilities, community facilities, international and national or statutorily designated sites and cultural heritage assets.

11.6 Baseline conditions

11.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

11.6.2 To inform the EIA Scoping Report, a desk-based study has been undertaken to obtain an understanding of the baseline noise and vibration conditions in the vicinity of the Project.

11.6.3 The vast majority of the Scoping Route Corridor is located within a rural setting, typically comprising agricultural land use. Due to the nature of the Project, the Scoping Route Corridor flanks substantial industrial facilities in several areas.

11.6.4 The acoustic environment along the Scoping Route Corridor varies significantly depending on proximity to prominent noise sources; these sources will include agricultural activities, road and rail infrastructure, industrial facilities, commercial premises/activities, wind turbines and the North Sea.

11.6.5 To inform the EIA, the following data sources will be used to further establish baseline conditions:

- Aerial imagery and mapping;
- Strategic noise maps and noise action plans;
- Third-party noise assessments, where available and applicable; and

- Baseline noise surveys for the Project at selected noise sensitive receptors, to establish the prevailing pre-development acoustic environment.

11.6.6 The strategy for the proposed baseline noise surveys will be agreed in advance with the relevant local authority. At this stage, it is intended the baseline survey will comprise:

- Unattended measurements taken over weekday and weekend period at receptors located in the vicinity of the Pumping Facility, with the resulting dataset subsequently used to inform the operational phase assessment; and
- Short term attended or unattended measurements taken at locations where the construction phase activities have the potential to be undertaken beyond the core daytime working hours, such as works requiring trenchless techniques.

11.6.7 The noise monitoring will conform to BS 7445 (Ref 11.12) using sound level meters and calibrators conforming to the Class 1 requirements of BS EN 61672 (Ref 11.14) and BS EN IEC 60942 (Ref 11.13) respectively.

11.7 Design, mitigation, and enhancement measures

11.7.1 Best Practicable Means (BPM) as defined by the Control of Pollution Act 1974 (Ref 11.1) will be adopted during the construction and decommissioning phases to control noise and vibration emissions. The control measures to be adopted will be defined in the draft Construction Environmental Management Plan (CEMP) and secured by a requirement of the draft Development Consent Order (DCO) and would be expected to include the following:

- Use of low noise/vibration techniques;
- Appropriate routeing of haul roads;
- Use of temporary barriers/enclosures;
- Control of working hours to minimise disturbance;
- A well-defined complaints procedure; and
- Pre-agreed monitoring strategy in the event of complaints being received.

11.7.2 In addition, a Decommissioning Environmental Management Plan (DEMP) will be implemented during the decommissioning phase, this shall identify and mitigate the potential impacts of decommissioning activities which could harm sensitive receptors. The DEMP will be secured by a requirement of the draft DCO.

11.7.3 Mitigation measures required during the operational phase of the Project will be subject to the outcome of the BS 4142 (Ref 11.9) assessment. Where required, a range of potential mitigation measures will be considered to control the noise levels.

11.7.4 The Noise and Vibration assessment will rely on commitments 1 and 2 outlined in the draft Register of Commitments in Volume III, Appendix F.

11.8 Description of likely significant effects

Construction

11.8.1 The Project has the potential to result in construction phase noise and vibration impacts, as a result of the following:

- Activities taking place on vessels located close to the coastline;
- Use of temporary construction compounds;
- Erection of temporary fencing;
- Topsoil strip/site preparation;
- Open trench excavations and pipelines installations;
- Trenchless pipe installations, i.e. Horizontal Directional Drilling (HDD), tunnel boring;
- Topsoil reinstatement;
- Vehicle movements on temporary haul roads;
- Earthworks;
- Building and equipment substructure;
- Erection of buildings/structures;
- Equipment installations; and
- Construction traffic on the public highway or private roads.

Operation

11.8.2 The operation of the Pumping Facility has the potential to result in noise impacts at the surrounding sensitive receptors. This is due to the introduction of various items of noise emitting plant and equipment that would be located at/above ground level.

11.8.3 With the exception of the Pumping Facility, the other above ground installations (AGIs) are not expected to generate noise emissions during normal operation that would give rise to noise impacts at offsite receptors. This is based on experience of similar developments and initial Project design input.

11.8.4 The AGI sites will not be manned during normal operation and therefore operational phase traffic flows will not give rise to significant adverse noise effects.

Decommissioning phase

11.8.5 During the decommissioning phase of the Project, the resultant noise and vibration levels are expected to be broadly similar to the construction phase, albeit localised to the AGIs on the basis that the buried pipelines will remain in situ.

Matters scoped in or out of further assessment

11.8.6 The matters scoped in or out of further assessment for noise and vibration are outlined in Table 11.2 below.

Table 11.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Human receptors affected by the construction of the Project.	Construction	✓		Potential for significant adverse noise effects on nearby human receptors resulting from construction traffic and the construction activities associated with the pipelines and AGIs.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.
Human receptors affected by noise from the Pumping Facility.	Operation	✓		Potential for significant adverse noise effects due to proposed noise emitting plant and equipment installed at the Pumping Facility.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.
Human receptors affected by decommissioning activities at the AGIs.	Decommissioning	✓		Potential for significant adverse noise effects, similar to those generated during the construction phase.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.
Human receptors affected by operational traffic flows.	Operation		✓	AGIs will not be manned, therefore operational phase traffic flows will not give rise to significant adverse noise effects on nearby human receptors.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Human receptors affected by the operation of the pipelines.	Operation		✓	Buried pipelines will not generate significant noise levels.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.
Human receptors affected by the operation of the PIG traps and block valves.	Operation		✓	PIG trap and block valve AGIs are not expected to generate significant levels of noise during normal operation.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.
Human receptors affected by operational vibration.	Operation		✓	Significant ground borne vibration resulting from the AGIs is not anticipated due to low levels of vibration from equipment installations or through inclusion of appropriate vibration isolation.	Lincolnshire County Council, North Lincolnshire Council, Selby District Council, West Lindsey District Council.

11.9 Proposed assessment methodology

11.9.1 For the construction and decommissioning phases of the Project, the assessment methodology set out in BS 5228-1 (Ref 11.10) will be used. The prediction method considers the noise emission level of the proposed plant items, the separation distance between the source and the receiver, and the effect of the intervening topography, ground conditions and structures.

11.9.2 The significance criteria for the construction and decommissioning phase noise levels will be derived from Annex E of BS 5228-1 (Ref 11.10). It is intended that construction activities undertaken during core daytime hours will be assessed against the lower bound cut-off value in Annex E of BS 5228-1 (Ref 11.10) and therefore would not require baseline measurement data to be collected along the length of the Scoping Route Corridor to derive the criteria. When assessing construction works of an impulsive nature, such as percussive piling, the assessment will consider shorter LAeq,T averaging periods in line with Section 8.5.2.5 of BS 5228-1 (Ref 11.10).

11.9.3 Where necessary, construction induced vibration levels will be predicted using the empirical formula contained in BS 5228-2 (Ref 11.11). The vibration levels will be assessed against the peak particle velocity threshold levels within the standard for humans and buildings. The significance criteria for the construction and decommissioning phase vibration levels will be derived from Annex B of BS 5228-2 (Ref 11.11).

11.9.4 Operational phase noise levels generated by the Pumping Facility will be assessed in accordance with the methodology set out in BS 4142 (Ref 11.9). The significance criteria for the operational phase assessment will be derived from BS 4142 (Ref 11.9) and through consultation with the local authorities.

11.9.5 For designated sites or heritage assets, the operational phase assessment will consider the predicted noise levels resulting from the Pumping Facility in the context of baseline conditions.

11.9.6 To inform the BS 4142 (Ref 11.9) assessment for the Pumping Facility, the noise emissions at surrounding sensitive receptors will be calculated using a noise prediction model. Modelling will be undertaken using nationally recognised modelling software (SoundPLAN or equivalent) which implements widely accepted modelling algorithms, including ISO 9613-2 (Ref 11.15), which would be used in this instance.

11.9.7 A low frequency noise assessment will be undertaken if the spectral noise data for the plant/equipment installations associated with the Pumping Facility will contain significant levels of low frequency content.

11.9.8 The influence of traffic flow fluctuations on the public highway during the various phases of the Project will be calculated using the methodology set out in the Calculation of Road Traffic Noise (CRTN) publication (Ref 11.13). The predicted variance in road traffic noise levels will be assessed using the short-term criteria provided in the Design Manual for Roads and Bridges document ref. ‘LA 111 - Noise and Vibration’ (Ref 11.14).

11.9.9 The noise assessment will include consideration of potential cumulative effects as a result of the Project in combination with other committed developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant local authorities.

11.10 Limitations and assumptions

11.10.1 The following limitations and assumptions are noted in respect of the noise and vibration EIA scoping chapter:

- The overview of baseline acoustic conditions is based on desk-based studies only at scoping stage;
- The location of construction phase activities that may require works to be undertaken outside of the core daytime hours has not been defined at the time of writing, and therefore further commentary on this has not been provided; and
- Details of noise emitting plant/equipment associated with the Pumping Facility have not been defined at this stage.

11.11 References

- Ref 11.1: Secretary of State (1974) *The Control of Pollution Act*. Available at: https://www.legislation.gov.uk/ukpga/1974/40 (Accessed: 10 February 2022).
- Ref 11.2: Secretary of State (1990) *The Environmental Pollution Act*. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents (Accessed: 11 February 2022).
- Ref 11.3: Department of Energy and Climate Change (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-1).* Available at: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure (Accessed: 3 February 2022).
- Ref 11.4: Department for Business, Energy and Industrial Strategy (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 3 February 2022).
- Ref 11.5: Department of Energy and Climate Change (2011) *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure (Accessed: 3 February 2022).
- Ref 11.6: Department for Business, Energy and Industrial Strategy (2021*) Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 3 February 2022).
- Ref 11.7: Department for Communities and Local Government (2021) *National Planning Policy Framework.* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 2 February 2022).
- Ref 11.8: Department for Environment, Food and Rural Affairs (2010) *Noise Policy Statement for England*. Available at: https://www.gov.uk/government/publications/noise-policy-statement-for-england (Accessed: 1 February 2022).

- Ref 11.9: British Standards Institution (2019) *British Standard 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound.* London: British Standard Institution.
- Ref 11.10: British Standards Institution (2014) *British Standard 5228:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites (Part 1: Noise).* London: British Standard Institution.
- Ref 11.11: British Standards Institution (2014) *British Standard 5228:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites (Part 2: Vibration).* London: British Standard Institution.
- Ref 11.12: British Standards Institution (2003) *British Standard 7445:2003, Description and measurement of environmental noise (Part 1: Guide to quantities and procedures).* London: British Standard Institution.
- Ref 11.13: British Standards Institution (2018) *British Standard EN IEC 60942:2018, Electroacoustics – Sound calibrators.* London: British Standard Institution.
- Ref 11.14: British Standards Institution (2013) *British Standard EN 61672-1:2013, Electroacoustics - Sound level meters (Part 1: Specifications).* London: British Standard Institution.
- Ref 11.15: Department of Transport (1988) *Calculation of Road Traffic Noise.* Surrey: Her Majesty's Stationary Office.
- Ref 11.16: Highways England (2019) *Design Manual for Roads and Bridges, LA 111 Noise and Vibration.* Available at: https://www.standardsforhighways.co.uk/dmrb/search/cc8cfcf7-c235-4052-8d32-d5398796b364 (Accessed: 12 February 2022).
- Ref 11.17: International Organization for Standardization (1996) *ISO 9613-2:1996(E): Acoustics. Attenuation of sound during propagation outdoors - Part 2: General method of calculation.* Geneva, Switzerland: International Organization for Standardization.
- Ref 11.18: World Health Organization (1999) *Guidelines for community noise.* Geneva, Switzerland: World Health Organization.
- Ref 11.19: World Health Organisation (2009) *Night Noise Guidelines for Europe.* Geneva, Switzerland: World Health Organization.

12. Socio-economics

12.1 Introduction

12.1.1 This Chapter addresses the proposed scope of the Environmental Impact Assessment (EIA) with respect to Socio-economics, Recreation and Tourism. It includes a summary of baseline data that will be collected and the proposed approach to the assessment of possible construction, operational and decommissioning effects. Matters that are proposed to be scoped in and out of the assessment are identified.

12.2 Legislation, policy and guidance

12.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

- The Countryside and Rights of Way Act 2000 (Ref 12.1).
- National Parks and Access to the Countryside Act 1949 (Ref 12.2).

Policy

- Overarching National Policy Statement for Energy EN-1 (Ref 12.3) and Draft Overarching National Policy Statement for Energy EN-1 (Ref 12.4).
  - EN-1 Adopted (Ref 12.3) and Draft (Ref 12.4)) state that the construction, operation and decommissioning of infrastructure may have the following socio-economic effects, that should be considered in any assessment:
    - The creation of jobs and training opportunities;
    - The provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;
    - Indirect beneficial economic impacts such as supporting local supply chains;
    - Effects on tourism;
    - The impact of an influx of workers which could change local population dynamics and alter demand for services and facilities and effect social cohesion; and
    - Cumulative effects.
- National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 12.5) and Draft National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 12.6).
  - EN-4 identifies effects to be considered for natural gas and oil pipelines and includes noise and vibration, biodiversity, landscape and visual, water quality and

resources and soil and geology. There is no specific mention of considering socio-economic impacts or effects on communities; and

- National Planning Policy Framework (2021) (Ref 12.7).

12.2.2 The relevant planning policy that will be reviewed for the Project will include the Local Development Plans for each of the four local authority areas (Selby, East Riding of Yorkshire, North Lincolnshire and West Lindsey). The local plan documents have been set out below with the relevant policies which include:

- Selby District Council:
  - Selby District Core Strategy Local Plan (October 2013) - Policies: SP1, SP13 SP17 (Ref 12.8).
  - Selby District Local Plan 2005 – Saved Policies – EMP2, EMP4, EN1, SL1 (Ref 12.9).
  - Selby New Local Plan: Preferred Options (January 2021) – EM2, SG10, (Ref 12.10).
- North Lincolnshire Council:
  - North Lincolnshire Core Strategy (June 2011) (Ref 12.11).
  - Planning for Renewable Energy Development – Supplementary Planning Document 2011 (Ref 12.12).
  - North Lincolnshire New Local Plan: Publication Draft (October 2021) (Ref 12.13).
- West Lindsey District Council:
  - Central Lincolnshire Local Plan 2012-2036 (April 2017) (Ref 12.14).
  - Central Lincolnshire Local Plan Review (June 2021) (Ref 12.15).
- East Riding of Yorkshire Council:
  - East Riding Local Plan Strategy Document (April 2016) (Ref 12.16).
  - East Riding Emerging Local Plan: Publication Document (January 2022) (Ref 12.17).

Guidance

- Government White Paper: Healthy Lives, Healthy People (2010) (Ref 12.18).
- A Green Future: Our 25 Year Plan to Improve the Environment (2019) (Ref 12.19).
- Planning Practice Guidance (PPG) – The Role of Health and Wellbeing in planning (2014) (Ref 12.20).
- Putting Health into Place National Health Service (NHS) England, 2019 (Ref 12.21).

12.3 Engagement

12.3.1 Engagement has been undertaken with Selby District Council, North Lincolnshire Council, North Yorkshire County Council, West Lindsey Council and East Riding of Yorkshire Council to agree the relevant topics that should be scoped in and out of this EIA Scoping Report. The consultees were asked to review the matters covered in this

EIA Scoping Report e.g. local economy and employment, community facilities and tourism and recreation, and to confirm acceptance that they were the appropriate matters to assess.

12.3.2 Engagement will continue throughout the EIA process. A summary of engagement to date has been provided in Table 12.1.

Table 12.1: Summary of engagement

Consultee	Date (method of engagement)	Summary of engagement
Selby District Council	02 March 2022 (letter via email)	Response received 17 March. Overall approach agreed. – A question was raised regarding relevant assessment methodologies (BS5228-1&2:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites'*, Institute of Air Quality Management (IAQM) *'Guidance on the Assessment of Dust from Demolition and Construction').* A further question was asked relating to whether potential impacts during construction including from traffic movements and construction compounds outside of the 250m buffer will be considered.
North Yorkshire County Council	02 March 2022 (letter via email)	No comments received to date.
North Lincolnshire Council	02 March 2022 (letter via email)	Response received 21 March. The stakeholder agreed with the proposed methodology and had no further clarifications.
East Riding of Yorkshire Council	02 March 2022 (letter via email)	Council confirmed on 05 March 2022 they agree with suggested approach.
West Lindsey District Council	02 March 2022 (letter via email)	No comments received to date.

12.4 Study Area

12.4.1 The spatial scope would include both local and wider Study Areas.

12.4.2 The Local Study Area relates to wards that are within 500m of the Scoping Route Corridor. This Study Area is based on professional judgement and experience of other similar projects.

12.4.3 The Wider Study Area relates to local authority spatial areas that the Scoping Route Corridor passes through (i.e. Selby District Council, North Lincolnshire Council, North East Lincolnshire Council and East Riding of Yorkshire Council) as well as the wider Yorkshire and the Humber region where appropriate.

12.4.4 The use of these Study Areas is intended to capture the majority of socio-economic effects that may occur outside of the immediate Scoping Route Corridor. Baseline information would be considered as appropriate at each spatial level.

12.5 Receptors

12.5.1 The potential effect, followed by the receptors that will be considered in this assessment is provided below.

- **Local economy and employment** – Receptor: Local workforce and local businesses (including agricultural businesses) potentially affected by the Project. For example, people that might gain employment as a result of the Project and/or businesses close to the Project that might be disrupted by the construction process;
- **Construction amenity impacts** – Receptor: Existing and future residents in the local Study Area that might be affected by the construction process of the Project.;
- **Community infrastructure** – Receptor: Existing and future users of community infrastructure in the local Study Area that might be affected by the Project, e.g. users of schools, community centres, libraries etc. potentially affected by the construction process; and
- **Tourism and recreation** – Receptor: Existing and future users of tourism assets, tourism businesses and accommodation providers and users of recreation infrastructure in the Local Study Area that might be affected by the Project. For example, this could include users of Public Rights of Way (PRoW); Bridleways, tourism assets, e.g. Lincolnshire Wolds Area of Natural Beauty (AONB), museums, stately homes, beaches, rural recreation/tourism business – e.g. horse riding, clay shooting ranges/paint balling/golf courses etc. Also, dog walkers, hikers, horse riders and beach users.

