V Net Zero Pipeline Project

Environmental Impact Assessment - Scoping Report

March 2022

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Applicant: Chrysaor Production (U.K.) Limited, a Harbour Energy Company

Quality information

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Revision History

Revision	Revision date	Details
Rev 1	31/01/22	1st Full Draft
Rev 2	18/02/22	2nd Draft addressing initial client comments
Rev 3	25/03/22	Final Version

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Abbreviations

Abbreviation	Definition
AADT	Average Annual Daily Traffic
AEP	Annual Exceedance Probability
AGI	Above Ground Infrastructure
AGLV	Area of Great Landscape Value
AIL	Abnormal Indivisible Load
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
APS	Annual Population Survey
AQEG	Air Quality Expert Group
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Standards
ASR	Annual Status Report
ATC	Automated Traffic Counts
BEIS	Department for Business, Energy and Industrial Strategy
BGS	British Geological Survey
BMV	Best and most versatile
BNG	Biodiversity Net Gain
BOD	Biological Oxygen Demand
BPM	Best Practicable Measures
BS	British Standard
BTO	British Trust for Ornithology
BTO WeBS	British Trust for Ornithology Wetland Birds Survey
CCC	Climate Change Committee
CCR	Coal Combustion Residuals
CCR	Climate Change Risk
CCS	Carbon Capture and Storage
CCUS	Carbon capture, utilisation and storage
CEMP	Construction Environmental Management Plan
CH_4	Methane
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industries Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments

Abbreviation	Definition
CLJSPC	Central Lincolnshire Joint Strategic Planning Committee
CMEs	Coronal Mass Ejections
CO	Carbon Monoxide
CO_2	Carbon dioxide
CO2e	Carbon dioxide equivalent
CRTN	Calculation of Road Traffic Noise
CZ	Character Zone
dB	Decibel
DBA	Desk-Based Assessment
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DLL	District Level Licensing
DMRB	Design Manual for Roads and Bridges
DoWCoP	Definition of Waste: Development Industry Code of Practice
DPD	Development Plan Documents
EA	Environment Agency
EC	European Commission
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
EEA	European Economic Area
EFT	Emissions Factor Toolkit
EIA	Environmental Impact Assessment
ELDC	East Lindsey District Council
EN-1	Overarching National Policy Statement for Energy
EN-3	National Policy Statement for Renewable Energy Infrastructure
EN-4	National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines
EN-5	National Policy Statement for Electricity Networks Infrastructure
EPC	Engineering, Procurement and Construction
EPD	Environmental Product Declaration
EPSM	European Protected Species Mitigation (License)
ES	Environmental Statement
ESDVs	Emergency shutdown valve

Abbreviation	Definition
EU	European Union
EWC	European Waste Catalogue
E Waste FD	European Waste Framework Directive
EWP	Energy White Paper – Powering our Net Zero Future
FMfP	Flood Maps for Planning
FRA	Flood Risk Assessment
GCN	Great Crested Newt
GHG	Greenhouse Gas
GIS	Geographic Information System
GLLEP	Greater Lincolnshire Local Enterprise Partnership
GLNP	Greater Lincolnshire Nature Partnership
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GVA	Gross Value Added
GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectares
HDD	Horizontal Directional Drilling
HDV	Heavy-Duty Vehicle
HER	Historic Environment Record
HFC	Hydrofluorocarbon
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HLC	Historic Land Characterisation
HRA	Habitats Regulation Assessment
HSE	Health and Safety Executive
HSI	Habitat Suitability Index
HUDU	Healthy Urban Development Unit
IAQM	Institute of Air Quality Management
ICCI	In-Combination Climate Change Impact
ICE	Inventory of Carbon and Energy
IDB	Internal Drainage Board
IEA	Institute of Environmental Assessment
IEMA	Institute of Environmental Management and Assessment
IMD	Index of Multiple Deprivation
INNS	Invasive Non-Native Species
ISO	International Organization for Standardization

Abbreviation	Definition
IPC	Infrastructure Planning Commission (now the Planning Inspectorate)
JNCC	Joint Nature Conservation Committee
KIPS	Killingholme Pipeline System
km	Kilometre
LCA	Landscape Character Area
LCC	Lincolnshire County Council
LAQM	Local Air Quality Management
LCA	Life-Cycle Assessment
LCRM	Land Contamination Risk Management
LCT	Landscape Character Type
LDV	Light-Duty Vehicle
LERC	Lincolnshire Environmental Records Centre
LGV	Light Goods Vehicle
LLFA	Local Lead Flood Authority
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LOGGS	Lincolnshire Offshore Gas Gathering System
LPA	Local Planning Authority
LSOA	Lower Super Output Area
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Sites
m	Metre
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi-Agency Geographic Information for the Countryside
mbgl	Meters Below Ground Level
MHCLG	Ministry of Housing, Communities and Local Government
mm	Millimetre
MLWS	Mean Low Water Spring
MMO	Marine Management Organisation
MMP	Materials Management Plan
MPA	Mineral Planning Authority
MSA	Mineral Safeguarding Area
MSOA	Middle Layer Super Output Area
$MtCO_2$	Metric tons of carbon dioxide
Mtpa	Million Tonnes Per Annum

Abbreviation	Definition
N_2O	Nitrous Oxide
NATMAP	National Soil Map of England and Wales
NCA	National Character Area
NCN	National Cycle Network
NELC	North East Lincolnshire Council
NERC	Natural Environment and Rural Communities Act
NF_3	Nitrogen Trifluoride
NHLE	National Heritage List for England
NHS	National Health Service
NLC	North Lincolnshire Council
NNR	National Nature Reserve
NO_2	Nitrogen Dioxide
NOEL	No Observed Effect Level
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework
NPS	National Policy Statements
NPSE	Noise Policy Statement for England
NRHE	National Record of the Historic Environment
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
NUI	Normally unattended installation
NVQ	National Vocational Qualification
NVZ	Nitrate Vulnerable Zones
OGA	Oil & Gas Authority
ONS	Office for National Statistics
OS	Ordnance Survey
Pb	Lead
PBDE	Polybrominated diphenyl ethers
PEIR	Preliminary Environmental Information Report
PFC	Perfluorocarbon
PFOS	Perfluorooctane sulphonate
PHE	Public Health England
PHI	Priority Habitat Inventory
PIA	Personal Injury Accident Data
PIG	Pipeline Inspection Gauge

Abbreviation	Definition
PINS	Planning Inspectorate
PM	Particulate Matter
PPG	Planning Policy Guidance
PPG-FRCC	Planning Practice Guidance – Flood Risk and Coastal Change
PPGNE	Planning Policy Guidance for the Natural Environment
PRF	Preliminary Roost Features
PRoW	Public Rights of Way
PWS	Private Water Supply
RBD	River Basin District
RBMP	River Basin Management Plan
RCA	Regional Character Area
RCP	Representative Concentration Pathway
REAC	Register of Environmental Actions and Commitments
RIGS	Regionally Important Geological Sites
SAC	Special Area of Conservation
SF_6	Sulphur Hexafluoride
SI	Statutory Instrument
SINC	Sites of Importance for Nature Conservation
SNCI	Site of Nature Conservation Interest
SNHRW	Stable Non-Reactive Hazardous Waste Cell
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SoS	Secretary of State
SP	Strategic Policy
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TA	Transport Assessment
TCE	The Crown Estate
TCO_2e	Tonnes of Carbon Dioxide equivalent
TGT	Theddlethorpe Gas Terminal
TMP	Traffic Management Plan
UKCP18	UK Climate Projections 2018

Abbreviation	Definition
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VNZ	V Net Zero
WeBS	Wetland Birds Survey
WBCSD	World Business Council for Sustainable Development
WFD	Water Framework Directive
WHO	World Health Organization
WLDC	West Lindsey District Council
WMP	Water Management Plan
WPA	Waste Planning Authority
WRAP	Waste and Resources Action Programme
WRI	World Resources Institute
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1. Introduction

1.1 General Background

1.1.1 Chrysaor Production (U.K) Limited (the 'Applicant'), a Harbour Energy group company, intends to transport compressed and conditioned Carbon Dioxide (CO_2) from the delivery point at Immingham to storage in depleted gas reservoirs in the Southern North Sea. This overall project is called the V Net Zero Transportation and Storage Scheme.

1.1.2 The V Net Zero Transportation and Storage Scheme will consist of the following two components as shown in **Figure 1-1**:

- An onshore transportation system comprising a buried 53 kilometre (km) 24" diameter onshore pipeline and shutdown valves with an offtake facility at Immingham. At the former Theddlethorpe Gas Terminal (TGT) site there will be an offshore pipeline tie-in and outlet facility. This onshore transportation will form part of the DCO; and
- An offshore system repurposing an existing 36" diameter decommissioned gas pipeline, a new 23 km section of 36" diameter pipeline and a new normally unattended installation (NUI) with facilities to inject the conveyed CO_2 into the depleted gas reservoirs under the Southern North Sea. The offshore system will not form part of the DCO.

1.1.3 This EIA Scoping Report therefore relates to the **onshore pipeline** transportation system called the **V Net Zero Pipeline**. Details on the wider V Net Zero Transportation and Storage Scheme will be included were necessary to help provide a more thorough understanding of the overall context to the development.

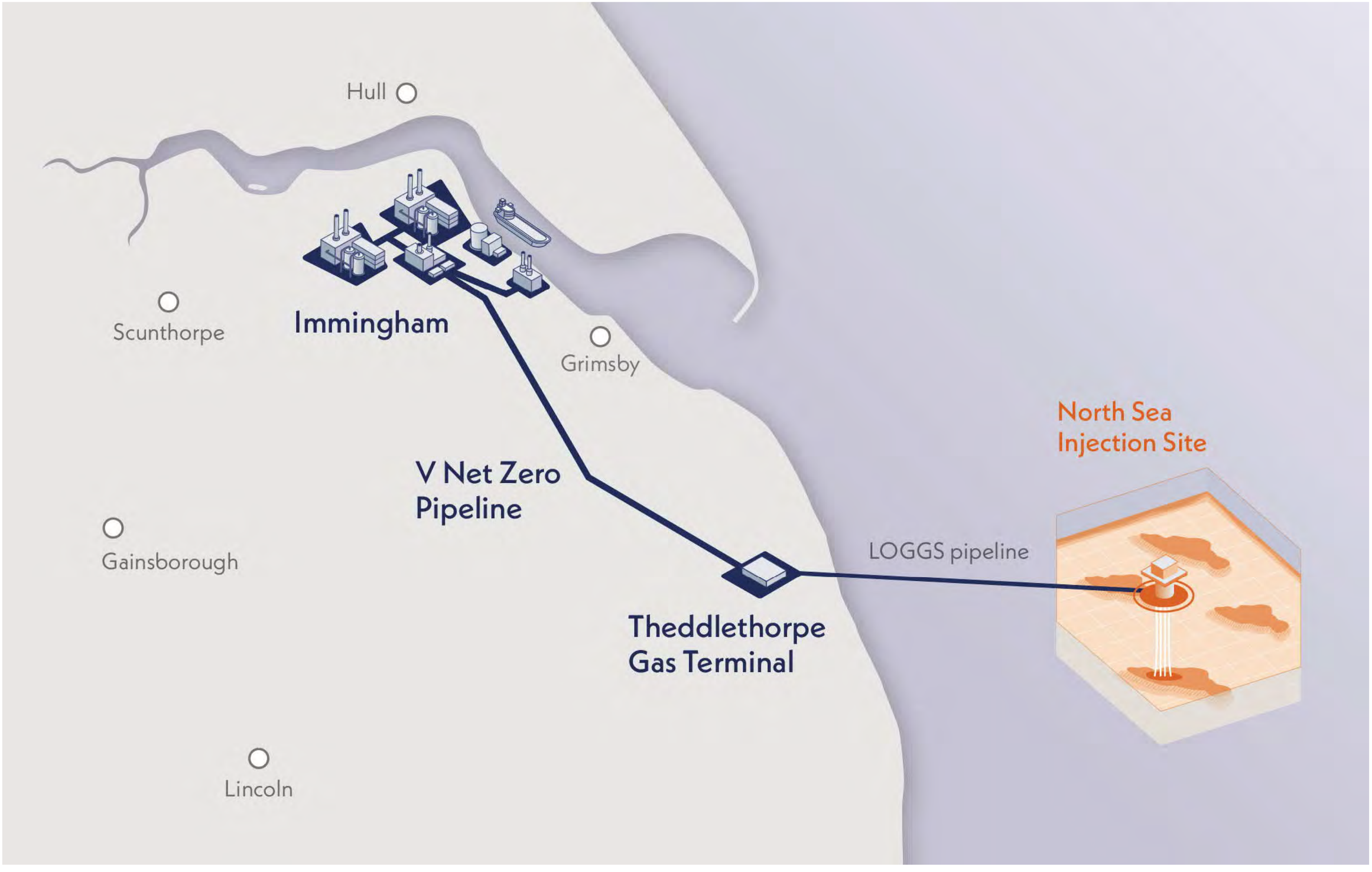
1.1.4 The V Net Zero Pipeline (also referred to as 'the Project') is located in Lincolnshire in the East Midlands of England (**Figure 1-2**). The Project comprises the development of a 53 km buried pipeline, which will enable CO_2 captured by emitters in Immingham to be transported to the former TGT Site, for onward transportation within the existing offshore Lincolnshire Offshore Gas Gathering system (LOGGS) Pipeline and a newly installed spur pipeline, to the offshore injection facilities for permanent storage.

1.1.5 Repurposing the existing offshore gas transmission pipeline infrastructure supports the wider project objective to minimise environmental impact of delivering the V Net Zero Transportation and Storage Scheme.

1.1.6 The V Net Zero Pipeline is classified as a Nationally Significant Infrastructure Project (NSIP) and will therefore require consent via a Development Consent Order (DCO) under Section 14.1(g) and Section 21 of the Planning Act 2008 ('PA2008') as amended. Additionally, it also falls within the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('EIA Regulations 2017'), which require an Environmental Statement (ES) to be prepared and submitted with the application for development consent.

1.1.7 AECOM has been commissioned by the Applicant to prepare this EIA Scoping Report for the Project. This EIA Scoping Report has been produced to establish the proposed scope of the ES and to support the request for a scoping opinion under Regulation 10(1) of the EIA Regulations 2017.

Figure 1-1: Overall V Net Zero Transportation and Storage Scheme



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CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

V Net Zero Pipeline Project Location

NOTES:

FIGURE TITLE

Figure 1-2
V Net Zero Pipeline Project Location

ISSUE PURPOSE

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1.1.8 This Scoping Report provides information to support such a request and can be used to help to inform both the Scoping Opinion and formal consultation with statutory environmental bodies by the Planning Inspectorate.

1.2 Requirement for a DCO

1.2.1 Onshore pipelines over 16.093 km (10 miles) in length are classified as Nationally Significant Infrastructure Projects (NSIPs) under section 14(1)(g) of the PA2008 (as amended) and require a Development Consent Order (DCO). An application for DCO will be submitted to Secretary of State (SoS) for Business, Energy & Industrial Strategy (BEIS) via the Planning Inspectorate. The DCO application will be accompanied by an Environmental Statement (ES) prepared in accordance with the Infrastructure Planning EIA Regulations 2017.

1.2.2 The NSIP will comprise:

- A pipeline for the conveyance of CO_2, and apparatus and works associated therewith, including offtake, offshore pipeline tie-in and outlet facilities;
- Shutdown valves;
- Ancillary works integral to the construction of the pipeline, including; construction compounds, temporary access tracks, and laydown areas;
- Land required for the construction, operation and maintenance of the pipeline; and
- The use of the existing offshore pipeline down to Mean Low Water Spring (MLWS).

1.2.3 The Department for Energy and Climate Change (now the BEIS) published several National Policy Statements (NPS) in relation to nationally significant energy infrastructure, which were designated by the SoS for Energy and Climate Change in July 2011.

1.2.4 There are no existing energy NPSs directly applicable to CO_2 transportation projects such as the V Net Zero Pipeline, but the following NPSs may still be important and relevant considerations in assessing the Project:

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

1.2.5 NPS EN-4 applies to nationally significant infrastructure pipeline projects which transport natural gas or oil. However, NPS EN-4 notes that the information provided within may also be useful in identifying impacts to be considered in applications for pipelines intended to transport other substances.

1.2.6 Updated drafts of both EN-1 and EN-4 were issued in 2021 and re-emphasised the government's plans to help decarbonise the UK's economy. These new emerging documents and any subsequent formal adoption of new NSPs for energy infrastructure will be considered where relevant during the production of the ES.

1.2.7 Section 105 of the PA2008 confirms that where no NPS has effect, projects should be tested against 'important and relevant' matters, which are typically local adopted planning policies and the National Planning Policy Framework (NPPF). Further details are provided in Chapter 3 of this report.

1.3 Requirement for an EIA

1.3.1 The Project falls under Schedule 1, paragraph 16 of the EIA Regulations 2017:

- *'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.'

1.3.2 The V Net Zero Pipeline has not been subject to an EIA Screening Request or Opinion, as all development listed within Schedule 1 is automatically classified as EIA development under the EIA Regulations 2017.

1.3.3 Under Regulation 8 of the EIA Regulations 2017, notification has been submitted to the SoS along with this EIA Scoping Report, to confirm that the Applicant currently intends to submit a DCO Application during winter 2022/2023.

1.4 The Scoping Report

Objective

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

1.4.2 The EIA Regulations 2017 set out the requirements for an applicant who proposes to request a scoping opinion from the SoS. Regulation 10 (3) of the EIA Regulations 2017 states that a request for a scoping opinion must include:

- A plan sufficient to identify the land;
- A description of the proposed development, including its location and technical capacity;
- An explanation of the likely significant effects of the development on the environment; and
- Such other information or representations as the person making the request may wish to provide or make.

1.4.3 PINS Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (June 2020) provides advice on the information that should be provided in the Scoping Report.

1.4.4 **Table 1-1** identifies where the suggested content can be found within this Scoping Report.

Table 1-1: Compliance with PINS Advice Note 7

Suggested information to be included within the Scoping Report	Location within this Scoping Report
The Proposed Development	
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development	Figures 1-3 display the Project location and Scoping Boundary in relation to the Local Planning Authorities, whilst Figure 4-1 shows a more detailed view of the Scoping Boundary. Figure 2-3 provides an

Suggested information to be included within the Scoping Report	Location within this Scoping Report
	overview of the key constraints in the local area.
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, section 2.4 and Chapter 4, section 4.3
EIA Approach and Topic Areas	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	Chapter 2, section 2.5
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	Each technical chapter (6 to 19) of the Scoping Report contains a summary table identifying those topics which will be 'scoped in' and those 'scoped out' of the ES
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided	Summarised within each technical chapter (6 to 19)
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	Information on baseline characteristics are included within Chapters 6-19
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	Items considered to be 'scoped in' for the purposes of the ES are identified within each of the technical chapters (6 to 19) and an overview of the assessment methodology is also provided
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	These details are provided within Chapters 6-19
Information Sources	
References to any guidance and best practice to be relied upon	Appropriate references are provided in Chapters 4-19
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities)	Consultation is currently underway – Chapter 5 provides the latest information as when this document was prepared
An outline of the structure of the proposed ES	Chapter 21 provides a proposed structure for the ES
Transboundary effects	
The Applicant may also wish to provide a completed transboundary screening matrix dealing with the potential effects of the Proposed Development on other European Economic Area (EEA) States	Appendix E. This follows the suggested format for the transboundary screening matrix is provided in the Planning Inspectorate's Advice Note 12 'Transboundary Impact Consultation'

1.4.5 In addition to the above, Regulation 10(3) of the EIA Regulations 2017 also requires "*such other information or representations as the person making the request may wish to provide or make*". A summary of this additional information is included within **Table 1-2** below.

1.4.6 A list of useful abbreviations is included within the front section of this Scoping Report and a glossary of key terms is provided in **Appendix A**.

Table 1-2: Other information included within this Scoping Report

Suggested information to be included within the Scoping Report	Location within this Scoping Report
An overview of the conditions present on site and in the surrounding area, together with a brief overview of the relevant planning policy context	Chapter 3; and technical chapters 6-19
Outline of the scope and assessment methodology (including the significance criteria to be adopted) for assessing the likely significant environmental effects to be employed for each aspect to be reported in the ES	Chapter 4. Each technical chapter (6 to 19) also provides a section on assessment methodology where required
The approach to dealing with alternatives	Chapters 2 and 4
The approach to undertaking the cumulative assessment	Chapter 19
The proposed approach to the EIA and an appraisal of the key environmental aspects and matters to be covered in the EIA (i.e. "scoped in") and the aspects and matters not requiring further consideration (i.e. "scoped out")	Chapters 4 and technical chapters 6 to 19

1.4.7 **Figure 1-3** provides an overview of the Scoping Boundary and overlain on the local planning authorities (LPAs) administrative boundaries through which the Project passes. Further details relating to the identification of the Scoping Boundary is included in Chapter 4.

1.4.8 The objective of this Scoping Report is to outline the proposed approach to the EIA, including identifying the environmental receptors that may be significantly impacted, either positively and negatively. This Scoping Report will inform consultation with the SoS via PINS as well as prescribed consultees, statutory undertakers and section 43 consultees, and enable key stakeholders to comment on the proposed structure, methodology, and content of the ES. It forms a key part of the request for a '*scoping opinion*' from PINS.

Structure of this Scoping Report

1.4.9 The structure of this Scoping Report is outlined below. Chapters 1 to 4 provide further detail on the Project, the legislative framework it falls within and the proposed approach to the EIA. Chapter 5 provides an overview of the stakeholder engagement undertaken to date along with brief details on future consultation activities. Chapters 6 to 19 set out details on the environmental and social setting, the proposed scope and approach to the assessment of pertinent environmental disciplines and the initial identification of potential significant effects. Chapter 20 provides the approach to Major accidents and disasters whilst chapter 21 provides an overall summary and identifies the next steps. In summary, the chapters of this EIA Scoping Report comprise:

- Chapter 1: Introduction;
- Chapter 2: Project Description;
- Chapter 3: Planning Policy Context;

- Chapter 4: Approach to EIA;
- Chapter 5: Stakeholder Engagement and Consultation;
- Chapter 6: Ecology & Biodiversity;
- Chapter 7: Landscape & Visual;
- Chapter 8: Historic Environment;
- Chapter 9: Geology & Hydrogeology;
- Chapter 10: Agriculture & Soils;
- Chapter 11: Water Environment;
- Chapter 12: Air Quality;
- Chapter 13: Noise & Vibration;
- Chapter 14: Traffic & Transport;
- Chapter 15: Socio-economics;
- Chapter 16: Health & Wellbeing;
- Chapter 17: Materials & Waste;
- Chapter 18: Climate Change;
- Chapter 19: Cumulative Effects;
- Chapter 20: Major Accidents and Disasters; and
- Chapter 21: Summary & Next Steps;

1.5 The Applicant

1.5.1 The Project is being developed by Chrysaor Production (U.K) Limited, which is a subsidiary of Harbour Energy plc. Harbour Energy plc was formed in 2021 through a merger between Chrysaor Holdings Limited and Premier Oil plc, and is the largest UK listed independent oil and gas company with its legacy companies having almost 90 years operating experience.

1.5.2 The Applicant is committed to helping solve the dual challenge the world energy markets face, namely increasing energy supply to meet growing demand and doing so with lower greenhouse-gas emissions. They are committed to playing their role in the transition to a lower-carbon economy whilst minimising the environmental impact of their operations around the world.

1.5.3 In support of this, the Applicant has committed to achieving Net Zero for their Scope 1 and 2 greenhouse gas emissions by 2035. For this to be achieved, the Applicant will need to make reductions in their own emissions supplemented by the purchase of independently verified offsets to mitigate the impact of the remaining emissions. Their overall strategy also includes leveraging their existing skills and infrastructure to pursue CO_2 transport and storage.

1.5.4 In line with this strategy, the Applicant has been awarded carbon storage licences by the Oil & Gas Authority (OGA) and have applied for a seabed lease with The Crown Estate (TCE) in relation to the wider V Net Zero Transportation and Storage Scheme. TCE has subsequently indicated its support to the required lease option (subject to final lease agreement).

1.5.5 The Applicant has a long and proud history of operating in the Humber and Lincolnshire area, providing safe and environmentally sound operations. In particular, they have more than 40 years of operational experience relating to the Viking field area, helping to support their geological understanding of the field and its ability to act as a regionally extensive superseal, securing the storage of CO_2. Additionally, they have also provided the stewardship of the TGT site over the same time period.

1.6 The Consultant

1.6.1 AECOM is an IEMA Registered Impact Assessor and also holds the IEMA EIA Quality Mark as recognition of commitment to the quality of our EIA product and continuous training of our environmental consultants. A Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who prepared the ES.

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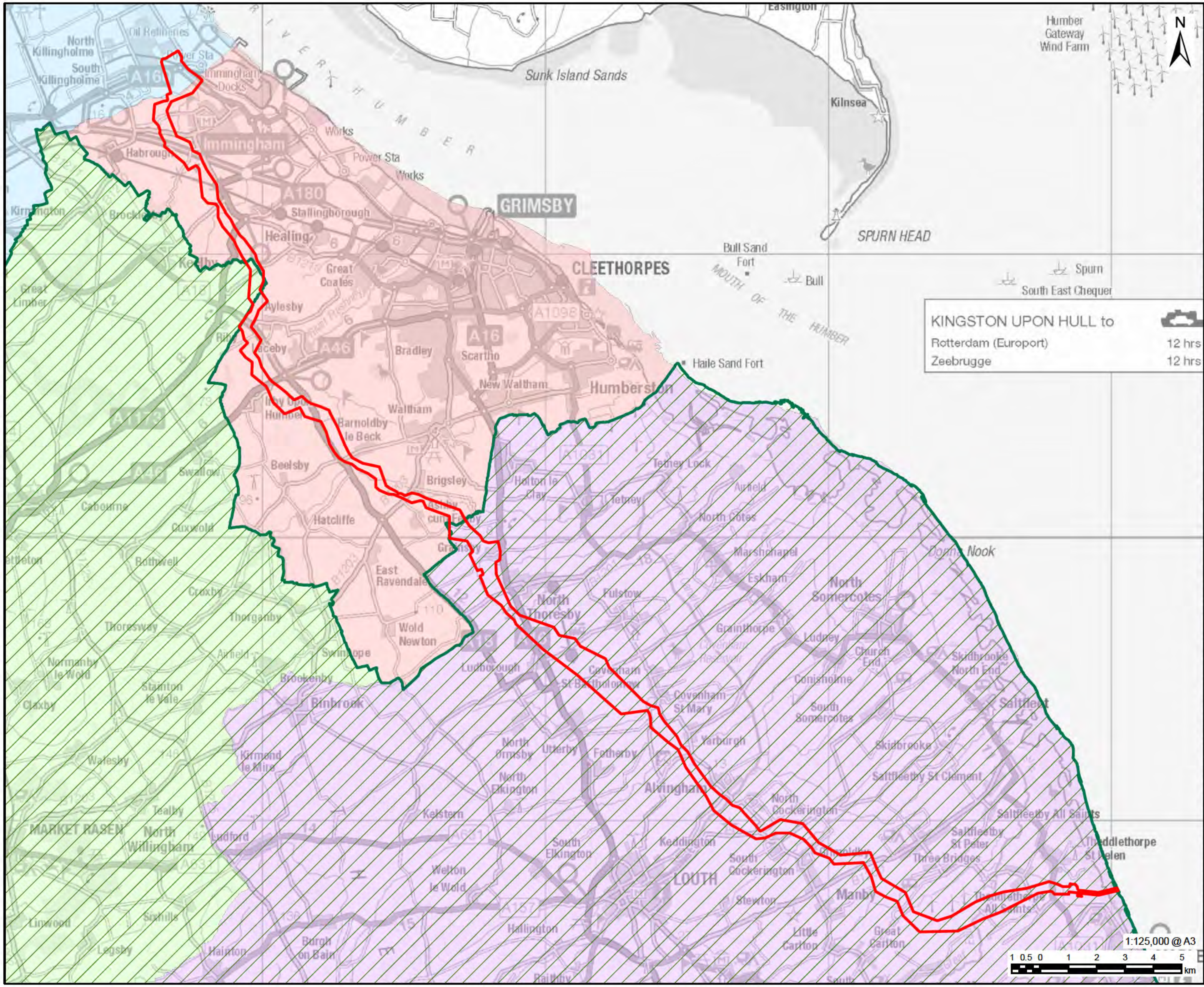

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CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

Scoping Boundary

Local Authority Boundary

Lincolnshire County Council

North East Lincolnshire Council

North Lincolnshire Council

East Lindsey District Council

West Lindsey District Council

NOTES:

FIGURE TITLE

Figure 1-3
V Net Zero Pipeline Scoping Boundary

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2. Project Description

2.1 Introduction

2.1.1 This chapter of the EIA Scoping Report provides a description of the various components of the Project and provides an overview of the design evolution and consideration of alternatives. Details are also provided relating to how the Scoping Boundary was defined and its connection to the preferred pipeline corridor (additional details relating to the Scoping Boundary are also provided within Chapter 4). Where certain elements of the design are not yet fully established or additional site selection work is currently underway, details are provided, and high-level design parameters are set out to aid the initial understanding of the Project. The following section initially describes the wider V Net Zero Transportation and Storage Scheme, of which the V Net Zero Pipeline forms a key element.

2.2 The Wider V Net Zero Transportation and Storage Scheme

2.2.1 As part of their commitments to tackling climate change, the UK government has set legally binding targets to become net-zero in all greenhouse gases by 2050 for England and Wales. In addition, the Government has shown clear commitment to developing Carbon Capture Usage and Storage (CCUS) infrastructure, with a goal of delivering four CCUS clusters, capturing 20-30 Million Tonnes of CO_2 ($MtCO_2$) across the economy, including 6 $MtCO_2$ of industrial emissions, per year, by 2030 (UK Government Net Zero Strategy: Build Back Greener, October 2021).

2.2.2 The Humber industrial cluster represents a unique emissions density within the UK, with 18.5 million tonnes of CO_2 equivalent (CO_2e) emitted in 2019 (Ref 2-1). Decarbonisation of the Humber Energy Intensive Industry Cluster is required to meet the UK Government's legally binding target of achieving Net Zero in 2050. The wider Humber region will require multiple CO_2 storage options to promote greater onshore capture infrastructure development and underpin robust storage risk management through diversity of storage options.