12.6 Baseline conditions

12.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

12.6.2 To enable a current and future baseline of the relevant Socio-Economic, Recreation and Tourism Study Area conditions to be established, the following baseline data and data sources will be assessed:

- **Population:** Socio-economic data will be assessed for the local and wider Study Areas, e.g. age profile, population growth, deprivation, skills and qualifications etc. using the most up to date population estimates (data source: Census 2011; Office for National Statistics (ONS));
- **Local economy and employment:** Employment levels, employment sectors (data source: NOMIS (ONS Official Labour Market Statistics service); annual business survey (data source: ONS), Local planning evidence base economic and employment studies and strategies where relevant, e.g. local authority economic assessments, employment land reviews;
- **Community infrastructure:** Information on community infrastructure will be assessed, e.g. education, healthcare facilities, libraries, post offices, community centres, youth centres and places of worship. Information will be sourced from local authority evidence base studies such as infrastructure delivery plans and studies and aerial mapping and imagery; and
- **Tourism and recreation:** Information on relevant tourism and recreation assets will be assessed within the local Study Area. Baseline information will be sourced from a variety of sources including aerial, Ordnance Survey (OS) and Local Authority mapping. Also, internet research and evidence base studies, for example, North Lincolnshire Open Space Study – June 2019 (Ref 12.22), Selby Council Indoor and Outdoor Sports Facilities Strategy – 2016 (Ref 12.23), West Lindsey: State of the District Report 2020 (Ref 12.20), Yorkshire Tourism Data Report 2019 (Ref 12.25) and East Riding of Yorkshire Council: Tourism Accommodation Study 2016 (Ref 12.26). A beach survey is planned in order to more accurately understand usage levels along the stretch of coastline at the Project's landfall location near Easington. This will help to better inform design (for example avoiding high usage areas/understanding local access patterns) and mitigation measures, such as restrictions on peak season working. The beach survey will identify levels of usage of the beach through counts of users and questionnaires. It will be carried out both during the peak holiday period and outside of this time (when recreational use by local residents can still be high, for example for dog-walking/leisure purposes).

12.7 Design, mitigation, and enhancement measures

12.7.1 Mitigation for Socio-economics, Recreation and Tourism will include the implementation of a Construction Environmental Management Plan (CEMP) to include the following measures:

- Appropriate induction to be given to ensure contractors act considerately in relation to local residents;
- Appropriate fencing, signage and safety precautions; and
- Measures associated with the design of construction compounds. Where practical, construction compounds would be located to avoid or minimise environmental and community impacts, provide the best access for personnel and deliveries in relation to major structures and worksites, and meet other construction requirements for the Project.

12.7.2 A Decommissioning Environmental Management Plan (DEMP) will be implemented during the decommissioning phase, this will identify and mitigate the potential impacts of decommissioning activities which could harm sensitive receptors.

12.7.3 A draft CEMP will be provided with the DCO application. The requirement for a CEMP and DEMP will be secured through the draft DCO.

12.7.4 Where PRoW or cycle routes may be disrupted by construction of the Project, temporary diversions will be put in place together with appropriate signage as necessary. If this is not possible discussions will occur with stakeholders to agree the most appropriate approach.

12.7.5 The Socio-economic, Recreation and Tourism assessment will rely on commitments 1, 2 and 10 outlined in the draft Register of Commitments in Volume III, Appendix F.

12.8 Description of likely significant effects

Construction and decommissioning

12.8.1 The likely Socio-economic, Recreation and Tourism effects during construction and decommissioning are as follows:

- **Local economy and employment:** The creation of direct employment, as well as indirect and induced employment opportunities. Like other major utility and infrastructure projects, there will be a high level of construction employment and a minimal level of operational employment. The labour force required for construction will consist of a mix of highly specialised workers, semi-skilled staff and others. These personnel include welders and plant operators, inspectors and supervisors, and management staff. Although a large percentage of the staff employed by the Main Works Contractor and Applicant will be drawn from the permanent staff of those organisations, it is normal practice on such projects that some local staff and site labour may be required which would be engaged on a subcontract basis to local firms;

  In addition to direct local employment described above, there may also be a small element of indirect employment (within daily commuting distance of the Project). This could involve local firms providing services (i.e. haulage, fencing, landscaping etc.), goods and materials (other than specialised steel line pipe and fittings) and local service staff (e.g. cleaning, security, catering, administrative) for the construction phase;

- **Accommodation:** Given that a high proportion of the construction workforce will come from outside the local area, there will be a requirement for temporary living accommodation within reasonable commuting distance of the project such as rented housing, hotels, guest houses, bed and breakfast establishments/lodgings and official caravan parks. This will also generate expenditure on other local services, such as petrol, food and drink etc.;

- **Local economic effects:** This will predominantly be through the procurement of local services/materials (e.g., some construction materials, fencing products etc.), expenditure of employees' salaries within the local economy (i.e. food and drink etc.) and the engagement of subcontracts to local suppliers such as the hiring of cranes, excavators etc.;

- **Residential amenity:** Short to medium term disturbance and nuisance within the local area. The assessment would consider findings from other EIA topics including Air Quality, Noise and Vibration, and Traffic and Transport;

- **Community infrastructure:** Impacts relating to changes in access to social infrastructure (for example education and healthcare services), or access to training and employment, for example as a result of road closures/diversions; and
- **Tourism and recreation:** Overall impacts on tourism and recreation are expected to be minimal. Impacts relating to changes in access to PRoW, bridleways and cycle routes and tourism assets (i.e. the beach at Easington).

Operation

12.8.2 The likely Socio-economic, Recreation and Tourism effects during operation are as follows:

- **Local economy and employment:** The creation of direct employment, as well as indirect and induced employment opportunities; and
- **Recreation facilities and PRoW:** Potential permanent diversions around AGIs.

Matters scoped in or out of further assessment

12.8.3 The matters scoped in or out of further assessment for Socio-economics, Recreation and Tourism are as follows outlined in Table 12.2.

Table 12.2: Matters scope in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Local economy and employment: Construction, operation and decommissioning employment	Construction, operation and decommissioning	✓		The construction, operation and decommissioning of the Project is likely to generate direct and indirect employment opportunities. This is likely to result in a temporary beneficial effect during construction and decommissioning, and a permanent beneficial effect during operation.	Selby District Council North Lincolnshire Council East Riding of Yorkshire Council
Local economy and employment: Potential disruption to future and existing businesses	Construction	✓		There is potential for disruption of businesses through the construction of AGIs and temporary disruption of businesses through the construction of the pipelines. Businesses most likely to be affected will be agricultural, as the Scoping Route Corridor passes through predominantly agricultural land as described in Chapter 2: Project Description.	Selby District Council North Lincolnshire Council East Riding of Yorkshire Council
Local economy and employment: Potential disruption to future and existing businesses	Operation and decommissioning		✓	Businesses are unlikely to be affected during the operation and decommissioning of the Project. Therefore, there are unlikely to be significant effects in terms of disruption to businesses during operation or decommissioning.	Selby District Council North Lincolnshire Council

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
				Due to the static and underground nature of the pipelines and the generally unintrusive characteristics of AGIs, there should not be any disruption to businesses.	East Riding of Yorkshire Council
Existing and future residents: Potential amenity effects to residents from the construction process of the Project.	Construction, and decommissioning	✓		Potential effects on the amenity of local residents from the construction process. For example, reduction in local air quality, noise and possible congestion on the local road network.	Selby District Council North Lincolnshire Council East Riding of Yorkshire Council
Community facilities: Community facilities including: schools, community centres, libraries, heath (GPs, dentists, hospitals), sports halls & swimming pools	Construction, and decommissioning	✓		There is the potential disruption of access to existing community infrastructure during the construction and decommissioning phase. For example, during construction users of PRoW. During decommissioning, pipelines will remain in situ and AGIs dismantled therefore impacts limited to users of PRoW.	Selby District Council North Lincolnshire Council East Riding of Yorkshire Council
Community facilities: Community facilities including: schools, community centres, libraries, heath (GPs,	Operation		✓	Due to the static and underground nature of the pipelines and the generally unintrusive characteristics of AGIs, there should not be any disruption to access to community facilities once the Project is operational.	Selby District Council

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
dentists, hospitals), sports halls & swimming pools				Noise disruption to community facilities during operation from the AGIs including the Pumping Facility are unlikely to lead to significant effects. The AGI locations identified are mainly in agricultural areas and not in close proximity to community facilities.	North Lincolnshire Council East Riding of Yorkshire Council
Tourism and recreation: potential access / nuisance effects to beach at landfall	Construction	✓		There is the potential disruption of access to the beach at the landfall at Easington during the construction phase, as well as potential degradation/nuisance effects on tourism assets, i.e., the beach itself.	-

12.9 Proposed assessment methodology

12.9.1 There are no published guidelines or specific requirements for assessing socio-economic related impacts as part of an EIA. The assessment will therefore use a range of appropriate guidance and methodologies to identify and assess relevant changes that may arise from the Project.

12.9.2 The economic and employment impact assessment will be informed by the Homes and Communities Agency's (HCA) 'Additionality Guide' (Ref 12.27). The 'Additionality Guide' is based on the principles of the HM Treasury Green Book and describes a methodology for defining the additional economic benefits arising from an intervention.

12.9.3 The approach for the assessment of Socio-Economic, Recreation and Tourism impacts would use a combination of quantitative and qualitative methodologies as appropriate to the topic. Specific methodologies for assessing the effects of the Project are as follows:

- **Local economy and employment:** Direct employment generated during the construction phase will be estimated by using the most appropriate and accessible of one of following two approaches. It will either be estimated using a 'bottom up' estimate of likely construction employees required for the Project as provided by the Applicant or by dividing the total estimated construction cost by the average output per construction employee as taken from data published by the ONS Annual Business Survey and Business Register and Employment Survey. Following the estimate of direct employment, an assessment of indirect employment would be made. Indirect employment will factor in an estimate of deadweight (i.e. what would happen in the absence of the Project), leakage (employment accessed by workers from outside the Study Area), displacement (reduction of employment elsewhere as a result of the Project and firms directly affected by the Project in terms of having to relocate or being disrupted by the construction process) and multiplier effects (increased employment in supply chains and as a result of local spend by new employees);
- **Local economy and employment:** Estimated direct employment generated during the operation phase will be provided by the Applicant. Indirect employment will be estimated using the same methodology as detailed above for the construction phase;
- **Community infrastructure:** An audit of the existing community facilities, including open space, recreation facilities including the beach and PRoW in terms of location, access and use would be undertaken using a variety of appropriate sources including aerial, OS and Local Authority mapping, internet research and relevant evidence base studies; and
- **Tourism:** Tourist businesses would be identified along the stretch of coastline on the landward side of the Project. Businesses would include visitor attractions, accommodation providers and related businesses. This assessment would be informed by the beach survey outlined above.

12.9.4 An assessment of both the positive and negative impacts of the Project relating to Socio-Economic, Recreation and Tourism receptors and baseline will be assessed.

12.9.5 Consideration would be given to the likely significant effects of the Project with committed schemes, including the Connected Projects. Potential cumulative effects of relevance to the Socio-economics, Recreation and Tourism Chapter include committed

schemes which generate additional population and thereby potentially impact on local facilities and resources.

12.9.6 Unlike other environmental topics such as noise, the sensitivity of socio-economic receptors to the Project is not determined by reference to designations or an objective standard. Instead, it is the nature of the activity that the human receptor is undertaking that is most influential in determining sensitivity. A combination of quantitative and qualitative assessment, together with professional judgement, would therefore be undertaken to define the sensitivity of receptor.

12.9.7 Impact magnitude would be assessed by consideration of the following factors for each predicted impact:

- The magnitude of the predicted impact;
- The geographic extent of the impact;
- The duration and reversibility of the impact; and
- The capacity of the local economy or area to absorb or adjust to the impact.

12.9.8 The terms used to define the significance of effect are as follows:

- Adverse: detrimental or negative impacts to a socio-economic resource or receptor;
- Negligible: imperceptible impacts to a socio-economic resource or receptor; and
- Beneficial: advantageous or positive impact to a socio-economic resource or receptor.

12.9.9 Where beneficial or adverse effects have been identified, these have been assessed against the following scales:

- Minor: slight, very short or highly localised impact;
- Moderate: limited impact (by extent, duration or magnitude) which may be considered significant; and
- Major: considerable impact (by extent, duration or magnitude) of more than local significance (for example a sizeable change in relation to the baseline or affecting a wide geographic area).

12.9.10 A more detailed table for assessing the significance of effects is in Table 3.1 Chapter 3: EIA Methodology.

12.10 Limitations and assumptions

12.10.1 There are no specific assumptions and limitations other than those outlined in Chapter 3: EIA Methodology.

12.11 References

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- Ref 12.10 Selby District Council (2021) *New Local Plan: Preferred Options*. Available at: https://www.selby.gov.uk/localplan (Accessed: 5 February 2022).
- Ref 12.11 North Lincolnshire Council (2011) *Core Strategy*. Available at: http://www.planning.northlincs.gov.uk/planningreports/corestratergy/adopteddpd/FullCoreStrategy.pdf (Accessed: 4 February 2022).
- Ref 12.12 North Lincolnshire Council (2011) *Planning for Renewable Energy Development: Supplementary Planning Document.* Available at: https://www.northlincs.gov.uk/wp-content/uploads/2018/11/Planning-for-Renewable-Energy-Development-SPD-Adopted.pdf (Accessed: 5 February 2022).
- Ref 12.13 North Lincolnshire Council (2021) *New Local Plan: Publication Draft*. Available at: https://localplan.northlincs.gov.uk/ (Accessed: 4 February 2022).

- Ref 12.14 Central Lincolnshire Council (2017) *Local Plan 2012-2036*. Available at: https://www.n-kesteven.gov.uk/residents/planning-and-building/planning/planning-policy/central-lincolnshire-local-plan/ (Accessed: 3 February 2022).
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- Ref 12.16 East Riding Council (2016) *Local Plan Strategy Document*. Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/east-riding-local-plan/ (Accessed: 6 February 2022).
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13. Human Health and Wellbeing

13.1 Introduction

13.1.1 This Chapter addresses the proposed scope of the Environmental Impact Assessment (EIA) with respect to Human Health and Wellbeing. It includes a summary of baseline data that will be collected and the proposed approach to the assessment of possible construction, operational and decommissioning effects. Matters that are to be scoped in and out of the assessment are identified.

13.2 Legislation, policy, and guidance

13.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

13.2.2 No specific legislation will be relied upon for the Human Health and Wellbeing assessment.

Policy

- The Overarching National Policy Statement for Energy (EN-1) (Adopted (Ref 13.1) and Draft Overarching National Policy Statement for Energy (EN-1) (Ref 13.2)).
  - EN-1 and Draft EN-1 state that energy production infrastructure may have impacts on the health and well-being of the population which should be considered in any assessment, including:
    - Direct impacts on health from traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation and increases in pests; and
    - Indirect impacts on health and well-being through effects on the size and composition of the local population.
- National Planning Policy Framework (2021) (Ref 13.3).

13.2.3 The relevant planning policy that will be reviewed for the Project will include the Local Development Plans for each of the four local authority areas (North Lincolnshire, Selby, West Lindsey and East Riding of Yorkshire). The local plan documents have been set out below with the relevant policies which include:

- North Lincolnshire:
  - North Lincolnshire Core Strategy (June 2011) (Ref 13.4).
  - North Lincolnshire New Local Plan: Publication Draft (October 2021) (Ref 13.5).
- Selby District Council:
  - Selby District Core Strategy Local Plan (October 2013) (Ref 13.6).

- Selby District Local Plan 2005 – Saved Policies (Ref 13.7).
- Selby New Local Plan: Preferred Options (2021) (Ref 13.8).

- West Lindsey District Council:
  - Central Lincolnshire Local Plan 2012-2036 (April 2017) (Ref 13.9).
  - Central Lincolnshire Local Plan Review (June 2021) (Ref 13.10).
- East Riding of Yorkshire Council:
  - East Riding Local Plan Strategy Document (April 2016) (Ref 13.11).
  - East Riding Emerging Local Plan: Publication Document (January 2022) (Ref 13.12).

Guidance

- Government White Paper: Healthy Lives, Healthy People (2010) (Ref 13.13).
- A Green Future: Our 25 Year Plan to Improve the Environment (2019) (Ref 13.14).
- Planning Practice Guidance (PPG) – The Role of Health and Wellbeing in planning (2014) (Ref 13.15).
- Putting Health into Place National Health Service (NHS) England, 2019 (Ref 13.16).
- Public Health England Health Impact Assessment in spatial planning (October 2020) (Ref 13.17).
- NHS London Healthy Urban Development Unit (HUDU), Planning for Health: Rapid Health Impact Assessment Tool (fourth edition October 2019) (Ref 13.18).
- The Institute of Environmental Management and Assessment (IEMA) Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (June 2017) (Ref 13.19).

13.3 Engagement

13.3.1 Engagement has been undertaken with Selby District Council, North Lincolnshire Council, North East Lincolnshire Council and East Riding of Yorkshire Council to agree the relevant topics that should be scoped in and out of this EIA Scoping Report. Engagement will continue throughout the EIA process. A summary of engagement to date has been provided in Table 13.1.

Table 13.1: Summary of Engagement

Consultee	Date (method of engagement)	Summary of engagement
Selby District Council	02 March 2022 (letter via email)	Response received 17 March. Overall approach agreed. A question was raised regarding relevant assessment methodologies (BS5228-1&2:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites'*, Institute of Air Quality Management (IAQM) *'Guidance on the Assessment of Dust from Demolition and Construction').* A further question was asked relating to whether potential impacts during construction including from traffic movements and construction compounds outside of the 250m buffer will be considered.
North Yorkshire County Council	02 March 2022 (letter via email)	No comments received to date.
North Lincolnshire Council	02 March 2022 (letter via email)	Response received 21 March 2022. The stakeholder agreed with the proposed methodology and had no further clarifications.
Lincolnshire County Council	02 March 2022 (letter via email)	Council confirmed on 05 March 2022 they agree with suggested approach.
East Riding of Yorkshire Council	02 March 2022 (letter via email)	No comments received to date.
West Lindsey District Council	02 March 2022 (letter via email)	Response received 17 March 2022.

13.4 Study Area

13.4.1 The spatial scope would include both local and wider Study Areas.

13.4.2 The local Study Area relates to wards that are within the Scoping Route Corridor.

13.4.3 The wider Study Area relates to local authority spatial areas that the Scoping Route Corridor passes through (i.e. Selby District Council, North Lincolnshire Council, North East Lincolnshire Council and East Riding of Yorkshire Council) as well as the wider Yorkshire and the Humber region where appropriate.

13.4.4 The use of these Study Areas is intended to capture the majority of Human Health and Wellbeing effects that may occur outside of the immediate Scoping Route Corridor. Baseline information would be considered as appropriate at each spatial level.

13.5 Receptors

13.5.1 Relevant receptors include the following:

- Existing and future residents of properties potentially affected by the Project;
- Users of healthcare facilities;
- Users of walking and cycling routes; and
- Users of areas of open space potentially affected by the Project.

13.6 Baseline conditions

13.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

13.6.2 The identification of population and human health issues must pay specific attention to vulnerable groups including children, older people, people with disabilities and people from low income groups.

13.6.3 The baseline section will review the available research and information to enable a thorough understanding of the links and potential interactions between topics scoped into the health assessment and their effect on health and wellbeing. A desktop literature review will be undertaken to identify sources of information and findings of relevance to individual effects and topics, helping to form the assessment.

13.6.4 To enable a current and future baseline of the relevant Human Health and Wellbeing Study Area conditions to be established, the following baseline data and data sources will be assessed

- **Human Health and Wellbeing:**
  - Office for National Statistics (ONS), for example Census data (2011) and some data from Census (2021);
  - Public Health England localhealth.org website – data provides a wider picture of the health of local residents using a series of health indicators including socio-economic background, lifestyle choices and health outcomes;

- Department for Communities and Local Government (DCLG), for example Indices of Deprivation (2019);
- Lincolnshire Joint Strategic Needs Assessment (JSNA) (2020) (Ref 13.20);
- Joint Health and Wellbeing Strategy for Lincolnshire (2018) (Ref 13.21);
- North Lincolnshire Council Joint Health and Wellbeing Strategy 2021-2026 (when published) (Ref 13.22);
- North Lincolnshire Joint Health and Wellbeing Strategy: Strategic Priority Actions (2016) (Ref 13.23);
- North Yorkshire Joint Strategic Needs Assessment 2021: Selby District Summary Profile (Ref 13.24); and
- East Riding Health and Wellbeing Strategy 2019-2022 (Ref 13.25).

- **Community and health infrastructure:** Information will be sourced from local authority evidence base studies such as infrastructure delivery plans and studies, and aerial mapping.

13.7 Design, mitigation, and enhancement measures

13.7.1 Mitigation for Population and Health will include the implementation of a Construction Environmental Management Plan (CEMP) to include the following measures:

- Appropriate instruction to be given to ensure contractors act considerately in relation to local residents;
- Appropriate fencing, signage and safety precautions; and
- Measures associated with the design of construction compounds. Where practical, construction compounds would be located to avoid or minimise environmental and community impacts, provide the best access for personnel and deliveries in relation to major structures and worksites, and meet other construction requirements for the Project.

13.7.2 A Decommissioning Environmental Management Plan (DEMP) will be implemented during the decommissioning phase, this shall identify and mitigate the potential impacts of decommissioning activities which could harm sensitive receptors.

13.7.3 A draft CEMP will be provided with the Development Consent Order (DCO) application. The requirement for a CEMP will be secured through the draft DCO.

13.7.4 Where Public Rights of Way (PRoW) or cycle routes may be disrupted by construction of the Project, temporary diversions will be put in place together with appropriate signage as necessary.

13.7.5 The Human Health and Wellbeing assessment will rely on commitments 1, 2 and 10 outlined in the draft Register of Commitments in Volume III, Appendix F.

13.8 Description of likely significant effects

Construction and decommissioning

13.8.1 The likely effects on Human Health and Wellbeing during construction and decommissioning of the Project are as follows:

- Potential impacts on health are likely to be restricted to changes in access to healthcare facilities that may arise;
- Health impacts associated with environmental change (for example, changes to noise levels, air quality or contaminated land); and
- Changes in levels of physical activity as a result of impacts restricting access to walking and cycling routes/areas of open space.

Operation

13.8.2 There are unlikely to be any significant effects on Human Health and Wellbeing from the Project during operation. The Project is a static, predominantly underground, piece of infrastructure that will have a negligible effect on the receptors, i.e. people living close by and/or users of nearby community infrastructure.

Matters scoped in or out of further assessment

13.8.3 The matters scoped in or out of further assessment for Human Health and Wellbeing are as follows outlined in Table 13.2.

Table 13.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Health and wellbeing: Dwellings and community infrastructure	Construction, and decommissioning	✓		Effects on human health and wellbeing caused by potential changes to accessibility and severance to existing housing, community assets and work during construction and decommissioning and effects on amenity value.	Selby District Council North Lincolnshire Council Lincolnshire County Council West Lindsey District Council
Health and wellbeing: Dwellings and community infrastructure	Operation		✓	There are unlikely to be any significant effects on human health and wellbeing from the Project during operation. The Project is a static, predominantly underground, piece of infrastructure that will have a negligible effect on the receptor, i.e. people living close by and/or users of nearby community infrastructure. The AGI locations identified are mainly in agricultural areas and not typically in close proximity to dwellings and community infrastructure.	Selby District Council North Lincolnshire Council Lincolnshire County Council West Lindsey District Council

13.9 Proposed assessment methodology

13.9.1 There are no specific published guidelines or requirements regarding the assessment of health impacts as part of an EIA. The assessment therefore seeks to identify and assess relevant changes that may arise from the Project using available guidance for specific topic areas and professional judgement. Relevant guidance that has been used to inform the assessment of impacts on health includes:

- Public Health England Health Impact Assessment in spatial planning (October 2020) (Ref 13.17);
- NHS London HUDU, Planning for Health: Rapid Health Impact Assessment Tool (fourth edition October 2019) (Ref 13.18); and
- IEMA Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (June 2017) (Ref 13.19).

Assessment methodology

13.9.2 For Human Health and Wellbeing, the assessment will use the HUDU Rapid Health Impact Assessment Tool (Ref 13.18 to assess the qualitative impact of the Project on relevant health determinants. The health determinants proposed to be scoped in for the assessment include:

- Access to social infrastructure (for example, community and healthcare services);
- Access to open space;
- Health related environmental change (for example, air quality, noise, visual amenity and contaminated land health related impacts);
- Access to work and training; and
- Accessibility and active travel.

13.9.3 For each determinant, a qualitative assessment would be undertaken as follows:

- How the health determinant might change and whether this would be beneficial or adverse;
- Duration of change – temporary or permanent;
- Exposure (including identification of vulnerable populations); and
- Intensity (magnitude or severity of the change in the health determinant).

13.9.4 Consideration will be given to the likely significant effects of the Project with committed schemes identified from a review of planning applications. Potential cumulative effects of relevance to human health include committed schemes which generate additional population or which may cause health related environmental change.

13.9.5 Unlike other environmental topics such as noise, the sensitivity of population and health receptors to the Project is not determined by reference to designations or an objective standard. Instead, it is the nature of the activity that the human receptor is undertaking that is most influential in determining sensitivity. A combination of quantitative and qualitative assessment, together with professional judgement, would therefore be undertaken to define the sensitivity of receptor.

13.9.6 Impact magnitude would be assessed by consideration of the following factors for each predicted impact:

- The magnitude of the predicted impact;
- The geographic extent of the impact;
- The duration and reversibility of the impact; and
- The capacity of the local economy or area to absorb or adjust to the impact.

13.9.7 The terms used to define the significance of effect are as follows:

- Adverse: detrimental or negative impacts to a socio-economic resource or receptor;
- Negligible: imperceptible impacts to a socio-economic resource or receptor; and
- Beneficial: advantageous or positive impact to a socio-economic resource or receptor.

13.9.8 Where beneficial or adverse effects have been identified, these have been assessed against the following scales:

- Minor: slight, very short or highly localised impact;
- Moderate: limited impact (by extent, duration or magnitude) which may be considered significant; and
- Major: considerable impact (by extent, duration or magnitude) of more than local significance (for example a sizeable change in relation to the baseline or affecting a wide geographic area).

13.9.9 A more detailed table for assessing the significance of effects is in Table 3.1 Chapter 3: EIA Methodology.

13.10 Limitations and assumptions

13.10.1 There are no specific assumptions and limitations other than those outlined in Chapter 3: EIA Methodology.

13.11 References

- Ref 13.1 Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed 28 January 2022).
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14. Traffic and Transport

14.1 Introduction

14.1.1 This Chapter considers the Traffic and Transport impacts of the Project. It sets out the proposed methodology for the Traffic and Transport assessment and provides rationale behind scoping operation and decommissioning out of the Environmental Impact Assessment (EIA).

14.1.2 It includes a summary of relevant consultation to date, baseline data sources and the proposed methodology for the assessment of possible construction effects. Aspects that are to be scoped in and out of the assessment are identified.

14.2 Legislation, policy, and guidance

14.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

14.2.2 Whilst a Transport and Traffic impact assessment is required as part of the scope of this ES, there is no legislation which specifically governs how Transport and Traffic impact assessments should be undertaken.

Policy

- The Overarching National Policy Statement for Energy (EN-1) (Ref 14.1).
  - This outlines the necessity for a Transport Assessment (TA) if the Project is likely to have significant transport implications. EN-1 stipulates a methodology to be utilised for the TA in Paragraph 5.14.3. Moreover, in Section 5.14 it is stated that, if appropriate, the Applicant should prepare Travel Plan including demand management measures in order to mitigate transport impacts. The draft EN-1 (Ref 14.2) reiterates this approach with updated guidance documents.
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) ((Ref 14.3).
- Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 14.4).
- National Planning Policy Framework 2021 (Ref 14.5).
- Transport Evidence Bases in Plan Making and Decision Taking (Ref 14.6).
- Travel Plan Guidelines (various dates) (14.7).
- North Yorkshire Local Transport Plan (LPT4) 2016-2045 (Ref 14.8).
- Lincolnshire Local Transport plan 2013/14-2022/23 (April 2013) (Ref 14.9).
- Lincolnshire County Council Network Management Plan (April 2018) (Ref 14.10).

- Central Lincolnshire Local Plan (Adopted 2017) (Ref 14.11).
- East Riding of Yorkshire Local Transport Plan (2015-2029) (Ref 14.12).
- East Riding Local Plan (adopted April 2016) (Ref 14.13).
- North Lincolnshire's Third Local Transport Plan (Ref 14.14).
- Emerging North Lincolnshire Local Plan (2017-2036) (Ref 14.15).
- Selby District Council Local Plan, Preferred Options (2021) (Ref 14.16).
- Water preferred policy: guidelines for the movement of abnormal indivisible loads (2019) (Ref 14.17).

Guidance

- The Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (2020) (Ref 14.18).
- Guidelines for the Environmental Assessment of Road Traffic ((Institute of Environmental Management and Assessment (IEMA), 1993) ('IEMA Guidelines') (Ref 14.19).

14.3 Engagement

14.3.1 Engagement has been undertaken with the relevant local highway authorities to agree the assessment methodology and approach. A summary of engagement to date has been provided in Table 14.1. Engagement will continue throughout the EIA process.

Table 14.1: Summary of Engagement

Consultee	Date (method of engagement)	Summary of engagement
National Highways	Meeting held 18 November 2021 (Scoping note issued)	Proposed IEMA methodology was accepted for the assessment of Traffic and Transport impacts. Requested that a Transport Assessment (TA) is undertaken to fully assess the impact of traffic on the surrounding highway network. This should include junction modelling if deemed required following further discussions on proposed construction routes and predicted flows. It is expected that a Travel Plan will be prepared. A follow up meeting should be arranged once the construction routes to/from the Project have been confirmed. The standard procedure for Abnormal Indivisible Loads (AILs) should be followed.
North Yorkshire County Council	25 February 2022 (letter issued via email).	Agreed that the operation of the project can be scoped out of the assessment as traffic generated by the project will be notably low judging from other local projects of this nature. Highlighted that careful management of vehicles will be required.
East Riding Council	25 February 2022 (letter issued via email).	No comments provided to date.
Lincolnshire County Council	25 February 2022 (letter issued via email).	No comments provided to date.

Consultee	Date (method of engagement)	Summary of engagement
North Lincolnshire Council	25 February 2022 (letter issued via email).	Confirmed that the proposed approach would appear to be acceptable in principle. Enquired if a Transport Statement will be prepared.

14.3.2 Comments with regard to preparing a Travel Plan and carefully managing AIL and other construction vehicle movements were considered and addressed in the form of specific commitments presented in the draft Register of Commitments for the Project (Volume III, Appendix F). A TA will be prepared to inform the EIA.

14.3.3 Regular meetings with National Highways and local highway authorities will take place to discuss the proposed construction traffic routes, access, highway improvements and mitigation for the Project. Technical workshops with National Highways and the local highway authorities will also take place to discuss the TA and Construction Traffic Management Plan (CTMP) as and when required.

14.4 Study Area

14.4.1 The Study Area will focus on the highway network and will include vehicle construction routes to and from the Project, adjacent land use and sensitive receptors within 150m of the Scoping Route Corridor.

14.4.2 At this stage, the exact locations for construction compounds and construction site access points are not known and, for this reason, proposed construction routes and the Study Area cannot be mapped definitively.

14.4.3 Roads that are likely to form the proposed construction traffic routes to the Project include roads which are part of Strategic Road Network (SRN) including the A1033, A63, M62, M18, M180, M181, A180, and A160, as well as roads on the Primary and Secondary Road Network including the A15, A1077, A614, A1033 and A1041. The existing road network is shown on Figure 14.1 (Volume II, Part 5). We will continue to engage with the highways authorities to agree the Study Area.

14.5 Receptors

14.5.1 The assessment would address potential effects relating to impacts from construction traffic and consider the following broad receptor groups or categories:

- Motorised users such as drivers, private and commercial vehicle travellers, and bus users;
- Non-motorised users: pedestrians, cyclists, and horse-riders; and
- Sensitive receptors such as schools, playgrounds, hospitals, tourist attractions, open spaces and recreational areas.

14.5.2 Potential sensitive receptors along proposed construction routes will be identified and potential effects on these receptors will be assessed as part of the EIA.

14.6 Baseline conditions

14.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

14.6.2 The following information will be reviewed for the assessment of the baseline conditions to determine the constraints for Traffic and Transport across the Project.

Traffic flow data

14.6.3 The Project will require a wide traffic survey scope due to the length of the pipelines and the associated Study Area. The Department for Transport (DfT) Road Traffic Statistics database will be reviewed and available data on the potential construction vehicle routes located along the SRN, maintained by National Highways, and the local highway network managed by the local highway authorities will be identified. DfT traffic counts on the existing road network are shown in Figure 14.1 (Volume II, Part 5).

14.6.4 The data will include annual surveys of Annual Average Daily Traffic (AADT) and vehicle classification including Heavy Goods Vehicles (HGVs). The AADT flows from the DfT counts will be converted into average weekday traffic flows and 12-hour flows (07:00-19:00 hrs) will be derived from the DfT traffic data by applying an appropriate factor. This will be based on a standard daily profile over 24-hour period from the DfT's online road traffic statistics Table TRA0307 (Ref 14.20).

14.6.5 Where required, additional traffic flow data will be collected using Automatic Traffic Counts (ATCs) and Manual Classified Count (MCC) surveys.

14.6.6 The vehicle flow data will be used to assess the increase in traffic generated by the Project under existing and future baseline scenarios. Future baseline flows will be estimated taking into account anticipated traffic growth using an appropriate growth factor derived from Trip End Model Presentation Program (TEMPro).

Collision data

14.6.7 Five-year personal injury collision data will be obtained for all roads that form the proposed construction traffic routes to the Project on the SRN. Three-year injury collision data will be obtained for roads on the highway network. A review of Stats 19 data will be undertaken to identify any collision cluster sites and to understand causation factors. Geographical Information Systems (GIS) software will be utilised to map these collisions. The analysis of collisions will help to identify key areas of concern, and where needed, help with the development of potential mitigation measures relating to the increase in vehicle flow generated by the Project.

Existing highway schemes

14.6.8 All existing highway schemes along proposed construction routes will be confirmed with National Highways and the relevant local highway authorities. Information regarding the duration of scheme construction programmes, temporary traffic management arrangements/phasing, available CTMP or Transport Assessment Reports (TAR), predicted operational traffic flows and any associated traffic modelling would be obtained where possible in order to understand baseline traffic conditions and reduce the impact on the highway network.

Committed highway schemes

14.6.9 In addition to existing highway schemes, the timeline and details for all committed highways schemes along proposed construction routes will need to be confirmed by National Highways and the relevant local highway authorities to understand future baseline traffic conditions on roads along proposed construction routes.

Network and junction modelling

14.6.10 The need for network modelling of the proposed construction route to assess the impact of the Project will be agreed with National Highways and the local highway authorities.

Potential constraints and restrictions

14.6.11 Site surveys will be undertaken to allow for a visual inspection of the potential construction vehicle routes, confirming findings of background data and identifying any unknown constraints or opportunities.

14.6.12 If AILs are required for the Project, details of any existing carriageway width, height and weight restrictions for the movement of such vehicles will be discussed and agreed with National Highways and the local highway authorities.

14.7 Design, mitigation, and enhancement measures

14.7.1 Mitigation measures for the construction phase would be provided and assessed as part of the Project. The extent of specific mitigation measures and their effectiveness would be discussed and agreed in advance with relevant stakeholders.