2.2.3 The Applicant wishes to promote regional collaboration towards future development of CO_2 Transportation infrastructure, to enable a broader decarbonisation development across the Humber and Lincolnshire region and to present the opportunity for new inward investment into a future low-carbon economy. The Applicant wants to promote and enable future regional collaboration, which will better enable consistent and factual public engagement and knowledge dissemination across the multiple potential decarbonisation projects within the wider Humber region.

2.2.4 The applicant is also working together with Associated British Ports at Port of Immingham for incorporating the opportunity for ship-based import or export of CO_2, towards a vision of the Humber as a CO_2 trading hub of the future and encouraging greater trade and inward investment.

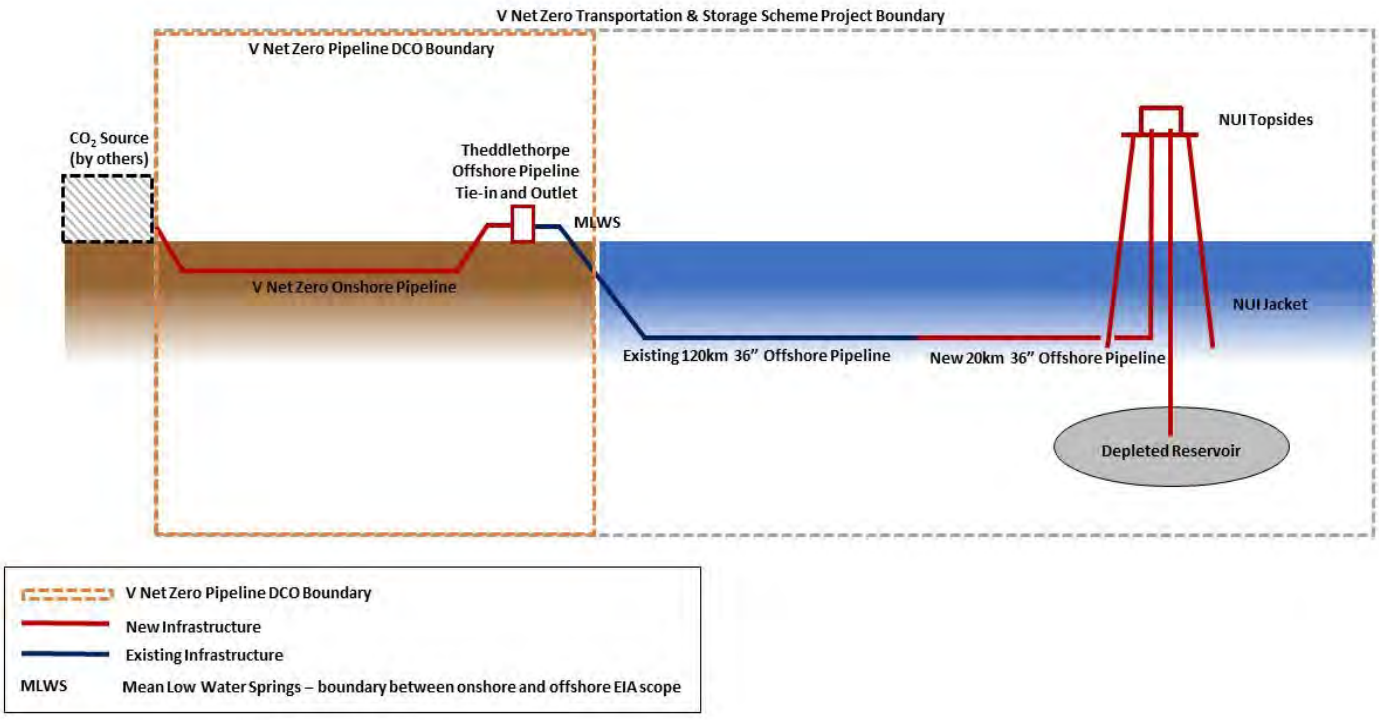
2.2.5 The V Net Zero Transportation and Storage Scheme intends to transport compressed and conditioned CO_2 from the offtake facility at Immingham to storage in depleted gas reservoirs in the Southern North Sea. The Oil and Gas Authority (OGA) awarded the Applicant a CO_2 appraisal and storage licence in 2021. The V Net Zero Transport and Storage Scheme aims to transport and store up to 11 million tonnes of CO_2 annually by 2030, and more than 12 million tonnes annually by 2034.

2.2.6 The main elements of the overall V Net Zero Transportation and Storage System (**Figure 2-1**), comprise:

- CO_2 source, conditioning and compression (e.g. by HumberZero, which is a ground-breaking green project aimed at decarbonising energy intensive industry);
- The V Net Zero Pipeline Project (the Project to which this Scoping Report relates), which consists of offtake facilities at Immingham; Onshore pipeline from Immingham to the former Theddlethorpe Gas Terminal (TGT) and offshore pipeline tie-in and outlet at the TGT site;
- Transportation via the existing and repurposed Lincolnshire Offshore Gas Gathering System (LOGGS) pipeline system (the existing offshore pipeline) onshore from the former TGT site to Mean Low Water Spring (MLWS) tide mark, to approximately 120 km offshore, along with the development of an additional 23 km subsea pipeline spur extension; and
- The utilisation of depleted gas reservoirs in the Viking area of the North Sea for CO_2 injection, more than 140 km offshore where the injection facilities are provided via a normally unattended installation (NUI).

2.2.7 This Scoping Report specifically covers the V Net Zero Pipeline from the point of receipt of CO_2 at Immingham, through its onshore transportation in the new pipeline to the former TGT site, and onward transportation through the existing offshore pipeline to MLWS tide mark. Onward transmission from here would be part of a separate consent application.

Figure 2-1: Schematic of the VNZ Transportation and Storage Scheme



2.3 V Net Zero Pipeline – Key Components

2.3.1 Key components of the V Net Zero Pipeline comprise the following, which are discussed in more detail in sections 2.9 to 2.15:

- Pipeline Offtake Facility at Immingham;
- Approximately 53 km buried 24" Onshore Pipeline including cathodic protection;
- Shutdown valves;
- A PIG launcher and receiver;
- Monitoring and Utility Systems;
- Venting Systems; and
- Offshore pipeline tie-in and outlet at former TGT site.

2.3.2 As part of the ongoing iterative design process, further work is currently underway to identify the land that will be required for temporary construction compounds, laydown/storage areas, and access/haul routes. This information will be provided within the ES and assessment made as appropriate.

2.4 Development Envelope / Design Parameters

2.4.1 The Planning Inspectorate's Advice Note 9: Using the '*Rochdale Envelope*', 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 aspects of a proposed project design that are not yet fixed, and therefore, it may be necessary for the EIA to assess likely credible worst-case variations to ensure that all foreseeable significant environmental effects of a project have been assessed.

2.4.2 The NPSs provide further guidelines on flexibility and should be referred to in justifying the amount of design detail contained within an application. The National Infrastructure Planning Association (NIPA) has published papers on striking the right balance between design detail and flexibility in DCOs and their recommendations for best practice will be considered in preparing the DCO application.

2.4.3 Consequently, it is prudent to maximise flexibility given the long lead in times to consent and subsequent engagement of EPC (engineering, procurement, and construction) contractors. This is particularly the case under the Planning Act 2008 where the process for post consent amendments can add unnecessary costs and delays to project delivery. It is typical for a DCO (especially linear schemes) to include the ability to alter the final design of a scheme by having "limits of deviation". For the V Net Zero Pipeline, we expect this limit of deviation to be set at around 100 metres, with a working width corridor of 36 metres within it.

2.4.4 This EIA Scoping Report is based on the emerging preliminary design for the Project available at the time of preparation, as described below. The Project is to be developed further through referenced design stages which will form the basis for the Statutory Consultation and then the DCO application. We understand that if any significant changes occur, there may be a need to re-consult and request a new scoping opinion.

2.4.5 Design parameters will be developed for statutory consultation and presented in the Preliminary Environmental Information Report (PEIR). Final parameters and limits of deviation will be presented in the ES, draft order and works plans.

2.4.6 When presenting the project design in the ES and the accompanying assessment, the requirements of Advice Note 9 will be complied with to ensure that the likely significant effects of the Project are assessed on a reasonable worst-case basis.

2.5 Design Evolution and Consideration of Alternatives

2.5.1 The area depicted as the Scoping Boundary (shown on **Figure 1-3** and **Figure 4-1**) reflects the Preferred Pipeline Corridor within which the V Net Zero Pipeline would be routed. The Scoping Boundary has been identified following significant work undertaken by the Applicant and their consultants, which was captured in the V Net Zero Pipeline Routeing Study. Further details of the approach to and outcome of the V Net Zero Pipeline Routeing Study are provided below.

Approach to Routeing

2.5.2 A preliminary high-level routeing assessment was undertaken by the Applicant to gain an initial understanding of the constraints and opportunities for the routeing of the proposed V Net Zero Pipeline. That preliminary high-level routeing assessment was then used to help inform the identification of potential pipeline corridors for inclusion in a V Net Zero Pipeline Routeing Study. This study reviewed a range of factors including safety, technical, cost, land related and environmental considerations.

2.5.3 **Table 2-1** below presents the topics and criteria which have been considered for the V Net Zero Pipeline Routeing Study. The environment sub-topics are aligned with applicable requirements of Section 5 of EN-1 (including the 2021 draft version).

2.5.4 As described in Section 1.2 of this Scoping Report, the Project is a NSIP and will require a DCO application to be made to BEIS. As such, the appropriate policy tests for the Project are those set out in NPS EN-1 and EN-4.

Table 2-1: V Net Zero Pipeline Routeing Study: Topics and Associated Sub-Topics

Environment	Technical	Cost	Lands
a. Biodiversity (EN-1 Section 5.3, Draft EN-1 Section 5.4); b. Landscape and Views (EN-1 Section 5.9, Draft EN-1 Section 5.10); c. Historic Environment (EN-1 Section 5.8, Draft EN-1 Section 5.9); d. Water Environment (EN-1 Section 5.7 and 5.15, Draft EN-1 Sections 5.8 and 5.16); e. Soils and Geology (EN-1 Section 5.3 and 5.15, Draft EN-1 Section 5.4 and 5.16); f. Traffic and Access (EN-1 Section 5.13, Draft EN-1 Section 5.14);	i. Robust pipeline design for safety j. Pipe content and operating conditions k. Robust pipeline design for safety l. Terrain and geotechnical conditions, major road and river crossings, utilities, and other crossings m. Permanent access and maintenance n. Construction access and haul roads o. Security p. Operation and maintenance q. Site specific hazards e.g. wind turbines,	r. Capital cost.	s. Current and proposed land uses; t. Requirement for additional third-party consents / approvals.

Environment	Technical	Cost	Lands
g. Land Use (EN-1 Section 5.4 and 5.10, Draft EN-1 Sections 5.5 and 5.11); h. Planning (EN-1 Section 5.10, Draft EN-1 Section 5.11).	electric cables or overhead electric cable crossings		

2.5.5 The following guiding principles were used to identify pipeline corridor options:

- Deliver a pipeline to enable the transportation of CO_2 to be undertaken in a safe and secure manner;
- Deliver a pipeline that is technically viable and constructable;
- Deliver a pipeline which emitters have the capability to feed into;
- Seek to utilise existing infrastructure or existing pipeline transit corridors wherever possible to help minimise impacts on the environment and minimise costs;
- Shorter, more direct routes will generally be of benefit/advantage compared with longer, less direct routes, as smaller scale infrastructure projects are generally likely to have lower environmental, safety, sustainability, and cost implications (for comparable technology options); and
- Options that avoid or minimise and mitigate impacts on environmental or socio-economic features will generally be of benefit/advantage compared with those which have the potential for significant residual effects.

2.5.6 With respect to the utilisation of existing infrastructure, this included consideration of the existing condensate pipeline route (between Killingholme and Theddlethorpe) due to this pipeline being emptied, cleaned, and put out of service in 2018 (the pipe remains in the ground). In addition, the existing Killingholme Pipeline System (KIPS) route, which runs between Killingholme and Theddlethorpe, was noted with respect to potential crossings and any potential for utilisation of existing easements.

2.5.7 Shutdown valves are likely be required along the pipeline and will be considered as part of the detailed design process. Their footprint and scale is relatively small and there is substantial flexibility as to their location. Consequently, their siting was not expected to have a major influence on robustness of the routeing work and the selection of a preferred corridor.

2.5.8 The options appraisal process comprised the following:

- The collation of relevant data for each topic area and identification of constraints (**Figure 2-3**). Relevant data comprised desk study information on internationally, nationally, regionally, and locally important receptors and features (such as, but not limited to, urban settlements, Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Local Nature Reserves (LNR), Local Wildlife Sites (LWS), Areas of Outstanding Natural Beauty (AONB), Listed Buildings, Scheduled Monuments, Flood Zones 2 and 3, Main Rivers, Source Protection Zones (SPZ), Superficial Geology, Agricultural Land Classification (ALC), historic landfill sites, local plan allocations, planning and DCO applications, mineral safeguarding zones, existing infrastructure (including roads, railways and pipelines). No surveys, such as ecological survey work, were considered necessary to support the routeing and siting work, however vantage point surveys were undertaken

by pipeline engineers to provide essential input to the engineering aspects of routeing; and

- Appraisal of each pipeline corridor option to understand the potential for effects. For each environmental feature or receptor, its nature, value or sensitivity and how it could be affected by the option has been considered, including details of how the effect could be avoided or mitigated and what the residual effects would be, noting whether effects are likely to be positive, negative or neutral. The capital cost of the options, based on broad assumptions regarding the technology to be used and the likely length of the scheme, have been considered where this was pertinent to decision making.

2.5.9 Data layers were collated into an ArcGIS Online Geographic Information System ('WebGIS') database to allow them to be individually mapped, overlain and used to help in the identification and appraisal of potential pipeline corridor options.

Identification of Pipeline Corridors

2.5.10 Using the guiding principles described above, several pipeline corridors were identified providing an end-to-end connection between Immingham and the former TGT Site. As well as the guiding principles described above, further routeing principles were identified for each of the constraints data identified in the desk study; wherever feasible, these features and receptors were avoided to minimise the potential for environmental effects.

2.5.11 It was not always feasible to avoid all environmental and physical features and receptors present in the Study Area. This is particularly the case where the pipeline corridors are wider (approximately 1km wide) to provide additional routeing flexibility where fewer features and constraints are present. However, the extent to which the much narrower 100m pipeline Limits of Deviation would be able to avoid such features and/or be able to reduce adverse effects through temporary narrowing, or through the implementation of mitigation measures (such as use of trenchless installation techniques) was considered in more detail in the options appraisal process.

2.5.12 Although avoidance (where feasible) of the environmental and physical features and receptors formed the basis of the routeing principles, one of the key objectives was to avoid routeing through the Lincolnshire Wolds AONB wherever feasible. NPS EN-1 states that AONBs have (together with National Parks and the Broads) the highest protection status with respect to landscape and scenic beauty, and their conservation should be given substantial weight by the Inspectorate in determining applications for development consent. Consent for development in the AONB may be granted in exceptional circumstances, where development is in the public interest. Applications should include an assessment of the need case, the cost and scope of alternatives, and the nature of any detrimental effect on the environment, landscape, and recreational opportunities and the extent to which they can be moderated.

2.5.13 Wide corridors were identified, wherever feasible and appropriate, to ensure maximum flexibility for the latter, more detailed routeing of the pipeline, its associated 36m working width and the anticipated limits of deviation of 100m.

2.5.14 Except for the area between North Thoresby and Covenham St Mary (see summary of 'Section D' below) several pipeline corridors were identified, providing up to three different pipeline corridor options, depending on the geographical location in the Study Area.

2.5.15 Once broad corridor options were identified, due to the nature and location of the environmental and physical features and receptors, there were four locations where all corridor options intersected (notwithstanding the start and end points at Immingham and the

former TGT Site). This led to the division of the Study Area into five distinct 'Sections' (A, B, C, D, and E) within which the corridor options resided as follows:

- **Section A** - Corridors A1 and A2;
- **Section B** - Corridors B1, B2A, and B2B;
- **Section C** - Corridors C1, C2, and C3;
- **Section D** - Corridor D1; and
- **Section E** - Corridor E1A, E1B and E2.

2.5.16 Where corridors have a suffix of 'A' or 'B' after the number, this is a sub-option providing a partial alternative to a main option.

2.5.17 In Section B, Corridor 1 provides an alternative (outside of the AONB) to Corridors 2A and 2B (which are both partially within the AONB). Similarly, in Section C, Corridors 1 and 2 provide alternatives (outside of the AONB) to Corridor 3 (wholly within the AONB).

2.5.18 In Section D, the consistency and relative lack of environmental and physical constraints and receptors between North Thoresby and Covenham St Mary led to the identification of a single, wider corridor in this location.

2.5.19 The implementation of the 5 intersecting Sections had the effect of enabling the pipeline to 'jump' from one corridor to another between the Sections; this increases the flexibility of the V Net Zero Pipeline Routeing Study, providing further opportunities for optionality (and therefore greater potential for minimising effects) compared to identifying full end to end options. Subsequently, the appraisal of the corridor options was undertaken on a Section-by-Section basis (see paragraphs 2.5.21 to 2.5.23 for a summary of the appraisal process and outcome).

2.5.20 For all corridors, it was assumed that the pipeline would be installed in an open cut trench as the default installation method; however, consideration was also given to the use of trenchless techniques to enable the pipeline to be installed beneath certain physical constraints (railway lines, A roads, main rivers, canals and priority habitats). A schematic of the various route options considered is provided in **Figure 2-2**.

Appraisal of Corridor Options

2.5.21 Each of the corridor options identified has been appraised in accordance with a methodology developed to provide a thorough appraisal of options and to inform robust decision-making. The aim was to ensure that decisions regarding the routeing of the V Net Zero Pipeline were based upon a thorough understanding of the implications of each option, using a wide range of suitable criteria. The methodology described earlier in the 'Approach to Routeing' section, including the topics and sub-topics set out in **Table 2-1**, have formed the basis of the appraisal.

2.5.22 Each of the eight sub-topics under the main topic of 'Environment' identified a preferred corridor (for each of the five Sections) where it was considered that there were meaningful differentiators between the options. Where no significant differentiators between corridors were identified, this was stated. Similarly, the preferred corridor in respect of the remaining four main topics of 'Technical', 'Cost' and 'Lands' were identified for each of the five Sections; if no significant differentiators were identified between the corridor options this was stated.

2.5.23 **Table 2-2** below provides a high-level overview of the appraisal process for each of the five Sections. The 'Sections' as they relate to the Scoping Boundary are shown on Figure 2-3.

Figure 2-2: Schematic of Corridor Options and Indicative Preferred Corridor

Table 2-2: Appraisal of Pipeline Corridor Options: High-Level Summary

Section	Preferred Corridor	Reasoned Justification
A	Corridor A1	<u>Environment</u> Corridor A1 is marginally preferred due to the excellent access to the existing road network compared to Corridor A2 which, in comparison, has poor access. The marginal preferences for Corridor A2 (for four environmental sub-topics of historic environment, landscape and views, soils and geology, and planning) are considered to be very slight, with any potential for more significant effects able to be avoided by using trenchless techniques; these marginal preferences for Corridor A2 are not considered to outweigh the strong preference for Corridor A1 from a transport and access perspective. <u>Technical and Cost</u> Corridor A1 is preferred as it is marginally shorter in length (therefore would be marginally cheaper and would help to minimise cumulative disturbance) than Corridor A2 and has better access to and from the highway network. Corridor A1 also has the potential for fewer pipeline crossings. For these reasons, it is also expected to be marginally more cost effective than Corridor A2. <u>Lands</u> There are no significant differentiators between either corridor.
B	Corridor B2A	<u>Environment</u> - Corridor B1 is unsuitable due to the potential interaction (and associated impacts) with the granted solar farm planning permission south of Bradley Wood. For most of the environmental sub-topics, there are only marginal differences between Corridor B2A and

		Corridor B2B; however, Corridor B2A is preferred to Corridor B2B due to it being routed outside of the Lincolnshire Wolds AONB for most of its length. Technical and Cost Corridor B1 is unsuitable (see 'Environment' above). There are no significant differentiators between Corridor B2A or Corridor B2B and both have good access along their entire length via the A18. Lands Corridor B2A or Corridor B2B are preferred due to the potential impact on the granted solar farm planning permission.
C	Corridor C1	Environment Where an environmental sub-topic has identified a marginal preference, this is spread equally between all three corridors. However, from a landscape and views perspective, there is a stronger preference for Corridor C1 due to it being routed outside of the Lincolnshire Wolds AONB and avoiding the well-established and tightly knit field boundaries, hedgerows, and tree groups (present in Corridor C2) which have the potential for landscape and biodiversity value. Technical and Cost There are few differentiators between the corridors in Section C; of note is the potential for some difficulties routeing around Grainsby in Corridor C1 (space, possibility for narrowing of installation corridor or trenchless crossing) and the marginally better potential for access via the A18 along most of the length of Corridor C2 and Corridor C3. Corridor C2 or Corridor C3 are marginally preferred. Lands Corridor C1 is preferred as it has less impact on the Residential Waste Recycling facility at the southern extent, which could have potentially greater business disturbance claim on the alternate corridors (where both accesses are severed).
D	Corridor D1	Only one corridor present in Section D based on general lack of constraints in this area.
E	Corridor E2	Environment On balance, Corridor E2 is preferred due to most of the corridor being outside of the alluvium superficial geology and outside of Flood Zones 2 and 3, and the presence of fewer biodiversity priority habitats and planning applications. Where other environmental sub-topics have preferences for Corridor E1A or E1B, these are marginal, and are not considered to outweigh the overall preference and suitability of Corridor E2. Technical and Cost Corridor E2 is preferred due to most of the corridor being outside of the alluvium superficial geology and outside of Flood Zones 2 and 3. There is better access from the local roads than for Corridors E1A and E1B and access for main river crossings (particularly canal crossings) is good. The difficulties of routeing through the Saltfleetby area (Corridor E1A and E1B) are likely to result in additional cost and time (programme). Lands Corridor E1B or Corridor E2 are preferred to avoid Saltfleetby B Gas Terminal.

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Section A

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CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- National Cycle Route
- Public Right of Way
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Monument
- Conservation Area
- Local Nature Reserve
- Ramsar
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- Lincolnshire Wolds Area of Outstanding Natural Beauty
- Area of Great Landscape Value

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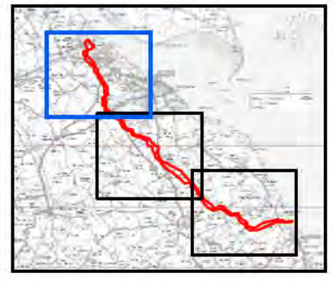

FIGURE TITLE

Figure 2-3 (1 of 3)
Environmental Constraints

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

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Section B

Section C

Section D

Section E

N

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CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- National Cycle Route
- Public Right of Way
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Monument
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- Local Nature Reserve
- Ramsar
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- Special Area of Conservation
- Site of Special Scientific Interest
- Lincolnshire Wolds Area of Outstanding Natural Beauty

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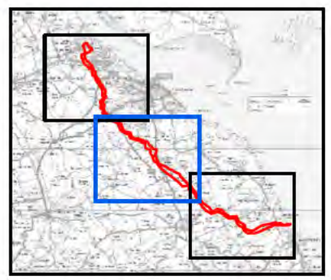

FIGURE TITLE

Figure 2-3 (2 of 3)
Environmental Constraints

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_2-3

Revision: 4 Drawn: LC Checked: HT Approved: MW Date: 2022-03-23

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Section E

CONSULTANT
AECOM

CLIENT
Chrysaor Production (U.K.) Limited

PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Public Right of Way
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Monument
- National Nature Reserve
- Ramsar
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- Lincolnshire Wolds Area of Outstanding Natural Beauty

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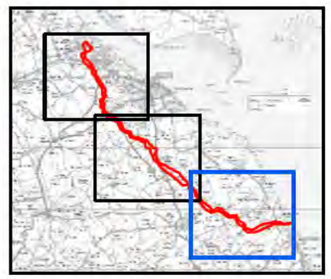

FIGURE TITLE
Figure 2-3 (3 of 3)
Environmental Constraints

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
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2.5.24 A full description of the design evolution and assessment of alternative options will be presented in detail in the Assessment of Alternatives chapter in the PEIR and ES.

2.6 Safety

Overview

2.6.1 Safety is our highest priority, and we operate responsibly and securely across all our activities. We work to reduce risks and protect our staff, contractors and the communities within which our activities have the potential to cause impact through the rigorous application of safe engineering practices in all we do.

Responsibility

2.6.2 Our Board of Directors oversees health and safety matters through the Health, Safety, Environment and Security (HSES) Committee. This Committee has a wide scope of responsibilities and is supported by our CEO, the Executive Vice President HSES and Global Services, and our business unit and HSES leaders. Harbour Energy's Leadership Team reviews HSES performance on an ongoing basis and carry out periodic reviews in each business unit. These reviews cover a wide range of leading and lagging key performance indicators that we use to further support our continuous improvement efforts. Everyone working for or on behalf of Harbour Energy has a personal responsibility to undertake their work in a safe and respectful manner.

Approach

2.6.3 Our HSES Policy is implemented through our Business Management System (BMS), which comprises a comprehensive set of standards and procedures that define our expectations and requirements for managing all our business activities. Our HSES Policy, endorsed by our CEO, supports and confirms our commitment to continually improve our performance. We strive to achieve process safety excellence and work continually to reduce the likelihood and potential severity of process safety events and improve occupational health and safety practices.

2.6.4 Harbour Energy has extensive experience of managing major hazard potential facilities, both onshore and offshore, developed throughout the operating history of the heritage companies in the UK. We apply best practices in the design use and maintenance of our equipment, planning every stage of our operations with the highest levels of control in order to minimise residual safety risks.

2.6.5 We are committed to implementing robust controls to systematically identify, evaluate and manage risks during all phases of the project lifecycle from design through to construction, operation and ultimately decommissioning, in line with our commitments of achieving no harm to people and protecting the environment. Furthermore, we promote robust regulator and public engagement to ensure correct design and planning are demonstrated to all stakeholders throughout or operational and project lifecycles.

2.6.6 We will employ rigorous checks to the design and regular inspections when in operation to ensure the system is in a well-defined and safe condition. We will work closely with landholders and land users to ensure that the pipeline location is well signposted to avoid any accidental interference with the pipeline, and that the burial depth of the pipeline is sufficient to prevent any potential for regular activities such as farming or road use to present any threat to the pipeline's integrity.

2.6.7 Harbour Energy will design, construct and operate the pipeline in accordance with the UK's Pipeline Safety Regulations (1996) and with best design practice standards.

2.7 Pipeline Offtake Facility at Immingham

2.7.1 The facilities to capture, meter and compress for transport any captured CO_2 would be performed by the emitters themselves, such as at the Humber refinery run by Phillips 66 or the VPI Immingham combined heat and power plant. Proposals by Phillips 66 and VPI (Humber Zero) are part of separate applications which are currently been prepared by these developers, under the Town and Country Planning Act 1990. These works therefore do not form part of the Project.

2.7.2 The first component of the Project will consist of the pipeline offtake facility which will be in South Killingholme, to the south of the existing VPI Immingham Site. These facilities will be located in a currently unused section of land to the south of the VPI Immingham site (**Figure 2-4**) and would include an offtake facility which connects directly to the compressor station from where the CO_2 will be transported. The Project's facilities will require a relatively small area, consisting of around 0.15 km^2.

2.7.3 The key components of the Pipeline Offtake Facility at Immingham consist of:

- Launcher (pig trap);
- Filtration;
- Fully actuated Shutdown Valve with separate hydraulic power unit;
- Isolation valves;
- Venting system; and
- Instrument and Control Kiosk.

2.7.4 **Appendix B** contains a more detailed overview of the Scoping Boundary within which the Pipeline Offtake Facility will be located.

Figure 2-4: Potential Pipeline Offtake Facility Site at Immingham

2.8 Onshore Pipeline

Pipeline Corridor

2.8.1 The onshore pipeline will be designed, constructed, operated and maintained in accordance with UK's Pipeline Safety Regulations (1996) and with best design practice standards and PD8010 Code of Practice for Pipelines – Part 1 Steel Pipelines on Land.

2.8.2 The Preferred Pipeline Corridor for the pipeline has been identified and is displayed as the Scoping Boundary on the supporting facilities. As discussed in section 2.5, a significant amount of routeing work has been undertaken to identify the Preferred Pipeline Corridor. The likely length of the pipeline alignment within the corridor is approximately 53 km. Key features of the pipeline route, in each of the five sections of the corridor, are described in **Table 2-3**.

Table 2-3: Key features of Preferred Pipeline Corridor

Section	Description
Section A - Immingham to Riby	The Project starts at Immingham where the pipeline will tie-in south of the existing VPI Immingham combined heat and power station and then run parallel to Manby Road before heading in a south westerly direction north of Immingham and Immingham Golf Club (which closed in 2018). The corridor then travels in a south easterly direction passing east of Immingham, crossing the A180 and the railway line. The corridor continues in a south easterly direction, passing west of Stallingborough and Healing and then crossing the A1173 before heading in a southerly direction east of and parallel to the A1173 towards the A18 between the settlements of Riby and Aylesby.
Section B - Laceby to A1203	The corridor travels in a southerly direction, south of and parallel to the A18. As it crosses, the A46, the corridor passes into the Lincolnshire Wolds AONB for approximately 1.5km as it heads in a more south easterly direction towards the A18 south of the Best Western Oaklands Hall Hotel. At the A18, the corridor exits the AONB and parallels the A18 in a south easterly direction towards Barnoldby le Beck which is to the east of the corridor as it crosses Waltham Road. The corridor crosses Waithe Beck (main river) and continues towards Main Road near Brigsley.
Section C - Ashby cum Fenby to North Thoresby	The corridor crosses Main Road at Brigsley and travels between Ashby cum Fenby and Brigsley south of Waithe Beck and towards Grainsby. Here, the corridor heads in a more southerly direction immediately east of Grainsby and the A16 and crossing the Black Leg Drain where it meets Section D.
Section D - Ludborough to Covenham St Bartholomew	In Section D, the corridor is generally wider as it heads in a south easterly direction north of Ludborough towards Covenham St Mary. The corridor crosses the A16, the Lincolnshire Wolds Railway, Pear Tree Lane and then crosses Pulton Drain (main river) and Ings Lane immediately south east of Covenham St Mary.