14.7.2 The Main Works Contractor through adopted mitigation measures would aim to minimise disruption to existing motorised and vulnerable road users, local residents, businesses and other users of the surrounding local road network. Traffic management would be planned and assessed for all construction vehicle movements.

14.7.3 A CTMP and Staff Travel Plan (STP) will be secured through a requirement in the Development Consent Order (DCO). The CTMP will be implemented by the Main Works Contractor to ensure that all traffic movements associated with the Project's construction works operate in a safe and compliant manner. The STP will be prepared by the Main Works Contractor with the aim of proactively managing trips to and from the site to minimise local impacts.

14.7.4 As the scheme design progresses, consideration will be given to moving materials, spoil and AILs by waterways. If applicable, this will be assessed in the EIA. Reference will be made to National Highways water preferred policy (Ref 14.17).

14.7.5 The Traffic and Transport assessment will rely on the commitments 1, 2, 11, 12 and 13 outlined in the draft Register of Commitments in Volume III, Appendix F.

14.8 Description of likely significant effects

Construction

14.8.1 The primary Traffic and Transportation effects associated with the Project will be as a direct result of an increase in traffic flows on the surrounding roads used by construction vehicles.

14.8.2 At the time of writing, the volume of construction traffic is not yet known. However, it is understood that the greatest construction traffic movements are likely to be associated with the construction compounds for the River Humber crossing and where the Project makes landfall at Easington. Increases in traffic flows will also be associated with the installation of the carbon dioxide and hydrogen pipeline infrastructure, AGI sites, access

points and roads (including temporary haul route construction), access reinstatement, access route removal and construction employee vehicle movements.

14.8.3 The potential effects on receptors will be included in the assessment of construction traffic where the flows generated by the Project increase baseline traffic and HGV flows by 30% or 10% in specifically sensitive areas.

14.8.4 Potential cumulative effects on the SRN and local highway network from this Project and all other committed developments, including the Connected Projects, will be assessed and taken account of when generating the predicted future baseline vehicle flows. Committed developments that would be considered would be confirmed with relevant local authorities.

Operation

14.8.5 During normal operation of the Project, it is understood that the only traffic generated would be associated with infrequent (a few times a year) repair and routine maintenance and inspection activities and a small number of operational staff at the Pumping Facility. Therefore, movements are not anticipated to have a material effect on the transport network and receptors.

Decommissioning

14.8.6 The pipelines will have an operational life of at least 40 years. When the pipelines reach the end of their life, they will be decommissioned safely under a separate consent. The pipelines will be left in situ. The AGIs will be dismantled, with all equipment removed, and the land returned to agricultural or other appropriate uses.

14.8.7 Decommissioning will consider all the relevant environmental legislation and technology available at the time. Any necessary licences and permits will be acquired. No decommissioning works will be carried out until the relevant planning authority has approved the scheme. For these reasons decommissioning is not predicted to result in a significant increase in traffic flows.

Matters scoped in or out of further assessment

14.8.8 The matters scoped in or out of further assessment for Traffic and Transport are outlined in Table 14.2 below.

Table 14.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Assessment of Traffic and Transport impacts	Construction	✓		To assess potential increase in traffic flows against IEMA Rule 1 and Rule 2.	National Highways and local highway authorities
Assessment of Traffic and Transport impacts	Operation		✓	Operational movements are not anticipated to have a material effect on the transport network and receptors and result in significant effects.	National Highways
Assessment of Traffic and Transport impacts	Decommissioning		✓	Decommissioning is not predicted to result in a significant increase in traffic flows and significant effects, as it is anticipated that the pipelines will be left in situ.	-

14.9 Proposed assessment methodology

14.9.1 This section sets out the scope and detailed assessment methodology that would be used to assess the Traffic and Transport impacts during the construction phase of the Project. The following methodology and assessment criteria have been developed using DMRB LA 104 Environmental Assessment and Monitoring (Ref 14.18) and Guidelines for the Environmental Assessment of Road Traffic (IEMA) (Ref 14.19) guidelines and take into account relevant policies and legislation.

14.9.2 The proposed methodology is broadly based on assessment criteria developed for similar major infrastructure projects. Professional judgement will also be applied to determine whether significant effects may arise which have not been identified by the use of the assessment criteria.

14.9.3 The assessment will examine a robust case in terms of Traffic and Transport effects, i.e. the peak period when the highest levels of construction traffic are expected to occur. It would be informed by a desk-based study, and discussions with the design team, in particular around anticipated construction traffic movements and proposed mitigation measures. Professional judgement will be applied to determine whether significant effects may arise which have not been identified by the use of the assessment criteria.

14.9.4 The assessment of the potential effects of the Project would be undertaken for construction traffic. The assessment will include the identification of temporary traffic management, including road and Public Right of Way (PRoW) closures and assumed diversionary routes.

14.9.5 The assessment of construction traffic will take account of:

- Engineering estimates of the quantity of plant, equipment and materials to be brought on to site and excavated material removed from the Project;
- The assumed method of construction; and
- Expected construction programme.

Traffic impact assessment methodology

14.9.6 For road users, the following rules taken from the IEMA Guidelines (Ref 14.19) are used to define the scale and extent of the assessment:

- Rule 1: Include highway links where the total traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

14.9.7 Increases below 10% are generally considered insignificant given that daily variations in background traffic flow would usually fluctuate by this amount. Therefore, changes in traffic flow below this level are assumed to result in no discernible environmental impact.

14.9.8 Where Rule 1 and Rule 2 would apply, the following potential environmental effects on ‘existing road users’ would be considered and likely would need to be addressed:

- Severance (reduced ability for pedestrians, cyclists and where relevant horse-riders to cross road links);
- Vulnerable users delay (changed journey times and distances for pedestrians, cyclists and where relevant horse-riders);
- Driver delay (changed journey times and distances for private and commercial vehicle occupants);
- Public transport users delay (changed journey times, distances or frequencies for public transport);
- Pedestrian, cycle and horse-rider amenity (loss of amenity for vulnerable road users);
- Fear and intimidation (fear and intimidation issues for pedestrians, cyclists and horse-riders due to increased traffic flows and change in composition); and
- Accidents and safety (reduction in road safety for all road users).

Significant assessment criteria

14.9.9 Resources are the assets and facilities which may be affected by the Project such as the highway network. Receptors are the users or beneficiaries of those resources such as pedestrians, cyclists and drivers who travel within the Study Area. This will include the areas along the highway routes that could be sensitive to changes in traffic volumes. Sensitive areas are defined by the presence of sensitive receptors and inadequate facilities, such as community centres, schools, equestrian facilities, narrow well-used footways along busy roads or accident black spots.

14.9.10 The significance of an environmental effect is a function of the value (sensitivity) of the receptor and the magnitude or scale of the impact (change). The DMRB LA 104 (Ref 14.18) provided advice on typical descriptors of environmental value, magnitude of change and significance of effects, and this has been used to develop appropriate sensitivity criteria.

14.9.11 The proposed sensitivity criteria developed using the DMRB LA 104 (Ref 14.18), IEMA guidance (Ref 14.19) and professional judgement is set out in Table 14.3. The sensitivity of a receptor is based on the relative importance of the receptor.

Table 14.3: Sensitivity of Receptors

Sensitivity	Description
High	Receptors of greatest sensitivity to traffic flows: hospitals, schools, colleges, nurseries, playgrounds, accident blackspots, retirement homes and urban/residential roads without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors, including: congested junctions, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycle ways, community centres, townhalls, parks and recreation facilities.

Low	Receptors with some sensitivity to traffic flows: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

14.9.12 The methodology proposed for determining the magnitude of impact follows guidance set out by the DMRB LA 104 (Ref 14.18) together with professional judgement. The order of magnitude criteria is shown in Table 14.4.

Table 14.4: Magnitude of Change (Impact) Categories

Magnitude of Change	Change from Baseline
Major	Total loss or major alteration to key elements or features of the baseline conditions to the extent that post-scenario character or composition of baseline conditions will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements or features of the baseline conditions to the extent that post-scenario character or composition of the baseline conditions will be materially changed.
Minor	Minor shift away from baseline conditions. Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be similar to the pre-scenario situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

14.9.13 The significance of transport effects would be determined by considering the identified impact magnitudes on the receptors affected by those impacts (taking account of their sensitivity) to determine the significance of effects. Moderate and major adverse/beneficial effects are assumed to represent significant effects.

14.9.14 Table 14.5 provides a matrix of magnitude of impact against sensitivity of receptors to identify where significant effects are anticipated to occur.

Table 14 5: Significance of Effect Matrix

Sensitivity of Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible

High	Large	Large or Moderate	Slight or moderate	Slight
Medium	Large or Moderate	Moderate	Slight	Neutral or slight
Low	Slight or moderate	Slight	Slight	Neutral or slight
Negligible	Slight	Neutral or slight	Neutral or slight	Neutral

14.10 Limitations and assumptions

14.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The volume of construction traffic will be determined following additional design work. However, it is understood that the greatest construction traffic movements are likely to be associated with the construction compounds for the Humber Estuary crossing and where the Project makes landfall at Easington.
- Marine vessel traffic associated with the landfall installation would not be considered in this assessment and would be covered by the offshore submission.

14.11 References

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- Ref 14.15 North Lincolnshire Council (2020) *North Lincolnshire Local Plan: Preferred Options.* Available at: https://localplan.northlincs.gov.uk/downloads/preferred_options.pdf (Accessed: 27 January 2022).
- Ref 14.16 Selby District Council (2021) *Local Plan, Preferred Options Plan.* Available at: https://www.selby.gov.uk/preferred-options (Accessed: 27 January 2022).
- Ref 14.17 Highways England (2019) *Water preferred policy: guidelines for the movement of abnormal indivisible loads*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/799833/WPP_guidelines_2019_DfT_consultation_revision.pdf (Accessed: 27 January 2022).
- Ref 14.18 Standards for Highways (2020) *The Design Manual for Roads and Bridges: LA 104 Environmental Assessment and Monitoring*. Available at:

https://standardsforhighways.co.uk/dmrb/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a (Accessed: 24 January 2022).

- Ref 14.19 Institution of Environmental Management and Assessment (1993) *Guidelines for the Environmental Assessment of Road Traffic*. Cambridgeshire, March: Institution of Environmental Management and Assessment.
- Ref 14.20 Department for Transport (2021) *TRA0307: Traffic distribution on all roads by time of day and day of the week in Great Britain.* Available at: https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra (Accessed: 25 January 2022).

15. Waste and Materials

15.1 Introduction

15.1.1 This Chapter considers the impact of the Project on the generation and disposal of waste and the consumption of material assets. Impacts arising during construction, operation and decommissioning are considered, along with any potential significant adverse environmental effects.

15.1.2 The Chapter includes a summary of the relevant engagement to date, baseline data sources and the proposed methodology for assessing material assets and waste. It also identifies topic areas that can be scoped out of the Environmental Impact Assessment (EIA).

15.2 Legislation, policy and guidance

15.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

15.2.2 No specific legislation will be relied upon for the Waste and Materials assessment.

Policy

- National Policy Statement EN-1 (Ref 15.1) and Draft National Policy Statement EN-1 (Ref 15.2):
  - The National Policy Statements (Adopted and Draft) EN-1 both state that an applicant seeking consent for an energy infrastructure proposal should, as part of its assessment, consider the arrangements for managing any waste produced and assess the impact of the waste arising from the development proposal on the capacity of waste management facilities.

15.2.3 The Scoping Route Corridor passes through minerals safeguarding areas for brick clay, sands and gravel, limestone and chalk in North Lincolnshire and close to an allocated minerals site for clay within Lincolnshire County Council. The following policies are relevant for the safeguarding of minerals and waste:

- East Riding of Yorkshire – Joint Minerals Local Plan (Ref 15.3) (including AGG10: Safeguarding of Mineral Infrastructure and Facilities);
- North Lincolnshire Council – Local Plan (Ref 15.4), including:
  - MIN2: Mineral Safeguarding;
  - Policy WAS1: Waste Management Principles; and
  - Policy WAS6: Waste Management in Development.
- Lincolnshire County Council (including West Lindsey District Council) - Core Strategy and Development Management Policies (Ref 15.5) including Policy M12:

Safeguarding of Existing Mineral Sites and Associated Minerals Infrastructure Environment Agency 2020 Waste Data Interrogator – Wastes Received, published January 2022; and

- North Yorkshire County Council (including Selby District Council) (Ref 15.6) including Policy W01 – Moving waste up the waste hierarchy Environment Agency 2020 Waste Data Interrogator – Wastes Removed, published January 2022.

Guidance

15.2.4 The Institute of Environmental Management and Assessment (IEMA) (2020) Guide to Materials and Waste in Environmental Impact Assessment (Ref 15.7) will be used to assess potential impacts from the Project for Materials and Waste.

15.3 Engagement

15.3.1 Written engagement has been undertaken with the relevant local authorities via a letter issued on 03 March 2022. The letter included a summary of the proposed methodology as included in Section 15.9 of this chapter and a list of matters to be scoped in or out of the materials and waste assessment summarised in Table 15.4.

15.3.2 Engagement and technical consultation will continue throughout the EIA process. A summary of engagement to date has been provided in Table 15.1.

Table 15.1: Summary of engagement

Consultee	Date (method of engagement)	Summary engagement
North Yorkshire County Council (with Selby District Council copied in)	03 March 2022 (via email)	No comments received to date.
East Riding of Yorkshire Council	03 March 2022 (via email)	Responded 06 March 2022, agreeing with scoping and methodology for Materials and Waste.
North Lincolnshire Council	03 March 2022 (via email)	No comments received to date.
Lincolnshire County Council (with West Lindsey District Council copied in)	03 March 2022 (via email)	No comments received to date.

15.4 Study Area

15.4.1 The Study Areas that are applicable to the Project (as defined in IEMA's 2020 Guide to Materials and Waste in Environmental Impact Assessment (Ref 15.7), (herein referred to as the 'IEMA Guide') are:

- The development Study Area - the extent of works within the Scoping Route Corridor, including areas required for construction of the pipeline, above ground installations (AGI) and temporary access during construction including site compounds, working platforms and other enabling activities.
- The expansive Study Area extends to the availability of construction materials and the capacity of waste management facilities within the UK and the regions where the Project is located. The expansive Study Area encompasses the local authority areas of North Yorkshire County Council, Selby District Council, East Riding of Yorkshire, North Lincolnshire Council, West Lindsey District Council and Lincolnshire County Council.

15.5 Receptors

15.5.1 In relation to materials and waste, sensitive receptors relate to those resources/facilities that might be affected by the inappropriate and unsustainable management of materials and waste.

15.5.2 The sensitive receptors identified in this EIA Scoping Report are:

- **Material resources** – consumption impacts on their immediate and long-term availability, resulting in depletion of natural resources;
- **Minerals Safeguarding Areas** – to assess the impact on the Project on minerals safeguarding areas, to ensure mineral resources are not needlessly sterilised;
- **Landfill void capacity** – A finite resource. Reductions in regional and national infrastructure, resulting in unsustainable use or loss of resources and temporary or permanent degradation of the natural environment; and
- The available capacity of **waste treatment sites** that may reuse, recover or recycle materials from the Project.

15.6 Baseline conditions

15.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES). It also includes a summary of relevant baseline data.

15.6.2 This section focusses on baseline data collated to determine the existing conditions for material consumption and waste reuse or disposal based on current land use. Regional and national information is summarised, providing the background against which the environmental assessment can be undertaken.

15.6.3 A desk study has been undertaken utilising available data from publicly available sources to provide information on material resource availability, minerals safeguarding areas, and landfill and waste treatment sites capacity. The most up to date information

has been utilised to collate data with the most recent year of data publication provided. The following data sources have been used:

- IEMA (2020) Guide to Materials and Waste in Environmental Impact Assessment (Ref 15.7);
- British Geological Society (BGS) Onshore Geoindex (Ref 15.10);
- East Riding of Yorkshire and Kingston upon Hull Joint Minerals Local Plan 2016 – 2033, Adopted 2019 (Ref 15.3);
- Lincolnshire County Council Minerals and Waste Development Scheme, February 2021 (Ref 15.4);
- North Lincolnshire Local Plan (2020 – 2038), October 2021 (Ref 15.4);
- North Yorkshire County Council, North York Moors National Park, City of York Council Minerals and Waste Joint Plan, November 2016 (Ref 15.6);
- Environment Agency 2020 Waste Data Interrogator – Wastes Received, published January 2022 (Ref 15.8);
- Environment Agency 2020 Waste Data Interrogator – Wastes Removed, published January 2022 (Ref 15.9); and
- Environment Agency 2020 Waste Summary Tables, published January 2022 (Ref 15.11).

Materials and Waste

Materials currently required

15.6.4 For the purpose of the baseline assessment, land use within the Scoping Route Corridor is predominantly agricultural, with some residential, commercial and industrial areas. Other assets include highways, rail, canals and existing pipeline infrastructure, along with environmental attributes such as rivers, wooded and agricultural areas.

15.6.5 Materials required for current land uses are anticipated to comprise aggregate, concrete, steel, timber and asphalt for use in general maintenance and repair works. Although there is no data available at the time of writing, professional judgement has been used to ascertain that the consumption of materials for current land use is minimal in comparison to regional and national availability.

15.6.6 The Scoping Route Corridor is potentially underlain by a small area of peat, recorded in the BGS Onshore Geoindex superficial deposits map at 1:50,000 scale to the south of Kettleby. This will be reviewed during the environmental assessment. However, there are no known active peat extractions within the Scoping Route Corridor.

Material and waste arisings currently generated

15.6.7 Current arisings within the Scoping Route Corridor are anticipated to be predominantly from earthworks and vegetation due to agricultural activities, and surplus materials from infrastructure repairs and maintenance. No specific data is available for waste or material arisings currently generated within the Scoping Route Corridor. However, using professional judgment, the generation is expected to be minimal, in the context of both waste treatment site and regional landfill capacity.

15.6.8 Table 15.2 details the number of permitted waste recovery sites and waste management routes in Yorkshire and the Humber Region (Environment Agency Waste Data Interrogator, 2020) (Ref 15.8 and Ref 15.9). The availability of waste recovery infrastructure regionally suggests that there is strong potential to divert arisings from site during construction of the Project from landfill. Recovering arisings and diverting them from landfill has the potential to materially influence the findings of the assessment of impacts and effects from materials and waste.