Section	Description
Section E - Covenham St Mary to Theddlethorpe	The corridor continues in a south easterly direction, parallel and west of Yarburgh Road and the settlements of Yarburgh, North End and Alvingham, crossing Westfield Road, Alvingham Road, and the Louth Canal and River Ludd (main rivers). Here, the corridor crosses Mill Hill Way immediately north of South Cockerington, and then crosses Gray Fleet Drain and in a more easterly direction towards the B1200. The corridor then heads south, crossing the Long Eau (main river) and then heads in an easterly direction, immediately south of the wind farm towards the crossing of the Great Eau (main river). From here, the corridor continues in an easterly direction, crossing Mill Road and the A1031 before making a connection to the former TGT site.

Pipeline Route Refinement

2.8.3 Additional detailed engineering design and environmental work is currently being undertaken to define a proposed pipeline route alignment within the currently identified Preferred Pipeline Corridor. This proposed route alignment and its associated 100m limits of deviation will be included within the draft Order Limits subject to the application, and details will be included within the ES. This process is currently ongoing and will also be informed by the non-statutory and statutory consultation which will be completed during 2022.

Pipeline Characteristics

2.8.4 The pipeline is expected to have an internal diameter of 24" and buried to a minimum depth of 1.2 m. The design pressure for the pipeline is anticipated as a maximum of 150 barg. Further design work is currently ongoing and thus all details outlined here will be confirmed in the ES.

2.8.5 The pipeline will be designed for a minimum operational life of 40 years, and it may be possible for measures to be taken to extend its operational lifecycle.

Pipeline Crossings

2.8.6 Anticipated crossing types and numbers are provided in **Table 2-4**. Details of available construction techniques for making these crossings are provided in section 2.15.

Table 2-4: Preliminary crossing types and numbers

Crossing type	Number of crossings identified within Scoping Boundary
Railway	Three railway crossings comprising Port of Immingham Line, Barton Line and Lincolnshire Wolds Railway.
Main River	Seven Main River crossings comprising Waithe Beck, Poulton Drain, River Lud, Louth Canal, Grayfleet Drain, Head Dike Drain and Old Engine Drain.

Crossing type	Number of crossings identified within Scoping Boundary
Ordinary Watercourse	Approximately 21 Ordinary Watercourse crossings including North Beck Drain, Old Fleet Drain, Laceby Beck and Green Dike.
Road	44 road crossings including Rosper Road (2), Unnamed Road, Unnamed Road, A173 Manby Road, Mill Lane, B1210 Harbrough Road, A180, Unnamed Road, Keelby Road, Riby Road, Wells Road, Unnamed Road, Barton Street, Unnamed Road (access track), A46, Old Man Road, Unnamed Road, Barton Street, Main Road, B1203 Ashby Hill, Thoroughfare, Gransby Lane, Unnamed Road, Unnamed Road, A16, Station Road, Pear Tree Lane, Ings Lane, Westfield Road, Alvingham Road, Unnamed Road, Louth Road, Mill Hill Way, Marsh Lane, Northgate Lane, B1200 Manby Middlegate, Willow Row Bank, Thacker Bank, Unnamed Road, Unnamed Road, High Gate and A1031 Mablethorpe Road.

Pipeline Design Standards, Codes and Regulations

2.8.7 Key design standards, codes and regulations relevant to the design of the Project include:

- Pipeline Safety Regulations 1996;
- Construction (Design and Management) Regulations 2015;
- Health and Safety at Work Act 1974;
- Management of Health and Safety at Work Regulations 1999;
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulation 2013;
- PD8010-1: Pipeline Systems. Steel pipeline on Land, second Edition, March 2015;
- ASME B31.3 Code for Pressure Piping;
- IGEM/TD/13 Pressure regulating installations for Natural Gas, Liquefied Petroleum Gas and Liquefied Petroleum Gas/Air; and
- API Specification 5L Specification for Line Pipe.

Pipeline Cathodic Protection

2.8.8 A Cathodic Protection (CP) system to monitor the status of the pipeline will be installed. The exact design of the CP system is currently being investigated but it is anticipated that it is likely to be an impressed current system with ground beds installed comprising of a series of anodes laid end to end in a trench. The CP design may require a ground bed to be preferably at a block valve station to provide added security for the rectifier and mains power cabinets. CP test posts will be installed at intervals along the length of the pipeline.

2.9 Shutdown Valves

2.9.1 A shutdown valve is a hydraulic actuated and spring return valve designed to stop the flow in the pipeline, upon the detection of a potentially dangerous event or non-standard operating conditions. The shutdown valves will quickly enable pipeline sections to be isolated in the extremely unlikely case of loss of containment from the pipeline, helping to minimise the impacts to the environment. This minimises risk of possible harm to people, equipment or the environment. The shutdown valves are designed to automatically operate in the event of a potentially dangerous event.

2.9.2 Shutdown valves are un-manned and are contained within a secure fenced-off compound, normally about 30m by 20m with a gated entrance, a control kiosk and paved entrance road, as well as a mains power metering cabinet fed by an incoming overhead powerline or buried cable. They will also have venting facilities to allow for purging.

2.9.3 Further design work is currently being undertaken with the ongoing route alignment work to identify suitable locations for the required shutdown valves. So, whilst the exact location of the shutdown valves is not defined, they will lie within the Scoping Boundary area identified within this report.

2.10 Pipeline Inspection Gauge Facilities

2.10.1 PIG traps are used for inserting PIGs into a pipeline then launching, receiving, and finally removing them without flow interruption. The PIG trap will be used to send and receive PIGs during commissioning tests and to receive PIGs during maintenance activities in the Operational Phase. PIGs are used for activities such as checking for defects (intelligent inline inspection), and inspection of the inside of the pipeline.

2.10.2 PIG trap facilities are expected to be located at the Pipeline Offtake Facility at Immingham (PIG Launcher), and at the repurposed former TGT site in Theddlethorpe (PIG Receiver),

2.11 Monitoring and Utility Systems

2.11.1 Monitoring systems will be required to support the operation of the system, enabling the operator to monitor the pressure, temperature and flow rate of the CO_2 within the pipeline.

2.11.2 The specification of the control and monitoring facilities has not yet been determined but work is ongoing. The instrumentation and control system shall be based on the latest version of advanced and proven integrated control and safety system (ICSS). The ICSS architecture and interface/support networks, communication links would be specified to achieve a high degree of operational reliability and availability and shall be designed with the highest standards of cybersecurity.

2.11.3 The exact electrical supply requirements will be determined over the coming months as the design of the Project advances. As a minimum the following on-site infrastructure, is anticipated to be required:

- Main switchboard (subject to security of supply);
- Switchgear/transformers;
- Cabling and Grounding System; and
- Lighting.

2.12 Venting Systems

2.12.1 Venting systems are anticipated to be required at both the Pipeline Offtake Facility at Immingham, and at the offshore pipeline tie-in and outlet at the former TGT site. Further work is currently being undertaken to determine if they are also required at other locations such as at shutdown valves, and if required this will be assessed within the EIA.

2.13 Offshore Pipeline Tie-in and Outlet at former TGT Site

2.13.1 The onshore pipeline would enter the repurposed TGT site from the west and terminate at new facilities built next to the existing offshore Pipeline, which enters the site from the east. The key components of the offshore pipeline tie-in and outlet at the former TGT site consists of:

- Receiver (pig trap);
- Filtration;
- Flow metering skid package;
- Fully actuated Shutdown Valve with separate hydraulic power unit;
- Isolation valves and tie-ins; and
- Instrument and Control Kiosk.

2.14 Existing LOGGS pipeline

2.14.1 The existing LOGGS 36” pipeline (offshore pipeline) enters the former TGT site from the east and terminates at an existing shutdown valve within the site. The LOGGS pipeline was first operated in 1988, transporting collected natural gas from a variety of gas fields (including the Viking field) in the North Sea to shore. The pipeline ceased operations in 2018, and in line with regulations, it was flushed clean of any hydrocarbons. Several surveys have been undertaken of the pipeline including a fracture assessment, integrity assessment and CO_2 corrosion assessment, which have resulted in high confidence that the pipeline will be suitable for the transportation of the CO_2 as part of the wider VNZ Transport and Storage Scheme.

2.14.2 All existing onshore valves on the LOGGS pipeline will be replaced as part of the Project, including the emergency shutdown valve located outside the former TGT site boundary, but within the identified Scoping Boundary. Additionally, further inline inspection of the existing LOGGS Pipeline will be undertaken, which will all be internal and from within the pipeline itself, and not at the surface.

2.15 Overview of Construction approaches for the Project

Pre-construction

2.15.1 Ahead of construction, the pipeline route lying within the Order Limits, will be surveyed and pegged out in consultation with the landowners / occupiers. This will establish the precise alignment of the pipeline, particularly in relation to any environmentally sensitive sites and field boundaries. This temporary working width will be fenced.

2.15.2 The location and condition of existing land drainage will be investigated and a record of their condition compiled. Two distinct phases would be identified, one for pre-construction and one for post construction. Where necessary, field drainage will be newly installed or restored elsewhere to enable landowner’s field drains to continue working throughout the construction period, helping to prevent soil damage and aiding recovery post-construction.

Figure 2-5: Former TGT Site and location for tie-in and outlet facilities

2.15.3 It will also help to keep the construction site as dry as possible. A specialist contractor would be procured to undertake this work. A post construction drainage scheme will be design by a land drainage expert.

2.15.4 The relevant permits and consents will be sought from the Environment Agency, Lead Local Flood Authority / Internal Drainage Board (IDB) / Canal and River Trust where necessary.

2.15.5 Pre-entry meetings with landowners / occupiers will be undertaken to discuss requirements for temporary fencing, access, monitoring and reinstatement. Any required pre-commencement environmental and engineering surveys will be undertaken including, but not limited to, ecology surveys, contaminated land surveys, geotechnical surveys, utility surveys and archaeological investigations.

Temporary Access Tracks

2.15.6 Temporary access tracks will be required, though proposed locations have yet to be identified.

2.15.7 The access tracks would typically be 4.5 m wide, and up to 9 m wide at passing places, which, coupled with the area for soil storage and drainage between the track and the fence line, would give a maximum swathe of 12 m. They would either be stone laid on a geotextile membrane, or formed of interlocking panels, depending on ground conditions and the duration and type of use.

2.15.8 Culvert installations would be required for temporary access tracks to cross ditches and watercourses. The size of the culvert would vary per crossing depending on the dimensions of the crossing, sensitivity and importance of the watercourse.

2.15.9 Where new accesses or widening of existing accesses from the public highway are required bellmouths would be installed. The installation of bellmouths may require the creation of visibility splays to create a line of sight for the safe use of the junction.

Construction Compounds and Laydown Areas

2.15.10 Construction compound and laydown areas will be required to support the construction of the Project. The locations of these facilities have not yet been defined, but work is ongoing to identify suitable locations.

2.15.11 A temporary Main Works Compound would be needed, which is expected to be approximately 40,000 m^2. This would include a site office, welfare facilities, parking, and storage facilities for equipment, materials and machinery.

2.15.12 Temporary construction compounds would also be required at each of the block valve sites. These would typically cover an area of approximately 4,000 m^2 and include welfare facilities, parking and storage facilities for equipment, materials and machinery. In addition, temporary storage areas for sections of pipe will also be required (known as Pipe Dumps). Design work is currently ongoing to identify suitable locations.

2.15.13 Temporary, smaller satellite compounds would be established to support road, watercourse, railway line and major infrastructure crossings. Laydown areas for storing sections of pipeline and other materials will also be required, details of which will be included within the ES.

Preparation of working width

2.15.14 The standard working width of the pipeline spread would be 36m. This would provide sufficient area for a running track (described in 2.16.15 below), topsoil storage, separate subsoil storage and would enable safe excavation of the trench (in open cut sections). This temporary working width will be fenced.

2.15.15 Working areas will be cleared of vegetation, scrub and hedgerow as appropriate, preferably in the winter immediately in advance of pipeline construction. Topsoil and subsoil would be stripped and stored separately within designated storage areas.

2.15.16 A haul route known as a running track will be created within the working width and will be used to access the entire length of the construction swathe.

2.15.17 Where the working width is located within 250 m of an identified Great Crested Newt (GCN) Habitat, a temporary low level GCN fence would be installed along the perimeter of the working width.

Main works

2.15.18 Approximately 53 km of steel pipe will be required. The pipe will be manufactured in specific pre-determined lengths and wall thicknesses and delivered to site by road. Temporary storage of pipeline would be required at the Pipe Dumps and construction compounds before they are distributed along the pipeline route.

2.15.19 The pipe trench will be dug either with mechanical excavators straddling or running alongside the pipeline trench or using a specialised trenching machine, down to a minimum depth of 1.8 m. The depth from the top of the pipeline to the ground surface will be a minimum of 1.2m and will likely be deeper in some locations. Where necessary, to aid construction and in order to maintain the integrity of the excavated trench, trench supports,

and close sheet piling may be used. Dewatering of the trench and other excavations may be required in some areas to stabilise the surrounding ground during construction.

2.15.20 Pipe strings would be fabricated and welded on site adjacent to the pipeline trench. Boom cranes would lift the welded pipe and place it into the trench. Further testing and GPS survey work would then be undertaken and the need for any cathodic protection cable connections would be identified. Only following completion of all these required works would the trench be then infilled and the site restored.

Road, Watercourse, Railway Line and Major Infrastructure crossings

2.15.21 The working width at these locations would be typically wider than the standard 36m working width. A variety of trenchless crossing techniques will be used when open-cut methods are not appropriate. These crossing techniques include, Auger Bore, Horizontal Directional Drilling (HDD) and Micro-tunnelling. Design work is currently ongoing to identify the appropriate method required for each crossing and details will be included within the ES.

2.15.22 At trenchless crossings of roads, watercourses and railway lines and other major infrastructure, the pipeline would be laid at a deeper depth. The depth of highway crossings would also be influenced by services and the depth of adjacent ditches.

2.15.23 The depth of the watercourse crossings is influenced by the depth of the true bed of the watercourse, the ground and the groundwater conditions, where the watercourse is navigable and the flexibility (bend radius) in the pipe and installation equipment. Watercourse would be crossed as close to 90 degree angles where possible.

Hydrostatic testing

2.15.24 Water would be required for pressure testing the new pipeline prior to commissioning. Design details are currently evolving to cover this component and details relating to the proposed sources and disposal methods will be included within the ES.

Reinstatement

2.15.25 Along the pipeline route, the ground will be reinstated with stored topsoil and subsoil following trenching. If necessary, the subsoil will be ripped prior to topsoil placement if compaction has occurred. Topsoil will be spread in such a way as to ensure that it does not become compacted. All surplus construction materials will be removed on completion of the work.

2.15.26 Following reinstatement of soil and subsoil, final restoration of the pipeline working width will commence. Restoration activities will include, reseeding of pasture land and reinstatement of field boundaries. The pipeline route will be marked with marker posts and aerial markers at field boundaries. These will be visible from the ground and all marker posts will be located to minimise interference with agricultural activities. Cathodic Protection Posts will also be installed along the pipeline route.

2.15.27 The Applicant is committed to making a positive contribution to biodiversity net gain and additional details will be included within the ES.

2.16 Operation

2.16.1 Once operational, activity along the pipeline would be kept to a minimum, and generally be limited to nonintrusive inspections of the pipeline and shutdown valves via for example aerial surveys and/or an annual walkover of the route. Internal maintenance via the use of PIG's would occur through the pipeline's lifetime, as required. The pipeline operation would be managed from the control room via connection to all monitoring and metering systems.

2.17 Decommissioning

2.17.1 The Project has a design life of approximately 40 years and when appropriate, the pipeline and associated infrastructure would be decommissioned. This would be undertaken safely and with regard to the environmental legislation at the time of decommissioning. The required licenses and permits would be acquired. The redundant pipeline can be dealt with in a number of ways:

- lifted and removed where appropriate;
- left in situ and filled with nitrogen and still CP monitored; and/or
- left in situ with no CP and grouted up to ensure it does not corrode and collapse in the long term.

2.17.2 All major crossings will remain in situ and be grouted up. If required, refurbishment or replacement of specific plant (e.g. at shutdown valves) will be performed to extend the Project's life if appropriate. A decommissioning strategy will be developed to support the EIA, details of which will be included within the ES, and assessment work undertaken where necessary. This will include a description of the proposed works, the land-use requirements and estimated timescales to complete the work. Where appropriate, an assessment of the impacts will be included.

2.17.3 At this initial stage, the decommissioning work is expected to consist of a number of solutions, including leaving the pipeline in situ, whilst dismantling and removing any above ground infrastructure such as shutdown valves. All work would be undertaken in accordance with the relevant waste disposal regulations at the time of decommissioning

2.18 References

Ref 2-1 Element Energy (2020) Humber Industrial Decarbonisation Roadmap. Available at: [redacted]

3. Planning Policy Context

3.1 Introduction

3.1.1 This chapter provides a summary of national, regional and local planning policies relevant to the Project, which have been considered when defining the scope of the EIA. Where specific aspects of these policies are directly relevant to specific environmental topics, these are addressed further in Chapters 6 to 19.

3.1.2 The DCO application will be accompanied by a Planning Statement which will set out each relevant national, regional and local planning policy in more detail and demonstrate how the Project accords.

3.2 Legislation

The Planning Act 2008

3.2.1 The Project is defined as a NSIP as set out in the Planning Act 2008 (PA2008) (Ref 3-1), Section 14(1)(g) and Section 21.

3.2.2 The PA2008 is accompanied by Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) which implement Directive 2014/92/EU on the assessment of the effects of certain public and private projects on the environment (the EIA Directive) as it relates to projects that fall under the remit of the Act. These regulations require that EIA be undertaken, and an Environmental Statement submitted, in support of DCO applications.

3.2.3 The Act also gave rise to 'The Infrastructure Planning (Decisions) Regulations 2010 (as amended by the Consequential Amendments Regulations 2012)', which set out regulations regarding issues which must be taken into account by decision makers in certain circumstances. Regulations 3 and 7 are relevant to this project.

3.2.4 Regulation 3 states that the decision maker shall have regard to the desirability of:

- Preserving Listed Buildings or their setting or any feature of special architectural or historic interest which they possess;
- Preserving or enhancing the character or appearance of Conservation Areas;
- Preserving Scheduled Monuments or their settings.

3.2.5 Regulation 7 states that the decision maker shall have regard to the United Nations Environment Programme Convention on Biological Diversity, one of whose objectives is the conservation of biological diversity.

3.3 National Planning Policy

National Policy Statements

3.3.1 The PA2008 s104 requires the Secretary of State ("SoS"), when determining Development Consent Orders, to have regard to the provisions of National Policy Statements (where relevant).

3.3.2 In July 2011, the SoS for the Department of Energy and Climate Change (DECC) designated a number of National Policy Statements relating to nationally significant energy infrastructure. In July 2016, the DECC became part of BEIS. BEIS now has responsibility for ensuring the provision of secure energy supplies in the UK.

3.3.3 In terms of this Project, none of the relevant technology-specific NPS directly apply. Where this is the case, section 105 of the PA2008 applies and applications will be tested against ‘*“2(c) any other matters which the Secretary of State thinks are both important and relevant to the Secretary of State's decision”*, which are typically local adopted planning policies and the National Planning Policy Framework (NPPF). However, the following NPSs are still important and relevant considerations in assessing the Project:

- Overarching National Policy Statement for Energy (EN-1) (Ref. 3-4); and
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 3-5).

3.3.4 The Overarching Energy NPS EN-1 requires the Planning Inspectorate to take account of adverse environmental, social and economic impacts and weigh these against the benefits of the proposal. It identifies the generic issues which should be taken into account in assessing applications for development consent, recognising that these are the issues which are likely to arise most frequently, but that they are not equally applicable to all projects. It also recognises that:

> *“A number of fossil fuel generating stations will have to close by the end of 2015. Although this capacity may be replaced by new nuclear and renewable generating capacity in due course, it is clear that these must be some fossil fuel generating capacity to provide back-up for when generation from intermittent renewable generating capacity is low and to help with the transition to low carbon electricity generation. It is important that such fossil fuel generating capacity should become low carbon, through development of CCS, in line with carbon reduction targets. Therefore there is a need for CCR fossil fuel generating stations and the need for the CCS demonstration projects is urgent”.*

3.3.5 NPS EN-1 also states, with regard to transportation:

> *“The most likely method for transporting the captured Carbon Dioxide is through pipelines. These will be located both onshore and offshore. There are currently no Carbon Dioxide pipelines in the UK and considerable future investment in pipelines will be required for the purpose of the demonstration programme. If CCS is deployed more widely, it is likely that these initial investments could form the basis of a wider Carbon Dioxide pipeline network, which is likely to require greater capacity pipelines. In considering applications the IPC should therefore take into account the Government wants developers to bear in mind foreseeable future developments when considering the size and route of their investments and may therefore propose pipeline with a greater capacity than necessary for the project alone.”*

3.3.6 NPS EN-4 applies to nationally significant infrastructure pipelines which transport natural gas or oil and, therefore, is not fully relevant to the Project. However, NPS EN-4 notes in section 1.6.2 that the information provided within may also be useful in identifying impacts to be considered in applications for pipelines intended to transport other substances.

3.3.7 Section 2 of NPS EN-4 sets out principles to be applied in the assessment and mitigation design specific to oil and gas pipelines. The EIA and mitigation design will incorporate these principles. This includes:

- how proposals would be resilient to climate change;
- consideration and demonstration of “good design”, in particular mitigation by design;
- assessment of noise and vibration and typical noise mitigation measures;
- assessment of water quality and resources including public water supply, and consultation with the Environment Agency;

- assessment of landscape and visual effects, and mitigation through design;
- assessment of biodiversity, mitigation through design and project specific mitigation measures to protect ecology; and
- assessment of the stability of the ground conditions and mitigation measures to minimise any adverse effects on soil and geology.

Draft Overarching National Planning Statement for Energy (EN-1)

3.3.8 The Draft EN-1 (Ref. 3-6) includes further references to CCS pipeline infrastructure and states:

> *"Where the need for a particular type of energy infrastructure set out above is established by this NPS, but that type of infrastructure is outside the scope of one of the technology specific NPSs, this NPS will have effect alone and will be the primary basis for Secretary of State's decision making. This will be the case for, but is not limited to, hydrogen pipeline and storage infrastructure, Carbon Capture Storage (CCS) pipeline infrastructure and other forms of low carbon generation infrastructure not included in EN-2 or EN-3".*

3.3.9 It also states:

> *"New carbon capture and storage infrastructure will be needed to ensure the transition to a net zero economy. The Committee on Climate Change Committee states CCS is a necessity not an option."*

3.3.10 Furthermore:

> *"Paragraphs 3.5.1-3.5.7 set out the need for CCS infrastructure over the coming decades. It is not the role of the planning system to deliver or limit specific amounts of CCS infrastructure covered by this NPS. The government has other mechanisms to influence the delivery of CCS infrastructure. This does not reduce the need for individual projects to demonstrate compliance with planning and environmental requirements or mean that everything that obtains development consent will get built."*

Draft National Planning Statement for Energy (EN-4)

3.3.11 The Draft EN-4 (Ref. 3-7) includes a further reference to climate change resilience measures which is said to form part of the impact assessment within the ES e.g. in the flood risk assessment.

The Energy White Paper – Powering our Net Zero Future (2020)

3.3.12 The Energy White Paper – Powering our Net Zero Future (EWP) (Ref 3-2) was presented to Parliament in December 2020 and builds on the Government's Policy Paper 'The ten point plan for a green industrial revolution' published in November 2020. At the core of the EWP is the commitment to achieve net zero and tackle climate change.

3.3.13 The EWP announced that the government would review the energy NPS to reflect the policies and broader strategic approach set out `in the white paper and ensure the continuation of a planning policy framework which can support the infrastructure required for the transition to net zero. BEIS consulted on new draft versions of EN-1 and EN-4 and are currently analysing feedback. At the time of writing this Scoping Report, these draft versions had not yet been adopted.

National Planning Policy Framework

3.3.14 The National Planning Policy Framework (NPPF) (Ref. 3-3) was revised on 20 July 2021 and sets out the government's planning policies for England and how these are expected to

be applied. It provides a framework within which locally prepared plans for housing and other development can be produced.

3.3.15 The NPPF states clearly the role of the NPS being the primary decision making document for NSIPs under the PA2008. Paragraph 5 of the NPPF states:

> *"The Framework does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy and may be a material consideration in preparing plans and making decisions on planning applications."*

3.3.16 The NPPF maintains the national policy support for the transition to a low carbon future and help to shape places in ways that contribute to radical reductions in greenhouse gas emissions.

3.4 Local Planning Policy – Local Development Plans

3.4.1 The Project extends across the administrative areas of Lincolnshire County Council (LCC), North Lincolnshire Council (NLC), North East Lincolnshire Council (NELC), West Lindsey District Council (WLDC) and East Lindsey District Council (ELDC). WLDC and ELDC are located within the LCC administrative boundary, where LCC are responsible for roads, minerals, and waste (amongst other things). NLC and NELC are unitary councils and therefore have the combined responsibilities of a district and county council and, subsequently, are not within the administrative boundary of LCC. The below sub-sections outline the current and emerging planning policy for each administrative body.

North Lincolnshire Council

3.4.2 The NLC Local Plan (Ref. 3-9) was adopted in May 2003 however some policies were replaced by the Core Strategy and the Housing and Employment Land Allocations Development Plan, which was adopted in June 2011. Some Local Plan policies were saved in September 2007.

3.4.3 The Core Strategy sets out the long-term spatial planning framework for the development of North Lincolnshire up to 2026 by providing strategic policies and guidance to deliver the vision for the area, including the scale and distribution of development, the provision of infrastructure to support it, and the protection of the natural and built environment. It will also help to ensure that the investment decisions of key bodies are not made in isolation, but are properly co-ordinated, with a strong focus on the principles of sustainable development.

3.4.4 Overarching policies of relevant to the Project include:

- CS2: Delivering more sustainable development.

3.4.5 There are several policies which aim to protect, enhance and support a diverse and multi-functional network of landscape, greenspace, waterscape and archaeology. These policies are identified in the relevant assessment chapter (Chapters 5-19) and include:

- CS6: Historic Environment;
- CS16: North Lincolnshire's Landscape, Greenspace and Waterscape;
- CS17: Biodiversity;
- CS18: Sustainable Resource Use and Climate Change;

- CS19: Flood Risk;
- CS20: Sustainable Waste Management; and
- CS21: Minerals.

3.4.6 North Lincolnshire Council is currently preparing a new single Local Plan which will replace the current North Lincolnshire Core Strategy. The Publication Draft of the new Local Plan has been consulted on, and NLC are seeking to submit their Local Plan to Planning Inspectorate in 2022 with an aim to have the Local Plan adopted in 2023.

North East Lincolnshire Council

3.4.7 NELC adopted its Local Plan (Ref 3-13) in March 2018, setting out the Council's vision and strategy for the Borough until 2032. The Plan sets out the Council's vision and strategy for development, including why, where and how the Borough will grow. The Plan is a plan for growth and aims to ensure North East Lincolnshire becomes a sustainable location in which people can live, work, and enjoy their recreation, both now and in the future.

3.4.8 There are several Strategic Objectives which provide a framework for the Local Plan Policies. Those relevant to the Project include:

- SO2 Climate change;
- SO6 Built, historic and natural environment;
- SO7 Transport; and
- SO10 Minerals and Waste.

3.4.9 The Local Plan also includes general policies that aim to protect, enhance and support a diverse and multi-functional network of landscape, greenspace, waterscape and archaeology. These policies are identified in the relevant assessment chapter (Chapters 5-19) and include:

- Policy 6 Infrastructure;
- Policy 31 Renewable and low carbon infrastructure;
- Policy 32 Energy and low carbon living;
- Policy 33 Flood Risk;
- Policy 34 Water management;
- Policy 39 Conserving and enhancing the historic environment;
- Policy 40 Developing a green infrastructure network;
- Policy 41 Biodiversity and Geodiversity;
- Policy 42 Landscape;
- Policy 43 Green space and recreation; and
- Policy 44 Safeguarding minerals and related infrastructure.

West Lindsey District Council

3.4.10 The Central Lincolnshire Local Plan (Ref 3-10), which covers the combined local authority areas of the City of Lincoln, North Kesteven, and West Lindsey, was adopted on 24 April 2017, replacing the West Lindsey Local Plan (First Review) (June, 2006). A local plan review is currently being undertaken, with the Draft Central Lincolnshire Local Plan proposed to replace the Local Plan adopted in 2017. The review began with an Issues and Options

consultation undertaken in June and July 2019 followed by a Draft Local Plan consultation undertaken between 30 June and 24 August 2021. Review of consultation responses is currently taking place in order to inform the Pre-Submission Plan. No timeline for adoption has been published.

3.4.11 The adopted Central Lincolnshire Local Plan seeks a positive and proactive approach to the environment in Central Lincolnshire, with the emphasis on achieving quality places that are attractive and sustainable, and which contribute to quality of life, community wellbeing and local character.

3.4.12 There are several policies which aim to protect, enhance and support a diverse and multi-functional network of landscape, greenspace, waterscape and archaeology. These policies are identified in the relevant assessment chapter (Chapters 5-19) and include:

- Policy LP12: Infrastructure to Support Growth;
- Policy LP14: Managing Water Resources and Flood Risk;
- Policy LP17: Landscape, Townscape and Views;
- Policy LP18: Climate Change and Low Carbon Living;
- Policy LP19: Renewable Energy Proposals;
- Policy LP20: Green Infrastructure Network;
- Policy LP21: Biodiversity and Geodiversity; and
- Policy LP25: The Historic Environment.

East Lindsey District Council

3.4.13 The East Lindsey Local Plan (Ref 3-11) was adopted on 18th July 2018. The local plan consists of the Core Strategy 2012-2031 and the Settlement Proposals Development Plan Document. The Core Strategy 2012-2031 sets out the vision and strategic policies for the growth and development of the District up to 2031.

3.4.14 Overarching policies of relevant to the Project include:

- Strategic Policy (SP) 2 – Sustainable Development.

3.4.15 There are several policies which aim to protect, enhance and support a diverse and multi-functional network of landscape, greenspace, waterscape and archaeology. These policies are identified in the relevant assessment chapter (Chapters 5-19) and include:

- SP11 – Historic Environment;
- SP16 – Inland Flood Risk;
- SP23 – Landscape;
- SP24 – Biodiversity and Geodiversity;
- SP25 – Green Infrastructure; and
- SP27 – Renewable and Low Carbon Energy.

Lincolnshire County Council

3.4.16 Lincolnshire County Council holds a planning function at County level, primarily dealing with application for minerals and waste development. Whilst this Project is not an application for either of these types of development, regard has been given to the relevant policies and allocations in The Lincolnshire Minerals and Waste Local Plan (Ref 3-12) which was

adopted in June 2016. It sets out the key principles to guide the future winning and working of minerals and the form of waste management development in the County up to 2031.

3.4.17 A new minerals and waste development scheme came into effect on 19 February 2021 following the County Council's decision to update the Lincolnshire Minerals and Waste Local Plan. This sets out the timetable for the preparation of a new plan, which will be produced as a single document, with adoption of the new plan targeted at winter 2024 to 2025.

3.4.18 Local aggregate assessments are available based on data from the following years: 2015, 2016, 2017, 2018, 2019 and 2020.

3.5 References

Ref 3-1 HM Government (2008). Planning Act. Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents

Ref 3-2 HM Government (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

Ref 3-3 Department for Communities and Local Government (2021). The National Planning Policy Framework (NPPF). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

Ref 3-4 Department for 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

Ref 3-5 Department for Energy and Climate Change (2021). 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/37049/1941-nps-gas-supply-oil-en4.pdf

Ref 3-6 Department for 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

Ref 3-7 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

Ref 3-8 HM Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made

Ref 3-9 North Lincolnshire Council (2011) Core Strategy and the Housing and Employment Land Allocations Development Plan 2006-2026. Available at: https://m.northlincs.gov.uk/public/planningreports/corestratergy/adopteddpd/FullCoreStrategy.pdf

Ref 3-10 North East Lincolnshire Council (2018) Central Lincolnshire Local Plan 2013-2032. Available at: https://www.nelincs.gov.uk/assets/uploads/2020/10/The-NEL-Local-Plan-adopted-2018.pdf

Ref 3-11 East Lindsey District Council (2018) Local Plan Core Strategy 2012-2031. Available at: https://www.e-lindsey.gov.uk/media/9791/Core-Strategy/pdf/Final_Version_of_Core_Strategy_2018.pdf?m=636821922732300000

Ref 3-12 Lincolnshire County Council (2016) Lincolnshire Minerals and Waste Local Plan up to 2031 Available at: https://www.lincolnshire.gov.uk/downloads/file/2361/core-strategy-and-development-management-policies

Ref 3-13 North East Lincolnshire Council (2018) Local Plan 2013 to 2032. Available at: [redacted]

4. Approach to EIA

4.1 Introduction

4.1.1 This chapter of the Scoping Report sets out the proposed overarching approach to the environmental impact assessment (EIA) for the Project. This section has been informed by current best practice guidance, as set out within PINS Advice Note 7 (Ref 4-1).

4.1.2 EIA is the process of identifying, evaluating and mitigating the likely significant environmental effects of a project. It promotes the early identification and evaluation of the likely significant environmental effects and enables appropriate mitigation (that is, measures to avoid, reduce or offset significant adverse effects) to be identified and incorporated into the design of the development, or commitments to be made to environmentally sensitive construction methods and practices.

4.1.3 The EIA will be reported in an Environmental Statement (ES), containing the information as stated in Regulation 14(a-f) of the Infrastructure Planning (EIA) Regulations 2017. It will be undertaken and reported by competent experts in line with Regulation 14(4)(a) of the Infrastructure Planning EIA Regulations 2017. This will be demonstrated in the ES with a statement outlining the qualifications and experience of the EIA team.

4.2 Consultation

4.2.1 Consultation will be undertaken with a range of prescribed (statutory and non-statutory) consultees. This is to ensure all consultees are adequately briefed on the Project and provided with an opportunity to provide feedback on the EIA approach, baseline, likely effects, and mitigation and enhancement.

4.2.2 Effective stakeholder engagement and consultation is intrinsic to the Planning Act 2008 and fundamental to the success of the Project. It is therefore vital to give opportunities for the public to be involved in the consenting process for certain activities, through access to information, justice, and consultation on key documents.

4.2.3 Further details relating to stakeholder engagement and consultation is provided within Chapter 5 of this report.

4.3 Scoping Boundary

4.3.1 The Scoping Boundary identified within this report is made up of four key components:

- The Offtake Facilities at Immingham;
- The preferred pipeline corridor (which would include the pipeline itself along with any required shutdown valves). This forms the majority of the area covered by the Scoping Boundary;
- The offshore pipeline tie-in and outlet at the former TGT site;
- The onshore section of existing LOGGS Pipeline from the former TGT site down to the MLWS.

4.3.2 In certain places the Scoping Boundary is substantially wider than that of the eventual draft Order Limits that will be applied for and included within the ES, though in a handful of ‘pinch points’ it is likely to be a reasonable reflection of the draft Order Limits.

4.3.3 The proposed scope of the EIA is based upon the Scoping Boundary, as it represents all possible route configurations that could be developed within the preferred pipeline corridor,

and therefore represents a realistic worst case, as not all the land identified in the Scoping Boundary will be required. The next step in the process will be to identify a proposed pipeline route alignment within the Scoping Boundary. This work is currently on-going and the alignment will be buffered up to 100m (typically 50m either side of the alignment) to provide the necessary Limits of Deviation (LoD) required to reduce construction risks, for example to avoid areas of unsuitable ground not picked up by design stage ground investigation, or previously unknown buried archaeology. Hereafter, references to the proposed pipeline route encompass both the alignment and the 100m LoD.

4.3.4 In addition to the LoD, which show the flexible area within which the final pipeline can be routed, there will be a need for areas of land for other infrastructure, such as shutdown valves and their associated permanent access tracks and junctions off the public highway. These will also inform the draft Order Limits but access tracks may extend beyond the typical pipeline LoD. Based on current design, however, these are currently expected to fall within the identified Scoping Boundary.

4.3.5 Lastly, the draft Order Limits presented within the ES will include all land needed temporarily for the safe and efficient construction of the Project, including land for construction compounds, laydown areas, pipe dumps, temporary haul routes and accesses etc. The exact locations of these are not known at present but design work is on-going to identify suitable locations. These will be identified and included within both the assessment of impacts presented within the ES and considered for the statutory consultation.

4.3.6 It is important to note that for any baseline surveys undertaken in the field to support the EIA, these will be based on the preferred route configuration and its associated draft Order Limits, unless otherwise stated. It is likely that the draft Order Limits will reduce in size as the design of the Project progresses and there is more certainty as to the land likely to be required. Where surveys are committed to within the draft Order Limits, or within a certain distance of the draft Order Limits, the Order Limits in question will be those currently anticipated at the point in time when the survey is undertaken. This means that some surveys may eventually become abortive but conversely, if, due to new information (e.g., survey results or stakeholder feedback) the draft Order Limits need to be moved, additional surveys may need to be undertaken to account for the potential gap in survey information.

4.3.7 The Scoping Boundary is shown on **Figure 4-1** and falls within the jurisdiction of NLC, NELC, WLDC, ELDC and LCC (as shown on **Figure 1-3**):

4.3.8 Due to the length of the pipeline corridor within the Scoping Boundary, where deemed appropriate, the narrative has been divided in to five sections matching the alternative assessment work which was undertaken and the selection of the preferred corridor.

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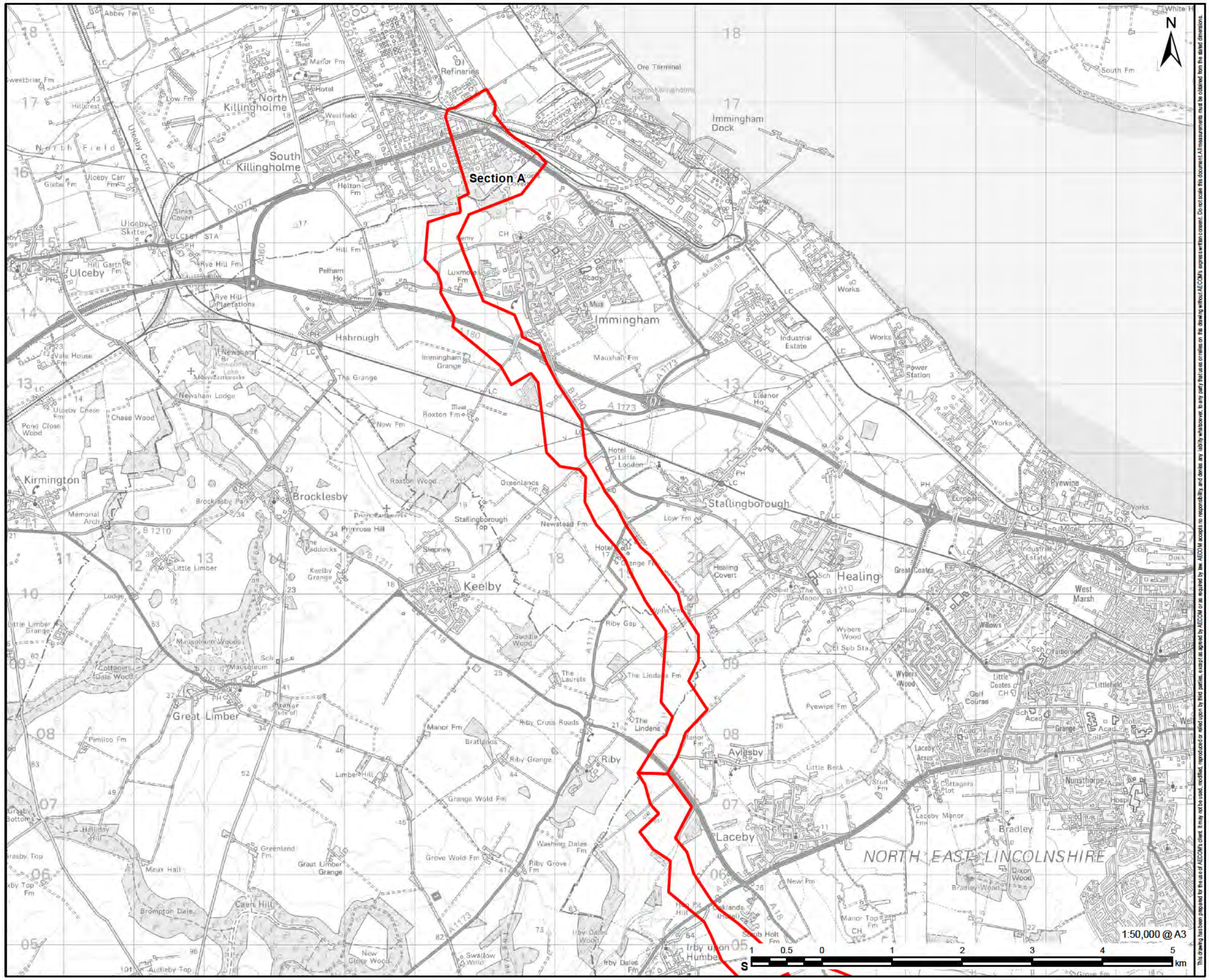

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PROJECT

V Net Zero Pipeline

LEGEND

Scoping Boundary

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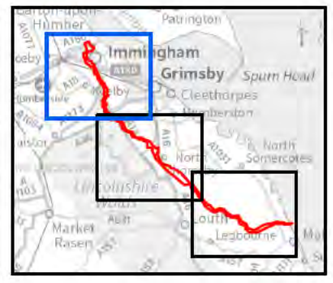

FIGURE TITLE

Figure 4-1 (1 of 3)
V Net Zero Pipeline Scoping Boundary including the Preferred Pipeline Corridor

ISSUE PURPOSE

SCOPING REPORT

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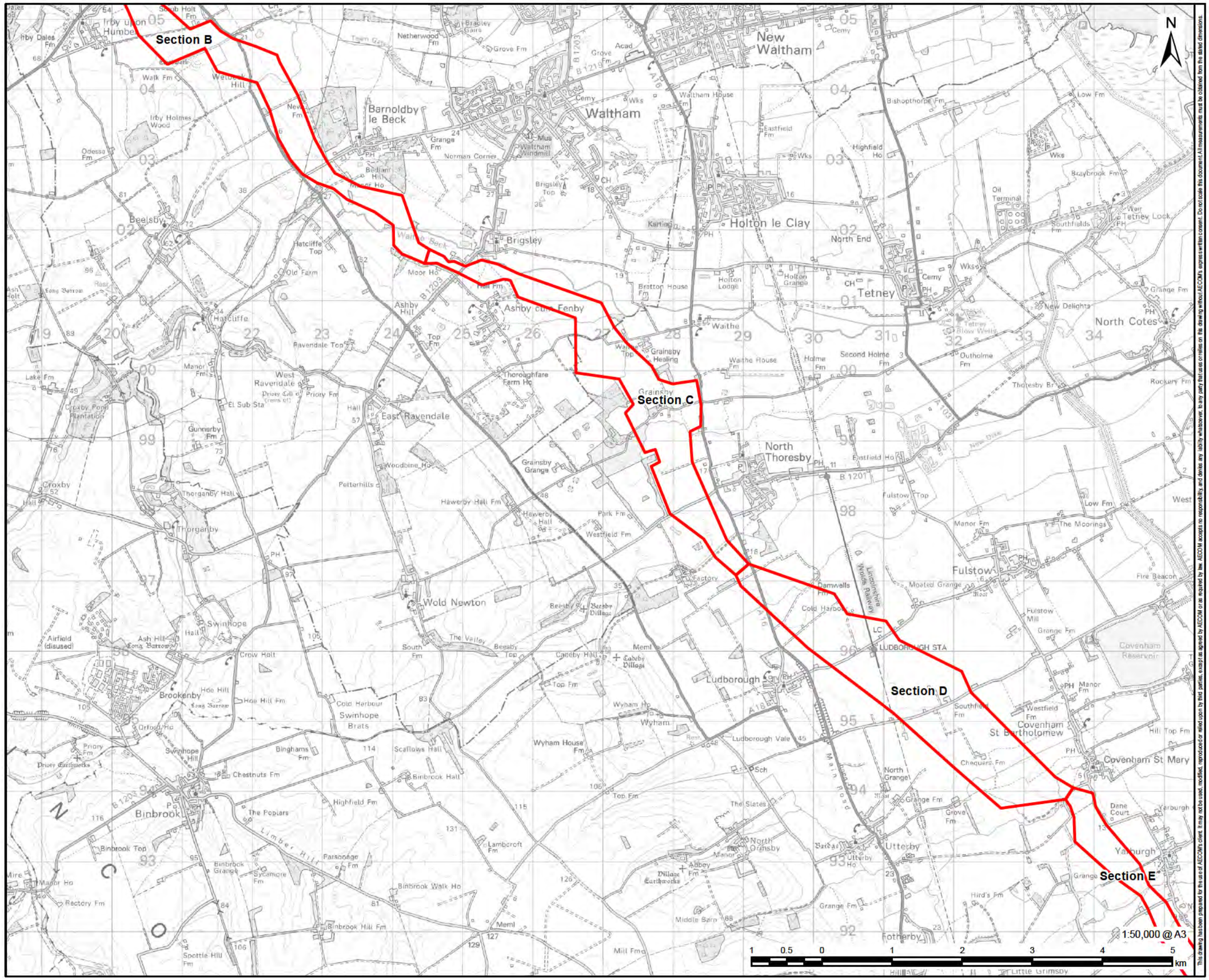

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FIGURE TITLE

Figure 4-1 (2 of 3)
V Net Zero Pipeline Scoping Boundary including the Preferred Pipeline Corridor

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

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LEGEND

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FIGURE TITLE

Figure 4-1 (3 of 3)
V Net Zero Pipeline Scoping Boundary including the Preferred Pipeline Corridor

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_4-1

4.4 Overview of the Proposed EIA Methodology

4.4.1 The assessment methodology follows a systematic approach in order to assess the potential impacts and subsequent effects of the Project on human health, the natural and physical environments and material assets in an appropriate manner, as per the EIA Regulations, 4(2) (Ref 4-3).

4.4.2 The Project would follow best practice by integrating environmental considerations into the design process at all stages. This has already begun through route development comprising both desk studies and initial baseline surveys that have sought to avoid or reduce disturbance of known environmental constraints and/or receptors, wherever possible.

4.4.3 The EIA will identify potentially significant adverse environmental effects and, if any, propose project specific mitigation measures to avoid, reduce or offset adverse environmental effects or maximise environmental benefits. These can then be incorporated into the further, post-consent configuration refinement of the Project.

4.4.4 The EIA process involves the main steps illustrated in **Figure 4-2**.

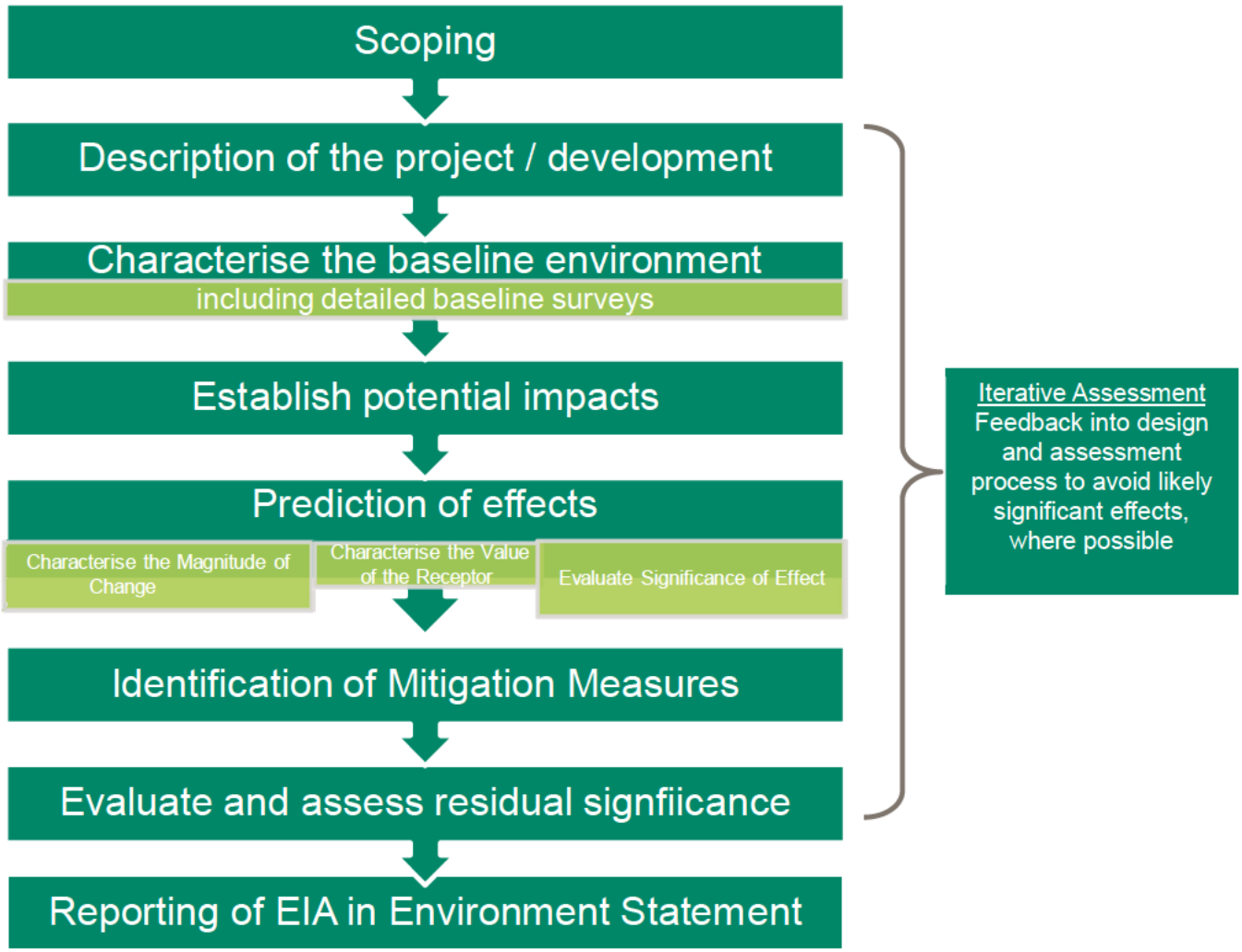

Figure 4-2: Overview of the EIA Process

Defining the Study Area

4.4.5 A Study Area is defined in each individual technical assessment in Chapters 6-19. A rationale is also provided to support the selection of the Study Area's selected for each technical discipline.

Characterisation of the Baseline Environment

4.4.6 To assess the potential impacts resulting from the Project it is necessary to first establish the environmental conditions that currently exist along and within the vicinity of the Project areas.

4.4.7 Appropriate understanding of the baseline for each environmental receptor should be collated through some or all of the following:

- Review of secondary sources (desk-based, i.e. review of existing documentation and literature; data searches and available data sets such as GroundSure or EnviroCheck);
- Review of primary baseline studies (field); and
- Stakeholder consultation.

4.4.8 The key data sources used to establish the baseline will be described in each technical assessment chapter (Chapter 6 to 19).

Future baseline

4.4.9 The ES will include an outline of the likely evolution of the existing baseline without the development of the Project, based on available information on future plans and knowledge of the historic land uses. The future baseline scenario will be clearly set out and described within the ES in the description of the Project and in each relevant technical chapter.

4.4.10 A precautionary approach to the future baseline will be taken in the Air Quality, and Material and Waste Chapters in the ES. This approach is explained in Chapter 12 Air Quality, Section 12.3.10-12.3.11, and Chapter 17 Materials & Waste, Section 17.2.13.

Assessment of Impacts

4.4.11 The Institute of Environmental Management and Assessment (IEMA) guidelines (2004, p11/2) state that: "The assessment stage of the EIA should follow a clear progression; from the characterisation of 'impact' to the assessment of the significance of the effects taking into account the evaluation of the sensitivity and value of the receptors."

4.4.12 The prediction of potential impacts will be undertaken to determine what could happen to each environmental receptor because of the Project and its associated activities. There is expected to be a diverse range of potential impacts to consider within the assessment process and it will likely be appropriate to use a range of prediction methods including quantitative, semi-qualitative and qualitative. The definitions used to describe impacts are noted in **Table 4-1**.

Table 4-1: Impact definition

Terms	Definition
Direct impact	Impacts that result from a direct interaction between the Project activities and the receiving environment.
Indirect impact	Impacts on the environment, which are not a direct result of the Project activities, often produced away from the activity or as a result of a complex pathway.
Inter-Project cumulative impact	Impacts that result from incremental changes caused by other present or reasonably foreseeable actions together with the Project (European Commission 1999). Generally considered to be the same impact but from different projects e.g. noise generated from two separate projects combining to affect residential amenity.
Beneficial impact	An impact that is considered to represent an improvement on the baseline condition or introduces a new desirable factor (Chartered Institute of Ecology and Environmental Management CIEEM 2010).
Adverse impact	An impact that is considered to represent an adverse change from the baseline condition or introduces a new undesirable factor (CIEEM 2010).

4.4.13 The significance of residual effects will be determined by reference to criteria for each assessment topic. Specific effect significance criteria for each technical discipline will be developed, giving due regard to the following:

- Scale of the impact (described as high, medium, low and very low);
- Effect duration, and whether effects are temporary, reversible or permanent;
- Effect nature (whether direct or indirect, reversible or irreversible, beneficial or adverse);
- Whether the effect occurs in isolation, is cumulative or interacts with other effects;
- Performance against any relevant environmental quality standards;
- Sensitivity of the receptor (described as high, medium, low and very low); and
- Compatibility with environmental policies.

4.4.14 Further guidance specifically relating to the magnitude of an impact, the sensitivity of a receptor and the significance of any resultant effects is provided in the following sections.

Magnitude of Change

4.4.15 General criteria for defining the magnitude of an impact are set out in **Table 4-2**. Key factors that influence this include:

- *Scale of change* – The scale of change refers to the degree of change to or from the baseline environment caused by the impact being described;
- *Spatial extent* – The extent of an impact is the full area over which the impact occurs; and
- *Duration and frequency* – The duration is the period within which the impact is expected to last prior to recovery or replacement of the feature. Frequency refers to how often the impact will occur.

Table 4-2: Impact Magnitude Criteria

Magnitude	Criteria
High	Long term and/or regional level loss; or major alteration to key elements/features of the baseline condition such that post development character/composition of the baseline will be fundamentally changed.
Medium	Medium term loss and/or local level change (greater than the Project footprint) or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Low	Short term, site specific and/or a minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Very Low	Very little change from baseline conditions. Change is barely distinguishable, approximating to a "no change" situation.

Sensitivity of the Receptor

4.4.16 The sensitivity of a receptor or feature is characterised by the vulnerability to change, recoverability and importance of the receptor or feature (**Table 4-3**). Characterisation of the receptor is achieved by balancing out these three considerations to determine the receptor's sensitivity.

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

Table 4-3: Sensitivity Criteria

Sensitivity	Description
High	Receptor has little or no ability to absorb change without fundamentally altering its character. For example: a. Receptor has low/no capacity to return to baseline conditions within the Project life, e.g. low tolerance to change and low recoverability such as a physical feature formed over a geological time scale, or loss of access with no alternatives. b. The receptor is a designated feature of a protected site or is rare or unique. c. Receptor is economically valuable.
Medium	Receptor has moderate capacity to absorb change without significantly altering its character, however some damage to the receptor will occur. For example: a. Receptor has intermediate tolerance to change. b. Medium capacity to return to baseline condition, e.g. >5 of up to 10 years. c. The receptor is valued but not protected.

Sensitivity	Description
Low	The receptor is tolerant to change without significant detriment to its character. Some minor damage to the receptor may occur. For example: a. Receptor has high tolerance to change. b. High capacity to return to baseline condition, e.g. within 1 year or up to 5 years. c. May affect socio-economic behaviour but is not a nuisance to users. d. The receptor is common and/or widespread.
Very Low	The receptor is tolerant to change with no effect on its character. The Project activity does not have a detectable effect on survival or viability.

Evaluating the Significance of Effects

4.4.17 Having established the magnitude of change and the sensitivity of the receptor the significance of an effect can be assessed. The identification of significance typically requires the application of professional judgement, however a significance matrix (**Table 4-4**) may also be used as a guide to help identify the likely significance of effects.

4.4.18 The significance of residual effects will be evaluated with reference to available definitive standards, accepted criteria and legislation. For issues where definitive quality standards do not exist, significance will be based on the:

- Local, district, regional or national scale or value of the resource affected;
- Number of receptors affected;
- Sensitivity of these receptors; and
- Duration of the effect.

4.4.19 Each of the specialist disciplines undertaking EIA may have a variation of the table below that aligns with magnitude and sensitivity criteria that best suits their topic area, which may also be defined in industry guidelines. These criteria and determination of significance are outlined in the specialist chapters (Chapters 6-19) below.

Table 4-4: Significance Matrix

		Magnitude of Change			
		Very Low	**Low**	**Medium**	**High**
Sensitivity of Receptor	**High**	Negligible/ Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Very Low	Negligible	Negligible	Negligible	Negligible/ Minor

4.4.20 The result of the interpretation of this matrix in line with the approach defined by each discipline is the assignment of the level of significance of the effect for all potential Project related impacts. This is done with due consideration of any 'mitigation by design' measures being in place, and then re-evaluated following the incorporation of any additional 'Project specific mitigation'. Further information on mitigation measures is provided below. **Table 4-5** provides typical descriptions for each of the four significant effect definitions.

Table 4-5: Generic Significance Effect Descriptions

Significance Category	Indicative Description	Significant Effect?
Major	A large and detrimental change to a sensitive receptor: likely or apparent exceeding of accepted (often legal) threshold. A large and beneficial change, leading to improvements to the baseline resulting in previously poor conditions being replaced by new legal compliance or major contribution being made to national targets. These effects may represent key factors in the decision-making process. Potentially associated with site and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.	Yes
Moderate	A medium scale change which, although not beyond an acceptable threshold, is still considered to be generally unacceptable, unless balanced out by other significant positive benefits of a project. Likely to be in breach of planning policy rather than a legal statute. These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making. A positive moderate effect is a medium scale change that is significant in that the baseline conditions are improved to the extent that guideline targets are contributed to.	Yes, typically – but subject to application of professional judgement.
Minor	A small change that, whilst adverse, does not exceed legal or guideline standards. Unlikely to breach planning policy. A small positive change, but not one that is likely to be a key factor in the overall balance of issues. These effects may be raised as local issues and may be of relevance in the detailed design of a project but are unlikely to be critical in the decision-making process.	No
Negligible	A very small scape change that is so small and unimportant that it is considered acceptable to disregard. Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making irrespective of other effects	No

4.4.21 Moderate and Major levels of significance are usually considered to be significant in EIA terms, whilst Negligible or Minor impacts are not considered to be significant.

4.4.22 In subsequent chapters of this report the general criteria described above have been made more specific for each environmental topic based on relevant standards or guidelines. Further explanation of the approach to assessing impacts and the specific criteria to be used for each topic is set out in later chapters, with any deviation from this standard approach noted.

Approach to Mitigation

4.4.23 A standard hierarchical approach to identifying mitigation requirements will be used:

- *Avoid or Prevent*: In the first instance, mitigation should seek to avoid or prevent the adverse effect at source, for example by routeing the pipelines] away from a sensitive receptor;
- *Reduce*: If the effect is unavoidable, mitigation measures should be implemented which seek to reduce the significance of the effect, for example the use of a noise bund to reduce noise levels at nearby noise sensitive receptors; and
- *Offset*: If the effect can neither be avoided nor reduced, mitigation should seek to offset the effect through the implementation of compensatory mitigation, for example offsite habitat creation to replace habitat losses.

4.4.24 Mitigation measures fall into two categories, as follows:

- *Mitigation by Design*: This is where the design of the Project is developed through an iterative process which involves seeking to avoid or reduce potential environmental effects through appropriate routeing, siting and specifications; and
- *Project Specific Mitigation*: Project specific mitigation refers to additional measures which will be identified and proposed following initial assessment. These will be presented within each of the topic chapters. These will be identified to further avoid or reduce potentially adverse environmental effects where they cannot be in the design of the Project.

4.4.25 A Register of Environmental Actions and Commitments (REAC) will be included in the DCO Application. This will tabulate all the environmental mitigation proposed as part of the ES and would contain detailed descriptions of the actions required by the main contractor(s) during the construction of the Project.