Table 15.2: Permitted waste facilities in Yorkshire and Humber region (2020)

Waste facility type	Number of permitted sites	Sites accepting waste in 2020
Landfill	92	33
Land disposal	48	20
Incineration	27	18
Transfer	359	281
Treatment	357	283
Metal recovery	342	174
Use of waste	0	0

15.6.9 Table 15.3 details the remaining landfill capacity within the Yorkshire and Humber region (Environment Agency Waste Data Interrogator, 2020) (Ref 15.8 and Ref 15.9).

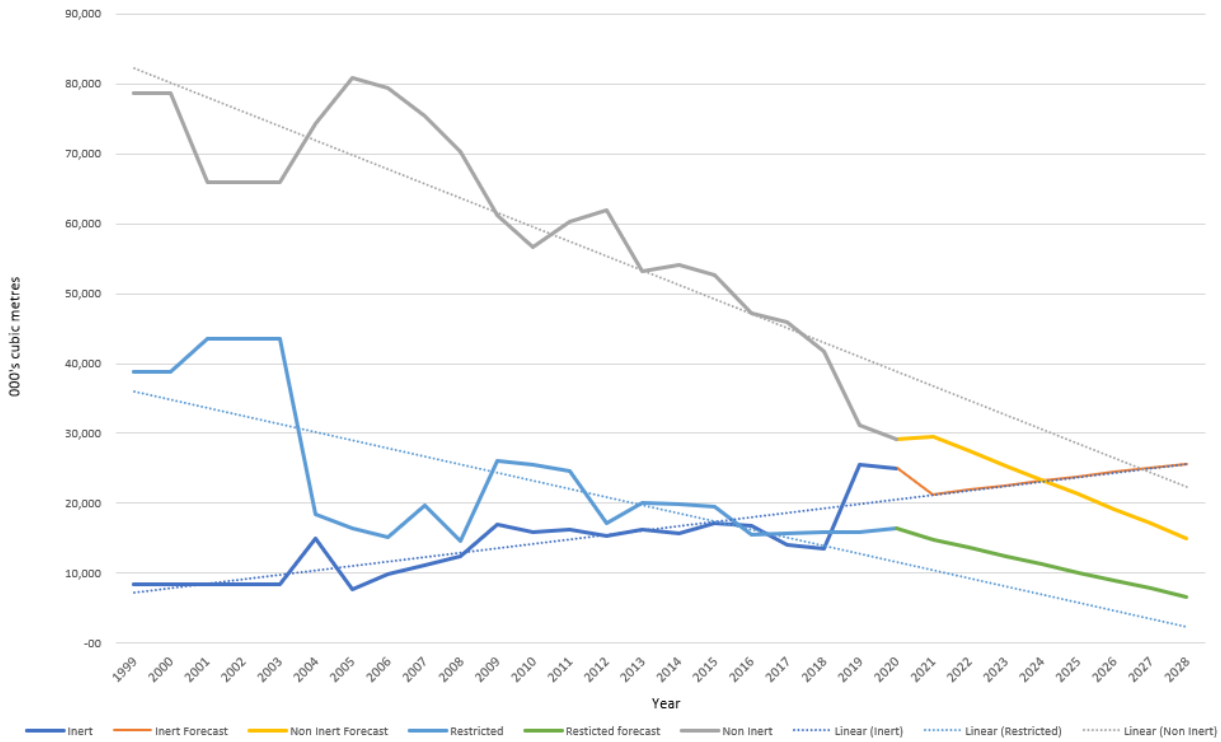
Table 15.3: Remaining Landfill capacity in Yorkshire and the Humber (2020)

Landfill type	Capacity in 2019 (m^3)	Capacity in 2020 (m^3)	Change in capacity (Mm^3 and %)
Hazardous (restricted and merchant)	2,650,000	2,387,000	-0.263 (-9.92%)
Non-hazardous (including with Stable Non-Reactive Hazardous Waste cell)	44,567,000	43,306,000	-1.261 (-2.82%)
Inert	25,473,000	25,040,000	-0.433 (-1.69%)
Total	**72,690,000**	**70,733,000**	-1.957 (-2.69%)

15.6.10 Further analysis of baseline data is provided in Insert 15.1, showing forecasted long term void capacity to the year of Project completion (2028). Baseline data indicates that

in the absence of future provision, non-hazardous and total landfill capacity is likely to become an increasingly sensitive receptor throughout the duration of the construction phase and in operation.

Insert 15.1: Remaining landfill capacity in Yorkshire and the Humber region



Future baseline

15.6.11 In the absence of the Project, it is considered that the current land use within the Scoping Route Corridor would remain predominantly agricultural. However, it should be noted that increased maintenance of nearby ageing infrastructure may be required.

15.6.12 Given the scale of the current infrastructure within the Scoping Route Corridor, the consumption of materials, generation of waste and the recovery of site arisings is expected to remain minimal.

15.7 Design, mitigation, and enhancement measures

15.7.1 Mitigation measures for the construction and operation of the Project will be identified and adopted if required as the design of the Project develops. Principles of circular practice and sustainable resource management (including designing out waste) in the context of the Waste Hierarchy and the Proximity Principle can be applied and adopted through the Register of Environmental Actions and Commitments. Mitigation will be outlined within the Construction Environmental Management Plan (CEMP) which will incorporate the requirement for the Main Works Contractor to prepare and implement a Site Waste Management Plan (SWMP) and Materials Management Plan (MMP). A draft of the CEMP, SWMP, MMP and the Register of Environmental Actions and Commitments will be provided with the ES.

15.7.2 The Waste and Materials assessment will rely on commitments 1, 2, 3 and 14 outlined in the draft Register of Commitments in Volume III, Appendix F.

15.8 Description of likely significant effects

Construction

15.8.1 The materials expected to be used within the construction of the Project are expected to comprise plastic piping, aggregates, concrete, metal and asphalt. Detailed volumes of construction material quantities or site arisings are not currently available at the time of writing; however, a high-level estimate of excavation arisings has been calculated and the following potentially significant effects are noted.

15.8.2 High level estimates at this stage, suggest that the Project is expected to generate in excess of 200,000 m^3 of excavated material from construction of the pipelines and construction platforms for the AGIs. This figure would comprise excavated material and directional drilling arisings and excludes waste generated from materials used to construct the AGIs. A more accurate figure would be calculated during the environmental assessment to determine if any significant effects are likely.

Operation

15.8.3 Materials used and waste generated during operation are anticipated to be minimal and limited to the ongoing maintenance and repair of the AGIs, including the Pumping Facility. Therefore, the operational phase is scoped out of further assessment.

Decommissioning

15.8.4 Waste generated during decommissioning would be limited to the removal of AGI infrastructure comprising concrete, metal and asphalt. The pipelines infrastructure below ground will remain in situ once the Project has reached the end of its operational life. Any impacts during the decommissioning phase will be minimised through the implementation of a Decommissioning Environmental Management Plan (DEMP), to be submitted with the Development Consent Order (DCO). In addition, when the pipelines reach the end of their life, they will be decommissioned safely under a separate consent.

Matters scoped in or out of future assessment

15.8.5 Table 15.4 details matters to be scoped in or out of further assessment. Once more detailed information becomes available, it may be possible to scope waste out of the future environmental assessment in agreement with the relevant stakeholders. If this is the case, the appropriate information will be provided in the ES and mitigation will be included in the relevant appendices.

Table 15 4: Matters scoped in or out of further assessment

Matters	Phase	Scoped In	Scoped Out	Justification	Agreed with
Materials (use of excavated arisings only)	Construction	✓		Further information is required to assess the impacts of the Project on regional material resource availability, in the context of the generation of excavation arisings and reuse of excavated material on site (or potentially off site) during construction.	East Riding of Yorkshire Council
Materials (minerals assessment only)	Construction	✓		An assessment is required specifically related to the minerals safeguarding areas that partially underlie the Project to ensure that mineral resources are not needlessly sterilised.	East Riding of Yorkshire Council
Materials (other materials)	Construction		✓	Other materials (not including excavated arisings) to be utilised for construction are not anticipated to impact on regional or national supplies. On that basis there will be no likely significant effects and other materials have been scoped out of further assessment.	East Riding of Yorkshire Council
Materials	Operation		✓	Limited quantities of materials, limited to those required during routine maintenance and repair, are anticipated to be used during operation. This is not on a scale that will result in significant effects from the Project, therefore operational material use has been scoped out of further assessment.	East Riding of Yorkshire Council
Materials	Decommissioning		✓	Limited quantities of materials are anticipated to be used during decommissioning and not on a scale that will result in significant effects from the Project. Therefore, material use during decommissioning has been scoped out of further assessment.	East Riding of Yorkshire Council

Matters	Phase	Scoped In	Scoped Out	Justification	Agreed with
Waste	Construction	✓		Excavation arisings and reuse of materials on site may materially impact the surrounding waste infrastructure and landfill capacity (worst case scenario).	East Riding of Yorkshire Council
	Operation		✓	Limited quantities of waste are anticipated to be generated during operation and not on a scale that will result in significant effects from the Project. As such, operational waste has been scoped out of further assessment.	East Riding of Yorkshire Council
	Decommissioning		✓	Waste generation will be limited to removal of AGIs (e.g. concrete, metals, asphalts), the majority of which can be reused, recycled or recovered. The pipelines will be left in situ and no waste will be generated from their decommissioning.	East Riding of Yorkshire Council

15.9 Proposed assessment methodology

15.9.1 A standard EIA methodology is set out in Chapter 3: EIA Methodology. The IEMA guidance on Materials and Waste (Ref 15.7) will be used to assess potential impacts from the Project for Materials and Waste, using Method W1 (Void capacity). The assessment will be qualitative, in accordance with the IEMA guidance and identify the following:

- Type and volume of materials proposed for use during the Project;
- Potential percentage recycled content of materials used;
- Type and volume of waste to be generated; and
- Details of proposed reuse, recovery, recycling or disposal of waste generated.

15.9.2 Impacts and effects will be evaluated against data for the regional and national materials markets, where information is available. The likely types and estimated quantities of material resources required (including site arisings generated) for the scoped in phases of the Project will be assessed against regional, and if required, national availability. The assessment will also consider the reuse of excavated material in the Project construction.

15.9.3 The likely types and estimated quantities of waste to be generated by the Project will be assessed and the impacts reviewed against regional (or national) void capacity.

Significance criteria

15.9.4 For the purposes of the assessment, IEMA Method W1 (void capacity) will be used when assessing the magnitude of waste. The outputs of comparing sensitivity against magnitude will be assessed against the significance of effects matrix provided within the IEMA Guide. Table 15.5 contains the materials and waste magnitude criteria (IEMA, 2020).

15.9.5 Table 15.6 contains the criteria for assessing sensitivity of materials and waste, taken from the IEMA 2020 Guide (Ref 15.7).

15.9.6 Classification of significant effects can be found in Table 3.1 of Chapter 3 of the EIA Scoping Report.

Table 15.5: Materials and Waste Magnitude Criteria replicated from the IEMA 2020 Guide (Ref 15.7)

Magnitude	Materials Criteria Assessment of the Project is made by determining whether the consumption of…	Inert and non-hazardous waste criteria Percentage depletion of remaining landfill void capacity	Hazardous waste criteria The percentage depletion of remaining landfill void capacity
No change	*...no materials are required*	*Zero waste generation and disposal from the development.*	*Zero waste generation and disposal from development.*
Negligible	*...no individual material type is equal to or greater than 1% by volume of the regional* baseline availability*	*Waste generated by the development will reduce regional* landfill void capacity baseline$ by <1%.*	*Waste generated by the development will reduce national landfill void capacity baseline$ by <0.1%*
Minor	*...one or more materials is between 1-5% by volume of the regional* baseline availability; and/or the development has the potential to adversely and substantially# impact access to one or more allocated mineral sites (in their entirety), placing their future use at risk.*	*Waste generated by the development will reduce regional* landfill void capacity baseline$ by 1-5%.*	*Waste generated by the development will reduce national landfill void capacity baseline$ by 0.1-0.5%*
Moderate	*...one or more materials is between 6-10% by volume of the regional* baseline availability; and/or one allocated mineral site is substantially# sterilised by the development rendering it inaccessible for future use.*	*Waste generated by the development will reduce regional* landfill void capacity baseline$ by 6-10%.*	*Waste generated by the development will reduce national landfill void capacity baseline$ by 0.5-1%*
Major	*…one or more materials is >10% by volume of the regional* baseline availability;*	*Waste generated by the development will reduce regional**	*Waste generated by the development will reduce*

Magnitude	Materials Criteria Assessment of the Project is made by determining whether the consumption of…	Inert and non-hazardous waste criteria Percentage depletion of remaining landfill void capacity	Hazardous waste criteria The percentage depletion of remaining landfill void capacity
	and/or *more than one allocated mineral site is substantially# sterilised by the development rendering it inaccessible for future use.*	*landfill void capacity baseline$ by >10%.*	*national landfill void capacity baseline$ by >1%*
Notes	** or where justified, national. # justified using professional judgement, based on the scale and nature of the allocated mineral site being assessed. $ forecast as the worst-case scenario, during a defined Construction Phase.*		

Table 15.6: Materials and Waste Sensitivity Criteria replicated from the IEMA 2020 Guide (Ref 15.7)

Magnitude	Materials Criteria Key materials required for the construction of the Project…	Inert and non-hazardous waste criteria Landfill void capacity is expected to…	Hazardous waste criteria Landfill void capacity is expected to…
Negligible	*…are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock;* *and/or* *…are available comprising a very high proportion of* *sustainable features and benefits compared to industry standard materials**	*...remain unchanged, or is expected to increase through a committed change in capacity.*	*...remain unchanged, or is expected to increase through a committed change in capacity.*

Magnitude	Materials Criteria Key materials required for the construction of the Project…	Inert and non-hazardous waste criteria Landfill void capacity is expected to…	Hazardous waste criteria Landfill void capacity is expected to…
Low	*…are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock;* *and/or* *…are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials.*	*...reduce minimally: by <1% as* *a result of wastes forecast.*	*..reduce minimally: by <0.1%* *as a result of wastes forecast.*
Medium	*…are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock;* *and/or* *…are available comprising some sustainable features and benefits compared to industry standard materials.*	*...reduce noticeably: by 1-5% as a result of wastes forecast.*	*..reduce noticeably: by 0.1- 0.5% as a result of wastes forecast.*
High	*…are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock;* *and/or* *…comprise little or no sustainable features and benefits compared to industry standard materials.*	*...reduce considerably: by 6- 10% as a result of wastes forecast.*	*...reduce considerably: by 0.5- 1% as a result of wastes forecast.*
Very High	*…are known to be insufficient in terms of production, supply and/or* *stock;*	*... reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable;*	*... reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable;*

Magnitude	Materials Criteria Key materials required for the construction of the Project…	Inert and non-hazardous waste criteria Landfill void capacity is expected to…	Hazardous waste criteria Landfill void capacity is expected to…
	and/or …comprise no sustainable features and benefits compared to industry-standard materials.	*or, would require new capacity or infrastructure to be put in place to meet forecast demand.*	*or, would require new capacity or infrastructure to be put in place to meet forecast demand.*
Notes	** Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.*		

15.10 Limitations and assumptions

15.10.1 The following limitations and assumptions have been identified:

- The most recent publicly available data has been used to collate baseline information (2019 – 2021 unless otherwise stated);
- Some waste facility operators may not release data for reasons of commercial confidentiality. The resulting data gaps may reduce the value of information that is publicly available;
- The assessment of landfill void capacity will be based on information available at the time the assessment is undertaken;
- The general lag in years of publishing of materials and waste facility capacity has implications for assessments presenting the 'current picture'. Relevant assumptions and caveats should be made in the assessment;
- It is assumed that material excavated during construction will be reused on site, wherever practicable; and
- There is no published or formalised methodology for assessing the impact upon waste treatment site capacity. Professional judgement has, therefore, been applied.

15.11 References

- Ref 15.1 Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 28 January 2022).
- Ref 15.2 Department for Business, Energy & Industrial Strategy (2021) *Draft Overarching National Policy Statement for Energy (EN-1).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed: 26 January 2022).
- Ref 15.3 East Riding of Yorkshire (2019) *Joint Minerals Local Plan 2016 – 2033.* Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/joint-minerals-plan/#:~:text=The%20new%20Joint%20Minerals%20Local,and%20other%20relevant%20planning%20applications (Accessed: 3 February 2022).
- Ref 15.4 - North Lincolnshire County (2020) *Local Plan: The Draft Plan.* Available at: https://localplan.northlincs.gov.uk/stages/3 (Accessed: 2 February 2022).
- Ref 15.5 Lincolnshire County Council (2021) *Lincolnshire Minerals and Waste Development Scheme*. Available at: https://www.lincolnshire.gov.uk/downloads/file/2361/core-strategy-and-development-management-policies (Accessed: 2 February 2022).
- Ref 15.6 - North Yorkshire County Council (2016*) Minerals and Waste Joint Plan, November 2016.* Available at: https://www.northyorks.gov.uk/minerals-and-waste-joint-plan (Accessed: 2 February 2022).

- Ref 15.7 Institute of Environmental Management and Assessment (2020) *Guide to Materials and Waste in Environmental Impact Assessment*. Available at: https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment (Accessed: 2 February 2022).
- Ref 15.8 Environment Agency (2022) *Waste Data Interrogator: Wastes Received.* Available from: https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator (Accessed 1 February 2022).
- Ref 15.9 – Environment Agency (2022) *Waste Data Interrogator: Wastes Removed.* Available at: https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator (Accessed 2 February 2022).
- Ref 15.10 British Geological Society (2022) *Geoindex Onshore*. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.139948279.53941229.1614087105-556125256.1573056023 (Accessed: 2 February 2022).
- Ref 15.11 – Environment Agency (2022) *Waste Summary Tables*. Available at: https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator (Accessed 1 February 2022).