4.4.26 The DCO will contain a requirement for a Construction Environmental Management Plan (CEMP), which would contain the REAC as well as other effective, site-specific procedures, details of identified monitoring and auditing of the mitigation as required. A draft CEMP will be prepared and submitted with the DCO application. This document would then be further developed once the Contractor is appointed. The requirement within the DCO would ensure that those measures included in the draft CEMP are legally secured and have to be actioned on pre / during / post construction.

Evaluate and Assess Residual Significance

4.4.27 Following the identification of Project specific mitigation measures, the assessment of significance will be re-evaluated to determine whether there is likely to be a residual impact and if it remains significant.

4.4.28 Residual effects assessed as Moderate or Major after consideration of Project specific mitigation measures will normally require additional analysis and consultation in order to discuss and possibly further mitigate where possible. Where further mitigation is not possible a residual effect may remain.

4.5 Transboundary Effects

4.5.1 It is not anticipated that the Project would have significant transboundary effects. A completed transboundary screening matrix dealing with the potential effects of the Project on other European Economic Area (EEA) States is presented in **Appendix E**.

4.6 Timescales and Assessment Years

Construction Phase Effects

4.6.1 Construction phase effects will be taken to be those effects which arise as a result of construction related activities. This covers sources of effects such as construction traffic, atmospheric emissions, construction noise and vibration, dust generation, site runoff, mud on roads, risk of fuel/oil spillage, and the visual intrusion of plant and machinery on-site.

4.6.2 The construction phase for the Project is expected to last up to 24 months in total, however a detailed programme of construction works will be prepared which will seek to limit the time during which specific locations are affected. Construction related activities can result in both temporary effects and permanent effects and these will be identified within the assessment.

Operational Phase Effects

4.6.3 Operational phase effects are taken to be the effects that occur as a result of the operational phase activities. These effects could be relatively short term, endure for a substantial period, or be permanent. This includes the effects of the physical presence of the Project infrastructure, and its operation, use and maintenance. The overall operational life of the Project is expected to be 40 years.

Decommissioning Phase Effects

4.6.4 For the assessment, these effects will be taken to be those which arise as a result of activities undertaken during the decommissioning phase of the Project. This covers sources of effects such as traffic, noise and vibration, dust generation and site run-off from decommissioning activities, for example. As with construction phase effects, some aspects of decommissioning will endure for longer than others.

4.6.5 The identification of construction and decommissioning effects will be made on the basis of existing knowledge, techniques and equipment. A ‘reasonable worst-case’ scenario will be used with respect to the envisaged construction and decommissioning methods, location (proximity to sensitive receptors), phasing and timing of construction and decommissioning activities.

4.7 References

Ref 4-1 The Planning Inspectorate 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/

Ref 4-2 The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009. Available at: https://www.legislation.gov.uk/uksi/2009/2264/contents/made

Ref 4-3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made

5. Stakeholder Engagement and Consultation

5.1 Context

5.1.1 Effective stakeholder engagement and consultation is intrinsic to the Planning Act 2008 (Ref 5-1) and will be fundamental to the success of the V Net Zero Pipeline (hereafter referred to as the Project).

5.1.2 The process of consultation is critical to the development of a comprehensive and balanced ES. The views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues that require further investigation. Consultation is an ongoing process, which enables mitigation measures to be incorporated into the Project design thereby limiting adverse effects and enhancing environmental benefits.

5.1.3 The Project has a wide range of stakeholders (including landowners, statutory/prescribed consultees, local communities and specialist interest groups) with differing interests that will require varied levels of consultation. Specific communication activities therefore need to be focussed to meet the needs of specific individuals and groups. This requires an understanding of the stakeholders and their interests in the Project.

5.1.4 Stakeholder engagement for the Project is based on the following core principles:

- Early and ongoing engagement to inform and influence the design process;
- Seeking feedback in the iterative design process and taking this feedback into consideration;
- Building of long-term relationships with key stakeholders throughout the different stages of the Scheme to help better understand their views;
- Where possible and practicable ensuring concerns are addressed; and
- Ensuring appropriate statutory consultation is undertaken in compliance with requirements of the Planning Act 2008 (Ref 5-1), EIA Regulations (Ref 5-2) and associated guidance.

5.2 DCO Consultation Requirements

5.2.1 The DCO process has several statutory requirements regarding consultation. These requirements stipulate that certain stakeholder groups and the community must be consulted as part of the pre-application process, as set out in Sections 42, 47 and 48 of the Planning Act 2008 (Ref 5-1) and Regulation 13 of the EIA Regulations (Ref 5-2). Further requirements set out how the Project and application must be publicised, and specific documents produced, including a Statement of Community Consultation (SoCC), Preliminary Environmental Information (usually in the form of a Preliminary Environmental Information Report (PEIR)) and a Consultation Report.

5.3 Consultation to Date

5.3.1 The Applicant commenced engagement activities in 2021, where they held initial meetings with National Grid on 21st July 2021 and with Lincolnshire Country Council on 26th November 2021.

5.3.2 A series of introductory meetings were also held with several key stakeholders and Local Planning Authorities between December 2021 and March 2022. These included:

- The Planning Inspectorate;

- Lincolnshire County Council;
- North Lincolnshire Council;
- North-East Lincolnshire Council;
- East Lindsey District Council;
- West Lindsey District Council;
- Natural England; and
- Environment Agency.

5.3.3 Meetings with Lincolnshire Wolds AONB Conservation Board and Network Rail are currently being scheduled and expected to take place in Q1 of 2022.

5.3.4 A project website is currently being developed to provide up to date information on the Project and is expected to be online from April 2022 [redacted]). In the meantime, the existing V Net Zero Cluster website provides useful background information on the overall V Net Zero Transportation and Storage Scheme, which includes details of relevance to the onshore pipeline. This website can be found at: [redacted]

5.4 Scoping Consultation

5.4.1 The Planning Inspectorate (on behalf of the SoS) will consult on this Scoping Report under the EIA Regulations (Ref 5-2). Views from consultees will be considered and used to inform the Scoping Opinion to be issued by The Planning Inspectorate (on behalf of the SoS).

5.4.2 Under Regulation 10(6) of the EIA Regulations (Ref 5-2), the SoS must undertake consultation with statutory consultation bodies, including environmental bodies (such as Natural England, the Environment Agency and Historic England) and relevant planning authorities: Lincolnshire County Council; North Lincolnshire Council; North-East Lincolnshire Council; East Lindsey Council; West Lindsey District Council; before adopting a Scoping Opinion.

5.5 Further Public Consultation

5.5.1 In accordance with Section 47(1) of the Planning Act 2008 (Ref 5-1) for an NSIP, the Applicant will prepare a Statement of Community Consultation (SoCC). This will outline how the Applicant intends to consult with the local community about the project, including in accordance with Regulation 12 of the EIA Regulations (Ref.5-2), and how it intends to publicise and consult on the PEIR. The Applicant is required to consult the host local authorities (i.e., those local authorities within whose administrative area the Project is located) on the draft SoCC and they will have a period of at least 28 days following receipt of the request to comment on a draft SoCC prior to its publication for inspection by the public.

5.5.2 A two-stage approach to consultation with the local community and wider public is planned, as follows:

- A first round of ***Non-Statutory*** events in between April and June 2022 to introduce the Project and present a preliminary design and the options previously considered; and
- A second round of events in Q3 2022, consisting of the ***Statutory*** consultation pursuant to the Planning Act 2008 (Ref 5-1) and EIA Regulations (Ref. 5-2) including consultation on the PEIR. The PEIR will report the outcomes of the preliminary assessment of likely significant environmental effects.

5.5.3 In addition, a series of virtual briefings will be held with elected representatives from Lincolnshire County Council, North Lincolnshire Council, North-East Lincolnshire Council, East Lindsey District Council and West Lindsey District Council during March and April 2022. These briefings will focus on the key aspects of Project and ensure members are appropriately engaged with on the Scoping Report. Feedback will also help inform the Project SoCC.

5.5.4 The approach to public consultation will include (without being limited to):

- Exchanges of correspondence, meetings and workshops with local community groups and businesses (online or in person as appropriate);
- The use of a Virtual Public Consultation Room, available for online interaction providing information on the Project and update on progress;
- Public exhibitions at several venues across the suggested route, where members of the community can view information about the Project and meet with members of the Project team; and
- Use of social media and media channels, as well as public affairs engagement with key elected representatives.

5.5.5 Consultation will also be undertaken with prescribed stakeholder bodies and affected landowners, in accordance with Sections 42 and 48 of the Planning Act 2008 (Ref 5-1) and Regulation 13 of the EIA Regulations (Ref 5-2). All consultation events will be planned in accordance with the COVID-19 guidance and regulations in place at the time. Topic specific technical and procedural consultation will continue throughout the EIA process

5.5.6 All responses received during consultation will be carefully considered and taken into account in the design evolution of the Project in accordance with Section 49 of the Planning Act 2008 (Ref 5-1). Details of any responses received during consultation and the account taken of those responses will be included in a Consultation Report. This Consultation Report will be submitted with the DCO application, and if the application is accepted, will be available for public review.

5.5.7 The Consultation Report will demonstrate how the Applicant has complied with the consultation requirements of the Planning Act 2008 (Ref 5-1) and EIA Regulations (Ref 5-2) and will be considered by the SoS when determining whether to accept the application, and then in examining the application.

5.5.8 A summary of the public consultation undertaken will be included within the ES and technical stakeholder engagement will be summarised within the individual technical chapters. In addition, the Applicant will aim to agree Statements of Common Ground with key stakeholders to set out matters that have been agreed during consultation.

5.6 References

Ref 5-1 Planning Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents

Ref 5-2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/572/contents/made

6. Ecology & Biodiversity

6.1 Introduction

6.1.1 This chapter of the Scoping Report presents an initial baseline for ecology and biodiversity relevant to the V Net Zero Pipeline (hereafter referred to as the Project), identifies the need for additional surveys to ensure there is appropriate information to accurately characterise the baseline, and sets out the Study Area. In addition, the chapter provides an overview of the proposed assessment methodology for the environmental assessment and identifies the potential effects provisionally identified.

6.1.2 Where appropriate, reference is made to the initial findings of the appraisals completed to inform routeing and siting, undertaken via desk studies conducted to date. This information has been used to identify ecological features (designated sites, habitats and species) that could potentially be affected by the Project, and to refine the scope of the ecological surveys to be undertaken to support the assessment of these potential effects.

6.1.3 The objectives of the ecological impact assessment (EcIA) will be to:

- Identify and describe existing ecological features[1] (and determine their importance) within and around the proposed locale of the Project in a defined area (the zone of influence);
- To assess the significance of the impacts of the Project and associated infrastructure on important ecological features[2] following the implementation of agreed mitigation measures; and
- Where required, identify appropriate compensation measures where significant effects upon important ecological features cannot be avoided or mitigated.

6.1.4 Potential direct effects upon designated sites, locally important sites and sensitive areas will be avoided wherever possible through the further consideration of routeing and siting.

6.1.5 Recommendations for avoidance, mitigation, compensation and enhancement measures will be proposed to minimise any adverse effects on these identified ecological features. Where necessary, the significance of any residual effects will be assessed. Examples of potential mitigation approaches are described in this chapter; however, agreed mitigation proposals will be detailed within the EcIA.

6.1.6 This chapter is supported by **Figure 6-1**, which shows the statutory nature conservation designations within 10 km of the Project.

6.2 Baseline Environment and Study Area

Consultation

6.2.1 Consultation will be carried out, as necessary, with Natural England, biodiversity officers for NELC, NLC, LCC, WLDC and ELDC (as applicable) Environment Agency and other interested parties, such as the Lincolnshire Wildlife Trust. This is ensure a robust approach to scope and methodology of surveys necessary to inform the assessment, as summarised in **Table 6-2**, and seek agreement on the potential Zone of Influence (ZoI) (likely to be up to 10 km) as defined by CIEEM guidance (Ref 6-1), as well as agree the valued features to be considered as part of the assessment, and any proposed mitigation measures.

[1] Ecological features i.e. designated sites, habitats, species and ecosystems, (including ecosystem function and processes).
[2] Important ecological features as defined by CIEEM are '*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)'.*

Study and Survey Area

6.2.2 The assessment will consider all the activities being conducted to facilitate the construction and operation of the Project, and the designated sites, habitats or species present that may be affected by those activities (e.g., the terrestrial habitats within which great crested newt may disperse from a breeding pond). The study and survey areas proposed are considered sufficient to reflect the potential effects of the Project, which are predominantly temporary with only small areas proposed for permanent facilities such as the shutdown valves and offtake facility. The purpose is to ensure sufficient ecological baseline data is collated to inform the EcIA and determine the potential effects likely to occur within the relevant ZoI for each ecological feature.

6.2.3 The assessment will initially consider features within a potential ZoI of up to 10 km. This will be refined as the Project's design progresses, and the final EcIA Study Area will be determined based on the potential impacts, which, based upon a precautionary approach and given the nature of the Project, is anticipated to be up to no further than 10 km from the Scoping Boundary. The 10 km distance is made from professional judgement and experience of other similar scaled projects and should be sufficient in which to assess all possible effects on ecology and biodiversity. The desk study will identify European and statutory designated sites and their qualifying features within 10 km of the Scoping Boundary.

6.2.4 This extended desk study area particularly seeks to address potential effects upon European or International Sites including their designating features particularly those such as mobile species e.g. birds or bats and/or designated habitats indirectly connected to the extent of the potential effects of the Project e.g. river catchments. A check will be made for non-statutory designated sites and records for protected and notable species within a more focussed area of 2 km of the Scoping Boundary, a distance based again on professional judgement and should capture all non-statutory designated sites which could be affected.

6.2.5 The field survey area will include all land within the extent of the Project (subject to land access) plus at least a 50 m buffer (to check for species features with disturbance buffer zones such as badger). Some species have specific geographical considerations and may dictate wider survey areas, for example ponds suitable to support great crested newt within 250 m of the proposed pipeline route[3], and temporary construction areas, will need to be surveyed for their potential to support great crested newt (Ref 6-18). These distances are based on widely accepted survey guidance applicable to different ecological species. Taxon-specific survey areas to be observed are detailed later in this section, some of which account for indirect impacts such as noise and air quality effects, where appropriate. The survey areas applied will ensure inclusion of all elements of the Project including both permanent (albeit this is considered to be minor) and temporary land take. Land use during the construction phase will include the pipeline route, shutdown valves and PIG trap site, but also land required for temporary construction compounds, laydown areas and haul routes etc.

Desk Study

6.2.6 A desk study will be undertaken to identify key sites and protected species information within a ZoI of up to a 10 km radius of the Scoping Boundary (the 'Desk Study Area'). The following sources will be used to inform the desk study:

[3] 250m is the distance defined by Natural England standing advice as the areas within which great crested newt may be present from a potential breeding sites (pond). For Projects where direct impacts upon ponds can be avoided, it is considered to be sufficiently reasonable based upon this guidance to adopted this as a spatial extent of the assessment of potential effects upon great crested newts (within terrestrial habitats). https://www.gov.uk/guidance/great-crested-newts-advice-for-making-planning-decisions

- The Natural England website [redacted]uk) for information on statutory designated sites of nature conservation interest and to confirm reasons for designation and their condition;
- The 'Multi-Agency Geographic Information for the Countryside' (MAGIC) website (www.magic.gov.uk) for information on the location of designated sites relevant to the Project Priority Habitats, ancient woodland and any other relevant information e.g. European Protected Species Mitigation (EPSM) licence records;
- Joint Nature Conservation Committee website (http://jncc.defra.gov.uk) for information regarding any European designations within the desk study area.
- Lincolnshire Environmental Records Centre (LERC), administered by the Greater Lincolnshire Nature Partnership (GLNP) for non-statutory designated site information, priority habitats data and, as required, protected species records;
- Planning Portals and local plans for any relevant information on designated sites and relevant planning polices and notable species within the Scoping Boundary;
- The British Trust for Ornithology (BTO) Wetland Birds Survey (WeBS) for records of wetland birds at coastal and inland WeBS count sectors within the Study Area. The sectors for which data are obtained will depend on the availability of count data at each sector within the Study Area, which will be discussed with the relevant WeBS officer prior to purchase;
- Local and specialist bird groups such as regional/county raptor monitoring groups (for example barn owl groups, the Barn Owl Trust and the Wildlife Conservation Partnership for records of barn owl);
- The Lincolnshire Bird Atlas (The Birds of Lincolnshire);
- Lincolnshire Coastal Grazing Marshes Project Website [redacted]); and
- Specialist species interest groups, e.g., bat and badger groups, county recorders and other wildlife organisations.

Designated Sites

Statutory Designated Sites

6.2.7 There are five European designated sites located within 10 km of the Scoping Boundary:

- Humber Estuary Ramsar, Special Protection Area (SPA) and Special Area of Conservation (SAC) - located approximately 0.55 km east of the section of the Scoping Boundary which relates to the new pipeline at its nearest point; but part of which lies within the Scoping Boundary extension covering the existing LOGGS Pipeline;
- Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC, located approximately 0.55 km east at the nearest point to the section of the Scoping Boundary which relates to the new pipeline; but part of which lies within the Scoping Boundary extension covering the existing LOGGS Pipeline;
- Greater Wash SPA located approximately 0.9 km east at the nearest point to the section of the Scoping Boundary which relates to the new pipeline; but part of which lies within the Scoping Boundary extension covering the existing LOGGS Pipeline.

6.2.8 In addition, there are 13 nationally designated sites (i.e. Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR)) within 10 km of the Scoping Boundary. These

sites and the reasons for their designation are summarised in **Table 6-1**. **Figure 6-1** shows the locations of the statutory designated sites in relation to the Scoping Boundary.

Table 6-1: Statutory Designated Sites for Nature Conservation within 10 km of the Scoping Boundary

Site	Grid Reference	Proximity to Scoping Boundary	Summary of Reasons for Designation
Humber Estuary SPA	TA241148	0.55 km east	The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season: avocet *Recurvirostra avosetta* (wintering and breeding) bittern *Botaurus stellaris (wintering)*, hen harrier *Circus cyaneus (wintering)*, golden plover *Pluvialis apricaria* (wintering), bar-tailed godwit *Limosa lapponica* (wintering), ruff *Philomachus pugnax* (passage), bittern *Botaurus stellaris* (breeding), marsh harrier *Circus aeruginosus* (breeding), little tern *Sternula albifrons* (breeding), shelduck *Tadorna tadorna* (wintering), knot *Calidris canutus* (wintering and passage), dunlin *Calidris alpina* (wintering and passage), black tailed godwit *Limosa limosa* (wintering and passage), redshank *Tringa tetanus* (wintering and passage). The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly over winter by over 20,000 waterbirds.
Humber Estuary Ramsar	TA238148	0.55 km east	Designated for habitats including dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. The estuary supports a waterfowl assemblage of international importance (153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001). The following bird species / populations occur at levels of international importance over winter and/or during the passage period (spring and autumn): golden plover, red knot, dunlin, black-tailed godwit, common redshank, common shelduck and bar-tailed godwit. (JNCC, 2008),
Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC	TF478909	0.55 km east	Annex I habitats that are a primary reason for selection of this site: shifting dunes along the shoreline with Ammophila arenaria, fixed coastal dunes with herbaceous vegetation, Dunes with Hippophae rhamnoides, and humid dune slacks.

Site	Grid Reference	Proximity to Scoping Boundary	Summary of Reasons for Designation
			Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: embryonic shifting dunes.
Greater Wash SPA	TF821744	0.9 km east	The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the following Annex I species: red-throated diver *Gavia stellata (wintering)*, little gull *Hydrocoloeus minutus*, sandwich tern *Thalasseus sandvicensis (breeding)*, common tern *Sterna hirundo (breeding)*, little tern *Sternula albifrons (breeding)* and common scoter *Melanitta nigra*.
Humber Estuary SAC	TA232154	1.29 km north-east	Annex I habitats that are a primary reason for selection of this site: Estuaries and mudflats and sandflats not covered by seawater at low tide. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Sandbanks which are slightly covered by seawater all the time, coastal lagoons, Salicornia and other annuals colonizing mud and sand, Atlantic salt meadows, embryonic shifting dunes, shifting dunes along the shoreline with Ammophila arenaria, fixed coastal dunes with herbaceous vegetation and dunes with Hippopha rhamnoides. Annex II species present as a qualifying feature, but not a primary reason for site selection: sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis* and grey seal *Halichoerus grypus*.
Saltfleetby - Theddlethorpe Dunes SSSI	TF481908	0.55 km east	Includes flats, dunes, salt and freshwater marsh support an exceptionally rich flora and fauna. There are outstanding assemblages of vascular plants, invertebrates and breeding birds and it is the most north-easterly breeding site in Britain for the Natterjack Toad. The intertidal sands and muds provide extensive feeding and roosting grounds for wildfowl and waders including brent geese, shelduck and dunlin.
Humber Estuary SSSI	TA232155	1.28 km north-east	The Humber Estuary supports nationally important habitats including intertidal mudflats and sandflats, coastal saltmarsh and associated saline lagoons, sand dunes and standing waters. The estuary supports nationally important numbers of 22 wintering waterfowl and nine passage waders, and a nationally important assemblage of breeding birds of lowland open waters and their margins. It is also nationally important for a breeding colony of grey seal, river lamprey and sea lamprey, a vascular plant assemblage and an invertebrate assemblage.
North Killingholme Haven Pits SSSI	TA166197	2.49 km north	Large saline lagoons which provide roosting and feeding grounds for waterfowl. Nine species of specialist lagoonal species are recorded from the pits include the polychaete worm *Alkmaria romijni.*

Site	Grid Reference	Proximity to Scoping Boundary	Summary of Reasons for Designation
			Designated for aggregations of non-breeding birds: Black-tailed Godwit *Limosa limosa islandica;*
Swallow Wold SSSI	TA168048	2.71 km west	Designated for: CG2 - Festuca ovina - Avenula pratensis lowland calcareous grassland CG4 - Brachypodium pinnatum lowland calcareous grassland
Tetney Blow Wells SSSI	TA320007	3.52 km east	Tetney Blow Wells consists of reedbeds together with base-rich fern and swamp vegetation associated with the calcareous water of four large artesian springs.
Muckton Wood SSSI	TF382811	6.76 km south-west	An example of primary woodland on boulder clay at the eastern edge of the Lincolnshire Wolds. Alder replaces the typical oak/ash canopy with a hazel understorey in areas where there is sub-surface water movement towards Muckton Beck. The area is managed as hazel coppice-with-standards. The site supports one of the largest heronries in the county with over 30 breeding pairs.
Swaby Valley SSSI	TF391776	9.24 km south-south-west	This glacial overflow valley supports two habitats now scarce in Lincolnshire - floristically diverse, lime-rich marsh and unimproved chalk turf. The marsh borders a stream bisecting the valley floor and the interest of the grassland is increased by the terraced nature of the slopes. Designated for botanical interest.
Calceby Marsh SSSI	TF398772	9.26 km south-south-west	An outstanding example of a base-rich marsh.
Sea Bank Clay Pits SSSI	TF532792	9.37 km south-south-east	A series of isolated flooded clay workings of varying size, depth and topography which now support uncommon aquatic plant communities characteristic of the slightly brackish, eutrophic (nutrient-rich) water in addition to extensive reedbeds and a rich marginal wetland flora.
Saltfleetby - Theddlethorpe Dunes NNR	TF481908	0.55 km east	Includes flats, dunes, salt and freshwater marsh support an exceptionally rich flora and fauna.
Donna Nook NNR	TF447961	7.33 km north	The reserve consists of dunes, slacks and inter-tidal areas. In winter, there is a breeding colony of grey seals, with more than 2,000 pups born annually.
Bradley & Dixon Woods LNR	TA242059	1.93 km north east	Ancient woodland.
Weelsby Woods Park LNR	TA285073	6.44 km north east	A large urban public park and woodland.
Cleethorpes Country Park LNR	TA306067	6.95 km north east	A 64-hectare country park which includes a lake, wetland, woodland, grassland, hedgerows and scrub habitats.

Site	Grid Reference	Proximity to Scoping Boundary	Summary of Reasons for Designation
Cleethorpes LNR	TA331070	7.57 km north east	Habitats include saltmarshes, mud flats, sand dunes and sand banks.

Non-Statutory Designated Sites

6.2.9 As part of the ecological desk study, the presence of all non-statutory designated sites will be determined and included in the EcIA. In Lincolnshire these are termed as Local Wildlife Sites (LWSs) and have been classified based upon selection criteria defined by Greater Lincolnshire Nature partnership (Ref 6-2).

6.2.10 The location and reasons for designation will be detailed within the EcIA to determine the potential for direct or indirect effects from the Project. Wherever possible non statutory sites will be avoided by the Project.

6.2.11 Other ecologically sensitive habitat sites such as Lincolnshire Wildlife Trust Nature Reserves, and work associated with the Lincolnshire Coastal Grazing Marshes Project will also be identified through the ecological desk study and assessed within the EcIA.

Habitats

6.2.12 Due to its size and length the Scoping Boundary contains a wide variety of habitats, characteristic of the Lincolnshire area. The pipeline offtake facility would be in in Immingham, near South Killingholme, on an area of grassland to the west of Rosper Road. The Project would be 0.55 km from the Humber Estuary Special Protection Area (SPA) and Ramsar and the Saltbyfleet – Theddlethorpe Dunes and Gibraltar Point SAC at its closest point. Habitats within the Humber Estuary comprise tidal rivers, mudflats and lagoons, salt marshes, salt pastures and salt steppes, coastal sand dunes, sand beaches and Machair, and bogs, marshes and fens.

6.2.13 The Scoping Boundary crosses the flat coastal plain before moving inland (into an area that includes an element of the Lincolnshire Wolds AONB, and then traversing back towards the flat coastal plain where the pipeline terminates. Based upon knowledge of the area and a review of aerial photography and the MAGIC website, most of the pipeline corridor traverses agricultural fields bounded by ditches, drains and hedgerows. The corridor has been routed to avoid the majority of priority habitats of high ecological importance such as semi-natural broadleaved woodland, species-rich grasslands and ponds where feasible.

6.2.14 The pipeline corridor crosses a number of watercourses including North Beck Drain, Laceby Beck, Waithe Beck, Two Mile Bank Drain, Louth Canal and River Great Eau / Long Eau. These habitats would be crossed using trenchless techniques to avoid direct disturbance of these habitats. This will be confirmed within the ES.

6.2.15 The area west of Theddlethorpe forms part of the Lincolnshire Coast and Marshes National Character Area. There is potential for the pipeline corridor to cross through some areas of floodplain grazing marsh – a Habitat of Principal Importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act.

6.2.16 The habitats within the Scoping Boundary will be confirmed during an Extended Phase 1 Habitat Survey. This survey will be undertaken with reference to methodology outlined within the Chartered Institute of Ecology and Environmental Management's Guidelines of Preliminary Ecological Appraisal (Ref 6-3) and the Joint Nature Conservation Committee's Handbook for Phase 1 Habitat Survey (Ref 6-4). The Phase 1 habitat survey will be supplemented by UK Habitat Classification and condition assessment in accordance with Defra's Biodiversity Metric 3.0 – Technical Supplement (Ref 6-5).

6.3 Planned Surveys

6.3.1 As noted above, habitats within the Scoping Boundary will be confirmed by undertaking an Extended Phase 1 Habitat Survey at the earliest appropriate opportunity. Habitat surveys will be focussed where permanent facilities may be located, along the proposed pipeline route, and temporary construction areas, and will also include habitat condition assessments, undertaken with reference to UKHab classifications to inform the Biodiversity Net Gain assessment (refer to Section 6.7 below for further information). Habitat condition assessment surveys of habitats of additional potential interest will also be conducted within the appropriate seasonal period to ensure the criteria for habitat condition can be effectively determined.

6.3.2 As the Humber Estuary SPA and Ramsar is located within 200 m of the Scoping Boundary at the southern end of the corridor, wintering bird surveys will be conducted to determine the usage of terrestrial habitats by wintering waterbirds during the high tide period. The scope will include habitats where there is potential for direct displacement and / or indirect noise/ visual disturbance to habitats that may be functionally linked[4] to the European designated sites. Breeding and passage bird surveys will also be completed to confirm the assemblage of bird species present and to identify any effects on bird populations due to the Project. The results of the surveys will be used to inform Habitats Regulations Assessment (refer to Section 6.6 below).

6.3.3 It is anticipated that some habitats within the Scoping Boundary will have suitability to support protected species including great crested newt (GCN), roosting, foraging and commuting bats, badger, otter, water vole and reptiles. The scope of the planned (and ongoing) ecology surveys are set out in **Table 6-2**.

6.3.4 The survey methodologies will follow Natural England standing advice and CIEEM best practice guidance for protected species and habitats, including recent guidance relating to completion of surveys during the Covid-19 Outbreak (CIEEM, 2021) (Ref 6-6). There are not anticipated to be any impacts on the field survey programme because of the Covid-19 pandemic; AECOM has undertaken specific risk assessments to allow the continuation of field survey work in a Covid-safe and legally compliant manner.

Ornithological Survey Scope

6.3.5 Proximity of the Scoping Boundary to a number of designated sites - notably the Humber Estuary SPA, Ramsar and SSSI; and the Greater Wash SPA (**Table 6-1**) – has triggered the requirement to carry out ornithological surveys, a key objective of which will be to determine the extent to which terrestrial habitats are used by species for which the designated sites are notified. The results of the surveys will be used to inform the Habitats Regulations Assessment (refer to Section 6.6 below) the broader EcIA, such that potential adverse effects of temporary habitat loss, displacement and disturbance of birds, arising from noise and visual impacts during construction of the proposed development, can be quantified and assessed.

[4] Functionally Linked Land' (FLL) is a term often used to describe areas of land (or other habitats such as open waters) occurring outside a designated site which are considered to be critical to, or necessary for, the ecological or behavioural functions in a relevant season of a qualifying feature for which a Special Area of Conservation (SAC)/ Special Protection Area (SPA)/ Ramsar site has been designated. These habitats are frequently used by qualifying species and support the function and integrity of the designated sites for them.

Revision: 3 Drawn: ER Checked: LC Approved: RW Date: 2022-03-23

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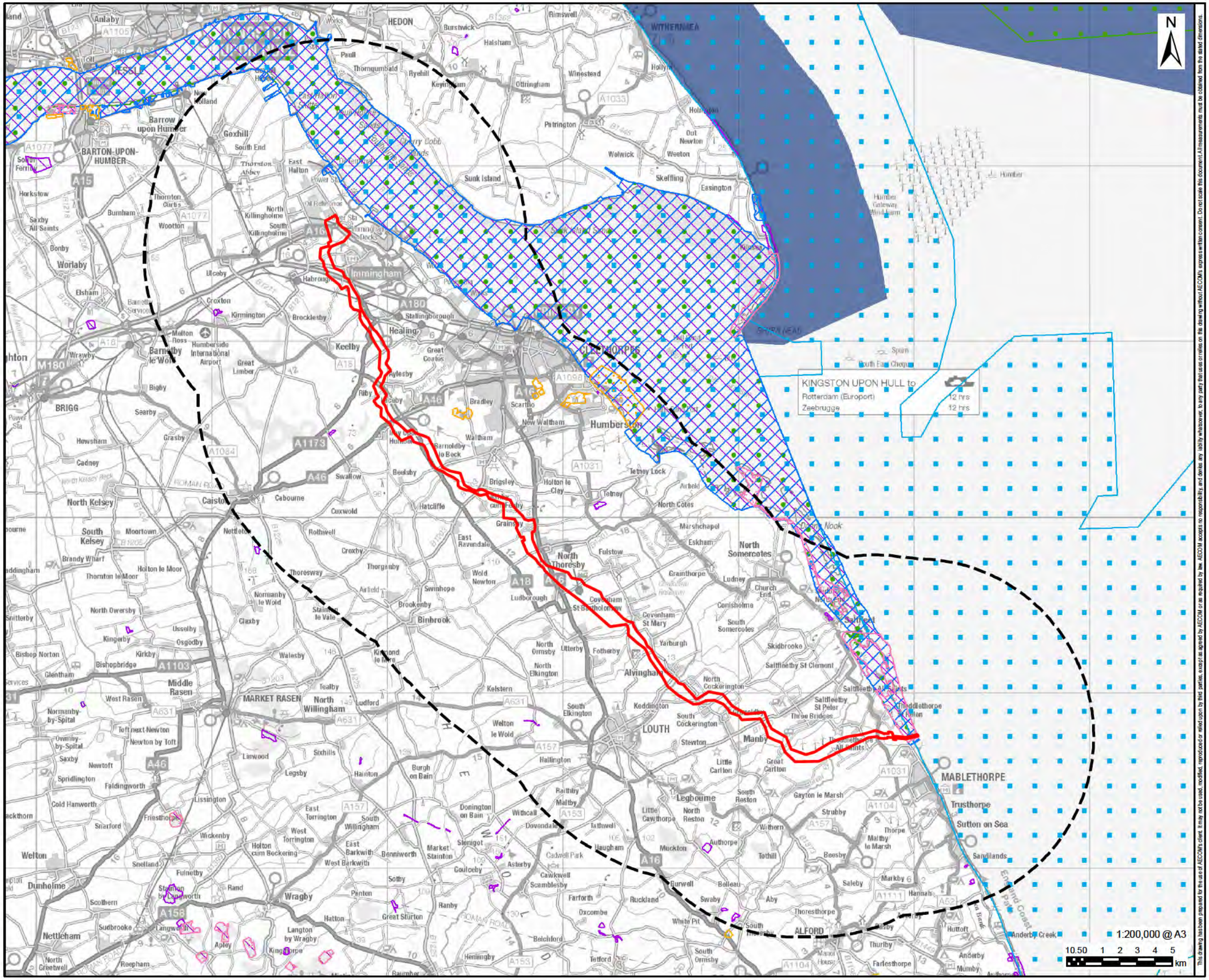

CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 10km Study Area
- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- Local Nature Reserve (LNR)
- Marine Conservation Zone (MCZ)

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FIGURE TITLE

Figure 6-1
Statutory Designated Sites

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_6-1

6.3.6 An area of farmland inland of the Theddlethorpe Gas Terminal (TGT) site (South Somercotes and Theddlethorpe) which the pipeline route is likely to cross, is identified by the British Trust for Ornithology Wetland Birds Survey (BTO WeBS) as Lincolnshire Grazing Marshes Core (High Tide) count area (although there have been no recent regular WeBS counts in this area[5]). This lies within a larger target recovery area for Coastal Grazing Marsh, identified under the Lincolnshire Coastal Grazing Marshes Project[6], that is known to support a range of breeding and non-breeding waders and wildfowl.

6.3.7 Experience gained on other projects in the area has identified that habitats at the northern end of the Scoping Boundary are used by feeding pink-footed goose (*Anser brachyrhynchus*) that roost on the Humber Estuary, and these habitats are likely to constitute functionally linked land. Small numbers of pink-footed goose are known to feed regularly in the vicinity of Immingham, beyond which the occurrence of this species, in the context of birds roosting within the Humber Estuary SPA and SSSI, rapidly decreases where the proposed pipeline traverses southwards away from Immingham. When developing the ornithological survey scope, the considerations above have been used as a reasonable proxy for the likelihood of functional linkages with respect to other species for which designated sites are notified; for example some species of waders that regularly feed on land, such as golden plover (*Pluvialis apricaria*) and lapwing (*Vanellus vanellus*) and potentially some of the breeding species for which the designated sites are notified (**Table 6-1**).

6.3.8 The following areas of onshore habitat are thus assumed to constitute potentially functionally linked land and are included for bird surveys to inform the assessment of likely significant effects on designated sites, as well as in the broader context of ecological impact assessment:

- At the southern end of the Scoping Boundary, the approximately 8 km (subject to confirmation of the route alignment) of proposed pipeline route inland from TGT, including all land up to 1km either side of the proposed route; and
- At the northern end of the Scoping Boundary, the first 5 km of proposed pipeline corridor southwards from the Pipeline Inlet Facility at Immingham, including all land up to 1km either side of the proposed pipeline route.

6.3.9 Within these key areas of ornithological interest/functionally linked land, the following surveys are proposed[7]:

- Monthly wintering and passage bird surveys, between August and March inclusive, of terrestrial habitats up to 1km from the proposed pipeline route, and temporary construction areas, using a “look-see” or field count methodology through a combination of walked and driven transects, and vantage points to scan open habitats. The surveys will be carried out from November 2021 to March 2022 and from August 2022 to October 2022; and
- Monthly breeding bird surveys of the same areas, but with a greater focus on the proposed pipeline route, and temporary construction areas, using the same methodology between late March and July 2022 inclusive (five surveys), focusing on species for which designated sites are notified. Spring passage birds will also be recorded during these surveys.

[5] [redacted]

[7] Transects and other survey locations will be determined through the use of aerial imagery, ordnance survey base maps and ground truthing of chosen locations to ensure that visual coverage of the surveys area is optimised while ensuring that survey locations can be accessed safely.

Table 6-2: Scope of Proposed Development Ecology Surveys

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
Habitats: Phase 1 Habitat Survey and Habitat Assessment Condition to inform Biodiversity Net Gain Assessment	Phase 1 Habitat Survey in accordance with the published method (Ref 6-4). The Phase 1 habitat survey will be supplemented by UK Habitat Classification and condition assessment in accordance with Defra's Biodiversity Metric 3.0 – Technical Supplement. Assessment of possible presence of protected, priority or otherwise notable species and, where relevant, the likely importance of habitat features for such species. Record of Invasive Non-Native Species (INNS) of plants. Incidental records of protected or priority species or their field signs. The phase 1 habitat and UK Habitat surveys will also be supplemented by aerial habitat mapping.	Optimal time – April to October but can be carried out at any time of year.	Based on a working width of 36m and a 50 m buffer either side of the preferred pipeline route. This will be extended further where deemed appropriate.	The information will form the basis of the calculation of potential permanent (albeit minor) and temporary habitat effects within the EcIA. Habitat condition assessments are required to support a Biodiversity Net Gain (BNG) assessment for the Project.
Hedgerows	Hedgerows that are identified as potentially important and crossed by the Proposed Development will be surveyed in accordance with the methodology as outlined in Defra (2007) Hedgerow Survey Handbook: A standard procedure for local surveys in the UK (Ref 6-7).	Optimal time – May to September 2022 inclusive. Surveys, where required will be carried out May/June 2022.	Areas to be identified following Phase 1 Habitat Survey, focused on the preferred route.	Dedicated hedgerow surveys considered to only be warranted where potentially important hedgerows are directly impacted by the Project. The information collated will also be used to inform the condition and distinctiveness assessment within the BNG calculation. Hedgerows which are species-poor as determined by the Phase 1 habitat surveys will not be subject to detailed hedgerow surveys, as temporary effects on low value habitats can be appropriately assessed and mitigated without the requirement for additional baseline data.

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
Breeding Birds in functionally linked land	Surveys using a "look-see" method to count birds and record their behaviours, using BTO species codes and behaviour notations, from walked and driven transects and ad hoc vantage points.	Monthly, between late March and July 2022 inclusive (5 surveys)	Proposed pipeline route plus up to 1km either side of it.	Survey scope suitable to address the potential temporary indirect effects of the Project and the minor permanent habitats losses predicted.
Breeding Birds beyond functionally linked land	Point Count method, recording all birds seen or heard by surveyors at the point location, using BTO species codes and behaviour notations.	Monthly between March and June 2022 inclusive (4 surveys)	Specific point count locations with visual coverage serving the Scoping Boundary, with focus on the preferred pipeline route.	Will provide sufficient baseline information on breeding bird assemblages to enable robust assessment of potential temporary indirect effects of the Project and the minor permanent habitats losses predicted, in combination with third party data. Proposed scheme design avoids impacts on hedgerow, wetland, and woodland habitats.
Wintering and passage birds in functionally linked land	Surveys using a "look-see" method to count birds and record their behaviours, using BTO species codes and behaviour notations, from walked and driven transects and ad hoc vantage points.	Monthly, August – March inclusive (November 2021 – March 2022; August – October 2022)	Scoping Boundary plus up to 1km either side of it.	Will provide sufficient baseline information on wintering and passage bird assemblages to enable robust assessment of potential temporary indirect effects of the Project and the minor permanent habitats losses predicted, in combination with third party data. Proposed scheme design avoids impacts on hedgerow, wetland, and woodland habitats.
Wintering birds beyond functionally linked land	Point Count method, recording all birds seen or heard by surveyors at the point location, using BTO species codes and behaviour notations.	Monthly between November 2021 and February 2022 inclusive (4 surveys)	Specific point count locations with visual coverage serving the Scoping Boundary, with focus on the preferred pipeline route.	Will provide sufficient baseline information on non-breeding bird assemblages to enable robust assessment of potential temporary effects and minor permanent habitat loss, in combination with third party data.

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
Great Crested Newt	Habitat Suitability Index (HSI) of ponds in accordance with Oldham et al., 2000 (Ref 6-8). A desk-based exercise will also be undertaken to map and categorise all waterbodies scoped in for survey. The exercise will be based upon data collected by the desk study and online information where this may be available i.e., European protected species mitigation licence information and Natural England Open data sources to inform the likely distribution of this species close to the Project extents.	Can be carried out at any time of year but will be undertaken between March/April 2022 and September 2022. Proposed to be undertaken in combination with Phase 1 Habitat Survey where land parcels coincide. Can be undertaken same time as eDNA survey	All ponds within proposed pipeline route, its limits of deviation (100m) and up to a 250m buffer. Number of ponds and location to be confirmed following the desk study (including aerial photography) and Phase 1 Habitat Survey.	Scope use to inform subsequent field surveys. Extent of survey area will ensure flexibility to allow for minor changes in route.
	Presence/ absence survey. Where possible Environmental DNA (eDNA) surveys (using approved great crested newt eDNA kit suppliers), will be undertaken in accordance with the protocols as set out by Biggs *et al.* (Ref 6-9). Where eDNA methodology may not be possible at specific waterbodies (e.g., likely contamination present or water too shallow for sampling) consideration of the need to undertake traditional presence/absence survey techniques will be made. Where necessary, standard presence/ absence surveys utilising four visits will be undertaken in accordance with the standard survey methodology (Ref 6-10).	eDNA: 15th April to 30th June (2022) Traditional presence/absence surveys: Mid-March to 30th June (2022) These surveys may need to be commenced prior to receipt of eDNA survey results being received in order to achieve required timings.	1 survey visit to each pond Number of ponds and location to be confirmed following the HSI and eDNA survey.	Based upon the avoidance of loss or direct effects upon great crested newt breeding waterbodies and prominently temporary nature of the proposed pipeline route construction works it is proposed that there is an appropriately robust and precedented approach to mitigation and legal compliance based on presence/ absence baseline data only. These data will be sufficient to support an application under a District Level Licensing (DLL) Scheme or a traditional EPSM license. Minor habitat losses associated within installation of the offtake facility and shutdown valves will be considered as unlikely to meet the threshold requiring more than presence/presence surveys.

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
	Population size class assessment survey. Six survey visits of waterbodies with positive eDNA result or known to support GCN (from desk-based data) in accordance with standard guidance (Ref 6-8, Ref 6-10).	Night-time and day-time surveys as detailed below: Each survey visit is carried out over two consecutive days. Day 1 - the survey is carried out between late afternoon then after hours of darkness (torchlight surveys) – can continue to midnight. Day 2 - the survey is carried out in the morning between approx. 6.00am and 11.00am	Number of ponds and location to be confirmed following the HSI and eDNA survey.	Where permanent GCN terrestrial habitat losses are predicted, it is proposed that population information may be required to support the assessment of effects and the determination of the requirements for mitigation to be adopted under a traditional EPSM GCN licence approach (were a DLL option not available) and licensable activities could not be entirely avoided.
Bats - Preliminary Roost Features (PRF) assessment	Permanent impacts on trees will be avoided where possible. Trees to be directly impacted will be subject to a PRF assessment survey in accordance with The Bat Conservation Trust guidance (Ref 6-9). No structures or buildings are proposed to be directly affected by the Proposed Scheme. Should a structure or building be impacted this will also be subject to PRF assessment in accordance with Collins *et. al*. (Ref 6-11)	Any time of year.	As per the Phase 1 Habitat Survey results.	Information collated on the location of trees that are suitable for roosting bats will inform design and offset buffers to avoid direct effects upon potential roost sites (and avoidance of trees and woodland with higher ecological value irrespective of bats which should be avoided). Furthermore, the PRF assessment information will form the basis of the scope for roost surveys (as detailed below).
Bats – Foraging/ Commuting	Activity surveys will be undertaken based upon published guidance (Ref 6-11) only where permanent habitat effects are predicted i.e. the shutdown valve sites and offshore	If required: April/May to September 2022 inclusive	Limited to areas of suitable habitat which will be permanently lost to facilitate the development.	It is not considered warranted that detailed bat activity surveys will be required along the pipeline route given the temporary nature of habitat loss, and the avoidance of

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
	pipeline tie-in and outlet at the former TGT site. An appropriate level of survey effort comprising walked transects and periods of remote static detector deployment across the activity season will be undertaken based on the suitability of the habitats for foraging/ commuting bats, in accordance with standard survey guidance. Activity transect routes will be planned to provide representative coverage of all habitats of potential value to foraging/ commuting bats within proximity to the areas of permanent land take (although the requirements for this will be reviewed dependent on the suitability of the habitat for bats within areas where permanent facilities are proposed.	Surveys would commence at dusk for up to 3-4 hours and/ or dawn for 3-4 hours.		the removal of mature trees or other structures which may support roosting bats. Where linear habitat features e.g. watercourses/ hedgerows are affected by the Project, but which may provide commuting routes or a foraging resource for bats, appropriate robust and precedented mitigation measures can be secured via adoption of construction methods that seek to avoid these features and reduce the temporary effects to a level that would not be significant.
Bats - Roosting	It is likely that the Project will be able to avoid trees with PRFs that have potential to support a bat roost. However, where this is not possible, trees will be subject to climbing and assessment of the identified PRF features where safe to do so, to confirm if the tree could be used as a roost and/ or if there are signs of bats. Where tree climbing confirms that the PRF does have potential to support a roost and /or where it is not possible to safely climb a tree, bat emergence/ re-entry surveys will be undertaken at dusk and dawn in accordance with standard survey guidance (Ref 6-11).	Any time of year. If required, between April/May and September 2022.	Features with bat roost suitability identified during the Phase 1 Habitat Survey, focused on the preferred pipeline route.	To determine appropriate mitigation, and EPSM licensing requirements if necessary, where trees with confirmed/ potential bat roosts cannot be entirely avoided.

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
Badger	Presence/absence survey for setts and field signs in combination with Phase 1 habitat survey. In combination with the Phase 1 Habitat survey. The survey will focus on habitat suitable to support setts. Incidental records obtained through desk study data in combination with the completion of other surveys will also supplement the baseline assessment.	Any time of year – and will be combined with the Phase 1 Habitat Survey.	As per the result of Phase 1 Habitat Survey, with focus on proposed pipeline route (within a 50 m working width plus 30 m buffer and temporary construction areas)	To determine appropriate mitigation either through avoidance of impacts on setts, or Natural England licensing for sett closures where direct impacts cannot be avoided. Pre-construction surveys for badger in areas where records of badger activity are identified will be committed to via the EcIA and embedded with mechanisms such as the Construction Environmental Management Plan (CEMP) or equivalent.
Otter and Water Vole	Presence/absence survey looking for field signs along watercourses and ditches where open cut crossing techniques will be required. Presence/absence survey based on Strachan *et al*. (Ref 6-12); a spring survey will be completed, and a second autumn period survey as required to confirm presence/ likely absence.	Otter - April to September inclusive. Water Vole - spring survey before end of June 2022; if required a second survey before end September 2022.	Up to 500m length of the watercourse – 250m up and down stream of crossing point. Access will be required to both banks and up to 10m from the bank edge.	To determine appropriate mitigation either through avoidance of impacts on water vole/ otter habitat, or Natural England licensing where direct impacts cannot be avoided.
Reptiles	A desk-based habitat assessment (using aerial mapping and data sources for reptile records/mapping for the area/county) will be undertaken to highlight potential areas of interest for reptiles within the Project boundary. These areas will then be subject to assessment for their potential to support reptiles as part of the Phase 1 Habitat Survey based on technical guidance by ARC Trust (Ref 6-13). Where habitats appear suitable for reptile populations and are to be permanently affected by the Proposed Development, presence/absence surveys will be undertaken following guidance provided by in Froglife Advice Sheet 10: Reptile Surveys (Ref 6-14).	If required: Optimal – April to middle of June and September. However, surveys will be carried out between April and September inclusive depending on the weather.	Limited - Only likely required at potential permanent infrastructure locations such as at either end of the route, or at shutdown valves - subject to the findings of the Phase 1 Habitat Survey.	Presence/ absence reptile surveys will only be considered warranted to be completed where areas of moderate/ high value reptile habitat could not be avoided by the Project. These data will inform the EcIA and mitigation strategy. Temporary construction effects upon small areas of suitable reptile habitat will be able to be mitigated through appropriate pre-construction measures where habitats/features of interest for reptiles are identified e.g. supervised vegetation clearance at an appropriate time of year.

Survey	Scope of Survey	Survey Timing – Months	Survey Area Extent	Justification
	Survey involves laying refugia (carpet tiles/roof felts) and leaving them in situ for up to 1-3 months. They will be checked 7 times and then removed after the last survey.			
Terrestrial Invertebrates	A desk based and aerial mapping exercise will review the presence of habitats which may be of particular interest to this species group.	Any potentially important terrestrial invertebrate habitat would be identified during the Phase 1 Habitat survey and desk study.	As per the Phase 1 Habitat Survey results - focused on the preferred pipeline route.	Due to the predominantly arable nature of the route corridor it should be possible to avoid areas of likely high habitat suitability for terrestrial invertebrates; therefore, it is not proposed at this stage to undertake detailed terrestrial invertebrate surveys. However, this will be reviewed as part of the desk study/ extended Phase 1 Habitat survey scope.
Aquatic Ecology	A habitat condition assessment (Modular River Physical) survey of watercourses and drain/ ditches crossed by the Project will be undertaken.	If required: June – September 2022	Focused on watercourse crossing points.	Main watercourses (such as the Louth canal and Rivers Great Eau and Long Eau) will be crossed through non-open cut techniques; however, habitat condition assessments will be undertaken to inform Biodiversity Net Gain calculations. Specific aquatic flora and fauna surveys are not proposed on the basis that the majority of the construction impacts on drains/ ditches crossed by open-cut techniques will be temporary and reversible, and that potential impacts (e.g., increase in suspended sediment) can be adequately addressed through standard mitigation techniques to be committed to in the CEMP.

6.3.10 Additional surveys to characterise the wintering and breeding bird assemblages along the length of the central section of Scoping Boundary (i.e. measuring approximately 40km, between the key areas identified above) will be undertaken during the breeding and non-breeding seasons using a point count method. These will be carried out at intervals of approximately 2 km along the length of the Scoping Boundary.

6.4 Assessment Method

6.4.1 Potential impacts on important ecological features will be assessed in accordance with CIEEM best practice guidance (Ref 6-1). The aims of the EcIA are to:

- identify relevant ecological features (i.e. designated sites, habitats, species or ecosystems) which may be impacted as a consequence of the Project;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Project, which may be beneficial (i.e. positive) or adverse (i.e. negative);
- facilitate scientifically rigorous and transparent determination of the consequences of the Project in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
- set out the steps to be taken to adhere to legal requirements relating to the relevant ecological features concerned.

6.4.2 It is not necessary in the assessment to address all habitats and species with potential to occur in the zone of influence of a proposed development. Instead, the focus should be on those that are 'relevant'. CIEEM guidance makes it clear that there is no need to "*carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*". This does not mean that efforts should not be made to safeguard wider biodiversity, and requirements for this will be considered. National policy documents emphasise the need to achieve no net loss of biodiversity and enhancement of biodiversity.

6.4.3 To support focussed EcIA, there is a need to determine the scale at which the ecological features identified through the desk studies and field surveys are of value. The value of each ecological feature will be defined with reference to the geographical level at which it matters, and the results of this assessment will be used to identify the relevant features requiring impact assessment. The frames of reference that will be used for this assessment, based on CIEEM guidance, are:

- International (generally this is within a European context, reflecting the general availability of good data to allow cross-comparison);
- National (Great Britain, but considering the potential for certain ecological features to be more notable (of higher value) in an England context relative to Great Britain as a whole);
- Regional (e.g. North-east);
- County (Lincolnshire);
- District (town or parish area e.g. Grimsby or Louth);
- Local (ecological features that do not meet criteria for valuation at a District or higher level, but that have sufficient value to merit retention or mitigation); and

- Negligible (common and widespread ecological features of such low priority that they do not require retention or mitigation at the relevant location to otherwise maintain a favourable nature conservation status).

6.4.4 All ecological features of Local value and above, where there is the potential for the project to directly or indirectly impact them, will be taken forward to impact assessment and will be the 'relevant ecological features' for the purposes of ecological impact assessment.

6.4.5 In line with the CIEEM guidelines, the terminology used within the EcIA will draw a clear distinction between the terms 'impact' and 'effect'. For the purposes of the EcIA, these terms are defined as follows:

- *impact* – actions resulting in changes to an ecological feature; for example, demolition activities leading to the removal of a building utilised as a bat roost; and
- *effect* – outcome resulting from an impact, acting upon the conservation status or structure and function of an ecological feature; for example, killing/injury of bats and reducing the availability of breeding habitat because of the loss of a bat roost may lead to an adverse effect on the conservation status of the population concerned.

Significance Criteria

6.4.6 For each ecological feature only those characteristics relevant to understanding the ecological effect and determining the significance are described. The determination of the significance of effects will be made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

- *not significant* - no effect on structure and function, or conservation status; and
- *significant* - structure and function, or conservation status is affected.

6.4.7 For significant effects (both adverse and beneficial) this will be qualified with reference to the geographic scale at which the effect is significant (e.g. an adverse effect significant at a national level).

6.4.8 The CIEEM approach described above broadly accords with the EIA methodology described in Chapter 4 of this Scoping Report. However, a matrix approach will not be used to classify effects, as this deviates from CIEEM guidance. To provide consistency of terminology in the final ecological impact assessment with other Chapters of the ES, the findings of the CIEEM assessment will be translated into the classification of effects scale used in other chapters of the ES as outlined in **Table 6-3** below.

Table 6-3: Relating CIEEM Assessment Terms to those used in other ES Chapters

Effect Classification	Terminology used in Other ES Chapters	Equivalent CIEEM Assessment
Significant (beneficial)	Major beneficial	Beneficial effect on structure/function or conservation status at regional, national or international level.
	Moderate beneficial	Beneficial effect on structure/function or conservation status at District or County level.
Not-significant	Minor beneficial	Beneficial effect on structure/function or conservation status at Site or Local level.
	Negligible	No effect on structure/function or conservation status.
	Minor adverse	Adverse effect on structure/function or conservation status at Site or Local level.

Effect Classification	Terminology used in Other ES Chapters	Equivalent CIEEM Assessment
Significant (adverse)	Moderate adverse	Adverse effect on structure/function or conservation status at District or County level.
	Major adverse	Adverse effect on structure/function or conservation status at Regional, National or International level.

6.4.9 Any significant adverse effects would be mitigated or compensated for, whilst ecological enhancements may be recommended where appropriate to meet planning policy objectives. Following the implementation of any mitigation and compensation, as appropriate, any residual effects on ecological features will be identified.

6.5 Identification of Potential Effects

6.5.1 The potential environmental effects will be assessed within the subsequent ES for the construction and operational phases of the project. At this stage, it is identified that the Project has the potential to result in effects on ecological features as detailed in **Table 6-4**.

6.5.2 No international statutory designated sites will be directly impacted by the Project. The potential for indirect effects upon these sites will be considered with the EcIA and a Habitat Regulation Assessment (HRA) as detailed below.

6.5.3 There are no statutory designated sites located within the Scoping Boundary, however there are potential pathways of effect between the Project and designated sites. The potential for direct and indirect impacts on relevant designated sites will be considered in the EcIA. Where possible any secondary or indirect impacts upon qualifying features of the site will be sought to be avoided in the design development and, where required the adoption of appropriate mitigation measures.

6.5.4 It is unlikely that any of the LWSs will be directly impacted by the Project, but the EcIA will examine whether there will be any indirect effects on LWSs during construction e.g. due to dust smothering or changes in hydrology, and to confirm any relevant avoidance/ mitigation requirements.

6.5.5 The Project would, wherever possible, avoid direct impacts upon waterbodies and as such the predicted effects upon great crested newt is limited to effects upon potential terrestrial habitat within 250 m of ponds where great crested newt is confirmed. Crossing of watercourses using open cut techniques will be minimised wherever possible to reduce the potential direct impacts upon aquatic habitats and potential effects upon associated protected fauna such as water vole or otter. Similarly, woodland, trees and other features with potential to support roosting bats and nesting birds will also be avoided as far as possible.

Table 6-4: Potential Ecological Effects Resulting from the Project

Stage of the Project	Activity / impact	Equivalent CIEEM Assessment
Construction	Permanent land take at Pipeline Inlet Facility and shutdown valves	Loss of habitat. Loss/ fragmentation of habitat supporting protected and notable species. Killing/ injury of protected and notable species e.g., GCN populations within 250 m of the preferred pipeline route. Fragmentation of habitats (loss of wildlife corridors).
	Temporary land take as a result of	Damage to habitat supporting protected and notable species.

Stage of the Project	Activity / impact	Equivalent CIEEM Assessment
	the pipeline, construction compound(s) and laydown areas	Loss/ fragmentation of habitat supporting protected and notable species. Killing/ injury of protected and notable species e.g., GCN populations within 250 m of the preferred pipeline route. Fragmentation of habitats (loss of wildlife corridors).
	Restoration of habitats following completion of works	Damage to habitat supporting protected and notable species (depending how and when the restoration activities are completed). Killing/ injury of protected and notable species e.g., GCN populations within 250 m of the preferred pipeline route.
	Noise/ visual	Disturbance to designated sites e.g., qualifying waterbird features of the Humber Estuary SPA and Ramsar. Disturbance to protected and notable species e.g., roosting/ foraging bats.
	Lighting	Disturbance/ disruption to bat flight lines and foraging habitat. Disturbance/ disruption to nocturnal foraging animals e.g., barn owl.
	Changes in hydrology	Damage to watercourses such as the Long Eau, Great Eau and Louth Canal.
	Surface water pollution	Damage to habitat supporting protected and notable species.
	Ground water pollution	Damage to habitat supporting protected and notable species.
	Dust emissions	Damage to habitats within designated sites due to dust smothering.
	Spread of invasive non-native plant species	Degradation of habitats, legal offence to plant or otherwise allow to spread in the wild.
Operation	Loss of functionally linked land	Loss of functionally linked land used by bird species listed as qualifying species of European designated sites.
	Noise/ visual disturbance at shutdown valves	Disturbance to protected and notable species e.g., roosting/ foraging bats.
	Lighting at shutdown valves	Disturbance/ disruption to bat flight lines and foraging habitat. Disturbance/ disruption to nocturnal foraging animals e.g., barn owl.
Decommissioning	Noise/ visual	Disturbance to designated sites e.g., qualifying waterbird features of the Humber Estuary SPA and Ramsar. Disturbance to protected and notable species e.g., roosting/ foraging bats.
	Lighting	Disturbance/ disruption to bat flight lines and foraging habitat.

Stage of the Project	Activity / impact	Equivalent CIEEM Assessment
		Disturbance/ disruption to nocturnal foraging animals e.g., barn owl.
	Changes in hydrology	Damage to watercourses such as the Long Eau, Great Eau and Louth Canal.
	Surface water pollution	Damage to habitat supporting protected and notable species.
	Ground water pollution	Damage to habitat supporting protected and notable species.

6.6 Design, Mitigation and Enhancement Measures

6.6.1 This section describes the typical measures that will be considered to mitigate for any potential adverse ecological effects that could arise from the Project. Four common forms of mitigation are recognised as follows and will be taken into consideration in the EcIA:

- *Avoidance* – Avoidance and prevention of adverse effects through the design of the proposed scheme and sensitive programming of works, for example re-aligning the pipeline to retain important ecological features;
- *Reduction* – Mitigation to reduce the scale and severity of effects, for example the use of wildlife proof fencing or restricting construction access in areas of ecological interest;
- *Compensation/replacement/restoration* – Compensation to offset adverse ecological effects through habitat creation, for example provision of bat boxes / houses to replace bat roosts lost by the proposed scheme or replanting hedgerows/reseeding grassland; and
- *Enhancement* – Enhancement and improvement of existing conditions, for example plant species chosen to enhance diversity and ecological interest of the area.