16. Hydrology and Land Drainage

16.1 Introduction

16.1.1 This Chapter considers the impact of the Project on the surface water environment, predominantly concerning terrestrial waterbodies and including the intertidal zone up to Mean Low Water Springs (MLWS). It sets out the proposed methodology for the assessment and identifies those impacts that can be scoped out of the Environmental Impact Assessment (EIA). It considers all possible receptors within the Study Area including the intertidal zone, main rivers, ordinary watercourses and other surface waterbodies such as lakes. Receptors considered also include surface water discharges and abstractions, the floodplain, and people and properties at risk of flooding now and/or in the future. Impacts on groundwater bodies and Groundwater Dependent Terrestrial Ecosystems are considered in Chapter 8: Geology and Hydrogeology.

16.2 Legislation, policy and guidance

16.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

16.2.2 The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2003 (Her Majesty's Stationery Office (HMSO), 2003) implemented the WFD in England and Wales and were amended by the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019 (Ref 16.1). The 2019 Regulations, specifically Regulation 20, stipulate that the substance of the WFD regime that applied pre-EU Exit will continue to apply with only relatively minor amendments.

16.2.3 Part 5 of the Environment Act 2021 (Ref 16.2), brings together measures to strengthen and update the existing regulatory and long-term planning framework for water, helping to reduce environmental risks, including to water quality and land drainage. It also strengthens the regulation of water and sewerage undertakers by the newly established Office for Environmental Protection.

16.2.4 The Land Drainage Act 1991 (Ref 16.3) together with the Water Resources Act 1991 (Ref 16.4) allows the Environment Agency (EA) to prevent the obstruction of any main river through the construction of flow control structures, culverts or any other structure in a main river. Where culverting or other works have a potential to affect the flow regime on ordinary watercourses, consent is required from the Lead Local Flood Authority (LLFA) under the Flood and Water Management Act 2010 (Ref 16.5) which provides better, more comprehensive management of flood risk for people, homes and businesses.

16.2.5 The assessment will also be in accordance with the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 16.6) and the Marine and Coastal Access Act 2009 (Ref 16.7).

Policy

16.2.6 Overarching National Policy Statement for Energy (EN-1) (Ref 16.8) states that energy projects have the potential to have adverse effects on the water environment, noting that where significant effects are likely an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment should be undertaken. The potential for the Project to result in significant effects on all these aspects of the water environment has been considered herein.

16.2.7 Flood risk is also a consideration and paragraph 5.7.4 of EN-1 states '*applications for energy projects of 1 hectare or greater in Flood Zone 1 in England…..and all proposals for energy projects located in Flood Zones 2 and 3… should be accompanied by a flood risk assessment (FRA)…This should identify and assess the risk of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account*'. The Project will be subject to an FRA that meets these criteria.

16.2.8 EN-1 sets out generic policy with respect to water quality and resources in section 5.16 and section 4.10 sets out policy on the pollution control framework. The protection of water quality and resources is also addressed in section 2.22 of the National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (Ref 16.9). It is stated that, where a project is likely to have effects on the water environment, an assessment of the impacts should be undertaken as part of an EIA. The Consultation draft of EN-4 (Ref 16.10) also advocates this approach. An overview of the matters scoped in and out of further assessment is provided in Table 16 2. Where effects with respect to water quality and resources during construction have been scoped in for further assessment, these will be assessed in the ES in line with EN-1 and EN-4.

16.2.9 Other key policy includes:

- The Environmental Permitting Regulations (2016) (Ref 16.11);
- National Planning Policy Framework (NPPF) (2021) (Ref 16.12) and accompany Flood Risk and Coastal Change; and Water Quality and Supply planning practice guidance (Ref 16.13); and
- Relevant policies from the East Riding Local Plan (2016) (Ref 16.14), the North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 16.15) and the Selby District Core Strategy Local Plan (2013) (Ref 16.16).

Guidance

16.2.10 Several standards and non-statutory guidelines, which provide details of assessment methodologies and mitigation techniques, will also be referenced to inform the assessment, including:

- Planning Inspectorate Advice Note 18: Water Framework Directive (Ref 16.17);
- Humber 2100+ - the Humber Flood Risk Management Strategy (published reports and emerging updates) (Ref 16.18, Ref 16.19);
- Construction Industry Research and Information Association (CIRIA) publications (various dates) (Ref 16.25, Ref 16.20); and
- Guidance for Pollution Prevention series (Ref 16.21).

16.3 Engagement

16.3.1 Engagement has been undertaken with the EA, all relevant LLFAs and Internal Drainage Boards (IDBs) to agree assessment methodologies, the defined Study Area and matters that can be scoped out of the EIA. The Marine Management Organisation (MMO) have also been consulted regarding the proposed methodology to cross the River Humber and to discuss works in the intertidal zone. In addition, this engagement has and will continue to facilitate baseline data collection. Technical engagement and consultation will continue throughout the EIA process. A summary of engagement to date has been provided in Table 16.1.

Table 16.1: Summary of engagement

Consultee	Date (method of engagement	Summary of engagement
Environment Agency	8 November 2021 (Introductory meeting)	It was agreed that: • The Project will follow the progress of the emerging Humber Strategy and assessments will consider relevant information; • The Project will engage with IDBs as important stakeholders; and • Data from EA flood models will be shared and used to inform the Project's FRA.
North Lincolnshire Council LLFA	24 November 2021 (Meeting)	It was agreed that, due to the nature of the Project, following reinstatement of the land on the pipelines construction working width after construction, effects on flood risk and land drainage would be minor. Permanent Above Ground Installations (AGIs) with a footprint exceeding 500m^2 would be expected to be drained to achieve greenfield runoff rates during storm events up to and including the 1 in 100 year plus climate change event. At the Pumping Facility, a detailed FRA would be expected, demonstrating that the infrastructure is flood resilient and that development does not increase flood risk elsewhere.
Marine Management Organisation	27 January 2022 (Meeting)	An introduction to the Project was provided. It was agreed that it may be possible to scope out an assessment of coastal processes at the landfall depending on the construction methods used.
North Lincolnshire Council, East Riding of Yorkshire Council, Lincolnshire County	February/March 2022 (Written correspondence)	Issued methodology and scoping letter which outlined the proposed methodology for assessment of Hydrology and Land Drainage.

Consultee	Date (method of engagement	Summary of engagement
Council and North Yorkshire County Council		It was agreed with Lincolnshire Council that the proposed scope of assessment is acceptable and that proposals for mitigating flood risk at AGIs will be Sustainable Drainage Systems (SuDs) compliant. North Lincolnshire Council, North Yorkshire County Council and East Riding of Yorkshire Council confirmed agreement with the proposed approach and scope of the assessment. It was noted by East Riding of Yorkshire Council that methods of riverbank reinstatement at open cut crossings should be sufficiently robust to prevent slippages where there is a high sand content. The Council also noted their satisfaction that coastal processes would be considered in the assessment and noted that robust mitigation would be needed to prevent exposure of the pipelines over the operational lifetime of the Project due to future coastal erosion.
IDBs	8 March 2022 (Introductory meeting)	It was agreed that: • Data identifying IDB watercourses and pumping stations would be shared; • The Project would collect information on existing land under drainage pipes from landowners and that where these are severed, they would be suitably re-instated by the Project; • Watercourse crossing methodologies and depths of cover between the pipelines and channel beds would be further discussed and agreed; and • Drainage Byelaws would be reviewed by the Project and a strategy for consenting in channel and riparian works would be agreed.
Environment Agency	10 March 2022 (Written correspondence)	Issued methodology and scoping letter which outlined the proposed methodology for assessment of Hydrology and Land Drainage.

Consultee	Date (method of engagement	Summary of engagement
		The written response received (10 March 2022) confirmed that the Environment Agency are generally in agreement with the scope and approach to the assessment proposed herein. It was agreed that: • The FRA will consider all relevant sources of flooding and provide evidence that appropriate mitigation measures including flood resilience techniques have been incorporated; • All critical AGI would be located above modelled flood depths for the 0.1% (1 in 1000) annual probability scenario, including climate change according to the lifetime of the AGI and latest guidelines (Ref 16.22), and including residual risk in case of a defence breach; • The Project would ensure access to flood defences and use construction methods that do not compromise the integrity of the flood defences during the duration of the construction works; • A drainage strategy setting out proposals for the management of surface water runoff from permanent AGI would be prepared; and • The effects on water quality and coastal processes in the intertidal zone for have been scoped in for the construction phase. Further discussion was requested regarding the proposed landfall location and future protection against coastal erosion and regarding inclusion of operational effects on coastal processes and water quality in the intertidal zone.
Environment Agency and East Riding of Yorkshire County Council	23 March 2022 (Meeting)	A joint meeting was held with a focus on coastal erosion at the proposed landfall location and the assessment of coastal processes. It was agreed that: • The Project's rationale for selection of the preferred landfall location at Easington is reasonable given that coastal erosion issues equally effect the alternative landfall option.

Consultee	Date (method of engagement	Summary of engagement
		• Subject to suitable design parameters for the buried pipeline as it crosses the intertidal zone, it was agreed that operational effects on coastal water quality and coastal processes can be scoped out.

16.4 Study Area

16.4.1 The Study Area for the EIA is proposed to include all land within the Scoping Route Corridor and in addition a buffer of 500m from this boundary. The assessment will consider predominantly terrestrial waterbodies and will also include the intertidal zone up to MLWS notably at the landfall, where the Project interacts with the offshore carbon dioxide transportation and storage infrastructure. The Study Area for the EIA is illustrated in Figure 16.1 (Volume II, Part 5).

16.4.2 The FRA that will be prepared to inform the EIA, will include for a larger Study Area where necessary, to ensure any potential flood risk impacts of the Project are considered at a catchment scale.

16.4.3 The Study Areas for assessing effects on geology and the groundwater environment are described in Chapter 8: Geology and Hydrogeology.

16.5 Receptors

16.5.1 Key water environment receptors are the main rivers and ordinary watercourses that would be crossed by the Project, illustrated in Figure 16.1 (Volume II, Part 5). Key main rivers include the Humber Estuary, tidal River Trent and River Aire. The Humber Estuary is tidally dominated within the Study Area. These features have several attributes that could be affected, including their water quality, flow conveyance and hydromorphology. Watercourses may also support existing water interests such as abstractions providing water supplies, receiving discharges and transporting and diluting waste waters.

16.5.2 Floodplains are another important receptor, in addition to existing flood defence assets. The floodplains and areas benefiting from flood defence assets are illustrated in Figure 16.2 and Figure 16.3 (Volume II, Part 5). The Scoping Route Corridor crosses large extents of fluvial and coastal floodplain (initially defined by the extents of EA Flood Zones 2 and 3a), with numerous existing infrastructures and built development within these zones that must not be put at increased flood risk by Project activities.

16.5.3 Sites designated for their nature conservation interest, where surface waters play a key role in sustaining the designated interest features, are also important receptors. Assessment of effects on such sites will be undertaken in collaboration with ecology and groundwater specialists.

16.5.4 The Scoping Route Corridor also crosses the intertidal zone in the vicinity of Easington. The Easington landfall is located on a rapidly eroding coastline, retreating on average at a rate of 1-2m per year. The underlying geology is of chalk overlain by a glacial till of soft boulder clay that can be rapidly eroded when saturated. It is this material that makes up much of the cliffs above Mean High Water Spring (MHWS). In addition to the easily eroding coastal geology, the strong prevailing wind and wave regime of the North Sea are from the northeast creating a strong littoral sediment transport along the Holderness Coast that rapidly moves material southwards. The intertidal area at landfall is located within the Yorkshire South WFD Coastal waterbody and as such impacts on this water body as a consequence of the landfall installation works will need to be considered in the assessment.

16.6 Baseline conditions

16.6.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES). A summary of baseline conditions is provided below.

16.6.2 Baseline data to characterise the water environment within the Study Area will be collected from a desk study, with reference to published data sources, supplemented by data sets collected in consultation with the EA, LLFAs and IDBs. Desk study data sources include the Environment Agency flood maps for rivers and the sea, surface water and reservoirs, the Environment Agency Catchment Data Explorer that records WFD data, the Environment Agency Water Quality Data Archive which provides records of water quality data for monitored main rivers, and Ordnance Survey maps and aerial imagery.

16.6.3 Field notes and photographs of water features, collected during ecological walkovers and surveys will also be referenced, in addition to the high-resolution aerial imagery.

16.6.4 Baseline data collection will be undertaken on a risk basis, focusing on collecting data for receptors where source-pathway linkages are identified. For example, watercourses that are intended to be crossed by open cut techniques and locations accommodating AGIs. For watercourse receptors (where applicable) and the intertidal zone, WFD status data (Ref 16.23) will be collected to characterise existing qualities and status objectives, as well as any measures identified to achieve these measures, as recorded in the Humber River Basin Management Plan. Existing surface water interests (abstractions and discharges) will be identified with reference to EA consent/permit registers. Areas of fluvial/coastal floodplain will be described using EA flood model data and existing flood defence assets will be identified with reference to EA asset records and the Flamborough Head to Gibraltar Point Shoreline Management Plan (Ref 16.24). Other sources of flood risk, such as from surface water, groundwater and artificial sources, will be characterised in consultation with the LLFAs and IDBs and with reference to relevant Strategic Flood Risk Assessments and other published sources.

16.6.5 Baseline collection on sediment transport, coastal water quality (in particular turbidity) and coastal morphology would be undertaken. This would be carried out by means of a desk based study assessing historical shoreline position data for the coastline around the landfall as a means of modelling the degree of coastal erosion. Data would be sourced from both the EA and East Riding of Yorkshire Council.

16.7 Design, mitigation, and enhancement measures

16.7.1 The assessment of effects will take account of a range of primary, secondary and tertiary mitigation measures. Key measures are described below.

16.7.2 The Project requires a new crossing of the Humber Estuary which is a large and sensitive receptor. A key primary mitigation measure is the trenchless construction method to cross the Humber Estuary. The pipelines would be laid within a tunnel beneath the channel, that would avoid physical changes to the river including its bed and banks, as well as impacts on its flow and sediment transport regimes and its hydromorphology. Disturbance within the riparian corridor and the risks of the construction phase detrimental to water quality would also be reduced.

16.7.3 Other large main river crossings, such as the River Aire and the tidal River Trent would also be crossed by trenchless techniques.

16.7.4 Another key primary mitigation measure is the inclusion of SuDs techniques to manage rainfall runoff from AGIs. Suitable techniques will be selected, influenced by ground conditions and with reference to the drainage hierarchy (Ref 16.25), to achieve both attenuation and treatment of surface water runoff, avoiding increases in surface water flood risk and pollution.

16.7.5 With regard to secondary measures, a commitment would be made, and secured through the Development Consent Order (DCO), to mitigate potential flood risk impacts associated with building AGIs in the floodplain. For example, losses of floodplain storage volume would be compensated and there would be no impediment to key floodplain flow paths.

16.7.6 A suite of tertiary mitigation measures is also relevant to the hydrology and land drainage assessment. These include securing secondary consents under the Environmental Permitting Regulations (Ref 16.11), the Land Drainage Byelaws and the Marine and Coastal Access Act 2009 (Ref 16.7) for qualifying works, as well as the good practice measures adopted during construction to avoid pollution, manage land drainage, mitigate flood risk and reduce temporary impacts on coastal processes and water quality in the intertidal zone. These measures will be documented in a Construction Environment Management Plan (CEMP), which would include a Surface Water Management Plan.

16.7.7 The Hydrology and Land Drainage assessment will rely on commitments 1, 2, 15 and 16 outlined in the draft Register of Commitments in Volume III, Appendix F.

16.8 Description of likely significant effects

Construction

16.8.1 Good practice measures within the CEMP would reduce the risk of pollution of the water environment during construction by removing the pathways between sources and receptors for most working areas. However, potential for construction work to cause localised and temporary pollution effects would remain.

16.8.2 At open cut watercourse crossings there would be temporary physical disturbance and temporary changes to watercourse flow regimes may also occur, for example, where over pumping is required during construction of the pipelines and access route watercourse crossings. Effects would range in duration but flumes and culvert crossings may be in place in some locations for several months. If open cut methods are also selected as the crossing solution in the intertidal zone associated works would carry a higher pollution risk. A reduced risk also exists in the event that the intertidal zone crossing involves trenchless techniques, such as Horizontal Directional Drilling (HDD). The unlikely event of a break-out during installation would also have the potential for localised and temporary effects, although appropriate measures detailed within the CEMP would help to mitigate these effects.

16.8.3 Whilst crossing watercourses via trenchless techniques reduces physical disturbance and flow regime effects, the technique is not entirely without pollution risk, which is associated with the potential for break out of drilling muds. Trenchless techniques also have a higher water demand.

16.8.4 During construction there would also be potential for effects on land drainage regimes and associated surface water flood risk, due to changes in land surface permeabilities or local topography, e.g. where vegetation cover is stripped and earthworks are undertaken. At work sites located in the tidal and/or fluvial floodplain there would be potential for significant effects associated with storage of spoil reducing available floodplain storage or interrupting key floodplain flow paths.

16.8.5 These higher construction risk activities and associated receptors are proposed to be scoped into the ES. Effects on artesian water, springs and groundwater resources is addressed in Chapter 8: Geology and hydrogeology.

Operation

16.8.6 During operation of the Project, pollution impact pathways to surface waterbodies and within the intertidal zone would be very limited. This is because land within the pipelines construction working width would be reinstated following completion of the construction works, and there would be no AGI in the intertidal zone. There would be no operational discharges to surface watercourses nor runoff from terrestrial AGIs in the intertidal zone. Physico-chemical elements supporting WFD waterbody status would therefore be safeguarded. Maintenance activities would fall under the Applicant's operational management procedures. No likely significant effects are therefore anticipated and it is proposed that this aspect is scoped out of the assessment.

16.8.7 Due to active coastal erosion in the vicinity of the Easington landfall the buried pipelines have the potential to become exposed during the operational lifetime of the Project. The Project design will ensure a suitable burial depth and appropriate measures are in place to prevent this potential future effect. If defensive measures are required for the pipeline landfall then the impacts that these, and any operational maintenance, may have on the coastal processes within the intertidal zone will be considered.

16.8.8 Given the nature of the Project, there would be no permanent effects on watercourse flow regimes. 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 interests (surface water abstractions and discharges) and hydromorphology is negligible.