6.6.2 The mitigation measures cannot be detailed in full until the baseline is completed, and the impact assessment concluded. However, initial concepts are outlined in this section.

6.6.3 The pipeline route alignment will continue to be developed to avoid more botanically diverse habitats e.g., semi-natural broad-leaved woodland, species rich grassland and grazing marsh, wherever practicable. If works have potential to affect designated sites, discussions with stakeholders are proposed to identify the optimal method for minimal disturbance in these sensitive areas.

6.6.4 Other potential impacts, where they cannot be avoided, may be mitigated through a range of actions including:

- Careful design (e.g. careful lighting design at the converter to ensure minimal incidental illumination of unnecessary areas);
- Introduction of a CEMP which would ensure controls on polluting activities and dust generating activities;
- Controls on noise generation and propagation where necessary;
- Implementation of European Protected Species Mitigation licences where necessary, including translocation of great crested newt (for example) and creation of alternative habitat features (e.g. bat roosts), if required;
- Restoration of any areas of vegetation clearance to improved habitat quality; and

- If necessary, provision of compensatory replacement habitat.

6.6.5 This is a preliminary list of measures and is not intended to be definitive or comprehensive.

6.7 Habitat Regulations Assessment

6.7.1 It is necessary to consider whether the Project is likely to have a significant effect on areas that have been designated for their international nature conservation value. Known as European sites, these include SACs, SPAs and, as a matter of government policy, Ramsar sites.

6.7.2 European sites are protected under the Conservation of Habitats and Species Regulations 2017 (as amended; relevant to England and Wales) (Ref 6-15). The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 ("the Withdrawal Act"). However, the most recent amendments to the Habitats Regulations – the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 – make it clear that the need for HRA continues to apply.

6.7.3 There is no formal Scoping phase associated with the HRA process. Notwithstanding, an approach to the proposed HRA has been provided and is included within Appendix D which covers relevant sites that may be impacted by the Project (from end to end).

6.7.4 The Scoping Boundary is located within 10 km of the following international sites:

- The Humber Estuary SPA;
- The Humber Estuary SAC;
- The Humber Estuary Ramsar;
- Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC; and,
- Greater Wash SPA.

6.7.5 Stage 1 of the HRA process (Test of Likely Significant Effects) will consider the potential pathways of effect between the Project and the European designated sites within 10 km of the Scoping Boundary (on the basis that it is unlikely that a project such as this will affect sites further afield), and whether there is potential to have a significant adverse effect on the integrity of the European designated sites, either alone or in combination with other plans or projects. Potential pathways of effect currently include noise, light and visual disturbance during construction, pollution (via hydrological links to the designated sites) and dust emissions and loss / disturbance of functionally linked land used by qualifying bird species. Information used to support the HRA process will include desk study data and the suite of bird surveys outlined in **Table 6-2** above.

6.7.6 Where there is potential for the Project to have a likely significant effect upon the qualifying features of the European designated sites, the pathway will be taken forward to Stage 2 - Appropriate Assessment. At Appropriate Assessment, the measures that will be implemented to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant, will be set out.

6.7.7 The HRA will be prepared in line with Planning Inspectorate Advice Note 10 (Habitats Regulations Assessment) including completion of the necessary matrices. The HRA process will be in line with the EIA process. There would be a "*Test of Likely Significant Effects Report*" at the PEIR stage, and this will be updated as necessary for DCO application including a report to inform Appropriate Assessment, if required.

6.8 Biodiversity Net Gain

6.8.1 The Environment Act was granted Royal Assent in November 2021 and was introduced to support the Government's overarching vision for leaving the environment in a better state for the next generation, including transposing elements of the UK Government's 25 Year Environment Plan (Ref 6-16) into statute and confirming the UK's approach to environmental governance post-Brexit.

6.8.2 Schedule 15 of the Environment Act 2021 (Ref 6-7) makes provision for Biodiversity Net Gain in relation to development consent for nationally significant infrastructure projects. The requirement for BNG for NSIPs will not become mandatory until 2025, however this project will aspire to achieve a Net Gain in biodiversity of at least 10%. A BNG assessment will be undertaken for the Project in accordance with the published Natural England Biodiversity Metric 3.0 (Ref 6-14).

6.9 Summary

6.9.1 A programme of ecological surveys, including a Phase 1 Habitat survey and protected species surveys, will be undertaken to inform the EcIA (surveys for passage/ wintering birds are ongoing, having commenced in 2021).

6.9.2 However, most of the impacts associated with the Project are likely to be temporary given the pipeline will be buried, with permanent above ground infrastructure limited to the footprint of the Pipeline Offtake Facility, the pipeline in-take and outlet at former TGT site and the shutdown valves. With the implementation of appropriate mitigation, the Project would not directly impact any statutory or non-statutory designated nature conservation sites. A summary of the scope of the ecology and biodiversity assessment is provided in **Table 6-5**.

6.9.3 As there is potential for significant effects on ecological features this topic is scoped into the main ES, and the assessment will be supported by the survey results presented in technical appendices to the ES chapter.

6.9.4 The ecology chapter will also be supported by a BNG assessment with the purpose of demonstrating 10% net gain to meet emerging planning policy. In addition, a report to inform HRA will be undertaken for the Humber Estuary SPA, SAC and Ramsar and the Greater Wash SPA, the qualifying features of these sites as set out in Appendix D.

Table 6-5: Summary of scope for ecology and biodiversity assessment

Element	Phase	Scoped in	Scoped Out	Justification
Designated Sites – non-statutory and statutory	Construction / Operation / Decommissioning	✓		There is the potential for indirect effects upon these sites.
Habitats (of botanical interest)	Construction / Operation / Decommissioning	✓		Habitats which may be of botanical interest or be Priority habitats which could be impacted by the Project. Routeing should avoid areas of high-quality habitat but this will be supported by survey data.

Element	Phase	Scoped in	Scoped Out	Justification
Hedgerows	Construction	✓		Where the pipeline or access tracks have to cross hedgerows there will be a temporary loss.
Breeding Birds	Construction / Operation / Decommissioning	✓		Habitats within the Scoping Boundary have the potential to support nesting, roosting or overwintering birds.
Wintering Birds	Construction / Operation / Decommissioning	✓		
GCN	Construction	✓		Waterbodies have been identified within the Scoping Boundary and up to 250m either side, which may support GCN.
Bats	Construction / Operation / Decommissioning	✓		Habitats within the Scoping Boundary have the potential to support bats.
Badger	Construction	✓		Habitats within the Scoping Boundary have the potential to support badger.
Otter and Water Vole	Construction / Decommissioning	✓		Habitats within the Scoping Boundary have the potential to support otter and water vole.
Reptiles	Construction		✓	This will be reviewed as part of the Phase 1 Habitat Survey scope, but pipeline routeing should avoid areas of high-quality habitat for reptiles.
Terrestrial invertebrates	Construction/ Decommissioning		✓	This will be reviewed as part of the Phase 1 Habitat Survey scope, but pipeline routeing should avoid areas of high-quality habitat for terrestrial invertebrates.
Aquatic Ecology	Construction / Decommissioning		✓	Specific aquatic flora and fauna surveys are not proposed. Most of the construction impacts on drains/ ditches crossed by open-cut techniques will be temporary and reversible. Potential effects can be adequately addressed through standard mitigation techniques.

6.10 References

Ref 6-1 CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, version 1.1 updated September 2019. Chartered Institute of Ecology and Environmental Management, Winchester.

Ref 6-2 Greater Lincolnshire Nature Partnership (2013) Local Wildlife Site Guidelines for Greater Lincolnshire. 3rd Edition [Online] Available at [redacted]

Ref 6-3 CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, Second Edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Ref 6-4 JNCC (2016) Handbook for Phase 1 habitat survey: a technique for environmental audit [Online] Available at https://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf.

Ref 6-5 Natural England (2021) Biodiversity Metric 3.0 – habitat condition assessment sheets with instructions [Online] Available at: [redacted]

Ref 6-6 CIEEM (2021). Guidance on Ecological Survey and Assessment in the UK During the COVID-19 Outbreak. Version 4. Published 10 February 2021. Chartered Institute of Ecology and Environmental Management, Winchester, UK.

Ref 6-7 Defra (2007) Hedgerow Survey Handbook: A standard procedure for local surveys in the UK.

Ref 6-8 Oldham, R.S., Keeble, J., Swan, M.J.S. & Jeffcote, M, (2000) Evaluating the suitability of habitat for the great crested newt (Triturus cristatus). Herpetological Journal 10 (4), 143-155.

Ref 6-9 Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. and Dunn, F. (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

Ref 6-10 English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

Ref 6-11 Collins, J (Ed) (2016) Bat Surveys for Professional Ecologists. Good Practice Guidelines 3rd Edition. Bat Conservation Trust, London.

Ref 6-12 Strachan, R., Dean, M., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

Ref 6-13 Brady, L.D. and Phillips, M. (2012) Developing a 'Habitat Suitability Index' for Reptiles. ARC Research Report 12/06.

Ref 6-14 Froglife (1999) Reptile Survey: An introduction to planning, conduction and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10.

Ref 6-15 Conservation of Habitats and Species Regulations 2017 (as amended).

Ref 6-16 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

Ref 6-17 Environment Act 2021 [Online] Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted

Ref 6-18 Natural England (2022) Great Crested newts: advice for making planning decisions [Online] Available at: https://www.gov.uk/guidance/great-crested-newts-advice-for-making-planning-decisions. Accessed 25.01.2022.

7. Landscape & Visual

7.1 Introduction

7.1.1 This chapter of the Scoping Report presents an initial baseline for landscape and visual amenity relevant to the V Net Zero Pipeline (hereafter referred to as the Project), identifies the need for additional surveys to ensure there is appropriate information to accurately characterise the baseline and sets out the Study Area. In addition, the chapter provides an overview of the assessment methodology to be followed for the environmental assessment and details the potential effects provisionally identified.

7.1.2 The potential effects on the fabric and character of the existing landscape and the influence that the Project could have on views and the visual amenity of people in and around the vicinity are also considered. The approach and methodology to the Landscape and Visual Impact Assessment (LVIA) is continuously reviewed and updated to comply with current best practice.

7.1.3 Landscape and visual effects are interrelated with other environmental effects but will be assessed separately. Landscape effects associated with the Project relate to the changes to the fabric, character and quality of the landscape and how it is experienced. Visual effects relate closely to changes to the landscape, but also concern changes in people's views as a result of the introduction of the Project.

7.1.4 This chapter is supported by **Figure 7-1**: Landscape Designations and Representative Viewpoints and **Figure 7-2:** Landscape Character.

7.2 Baseline Environment and Study Area

7.2.1 An initial study of the baseline environment has been undertaken through desk-based research to establish the existing conditions of the landscape and visual resources to inform the options appraisal process, and to inform the ongoing design development of the Project.

7.2.2 Desk-based research involves a review of mapping and aerial photography, planning and policy documents, landscape character assessments, and other sources of information relevant to the baseline environment of the Study Area.

7.2.3 The baseline environment will provide a description of the identified landscape and visual receptors, indicating their key characteristics and value, against which the potential change arising from the development of the Project will be assessed.

7.2.4 Key sources of information for the landscape and visual baseline include:

- Ordnance Survey (OS) mapping, and aerial photography;
- Natural England (Ref 7-1);
- Historic England (Ref 7-2);
- National, regional, and local planning policy; and
- Published landscape character assessments.

7.2.5 Consultation will be held with relevant LPAs and statutory consultees early in the LVIA process. This will help to inform detailed baseline survey and data collection; refinement of the location of representative viewpoints that will form the basis of the visual assessment; and, to agree the approach to mitigation measures and landscape reinstatement.

Study Area

7.2.6 An initial Study Area of 1 km from the pipeline corridor (including shutdown valves) and 3 km from the Pipeline Offtake Facility and the offshore pipeline tie-in and outlet at the former TGT Site has been identified for the landscape and visual assessments. It is judged that significant landscape or visual effects will be unlikely beyond this Study Area. The LVIA Study Area is shown on **Figure 7-1**.

7.2.7 The extent of the Study Area has been informed by a review of the maximum parameters of the Project, desk-based research, the appraisal work undertaken to date to inform the routeing and siting work undertaken to date, knowledge of the area and professional judgement. The Study Area will be further refined at the detailed assessment stage to ensure a proportional approach, focussed on potential significant effects and take into account the location of other design elements such as shutdown valves whose positioning is subject to further design work.

Landscape Designations

7.2.8 The landscape designation context of the Study Area is shown on **Figure 7-1**.

7.2.9 A small part of the Study Area is located within the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) and an area identified as an Area of Great Landscape Value (AGLV). The AGLV is a non-statutory, local-level designation identified by West Lindsey in the adopted West Lindsey Local Plan (Ref 7-3).

Landscape Character

7.2.10 The national and local landscape character context of the Study Area is shown on **Figure 7-1.** At the national level, the study area falls within parts of the following Natural England National Character Areas (NCAs) (Ref 7-1):

- NCA 41: Humber Estuary;
- NCA 42: Lincolnshire Coast and Marshes; and
- NCA 43: Lincolnshire Wolds

7.2.11 At the regional level, landscape character is identified by the Lincolnshire County Council (2011) The Historic Character of The County of Lincolnshire (Ref 7-4) and the East Midlands Region Landscape Character Assessment (Ref 7-5).

7.2.12 The Study Area encompasses regional-level Regional Character Areas (RCA) including:

The Historic Character of The County of Lincolnshire

- RCA 3: The Northern Marshes;
- RCA 4: The Wolds; and
- RCA 8: The Grazing Marshes.

East Midlands Region Landscape Character Assessment

- RCA 2a: Settled Fens and Marshes; and
- RCA 2c: Fen and Marsh Margin Farmlands.

7.2.13 At the local level, landscape character is identified by:

- North Lincoln Council (1999) North Lincolnshire Landscape Character Assessment and Guidelines (Ref 7-6);
- The Historic Character of The County of Lincolnshire (Ref 7-4);

- East Lindsey Council (2009) East Lindsey District Landscape Character Assessment (Ref 7-7); and
- West Lindsey Council (1999) West Lindsey District Landscape Character Assessment (Ref 7-8).
- The Study Area encompasses local-level Landscape Character Areas (LCA) and Character Zones (CZ) including:

North Lincolnshire Landscape Character Assessment and Guidelines

- LCA Lincolnshire Drift; and
- LCA Humber Estuary.

The Historic Character of The County of Lincolnshire

- CZ NOM1: The Humber Bank;
- CZ NOM2: The Immingham Coastal Marsh;
- CZ NOM3: The Grimsby Commuter Belt;
- CZ WOL3: The Upper Wolds; and
- CZ GRM1: The Middle Marsh.

East Lindsey District Landscape Character Assessment

- LCA I1: Holton le Clay to Great Steeping Middle Marsh; and
- LCA J1: Tetney Lock to Skegness Coastal Outmarsh.

West Lindsey Council Landscape Character Assessment

- LCA Wolds' Estates.

Representative Viewpoint Locations

7.2.14 The visual assessment will be based on a series of representative viewpoints. These viewpoints have been chosen to provide a representative cross section of receptor types and locations within the Study Area, focused on those with the potential for significant effects.

7.2.15 **Table 7-1** details the representative viewpoint locations proposed for the pipeline corridor and the inlet and handing facilities and their reason for inclusion in the LVIA. The location of the proposed representative viewpoints is shown on **Figure 7-1**.

Table 7-1: Representative Viewpoint Locations

Viewpoint Number	Grid Reference (X, Y)	Location Description	Reason for Inclusion
1	518106, 418050	Station Road Proposed England Coast Path PRoW 530	Representative of recreational receptors including PRoW and long distance recreational trail.
2	517044, 417160	Marsh Lane/ Rosper Road Proposed England Coast Path	Representative of recreational receptors users of the long distance recreational trail and users of the local road network.

Viewpoint Number	Grid Reference (X, Y)	Location Description	Reason for Inclusion
3	516966, 414709	Brocklesby Avenue, Immingham	Representative of settlement and users of the local road network.
4	519402, 411226	Riby Road, Stalingborough	Representative of settlement and users of the local road network.
5	520469, 407287	PRoW 107 St Lawrence Trail, Aylesby	Representative of settlement and recreational receptors including PRoW.
6	520034, 404664	Walk Lane, Irby Upon Humber	Representative of settlement, recreational receptors including PRoW and visitors to the AONB and users of the local road network.
7	525579, 400677	Ashby cum Fenby PRoW 150	Representative of settlement and recreational receptors including PRoW.
8	528624, 398335	A16/ High Street North Thoresby	Representative of settlement and users of the local road network.
9	533649, 395071	Main Road, Covenham St Bartholomew	Representative of settlement and users of the local road network.
10	536186, 391116	Yarburgh Road, Alvingham	Representative of settlement and users of the local road network.
11	539264, 388847	Middlesykes Lane, Grimoldby	Representative of settlement, recreational receptors including PRoW and users of the local road network.
12	541877, 388702	Main Road, Saltfleatby	Representative of settlement, recreational receptors including PRoW and users of the local road network.
13	547254, 387169	Sea Lane, Threddlethorpe	Representative of settlement and users of the local road network.
14	548003, 388483	PRoW 252 off Mabblethorpe Road A1031	Representative of settlement, recreational receptors including PRoW and users of the local road network.

7.2.16 It is important to note that this list will be expanded to include appropriate viewpoint locations for each of the shutdown valves required for the Project, as soon as the exact positioning of these valves have been determined. Equally, it is important to note that the positioning of the shutdown valves will take landscape and visual factors into consideration as part of this siting exercise which will be completed as the design evolves.

7.2.17 Feedback from consultation events will also be taken into consideration in selection of a finalised list of viewpoint locations.

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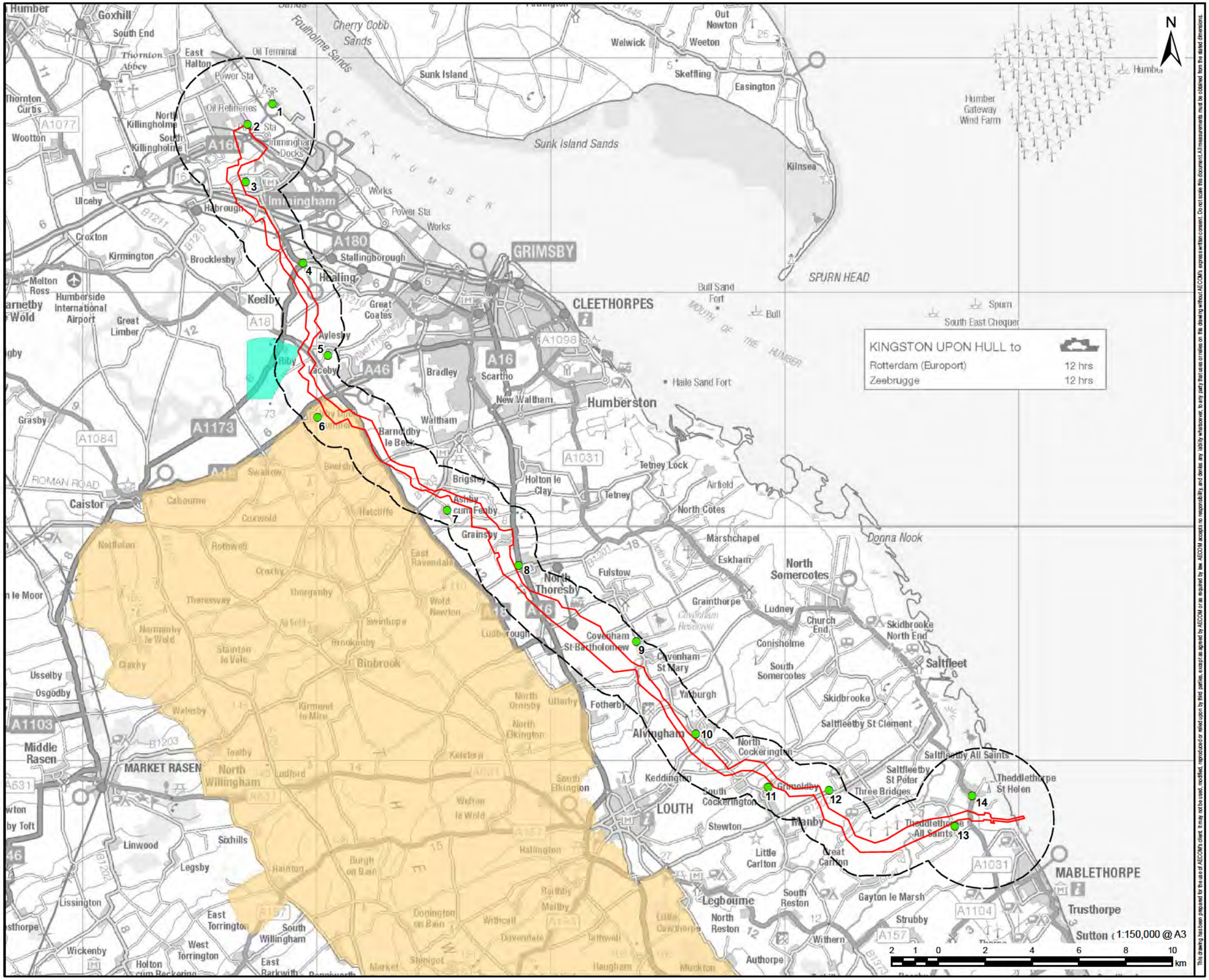

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PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Study Area
- Viewpoint Location
- Area of Great Landscape Value
- Lincolnshire Wolds Area of Outstanding Natural Beauty

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FIGURE TITLE
Figure 7-1
Landscape Designations and Representative Viewpoints

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_7-1

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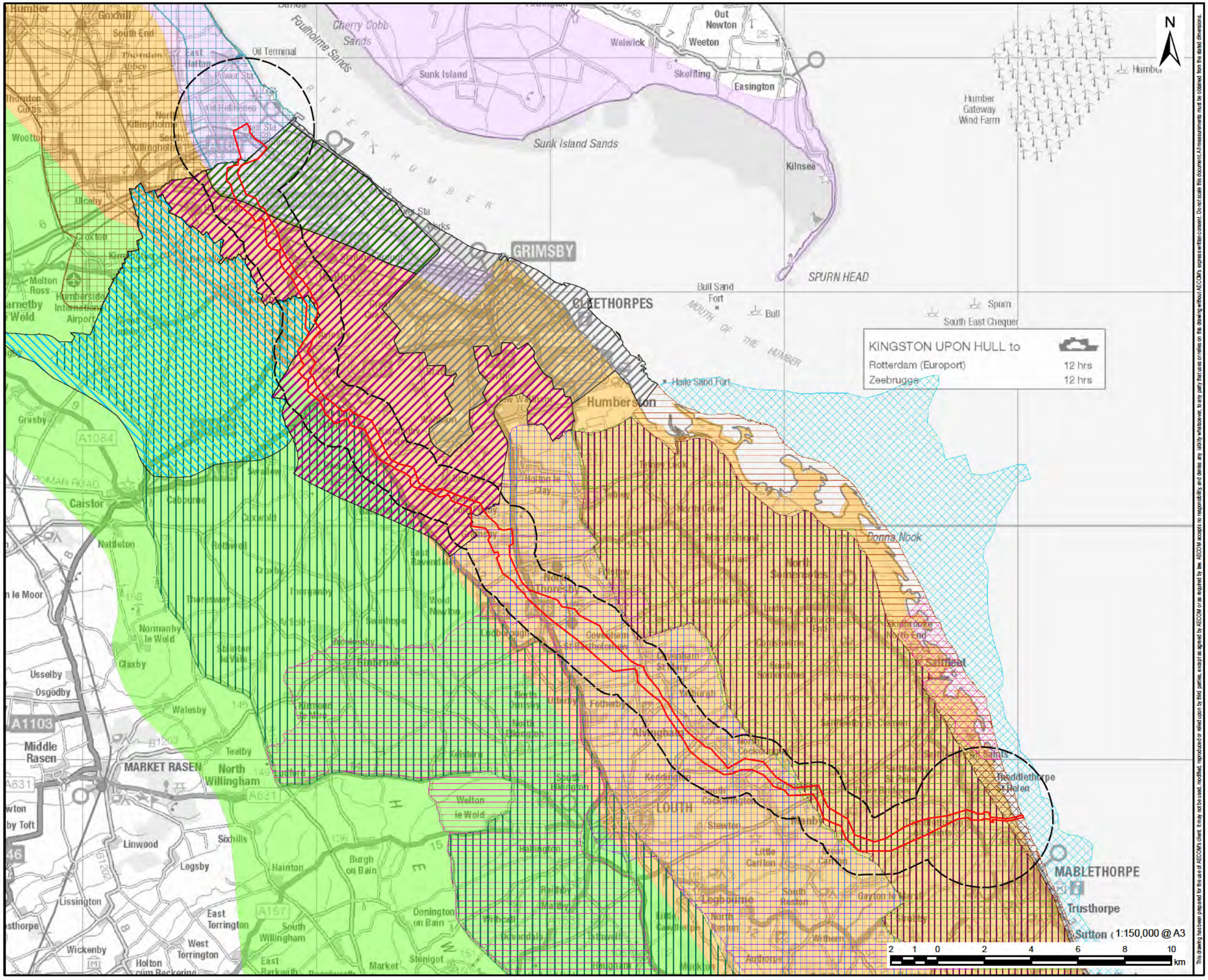

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PROJECT
V Net Zero Pipeline

LEGEND
- Study Area
- Scoping Boundary

National Character Area:
- NCA 41: Humber Estuary
- NCA 42: Lincolnshire Coast and Marshes
- NCA 43: Lincolnshire Wolds

North East Lincolnshire Landscape Character Area:
- Humber Estuary
- Lincolnshire Coast and Marshes
- Undefined

West Lindsey District Council Landscape Character Area:
- 14: Wolds' Estates

East Lindsey District Council Landscape Character Area:
- G1: Binbrook to Tetford Wolds Farmland
- I1: Holton le Clay to Great Steeping Middle Marsh
- J1: Tetney Lock to Skegness Coastal Outmarsh
- K1: Donna Nook to Gibraltar Point Naturalistic Coast

North Lincolnshire Landscape Character Area:
- LCA Humber Estuary
- LCA Lincolnshire Drift

East Midlands Region Landscape Character Area:
- 1A: Coastal Saltmarshes and Mudflats
- 1B: Coastal Dunes, Beach and Intertidal Sand Flats
- 1C: Shallow Coastal Waters
- 2A: Settled Fens and Marshes
- 2C: Fen and Marsh Margin Farmlands
- 7A: Chalk Wolds

NOTES:

FIGURE TITLE
Figure 7-2
Landscape Character Areas

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_7-2

Visualisations

7.2.18 A series of visualisations will be produced for the Pipeline Offtake Facility, the offshore pipeline tie-in and outlet and shutdown valves at representative viewpoint locations to assist with an understanding of the potential visual effects.

7.2.19 No visualisations are proposed for the pipeline route because of the temporary nature of impacts predicted to arise during the construction phase of the pipeline. The need for any visualisation relating to shutdown valves will be determined once the proposed locations are established.

7.2.20 The methodology for the preparation and presentation of the visualisations will follow the requirements set out in the Landscape Institute, 2019, Technical Guidance Note 06-19: Visual Representation of Development Proposals (Ref 7-9).

7.3 Planned Surveys

7.3.1 Field surveys of the preferred pipeline corridor, Pipeline Offtake Facility, offshore pipeline tie-in and outlet and shutdown valves will be undertaken after Scoping Opinions have been received and consultation has been conducted with relevant LPAs. These surveys will be used to undertake the landscape and visual assessments, and to capture photography from representative viewpoint locations used in the visual assessment and as supporting figures for the LVIA.

7.3.2 All locations visited during the surveys will be publicly accessible areas. Surveys will be undertaken in line with UK Government guidelines relating to the Covid-19 pandemic and relevant Health and Safety procedures. At the time of writing there are no foreseeable limitations to the LVIA surveys because of Covid-19 restrictions.

7.4 Assessment Method

7.4.1 The landscape and visual assessment will be carried out in accordance with the following good practice guidance documents:

- The Landscape Institute and Institute of Environmental Management and Assessment (2013), Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition (Ref 7-10);
- Landscape Institute (2019) Visual Representation of Development Proposals, Technical Guidance Note 06/19 (Ref 7-9); and
- Natural England (2014) An Approach to Landscape Character Assessment (Ref 7-11).

7.4.2 GLVIA3 places a strong emphasis on the importance of professional judgement in identifying and defining the significance of landscape and visual effects. The LVIA will be undertaken by a Chartered Landscape Architect with experience in the assessment of similar types of projects. Professional judgement will be used in combination with structured methods and criteria to evaluate landscape and visual value and susceptibility, the resulting sensitivity, magnitude and significance of effect.

7.4.3 The following section summarises the methodology for the LVIA which builds on the general assessment methodology presented in Chapter 4. For clarity and in accordance with good practice, the assessment of potential effects on landscape character and visual amenity, although closely related, are undertaken separately.

Sensitivity of Landscape Receptors

7.4.4 Landscape receptors are described as components of the landscape that are likely to be affected by the Project. These can include overall character and key characteristics,

individual elements or features and specific aesthetic or perceptual aspects. It is the interaction between the different components of the Project and these landscape receptors which has potential to result in landscape effects (both adverse and beneficial).

7.4.5 The sensitivity of the landscape receptor is a combination of the value of the landscape (undertaken as part of the baseline study) and the susceptibility to change of the receptor to the specific type of development being assessed.

7.4.6 Landscape value is frequently addressed by reference to international, national, regional and local designations, determined by statutory bodies and planning agencies. Absence of such a designation does not necessarily imply a lack of quality or value. Factors such as accessibility and local scarcity can render areas of nationally unremarkable quality, highly valuable as a local resource. The evaluation of landscape value will be undertaken considering the following factors and classified as high, medium or low with evidence provided as to the basis of the evaluation:

- *Landscape quality/condition* - the measure of the physical state of the landscape including the intactness of the landscape and the condition of individual elements;
- *Scenic quality* - the level of visual and sensory appeal of the landscape;
- *Perceptual aspects* - the extent that the landscape receptor is recognised for its perceptual qualities (e.g. remoteness or tranquillity);
- *Rarity* - the presence of unusual elements or features;
- *Representativeness* - the presence of particularly characteristic features;
- *Recreation* - the extent that recreational activities contribute to the landscape receptor; and
- *Association* - extent that cultural or historical associations contribute to the landscape receptor.