16.8.9 Likely significant effects during operation are therefore limited to effects on land drainage and surface water flood risk at AGIs, and increases in tidal and/or fluvial flood risk, where these sites are in the floodplain. These aspects will be assessed in the ES, which will be informed by the findings of a supporting FRA.

Decommissioning

16.8.10 No likely significant effects on hydrology and land drainage receptors have been identified in association with the decommissioning of the Project. This is because the pipelines will be left in situ, avoiding physical disturbances to water receptors and avoiding creation of pollution pathways. The AGIs would be dismantled, with all equipment removed and the land returned to agricultural or other appropriate uses.

16.8.11 Decommissioning would consider all the relevant environmental legislation and technology available at the time and any necessary licences and permits would be acquired. A Decommissioning Environmental Management Plan (DEMP) will be implemented during the decommissioning phase, this shall identify and mitigate the potential impacts of decommissioning activities which could harm sensitive receptors.

Matters scoped in or out of further assessment

16.8.12 A summary of matters scoped in or out of further assessment is provided in Table 16.2.

Table 16.2: Matters scoped in or out of further assessment

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Water interests (existing surface water abstractions and discharges)	Construction, Operation and Decommissioning		✓	No new consumptive use of surface water resources is proposed, and safeguards will be put in place to protect surface water quality so there would be no impacts on the integrity of existing water interests.	Local Authorities and IDBs
Watercourses and waterbodies - hydromorphology	Construction	✓		Where open cut crossing methods are proposed, an impact pathway may be created, with potential for temporary effects.	Local Authorities and IDBs (subject to agreeing a suitable depth of cover and bankside reinstatement method)
	Operation and Decommissioning		✓	Once the pipelines working width is reinstated, there would be no impact pathway. The banks and riparian corridors of watercourses would not be disturbed and there would be a suitable separation distance between channel beds and the crest of the buried pipelines.	
Surface water quality	Construction	✓		Potential for temporary effects at construction works sites, for example, due to the generation of silted runoff and associate with overpumping and dewatering activities (dewatering effects assessed in Chapter 8: Geology and Hydrogeology).	Local Authorities and IDBs
	Operation and Decommissioning		✓	No operational discharges of effluents would be generated that would be discharged to surface waters. A suitable post construction land drainage scheme would also be implemented.	
	Construction	✓		There are working areas in Flood Zone 3.	

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
Flood risk from rivers and the sea	Operation	✓		Potential for permanent AGIs in Flood Zone 3 and in proximity to existing flood defenses.	Local Authorities and IDBs
	Decommissioning		✓	All AGIs would be removed and the land reinstated.	
Flood risk from surface water and effects on the land drainage regime (quantity and quality of flows)	Construction and Operation	✓		Temporary and permanent changes to impermeable land cover and potential for temporary disruption to existing land drainage routes and changes to water quality during construction. Installation of a suitable pre and post construction drainage scheme.	Local Authorities and IDBs
	Decommissioning		✓	Pipelines will remain in-situ. AGI to be removed and the land re-instated.	
Flood risk from other sources (groundwater, artificial sources)	Construction, Operation and Decommissioning		✓	There would be limited barriers to existing groundwater flow paths due to the generally shallow excavations to create the pipelines trenches and the Project is of low vulnerability to flooding from these 'other' sources. These conclusions will be confirmed by the Project's Flood Risk Assessment.	Local Authorities and IDBs
Water quality and coastal processes in the intertidal zone	Construction	✓		Temporary works within the intertidal zone having potential to impact water quality and coastal processes. If a trenchless crossing solution was selected these effects could be scoped out as there would be very limited physical disturbance and no likely significant pollution pathways.	East Riding of Yorkshire Council
	Operation and Decommissioning		✓	Once construction works and reinstatement is complete all infrastructure in the intertidal zone would be buried to a suitable depth of cover and no operational discharges are proposed. Due to the eroding coastline and dynamic coastal processes in the intertidal zone, monitoring measures would be in place to ensure that the pipeline does not become	East Riding of Yorkshire Council (subject to agreeing a suitable pipeline depth of cover)

Matter	Phase	Scoped in	Scoped out	Justification	Agreed with
				exposed. Further details of relevant design and monitoring measures will be included in the PEIR and ES. Pipelines infrastructure will remain in-situ following Project decommissioning.	

16.9 Proposed assessment methodology

16.9.1 The assessment will be based on guidance set out in Part 10 of Volume 11 of the Design Manual for Roads and Bridges (DMRB), LA113 (Ref 16.26). 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. The method provides guidance on assigning value (sensitivity) to receptors (for example, watercourses, floodplains) as well as criteria for assigning impact magnitude. The criteria consider the scale/extent of the predicted change and the nature and duration of the impact and these criteria are reproduced in Tables 1.1 to 1.4 in Volume III, Appendix H. The significance of an effect is then derived using the matrix set out in Table 3.1, Chapter 3: EIA Methodology.

16.9.2 Given the size of the Project and the presence of large areas of Flood Zone 3 within the Study Area, an FRA of the Project will be produced in accordance with the NPPF, as well as with reference to the CIRIA guidance (Ref 16.25) and local flood risk management guidelines published by the LLFAs. The FRA will consider flood risk from fluvial, coastal and surface water sources during both construction and operation. It will also include details of the measures proposed to adhere to local drainage and flood risk planning policies. Where AGIs are proposed, the FRA will consider flood risk over the lifetime of these assets, incorporating allowance for climate change in accordance with published guidance (Ref 16.22). The assessment will be reported in accordance with the hydrological catchments that the Project crosses through.

16.9.3 A WFD Screening Assessment will also be produced for the Project guided by Planning Advice Note 18: The Water Framework Directive (Ref 16.17) and Environment Agency guidelines for estuarine and coastal waters (Ref 16.27). The effects of the Project on the Humber River Basin Management Plan (Ref 16.28) 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 Directive. A qualitative approach is proposed, and the assessment will identify how the Project design will avoid waterbody deterioration, as well as any other mitigation necessary as set out in the draft Register of Commitments in Volume III, Appendix F (see commitment 1, 2, 16 and 16). The assessment will be reported in accordance with the WFD Operational Catchments that the Project crosses.

16.10 Limitations and assumptions

16.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- It is assumed there is sufficient data from the Environment Agency, LLFAs and IDBs to inform a site-specific FRA and that no new flood risk models will need to be developed;
- 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;
- The assessment of construction effects on the intertidal zone will be qualitative and will be informed by a baseline assessment of cliff and shore platform erosion at the

Easington landfall as well as an assessment of coastal processes in combination with a desk study that is being undertaken for the Northern Endurance Partnership (offshore carbon dioxide transportation and storage) ES;

- 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; and
- Consideration will be given to sampling of intertidal sediments at the Easington landfall to characterise a baseline for physical characteristics and levels of contaminants. Sampling would not be undertaken in the event that the landfall was installed by trenchless techniques.

16.11 References

- Ref 16.1 Her Majesty's Stationery Office (2003) *The Water Environment (Water Framework Directive) (England and Wales) Regulations*. Available at: https://www.legislation.gov.uk/uksi/2003/3242/contents/made (Accessed: 20 March 2022); and Her Majesty's Stationery Office (2019). *The Floods and Water (Amendment etc.) (EU Exit) Regulations.* Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176283/contents (Accessed: 20 March 2022).
- Ref 16.2 *Her Majesty's Stationery Office (2021) Environment Bill Act*. Available at: https://bills.parliament.uk/bills/2593 (Accessed: 20 March 2022).
- Ref 16.3 Her Majesty's Stationery Office (1991) *Land Drainage Act*. Available at: https://www.legislation.gov.uk/ukpga/1991/59/contents (Accessed: 20 March 2022).
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- Ref 16.5 Her Majesty's Stationery Office (2019) *The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019*. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176283/contents (Accessed: 23 January 2022).
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- Ref 16.10 Department for Business, Energy and Industrial Strategy (2021*) Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed: 27 January 2022).
- Ref 16.11 Her Majesty's Stationery Office (2016) *Environmental Permitting (England and Wales) Regulations 2016.* Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents/made (Accessed: 23 January 2022).
- Ref 16.12 Ministry of Housing, Communities and Local Government (2021) *National Planning Policy Framework.* Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 21 January 2022).
- Ref 16.13 Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework Planning Practice Guidance: Flood Risk and Coastal Change.* Available at: https://www.gov.uk/guidance/flood-risk-and-coastal-change (Accessed: 22 January 2022).
- Ref 16.14 East Riding of Yorkshire Council (2016). *East Riding Local Plan*. Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/east-riding-local-plan/ (Accessed: 23 January 2022).
- Ref 16.15 North Lincolnshire Council (2011) *Core Strategy*. Available at: http://www.planning.northlincs.gov.uk/planningreports/corestratergy/adopteddpd/FullCoreStrategy.pdf (Accessed: 24 January 2022).
- Ref 16.16 Selby District Council (2013) *Core Strategy Local Plan*. Available at: https://www.selby.gov.uk/selby-district-core-strategy-local-plan (Accessed: 23 January 2022).
- Ref 16.17 The Planning Inspectorate (2017) *Advice Note 18: The Water Framework Directive.* Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/#:~:text=It%20establishes%20a%20legislative%20framework,and%20groundwater%20throughout%20the%20EU (Accessed: 22 January 2022).
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- Ref 16.20 CIRIA (2006) *Control of water pollution from linear construction projects (C649).* Available at: http://observatoriaigua.uib.es/repositori/suds_control.pdf (Accessed: 23 January 2022).
- Ref 16.21 Environment Agency (various publication dates*). Guidance for Pollution Prevention Series.* Bristol: Environment Agency.

- Ref 16.22 Environment Agency (2021). *Flood Risk Assessments: climate change allowances.* Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed: 14 February 2022).
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17. Major Accidents and Disasters

17.1 Introduction

17.1.1 This Chapter outlines the proposed scope of the Environmental Impact Assessment (EIA) with respect to Major Accidents and Disasters (MA&D). It includes a description of the proposed Study Area for the assessment, the datasets that will be used to inform the EIA, an overview of potential receptors, the likely significant effects to be considered within the EIA and how these likely significant effects will be assessed for the purpose of an EIA.

17.1.2 There is no accepted methodology for assessing MA&D within an EIA. Therefore, the assessment methodology outlined below is substantially based on the Institute of Environmental Management and Assessment's (IEMA) 'Major accidents and disasters in EIA: A primer' guidance (Ref 17.1).

17.1.3 Ref 17.1 sets out key definitions for the assessment as follows:

- 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 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".*

17.2 Legislation, policy and guidance

17.2.1 This assessment will be undertaken in accordance with, and with reference to, the following legislation, policy and guidance.

Legislation

17.2.2 The following relevant legislation has been used to determine the methodology to be applied for the MA&D assessment:

- Health and Safety at Work Etc. Act 1974 (HSWA) (Ref 17.2);
- Control of Major Accident Hazards (COMAH) Regulations 2015 (Ref 17.3);
- Pipelines Safety Regulations (PSR) 1996 (Ref 17.4); and
- Pressure Systems Safety Regulations (PSSR) 2000 (Ref 17.5).

Policy

17.2.3 The Overarching National Policy Statement for Energy (EN-1) (Ref 17.6) outlines generic policy with respect to occupational health and safety in Section 4.11. Further,

EN-1 goes on to state that, where relevant, energy infrastructure will be subject to the COMAH Regulations 1999. In the subsequent Draft Overarching National Policy Statement for Energy (Ref. 17.7), this legislation was updated to the COMAH Regulations 2015.

17.2.4 The Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 17.8) reiterates the above commitment to the COMAH Regulations 2015, outlining that "gas storage and supply infrastructure sites are subject to stringent safety standards under the Control of Major Accident Hazards (COMAH) Regulations 2015". Moreover, both the current EN-4 (Ref 17.9) and draft EN-4 state that the principal legislation governing the safety of pipelines (Pipelines Safety Regulations 1996 (Ref 17.3)) requires that pipelines are designed, constructed and operated so that the risks are as low as reasonably practicable (ALARP).

17.2.5 Other key policy includes:

- Relevant policies from the East Riding Local Plan (2016) (Ref 17.10), the North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 17.11) and the Selby District Core Strategy Local Plan (2013) (Ref 17.12).

Guidance

17.2.6 The following relevant guidance has been used to determine the methodology to be applied for the MA&D assessment:

- The Institute of Environmental Management and Assessment (IEMA) (2020) has recently developed a guidance document 'Major Accidents and Disasters in EIA: A Primer' (Ref 17.1) to increase awareness of MA&Ds within EIA and its application;
- The Health and Safety Executive's (HSE) Reducing Risks, Protecting People (R2P2) (Ref 17.13);
- The Chemical and Downstream Oil Industries Forum (CDOIF) (Ref 17.14);
- HSE RR1035 Update of pipeline failure rates for land use planning assessments (Ref 17.15);
- UK Onshore Pipeline Operator's Association (UKOPA) Pipeline Product Loss Incidents and Faults Report (1962 – 2019) (Ref 17.16);
- HSE Failure Rate and Event Data for use within Risk Assessments (Ref 17.17) and
- HSE Further guidance on emergency plans for major accident hazard pipelines (Ref 17.18).

17.3 Engagement

17.3.1 At this early stage of the Project, no specific engagement has been undertaken in relation to the assessment of MA&Ds. However, engagement will be progressed as part of the EIA process.

17.3.2 The Environment Agency has, and continues to be, consulted with regards to the assessment of Hydrology and Land Drainage and has raised the following issues also relevant to MA&D:

- *"…the long term future of the defences that Easington gas terminal are reliant upon are uncertain. This is partly due to the dynamic and rapidly eroding coastline, as well*

as the legal agreements and requirements associated with the Easington Gas Terminal planning permission. The coastline is being monitored at this location, and a decision will be made on the future of the defences and the gas terminal by 2045".

- *"…it cannot be said that during operation there will be no effects/operational discharges, as there is always the potential for unintended/accidental release and then disturbance for repairs. Although the probability may be low, this scenario and its effects should probably be considered and scoped into the assessment. Also, generally, pipeline failure and leakage of, for example CO_2, could have a deleterious impact on organisms and health".*

17.4 Study Area

17.4.1 Different Study Areas will be applied depending on the nature of the factor (defined below) that is under consideration. Each factor has been grouped into either an external source of major accidents or disasters (where the Project is a receptor), or where the Project is a source of major accident to receptors.

17.4.2 The following factors and associated distances were adopted for setting the Study Area in order to capture internal and external influencing factors which may have high adverse consequences on the Project:

- External major accident Study Areas:
  - Airports and airfields within 10km (based on HSE research (Ref. 17.19));
  - COMAH Establishments within 3km (based upon typical HSE Land Use Planning restrictions);
  - Major Accident Hazard Pipelines within 1km (based on HSE Research (Ref. 17.20));
  - Connected Projects within the East Coast Cluster and Northern Endurance Partnership as outlined in Chapter 2: Project Description; and
  - Other utilities (pipelines, electrical, gas, electrical, telecommunications etc.) crossing the Scoping Route Corridor.
- Disaster Study Areas:
  - Natural features with the potential to create risks (for example, hydrological and geological - more specifically, flood risk and unstable ground conditions respectively) within 1km (beyond this Study Area there would be no pathway to affect the Project).
- Receptor Study Areas:
  - Receptors during construction within 500m (beyond this Study Area there would be no pathway from construction activities to affect receptors);
  - Receptors during operation (including commissioning) within 1km (based upon a worst-case estimate of potential effects of hydrogen and carbon dioxide releases); and
  - Receptors during decommissioning within 500m (beyond this Study Area there would be no pathway from decommissioning activities to affect receptors).

17.4.3 The temporal scope of the assessment will be consistent with the period over which the Project would be carried out and therefore will cover the construction, operation and decommissioning phases.

17.5 Baseline conditions

17.5.1 This section sets out the baseline data that will be relied upon to produce a detailed assessment of baseline conditions that will be contained within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

17.5.2 The baseline conditions for the MA&D assessment will be derived from the following desk study sources:

17.5.3 The baseline will draw on information from other topics of the ES for the Project as follows:

- Chapter 7: Ecology and Biodiversity;
- Chapter 9: Geology and Hydrogeology;
- Chapter 10: Heritage;
- Chapter 13: Socio-economic;
- Chapter 14: Human Health and Wellbeing;
- Chapter 15: Traffic and Transport;
- Chapter 16: Waste and Materials; and
- Chapter 17: Hydrology and Land Drainage.
- National Risk Register of Civil Emergencies (Ref. 17.21);
- British Geological Survey 'Onshore GeoIndex' (Ref 17.22);
- Tsunamis Hazard Map (Ref 17.23);
- The International Disaster Database (Ref 17.24);
- HSE's Planning Advice Web App (Ref 17.25);
- HSE COMAH 2015 Public Information Search (Ref 17.26);
- Project specific aerial imagery and mapping covering the Study Area; and
- The Yorkshire and Humber (CCS Cross Country Pipeline) Safety Statement (Ref. 17.27).

17.6 Receptors

17.6.1 Receptors are defined within the IEMA guidance as *"the specific component of the environment that could be adversely affected if the source reaches it"* (Ref 17.1).

17.6.2 A preliminary list of relevant receptors has been identified through a review of base mapping and aerial photography. The identification of receptors at this stage has been limited to a preliminary 1km Study Area. During the EIA process, once routes have been identified, the Study Area will be applied to those routes. Therefore, at this stage, only a high-level identification of receptors has been undertaken, as provided in Table 17.1.

Table 17.1: Preliminary list of receptors within the MA&D Study Area

Receptor Type	Receptor Details
Human health (public)	Members of the public, local communities and nearby workers at other facilities are considered in this receptor type; this includes residential, commercial and industrial locations as well as public spaces. The existing land-use within the 1km Study Area suggests that the area is sparsely populated and consists mostly of rural agricultural land. There are 17 low density residential areas partially or entirely encompassed within the 1km Study Area. There are likely to be a number of more vulnerable receptors such as education centres (e.g. colleges, schools), medical and care facilities (e.g. hospitals, care homes). The receptors will be confirmed in the PEIR.
Human health (workers)	All workers associated with the Project are considered in this receptor type. Information regarding the construction and operational workforce is not available at this stage of the Project. Further information will be provided within the project description at the PEIR and ES stage.
Designated land/waters sites (internationally important)	There are several designated land/water sites of international importance (Special Area of Conservation (SAC), Special Protection Area (SPA), and Ramsar) within the 1km Study Area (e.g., the Humber Estuary SAC, SPA and Ramsar).
Designated land/water sites (nationally important)	There are a number of designated land/water sites of national importance (Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Marine Conservation Zone (MCZ) and Ancient Woodlands) within the 1km Study Area (e.g., Dimlington Cliffs SSSI).
Other designated land	This category includes receptors such as Areas of Natural Beauty (AONB), National Parks and Local Nature Reserves (LNR). There are two LNRs within the 1km Study Area. There are no AONBs, National Parks or further designations within the 1km Study Area.
Priority Habitats	Priority habitats include Habitats of Principal Importance and other locally designated rural land-based schemes. These have been identified in Chapter 6: Biodiversity.

Receptor Type	Receptor Details
Protected Species	Specific populations of species will be identified in the assessment undertaken in Chapter 6: Biodiversity.
Widespread Habitat – Non-Designated Land	These categories include land/water which is used for agriculture, forestry, fishing, recreation, or aquaculture.
Widespread Habitat – Non-Designated Waterbodies	
Soil or Sediment	Those Soil or Sediment receptors which are vulnerable to MA&Ds will be identified in future environmental reporting.
Groundwater – Source of Drinking Water	The presence of ground water will be identified in Chapter 8: Ground Conditions.
Groundwater – Source of Non-Drinking Water	
Historic Environment	This category is limited to Grade I listed buildings or Park and Gardens, scheduled monuments, and conservation areas. In total, there are a total of 19 Grade I Listed Buildings, 1 Grade I Park and Garden and 16 Scheduled Monuments within the 1km Study Area.
Fresh and Estuarine Water Habitats	There are several water bodies in the vicinity of the 1km Study Area.

17.7 Design, mitigation, and enhancement measures

17.7.1 This Chapter acknowledges and considers the implementation of primary and tertiary mitigation measures identified in each of the technical chapters outlined within paragraph 17.5.2.

17.7.2 The Applicant has committed to constructing and managing the Project in accordance with:

- Legislation, Engineering Standards and good practice;
- Environmental, Health & Safety Management systems;
- Supplier management environmental, health & safety standards (e.g., Construction Skills Certification Scheme (CSCS));
- Risk management systems; and
- Construction and Environmental Management systems (a draft Construction Environmental Management Plan (CEMP) will be provided with the Development Consent Order (DCO) Application and the DCO application will contain a requirement for a CEMP).

17.8 Description of likely significant effects

Construction

17.8.1 Potential likely significant effects for MA&D during construction include:

- Construction works causing damage to existing utilities such as power, water, telecommunications or natural gas with the potential for serious harm to the project workforce and temporary loss of supply to the public;
- Accidents during commissioning which may lead to serious harm to the Project workforce;
- Fire in the construction compounds with the potential to cause serious harm to the Project workforce and possibly spreads to neighbouring areas;
- Accidental release of hazardous fluid during pressurisation with the potential to cause serious harm to the Project workforce and spread to neighbouring areas;
- A major accident occurring on an external site or third-party pipeline involving hazardous substances causing serious harm to the Project workforce; and
- Release of drilling fluids during a break-out during Horizontal Directional Drilling (HDD) operations or major fuel spill with the potential to cause contamination to hydrogeology and hydrology and spread to soil and sediments.

Operation

17.8.2 Potential likely significant effects for MA&D during operation are likely to include:

- Pipelines - damage due to external interference or external force (e.g. earthquake), both of which are outside the immediate control of the pipeline operator;

- Above Ground Installations (AGI) are controlled sites so the most likely cause of a release will be incorrect operation and maintenance or incorrect equipment function, both mitigated by management procedures;
- Cyber attacks may result in incorrect / unplanned operation of assets (i.e. shut down);
- Fire at an AGI site could cause damage to the pipework and equipment which may cause a leak of hydrogen and/or carbon dioxide;
- The pipelines or AGIs could be affected by a significant land movement. This could damage the pipelines and subsequently, cause a significant release of carbon dioxide and/or hydrogen; and
- A major accident occurring on an external site or third-party pipeline involving hazardous substances causing serious harm to the Project workforce or Project assets.

Decommissioning

17.8.3 Potential likely significant effects for MA&D during decommissioning include:

- Decommissioning works causing damage to existing utilities such as power, water, telecommunications or natural gas with the potential for serious harm to the Project workforce and temporary loss of supply to the public;
- Fire in construction compounds reinstated for decommissioning with the potential to cause serious harm to the Project workforce and possibly spreads to neighbouring areas;
- Accidental release of hazardous fluid in construction compounds with the potential to cause serious harm to the Project workforce and spread to neighbouring areas; and
- A major accident occurring on an external site or third-party pipeline involving hazardous substances causing serious harm to the Project workforce or Project assets.

Matters scoped in or out of further assessment

17.8.4 The EIA Regulations (Ref 17.28) recognise that developments will affect different environmental aspects to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are “likely to be significantly affected by the development”.

17.8.5 The IEMA guidance (Ref 17.1) recommends the assessment focuses on events that have a low likelihood of occurrence but potentially high consequences. The justification for this is that events that would be high likelihood and high risk would be unacceptable for any development and therefore be managed or designed-out and low likelihood and low consequence events (e.g. minor construction spills) would not be considered as major accidents or disasters. This approach has been adopted to scoping in and out events from this assessment. Further detail on the matters scoped in or out of further assessment for MA&D is outlined in Volume III, Appendix E.

17.9 Proposed Assessment Methodology

17.9.1 The proposed generic project-wide approach to the assessment methodology is set out in Chapter 3: EIA Methodology. However, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the MA&Ds assessment in the ES.

17.9.2 The sole piece of established guidance on the assessment of MA&Ds within the context of EIA in the UK remains the IEMA guidance document 'Major Accidents and Disasters in EIA: A Primer' (Ref 17.1). Two clear principles have emerged from this guidance alongside more generalised existing EIA guidance. These have been adopted in the methodology described below; firstly, the principle of proportionality and secondly, the established principle that only those effects likely to be significant need to be assessed within the EIA.

17.9.3 The approach described is aligned to the IEMA Primer. The context of the guidance for MA&Ds is that the scope covers those MA&Ds which could impede the Project's activities and objectives and may have adverse effects upon receptors. The focus of the assessment will therefore recognise significant risk arising from MA&Ds which may lead to potentially significant environmental effects, thereby building resilience into the Project and reducing the vulnerability.

17.9.4 MA&Ds are by their nature, high consequence events (if they occur) and are 'unplanned' with the effects not part of the intended design, construction or operational intent. However, where relevant low likelihood and low consequence events will also be appropriately assessed.

17.9.5 The assessment of significant effects for MA&Ds focuses on the risk, which is the combination of the severity of harm (consequence), sensitivity of the receptor and likelihood of occurrence.

17.9.6 Risk tolerability for MA&Ds in the UK is built on the principle of eliminating intolerable risks, and to ensure, particularly at engineering design stages, that any residual risks are further minimised where 'reasonably practicable'. This principle has been applied in the assessment here, with 'intolerable risk' interpreted as equivalent to 'significant adverse effects'.

17.9.7 A significant adverse effect for MA&Ds is one which would result in the following consequences, with a likelihood that the effect is considered intolerable to general society, based on commonly accepted benchmarks for what is intolerable:

- Serious damage to human populations – This includes harm which would be considered substantial, i.e., fatalities, multiple serious injuries or a substantial number requiring medical attention; and
- Serious damage to the environment – Loss or significant detriment to populations of species or organisms, designated sites, cultural heritage sites, contamination of drinking water supplies, ground or groundwater, or harm to environmental receptors in line with other UK major accident regulations.

17.9.8 A significant effect could include both immediate and delayed effects. An immediate effect would be one that is self-evident at the time of the event (e.g. fire damage, injury). A delayed effect is one which becomes evident only after time (e.g. loss of feeding resources for a particular species leading to a change in ecosystem dynamics).

17.9.9 The proposed methodology is qualitative as the design is at the planning stage. After consent is granted and the design advances through detailed engineering design stages, additional risk assessments (qualitative and where necessary quantitative) will be undertaken as part of the normal pre-construction design process, to account for all relevant emerging and requirements.

17.9.10 The assessment approach will:

- Outline the credible pathways that exist (i.e. the link between an MA&D event and a receptor);
- Qualitatively assess the harm/damage which could be caused to the receptor to estimate the magnitude of accidents and disasters (if they were realised), at the receptor;
- Qualitatively assess the likelihood of the effect, considering the range of impacts which may be associated with the source/initiator of an accident/disaster and taking into account the measures embedded in the Project which would reduce their occurrence and/or severity; and
- Establish whether there are any significant (i.e., intolerable) effects from MA&Ds.

Assessment of effects

17.9.11 As noted above, a significant effect for MA&D focuses on risk. This differs from the way in which many other topics in the EIA context are addressed. Typically, other topics examine effects that are considered likely to occur and therefore such effects are unlikely to meet the thresholds required to be considered a major accident or a disaster.

17.9.12 The ES will consider those MA&Ds which were scoped into the assessment. These are typically by their nature of a low likelihood but are important considerations so that resilience against them can be built into a project at the planning stage, and to provide sufficient information for informed decisions to be made for planning purposes. Resilience is built by ensuring that high consequence events are eliminated or, where elimination is not possible, reduced to such an extent that the chance of them occurring is so small that they can be deemed not to be significant.

17.9.13 Risk tolerability for people is well established in the UK and under the Health and Safety at Work Etc. Act 1974 (HSWA) it requires that risks to employees and others are reduced as far as is reasonably practicable. The term ‘reasonably practicable’ means that the level of risk and the benefits of reducing risk must be assessed against the trouble, time and money needed to control it (also termed As Low As Reasonably Practicable (i.e. ALARP)). The primary reference for this is HSE’s Reducing Risks Protecting People (R2P2) (Ref 17.13). The Chemical and Downstream Oil Industries Forum (FCDOIF) (Ref 17.14) and R2P2 criteria will be used for this assessment to provide a consistent basis for the study against common benchmarks for MA&Ds applied across the UK.

17.9.14 The following factors are important in defining the criteria:

- Magnitude of change – the consequence thresholds of MA&Ds are established from the following dimensions and intrinsically account for receptor sensitivity:
  - Severity of harm (a combination of extent and damage potential); and
  - Duration of harm (the recovery period) for non-human receptors or the numbers of people affected for human receptors.

- Likelihood of the event occurring.

17.9.15 These combine to provide a measure of risk (i.e., the combination of the serious damage arising from a potential event and its likelihood of occurrence). The fact that the Project is currently in the planning stage means that the estimates are necessarily qualitative and based on professional judgement informed by comparison against experience in similar industries and for similar developments, where possible and practical.

Magnitude of change

17.9.16 In order to distinguish between potential major accidents of differing severities, all potential MA&Ds are categorised into one of four magnitude of change categories: Low, Medium, High and Very High. Any scenario which does not meet the criteria of a MA&D is simply listed as 'Not MA&D'. Magnitude of change within the context of MA&Ds is assessed from both the severity of the harm, and either the duration over which the receptor experiences that harm or the number of people affected.

17.9.17 Four categories of harm severity are considered:

- Not Significant: This level of harm is below the minimum threshold determined for a major accident or disaster in the CDOIF guidance and/or in R2P2; and
- Severe, Major or Catastrophic: These represent increasing levels of damage or harm to populations or environmental receptors.

17.9.18 For non-human receptor types, four categories of duration are considered: Short, Medium, Long and Very Long Term.

17.9.19 The combination of harm severity and harm duration for non-human receptors to determine magnitude of change is given in Table 17.2.

Table 17 2: Magnitude of change matrix – non-human receptors

Severity of Harm	**Catastrophic**		High	Very High	Very High
	Major		Medium	High	Very High
	Severe		Low	Medium	High
	Not Significant	Not MA&D			
		Short	**Medium**	**Long**	**Very Long**
		Duration of Harm			

17.9.20 For human receptors, the number of people affected is accounted for in assigning the magnitude of change. The combination of harm severity and people affected for human receptors to determine magnitude of change is given in Table 17.3.

Table 17.3: Magnitude of change matrix – human receptors

Severity of Harm	**Catastrophic**	Very High	**Very High**	**Number of people affected**
		High	**Low to High**	
	Major	Medium		
	Severe	Low		
	Not Significant	Not MA&D		

17.9.21 Potential MA&Ds that have been assigned a magnitude of change (i.e., scoped in) are further assessed for significance.

Determination of significance

17.9.22 Guidance provided by IEMA (Ref 17.1) highlights that the context for inclusion of MA&Ds in EIA is to ensure that adequate focus is given to the provision for events leading to significant risk, with the objective of building resilience into a development against such effects.

17.9.23 Table 17.4 presents the magnitude of change and a qualitative likelihood scale to determine whether the risk is significant. In the assessment, a significant effect would represent a level of risk that would generally be considered intolerable.

17.9.24 The assessment will apply professional judgement to evaluate the likelihood of each potential major accident or disaster occurring once the mitigation is applied. The likelihood and risk reported is that above the baseline (i.e., the incremental likelihood and risk). This is the risk that can be attributed to the development directly or indirectly.

17.9.25 While qualitatively stated, the definition and classifications used for likelihood are designed to be compliant with HSE's R2P2 (Ref 17.13) for societal risk, and CDOIF (Ref 17.14) for environmental tolerability, if considered on a per effect basis rather than in terms of aggregated risk (i.e., the risk from all contributors to a receptor). Professional judgement has been used to establish the appropriate qualitative parameters for likelihood categorisation, with levels used ranging from 'Remote chance of occurring' through to 'Reasonable chance of occurring'. These then provide an allocation of likelihood against magnitude to determine risk significance, which in turn is an approach that is consistent with major accident tolerability perceptions commonly applied elsewhere in the UK.

Table 17.4: Significance matrix – Major Accidents and Disasters

Magnitude of Change	**Likelihood (per receptor per effect)**				
	Remote chance of occurring	**Very small chance of occurring**	**Small chance of occurring**	**Chance of occurring**	**Reasonable chance of occurring**
Very High	Not significant	Significant	Significant	Significant	Significant

High	Not significant	Not significant	Significant	Significant	Significant
Medium	Not significant	Not significant	Not significant	Significant	Significant
Low	Not significant	Not significant	Not significant	Not significant	Significant

Table 17.5 outlines the format in which the ES assessment will be presented. This ensures a clear and rational source-pathway-receptor linkage and subsequent allocation of significance for the specific linkage.

Table 17.5: ES Assessment Matrix

MA&D	Receptors	Pathway	Embedded mitigation	Magnitude of Change	Likelihood	Risk or significance of effect
A description of the MA&D that was scoped into the assessment at the EIA Scoping stage.	*A description of the receptors potentially affected by the MA&D.*	*A description of the potential pathway between the MA&D and the identified receptors.*	*A description of the embedded mitigation that aims to remove, reduce the potential for the MA&D and therefore, considered when determining its severity and likelihood.*	*The magnitude of change arising because of the pathway between MA&D and receptor as per Table 17.2 and 17.3.*	*Allocation of a category using the Likelihood categories outlined in Table 17.4, e.g., very small chance of occurring.*	*Allocation of significance utilising the matrix outlined in Table 17.4.*

17.10 Limitations and assumptions

17.10.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- The design of structures and infrastructure will be subject to relevant Hazard Identification (HAZID) studies and actions identified integrated into the final design to reduce risks to be ALARP;
- The construction stage of the Project will be managed through the implementation of the Construction Phase Plan (required under the Construction (Design and Management) (CDM) Regulations 2015 (Ref 17.29) and CEMP. A draft CEMP will be provided with the DCO application; and
- Environmental effects associated with unplanned events that do not meet the definition of a major accident and/or disaster (e.g. minor leaks and spills that may be contained within the construction sites are addressed in other topic chapters as appropriate and not in this section). It is also recognised that the management framework for the Project is not fully defined at this stage; however, a presumption of standard practice and regulatory compliance within the adopted management framework has been assumed and will be developed following the appointment of the Main Works Contractor.

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18. Summary

18.1.1 It is proposed that the following environmental factors, as listed under Regulation 5 (2) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, are included in the scope of the EIA:

- Agriculture and Soils;
- Air Quality;
- Ecology and Biodiversity;
- Climate;
- Geology and Hydrogeology;
- Heritage;
- Landscape;
- Noise and Vibration;
- Socio-Economics;
- Human Health and Wellbeing;
- Traffic and Transport;
- Waste and Materials;
- Hydrology and Land Drainage;
- Major Accidents and Disasters; and
- Cumulative Effects.

18.1.2 The topic-specific matters scoped out of further assessment are detailed within Chapters 4 to 17 of this EIA Scoping Report.

18.2 Next steps

18.2.1 Once the Scoping Opinion has been received from the Planning Inspectorate and considered, preparations will be made for the formal pre-application consultation under Sections 42 and 48 of the Planning Act 2008. A Preliminary Environmental Information Report (PEIR) will be produced and consulted on in Q3 2022. The PEIR will provide an initial statement of the environmental information available for the Project, including descriptions of the likely environmental effects and mitigation measures that are expected to be adopted. The PEIR is intended to allow those taking part in the consultation to understand the nature, scale, location and likely significant environmental effects of the Project, such that they can make an informed contribution to the process of preapplication consultation under the Planning Act 2008 and to the EIA process.

18.2.2 Consultation will also be undertaken with the local community in accordance with Section 47 of the Planning Act 2008. A Statement of Community Consultation (SoCC)

will be developed which sets out the types and likely dates of consultation and engagement.

18.2.3 The Applicant will further refine the Project having regard to the consultation responses received from the Scoping Report and PEIR stages of the process. The final results of the EIA will be presented in an Environmental Statement (ES) and a summary of all consultation responses received and how the Applicant had regard to the feedback received will be presented in a Consultation Report, both of which will accompany the Development Consent Order (DCO) application.

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