7.4.7 Landscape susceptibility relates to the ability of a particular landscape to accommodate a project. It is appraised through consideration of the baseline characteristics of the landscape, and in particular, the scale or complexity of a given landscape. The evaluation of landscape susceptibility will be defined as high, medium or low and will be supported by a clear explanation based upon the analysis of the landscape receptor and the extent to which it is able to accommodate the type of change proposed, specific to the Project.

7.4.8 The overall sensitivity assessment of the landscape receptor is made by employing professional judgement to combine and analyse the identified value and susceptibility with overall levels given from high, medium to low (**Table 7-2**).

Table 7-2: Sensitivity of Landscape Receptors

	Higher Sensitivity	⟷	Lower Sensitivity
Value	A designated landscape (National Park, Area of Outstanding National Beauty, National Scenic Area, World Heritage Site) or a landscape in very good condition, exceptional scenic quality and high recreational opportunities or a high degree of rarity.		Landscapes containing few if any notable elements/features, of poor condition or containing several detracting features and limited aesthetic qualities. Landscapes which are not formally designated.

	Higher Sensitivity	⟷	Lower Sensitivity
Susceptibility	Attributes that make up the character of the landscape which offer very limited opportunities to accommodate change of the type proposed without fundamentally altering key characteristics.		Attributes that make up the character of the landscape which are tolerant of a large degree of the type of change proposed without fundamentally altering the key characteristics.

Sensitivity of Visual Receptors

7.4.9 Sensitivity of visual receptors is defined through appraisal of the viewing expectation, or value placed on the view as identified in the baseline study, and its susceptibility to change.

7.4.10 Value of the view is an appraisal of the value attached to views and is often informed by the appearance on Ordnance Survey or tourist maps and in guidebooks, literature or art or identified in policy. Value can also be indicated by the provision of parking or services and signage and interpretation. The nature and composition of the view and its scenic quality is also an indicator. The value of the view is classified as high, medium or low and will be supported by evidenced, professional judgements.

7.4.11 The susceptibility of visual receptors is a function of the occupation or activity of people experiencing the view and the extent to which their attention or interest is focussed on the view and the visual amenity they experience at a particular location. For example, residents in their home, walkers whose interest may tend to be focused on the landscape or a particular view, or visitors at an attraction where views are an important part of the experience, may indicate a higher level of susceptibility. Whereas, receptors occupied in outdoor sport where views are not important or at their place of work could be considered less susceptible to change.

7.4.12 As with landscape susceptibility, judgements about the susceptibility of visual receptors are described as high, medium or low using consistent and reasoned judgements.

7.4.13 The overall sensitivity assessment of the visual receptor is determined by employing professional judgement to combine and analyse the identified value and susceptibility on a scale from high, medium to low (**Table 7-3**). The basis of the assessment is made clear in the evaluation of each visual receptor.

Table 7-3: Sensitivity of Visual Receptors

	Higher Sensitivity	⟷	Lower Sensitivity
Value	Views protected by designation, or nationally recognised, or recorded on maps/guidebooks or with cultural associations. Views that have high scenic qualities relating to the content and composition of the view.		Views which are not documented or protected with minimal or no cultural associations. Views that exhibit low scenic qualities relating to the content and composition of the view.
Susceptibility	Viewers whose attention or interest is focussed on their surroundings.		People whose attention or interest is not focussed on their surroundings and where the view is incidental to their enjoyment.

Landscape Magnitude of Change

7.4.14 Magnitude of landscape change refers to the extent to which the Project will alter the existing characteristics of the landscape. It is an expression of the size or scale of change to the landscape, the geographical extent of the area influenced and its duration and reversibility. The variables involved are described below:

- The extent of existing landscape elements that will be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape;
- The extent to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones;
- Whether the change alters the key characteristics of the landscape, which are integral to its distinctive character;
- The geographic area over which the change will be felt (within the application boundary itself, the immediate setting, at the scale of the landscape character area, on a larger scale influencing several landscape character areas); and
- The duration of the change short term, medium term or long term (which is defined in Chapter 4), and its reversibility (whether it is permanent, temporary or partially reversible).

7.4.15 An overall assessment of the magnitude of landscape change resulting from the Project on the landscape receptor is made combining the above judgements using evidence and professional judgement. The levels of magnitude of change are described as being high, medium, low, very low and none are defined in **Table 7-4**.

Table 7-4: Magnitude of Change – Landscape Receptors

Magnitude	Criteria
High	Large alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term impacts, permanent or reversible.
Medium	Partial alteration to the landscape receptor or may impact a wide area or characteristics at a local level. May be medium term impacts, permanent or reversible.
Low	Slight alteration to the landscape receptor or may impact a restricted area and few key characteristics. May be short to medium term impacts, permanent or reversible.
Very Low	Very slight alteration to the landscape receptor or may impact a limited area or no key characteristics. May be short term impacts, permanent or reversible.
None	No change to the landscape receptor.

Visual Magnitude of Change

7.4.16 Visual magnitude of change relates to the extent to which the Project will alter the existing view and is an expression of the size or scale of change in the view, the geographical extent of the area influenced and its duration and reversibility. The variables involved are described below:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Project;
- The degree of contrast or integration of any new features or changes in the form, scale, composition and focal points of the view;
- The nature of the view of the Project in relation to the amount of time over which it will be experienced and whether views will be full, partial or glimpsed;
- The angle of view in relation to the main activity of the receptor, distance of the viewpoint from the Project and the extent of the area over which the changes will be visible; and
- The duration of the change short term, medium term or long term (which is defined in Chapter 4) and its reversibility (whether it is permanent, temporary or partially reversible).

7.4.17 An overall assessment of the magnitude of visual change resulting from the Project on the visual receptor is made combining the above judgements using evidence and professional judgement. The levels of magnitude of change are described as being high, medium, low, very low and none are defined in **Table 7-5**.

Table 7-5: Magnitude of Change – Visual Receptors

Magnitude	Criteria
High	A pronounced change to the composition of the view or change that may be viewed in the foreground or directly. May be longer term impacts, permanent or reversible.
Medium	A noticeable change to the composition of the view or change that may be viewed in the middle ground or indirectly. May be medium term impacts, permanent or reversible.
Low	An unobtrusive change in the composition of the view or change that may be viewed in the background or obliquely. May be short to medium term impacts, permanent or reversible.
Very Low	A barely perceptible change in the composition of the view or change that may be viewed in the background and/or very obliquely. May be short term impacts, permanent or reversible.
None	No change to the view.

Significance of effects

7.4.18 Determination of the significance of landscape and visual effects will be undertaken by employing professional judgement and experience to combine and analyse the magnitude of change against the identified sensitivity of the receptor. The assessments will take account of direct and indirect change on existing landscape elements, features, key characteristics and evaluates the extent to which these will be lost or modified, in the context of their importance in determining the existing baseline character. The visual assessment will take into account likely changes to the visual composition, including the extent to which new features will distract or screen existing elements in the view or disrupt the scale, structure or focus of the existing view.

7.4.19 The levels of landscape and visual effects will be described with reference to the criteria outlined below in **Table 7-6**. For the purposes of this assessment, effects of moderate or above are generally considered to be significant.

Table 7-6: Significance of Effect

Significance of Effect	Landscape	Visual
Major Beneficial	Alterations that result in a considerable improvement of the existing landscape resource. Valued characteristic features would be restored or reintroduced.	Alterations that typically result in a pronounced improvement in the existing view.
Moderate Beneficial	Alterations that result in a partial improvement of the existing landscape resource. Valued characteristic features would be largely restored or reintroduced.	Alterations that typically result in a noticeable improvement in the existing view.
Minor Beneficial	Alterations that result in a slight improvement of the existing landscape resource. Characteristic features would be partially restored.	Alterations that typically result in a limited improvement in the existing view.
Negligible Beneficial	Alterations that result in a very slight improvement to the existing landscape resource, not uncharacteristic within the receiving landscape.	Alterations that typically result in a barely perceptible improvement in the existing view.
Neutral	No alteration to any of the components that contribute to the existing landscape resource.	No change to the existing view.
Negligible Adverse	Alterations that result in a very slight deterioration to the existing landscape resource, not uncharacteristic within the receiving landscape.	Alterations that typically result in a barely perceptible deterioration in the existing view.
Minor Adverse	Alterations that result in a slight deterioration of the existing landscape resource. Characteristic features would be partially lost.	Alterations that typically result in a limited deterioration in the existing view.
Moderate Adverse	Alterations that result in a partial deterioration of the existing landscape resource. Valued characteristic features would be largely lost.	Alterations that typically result in a noticeable deterioration in the existing view.
Major Adverse	Alterations that result in a considerable deterioration of the existing landscape resource. Valued characteristic features would be wholly lost.	Alterations that typically result in a pronounced deterioration in the existing view.

Cumulative Landscape and Visual Effects

7.4.20 Assessment of cumulative landscape and visual effects will be undertaken based on applications for schemes of a similar type, nature and scale agreed in advance with consultees. The cumulative assessment will be based on the addition of the Project in combination with the cumulative schemes (consented and application schemes) where there is likely to be intervisibility and potentially significant cumulative landscape and visual effects.

7.5 Identification of Potential Effects

7.5.1 The siting of the Pipeline Offtake Facility and the offshore pipeline tie-in and outlet and the routeing of the onshore pipeline corridor has reduced the potential for significant landscape and visual effects, through seeking to avoid the more sensitive landscape features, protected trees (e.g., Ancient Woodland) and proximity to settlement. Where the removal of landscape features along the onshore pipeline corridor are unavoidable such as hedgerows and arable land, these will be fully reinstated to the pre-existing condition as far as reasonably practical (secured through a measure in the REAC) once installation of the onshore pipeline is complete.

7.5.2 As a result, the LVIA of the pipeline route will be focussed on the construction phase as operational effects are not considered to be significant as the pipeline will be entirely buried (other than the shutdown valves and at the Offtake Facility and offshore pipeline tie-in and outlet). This is underpinned by professional judgement and past experience of similar pipeline projects. Effects on the landscape and visual resource as a result of the introduction of the Pipeline Inlet Facility and offshore pipeline tie-in and outlet sites will be assessed both at construction and operation (at year 1 of operation and year 15 of operation once any mitigation planting has established).

7.5.3 Effects associated with lighting, both during construction and once operational will be considered as part of the landscape and visual assessment.

7.5.4 Potential effects on landscape character and visual amenity which will be considered include the following:

Construction

Landscape Character

- Temporary physical effects on the landscape fabric as a result of the movement and scale of plant and activities associated with the construction of the Pipeline Offtake Facility and offshore pipeline tie-in and outlet, shutdown valves and pipeline route including construction compound(s), temporary accommodation and access tracks;
- Temporary effects on the special landscape qualities of the Lincolnshire AONB and AGLV, including their setting as a result of the above construction operations; and
- Temporary effects on the LCA/LCTs within the Study Area as a result of the above construction operations.

Visual Amenity

- Temporary disruption to views from residential and recreational receptors and road users due to the construction plant and activities associated with the construction of the onshore pipeline corridor, Pipeline Offtake Facility, offshore pipeline tie-in and outlet, and shutdown valves including the construction compound(s), temporary accommodation and access tracks.

Operation

Landscape Character

- Long term effects on the physical landscape fabric including loss of existing landscape elements due to the introduction of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet.
- Long term effects on the LCA/LCTs within the study area as a result of the introduction of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet, including perceptual changes to the character.

Visual Amenity

- Long term changes to views from residential and recreational receptors and road users due to the introduction of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet.

Decommissioning

7.5.5 A decommissioning strategy is being developed. The temporary and limited nature of the decommissioning of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet is not anticipated to give rise to any significant effects.

7.6 Design, Mitigation and Enhancement Measures

7.6.1 Mitigation measures are undertaken as a response to anticipated adverse landscape and visual effects. Mitigation by Design are steps taken during the design phase to help minimise potential effects, based on key sensitivities, constraints and opportunities identified through baseline study. Landscape and visual considerations will continue to inform the form, location and routeing of the various elements throughout the design process.

7.6.2 Project Specific Mitigation are those that seek to further reduce potential effects that could not be entirely designed out and are identified and informed by the detailed assessment stage. These include landscape reinstatement and landform and woodland screening and seek to help reduce the extent or significance of negative effects in the long term.

7.6.3 Project Specific Mitigation is likely to include reinstatement of hedgerows and other vegetation along the pipeline route and temporary access tracks and landscape integration of the pipeline Offtake Facility and offshore pipeline tie-in through planting design. Landscape mitigation measures will be developed to support the landscape strategies and guidelines identified in published landscape character assessments.

7.6.4 Details of landscape mitigation measures, such as planting types and species will be developed in consultation with LPAs.

7.7 Summary

7.7.1 The LVIA will be undertaken in accordance with GLVIA3 and current good practice guidance.

7.7.2 The landscape assessment will consider potential effects on recognised national and local landscape character areas and landscape designations.

7.7.3 The visual assessment will be based on a series of representative viewpoint locations which will be informed by detailed baseline study and defined in consultation with statutory consultees.

7.7.4 The LVIA will also consider the potential for cumulative effects during the operation phase, resulting from the addition of the Project in relation to other similar developments.

7.7.5 Mitigation measures will also be developed and informed by the detailed baseline and assessment stages and will seek to minimise potential adverse effects. This will focus on the reinstatement of the onshore pipeline corridor and integrating and partially screening views of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet.

7.7.6 As there is the potential for long term landscape and visual effects associated with the Pipeline Offtake Facility, offshore pipeline tie-in and outlet and shutdown valves, the LVIA will be included within the main ES. However, given the temporary and reversible effects associated with the pipeline itself, it is proposed that operational phase effects associated with the pipeline would be scoped out of the LVIA. A summary of the scope for the landscape and visual assessment in presented in **Table 7-7**.

Table 7-7: Summary of scope for landscape and visual assessment

Element	Phase	Scoped in	Scoped out	Justification
Effects to landscape character as a result of the construction of the Pipeline Offtake Facility and offshore pipeline tie-in and outlet and pipeline, as well as shutdown valves, construction compounds.	Construction	✓		
Temporary effects on special landscape qualities of the Lincolnshire AONB and AGLV, and LCA/LCTs in the Study Area, including their setting.	Construction	✓		
Long term effects on landscape character as a result of the introduction of the pipeline.	Operation		✓	During the operation of the Project, the pipeline would be buried out with of the Offtake facility and offshore pipeline tie-in and outlet and would not affect landscape character.
Long term effects on landscape character, including loss of exiting landscape elements, as a result of the Pipeline Offtake Facility and offshore pipeline tie-in and outlet.	Operation	✓		
Long term effects on the LCA/LCTs within the Study Area as a result of the introduction of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet.	Operation	✓		
Temporary disruption to views from residential and	Construction	✓		

Element	Phase	Scoped in	Scoped out	Justification
recreational receptors, and road users.				
Long term effects on visual amenity as a result of the Pipeline Offtake Facility and offshore pipeline tie-in and outlet.	Operation	✓		
Long term effects to visual amenity as a result of the pipeline.	Operation		✓	During the operation of the Project, the pipeline would be buried and would not affect landscape character.
Effects associated with lighting.	Construction, Operation	✓		
Decommissioning of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet.	Decommissioning		✓	The temporary and limited nature of the decommissioning of the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet is not anticipated to give rise to any significant effects.

7.8 References

Ref 7-1 Natural England [online resources]. Available at [redacted]

Ref 7-2 Historic England [online resources] (https://historicengland.org.uk/).

Ref 7-3 West Lindsey Local Plan (2006)

Ref 7-4 Lincolnshire County Council (2011), The Historic Character of The County of Lincolnshire [online resources]. Available at https://www.lincolnshire.gov.uk/historic-environment/historic-landscape-characterisation

Ref 7-5 Natural England (2014), East Midlands Region Landscape Character Assessment [online resources].Available at [redacted]

Ref 7-6 North Lincoln Council (1999) North Lincolnshire Landscape Character Assessment and Guidelines

Ref 7-7 East Lindsey Council (2009) East Lindsey District Landscape Character Assessment

Ref 7-8 West Lindsey Council (1999) West Lindsey District Landscape Character Assessment

Ref 7-9 Landscape Institute, 2019, Technical Guidance Note 06-19: Visual Representation of Development Proposals

Ref 7-10 The Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition

Ref 7-11 Natural England (2014) An Approach to Landscape Character Assessment

8. Historic Environment

8.1 Introduction

8.1.1 This chapter of the Scoping Report presents an initial baseline for archaeology and cultural heritage for the V Net Zero Pipeline (hereafter referred to the Project), identifies the need for additional surveys to ensure we have appropriate information to accurately characterise the baseline and sets out the Study Area. In addition, the chapter provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects.

8.1.2 Archaeology and cultural heritage comprises above and below-ground archaeological assets, buildings or structures of historic interest, historic landscape features, including historically important hedgerows, and any other elements that are of cultural heritage interest.

8.1.3 This chapter is supported by **Figure 8-1** which shows the location of designated heritage assets and **Figure 8-2**, which shows the location of non-designated heritage assets.

8.2 Baseline Environment and Study Area

Study Area

8.2.1 The Study Area is defined as the area within which cultural heritage assets may experience effects as a result of the Project during construction, operation and / or decommissioning. Effects to heritage assets may arise as a result of physical impacts to their fabric or through change to their setting.

8.2.2 For the purposes of this Scoping Report, an initial study area of 1 km either side of the Scoping Boundary has been used to capture data relating to designated and non-designated heritage assets (refer to **Figure 8-1** and **Figure 8-2**). The Study Area provides the necessary context for establishing the likely effects arising from the Project and the potential impacts upon cultural heritage assets, including those arising from changes within their settings.

Approach to Defining the Baseline

8.2.3 A number of data sources have been consulted during the preparation of this chapter to define the preliminary baseline conditions for archaeological and cultural heritage assets. These data sources include:

- National Heritage List for England (NHLE) for information relating to designated heritage assets;
- North East Lincolnshire Council Historic Environment Record (HER) for information relating to non-designated heritage assets, sites and historic landscape;
- North Lincolnshire Council HER for information relating to non-designated heritage assets, sites and historic landscape;
- Heritage Gateway for information relating to non-designated heritage assets;
- Lincolnshire Heritage Explorer map, maintained by Lincolnshire County Council, for information relating to heritage assets and archaeological fieldwork events;
- Archaeology Data Service, for information relating to heritage assets and previous fieldwork events; and

- Other available online sources.

8.2.4 Due to the length of the Scoping Boundary, the heritage assessment of the Project is divided into five sections between the Pipeline Offtake Facility at Immingham and the Mean Low Water Springs (MLWS), near Theddlethorpe Gas Terminal (TGT) as detailed in Chapter 2 of this report.

- Section A: Killingholme to south of the A18;
- Section B: South of A18 to west of Brigsley;
- Section C: West of Brigsley to North Thoresby;
- Section D: North Thoresby to Covenham St. Mary; and
- Section E: Covenham St. Mary to Theddlethorpe and MLWS mark.

8.3 Summary of archaeological and historical baseline

8.3.1 There are no World Heritage Sites, registered battlefields, or registered parks and gardens within the 1 km Study Area used for this Scoping Report.

8.3.2 The following provides a summary of the cultural heritage baseline conditions. Heritage assets referenced in the summary baseline are identified by either their HER identification number for non-designated assets, which is prefixed by ‘MNL’ for North East Lincolnshire Council HER and by ‘MLI’ for North Lincolnshire Council HER, or by their National Heritage List for England (NHLE) reference number for designated assets.

Pipeline Route - Section A

8.3.3 There are 22 designated heritage assets within the 1 km Study Area. This number comprises the site of a medieval settlement, post-medieval manor house and gardens at Stallingborough which is a scheduled monument (NHLE 1020423); two Grade I listed churches: the Grade I listed Church of St. Andrew (NHLE 1310011) at Immingham and the Grade I listed Church of St. Lawrence (NHLE 1161566) at Aylesby; three Grade II* buildings comprising the Church of St. Peter and St. Paul (NHLE 1346978) at Stallingborough, the Church of St. Edmund (NHLE 1146937) in Riby, an anti-aircraft gun site (NHLE 1403222) to the south of Keelby Road, and 16 grade II listed buildings.

8.3.4 Two of these assets, The Mill (NHLE 1103468) to the south of Riby Road, and a Royal Observer Corps monitoring post (NHLE 1403218) to the south of Keelby Road, both Grade II listed, are located within Section A of the pipeline route and Scoping Boundary.

8.3.5 Non-designated heritage assets recorded within Section A include Early Neolithic to Late Bronze Age flint scatters (MNL 4198) to the west of Stallingborough Road; findspots of Roman pottery (MNL 1507) in the fields to the west of Immingham and Stallingborough, and the sites of former structures, including a post-medieval mill (MNL 4349), a farmstead (MNL 1879) and a World War 2 searchlight battery (MNL 4346).

Pipeline Route - Section B

8.3.6 There are 13 designated heritage assets within the 1 km Study Area comprising the scheduled remains of a Civil War defensive earthwork (NHLE 1007735); the Grade I listed Church of St. Andrew (NHLE 1161130) located within Irby upon Humber Conservation Area, the Grade I listed Church of St. Helen (NHLE 1103486) in Barnoldby le Beck, and nine Grade II listed buildings.

8.3.7 None of these assets are located within Section B of the pipeline route and Scoping Boundary.

8.3.8 Non-designated heritage assets recorded within Section B include the sites of a potential Late Medieval enclosure (MNL123) to the west of Aylesby; historic landscape features associated with 18th and 19th century chalk quarrying (MNL 1566) to the west of Laceby, and an Early Medieval settlement (MNL 71) at Welbeck Hill.

Pipeline Route - Section C

8.3.9 There are 17 designated heritage assets within the 1 km Study Area comprising, the Grade I listed Church of St. Martin (NHLE 1359965) in Waithe; five Grade II* buildings comprising The Farmhouse (NHLE 1063127) and the Church of St. Helen (NHLE 1359941), which is located within North Thoresby Conservation Area, the Church of St. Nicholas (NHLE 1063111) in Grainsby, the Church of St. Peter (NHLE 1346925) in Ashby cum Fenby, and the Church of St. Helen (NHLE 1103490) in Brigsley, and ten Grade II listed buildings.

8.3.10 The Grade II* listed Church of St. Nicholas (NHLE 1063111) and the adjacent Grade II listed Old Rectory (NHLE 1359936) in Grainsby are located within Section C of the pipeline route and Scoping Boundary.

8.3.11 Non-designated heritage assets recorded within Section C include post-medieval features associated with water management including a sluice (MNL 1549) to the east of Ashby cum Fenby. The Scoping Boundary withing Section C also passes through the buried remains of the shrunken medieval village of Grainsby (MLI 41222) which extends to the south and the south-west of the current village, and the site of a prehistoric farmstead to the west of North Thoresby (MLI 87920).

Pipeline Route - Section D

8.3.12 There are 10 designated heritage assets within the 1 km Study Area comprising the scheduled remains of The Manor moated site and fishpond complex (NHLE 1019979), the Grade I listed Church of St. Mary (NHLE 1063122) in Ludborough; Grade II* listed Church of St. Mary (NHLE 1063109), Church of St. Bartholomew (NHLE 1063108) in Covenham St. Mary; the Grade II* listed Manor House (NHLE 1063123) in Ludborough, and five Grade II listed buildings.

8.3.13 None of these assets are located within Section D of the pipeline route and Scoping Boundary.

8.3.14 Non-designated heritage assets recorded within Section D include extant buildings associated with 19th century farmsteads, such as at Southfield Farm (MLI 117094) and Chequers Farm (MLI 117569), Utterby.

Pipeline Route - Section E

8.3.15 There are 34 designated heritage assets within the 1 km study area. These comprise the scheduled remains of North Cockerington Hall moated site (NHLE 1004988); six Grade I listed churches comprising, the Church of St. John the Baptist (NHLE 1063089) in Yarburgh, the Church of St. Mary (NHLE 1261895) and the Church of St. Adelwold (NHLE 1063076) in Alvingham, the Church of St. Leonard (NHLE 1309123) in South Cockerington, the

Church of St. Edith (NHLE 1359986) in Grimoldby, and Church of All Saints (NHLE 1062991) in Theddlethorpe All Saints. There are also two Grade II* listed buildings comprising the Watermill (NHLE 1063077) at Alvingham and the Church of St. Helen (NHLE 1147259) at Theddlethorpe St. Helen, and 25 Grade II listed buildings.

8.3.16 The Grade II listed Neves Farm House (NHLE 1062990) is located within Section E of the pipeline route and Scoping Boundary.

8.3.17 Non-designated heritage assets recorded within the Section E include the cropmark of the site of a potential Bronze Age barrow to the west of Alvingham (MLI 82175); the 18th century Louth Navigation Canal (MLI 86587); cropmarks of an undated enclosure (MLI 88042) and parallel cropmarks indicating a possible trackway (MLI 88041) to the north-east of Grimoldby; the site of a 19th century farmstead (MLI 777829) at Hedge Ends, Grimoldby; the site of a possibly medieval field system and former settlement (MLI 42821) near Walk Farm, Great Carlton; a probable medieval salters' route (MLI 82703) surviving as an earthwork and marked as 'Two Mile Bank' on current Ordnance Survey mapping; undated linear features (MLI 88208) and the site of a 19th century farmstead (MLI 41423) at Gayton le Marsh Grange; the site of medieval toft earthworks and cropmarks at Theddlethorpe All Saints (MLI 88214); the sites of several World War 2 aircraft obstructions in the fields south of Theddlethorpe All Saints (MLI 88213); the site of undated ditches (MLI 80942) and possible Early Medieval settlement (MLI 80941) to the west of the A1031 Mablethorpe Road; and the site of an undated enclosure (MLI 88265) in the fields west of the former TGT site.

Section A

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PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- 1km Survey Area
- Scheduled Monument
- Conservation Area

Listed Buildings
- Grade I
- Grade II
- Grade II*

FIGURE TITLE
Figure 8-1 (1 of 3)
Location of Designated Heritage Assets

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_8-1

Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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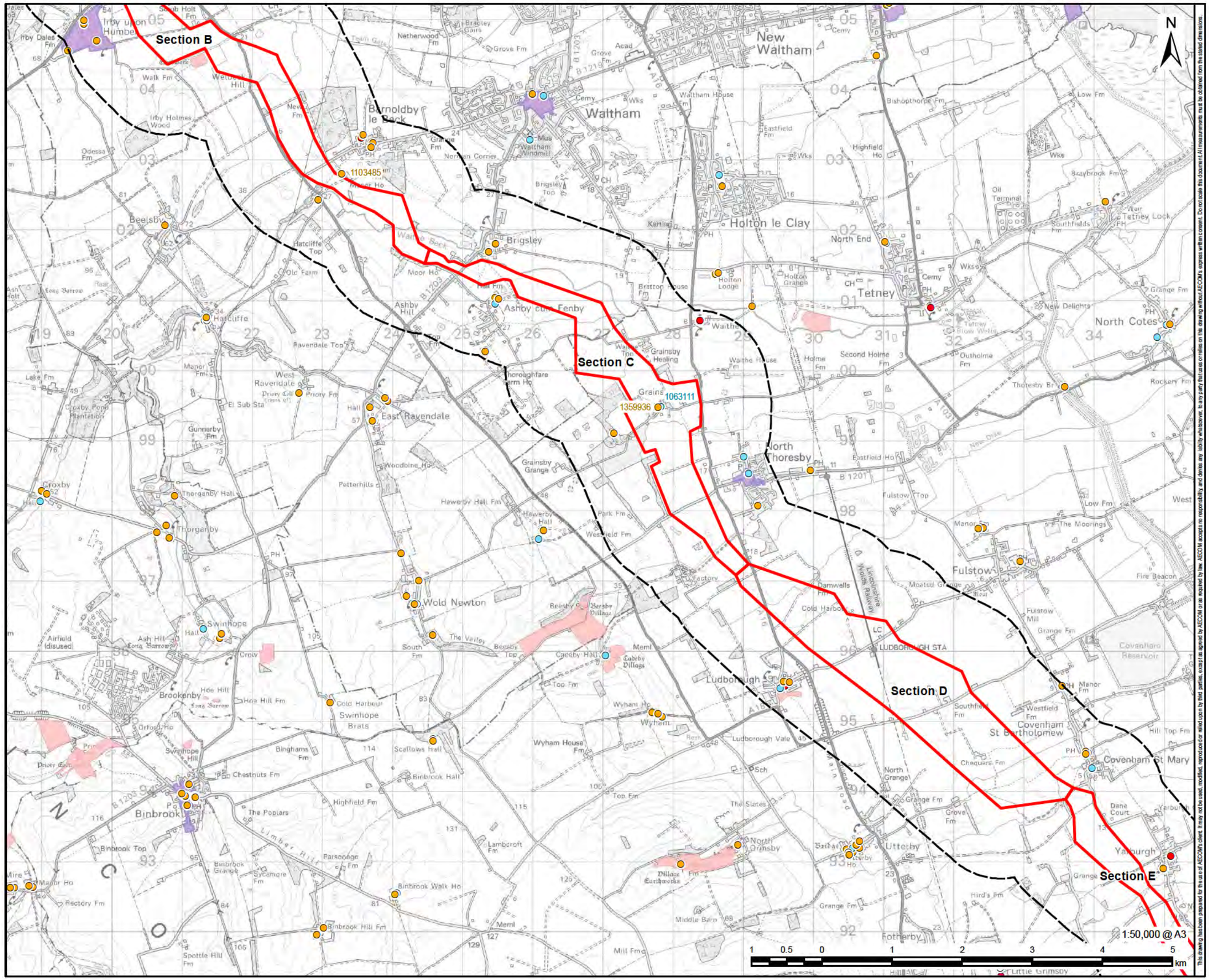

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PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 1km Survey Area
- Scheduled Monument
- Conservation Area

Listed Buildings

- Grade I
- Grade II
- Grade II*

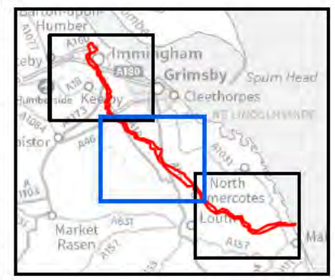

FIGURE TITLE

Figure 8-1 (2 of 3)
Location of Designated Heritage Assets

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_8-1

Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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Section E

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1062992

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PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 1km Survey Area
- Scheduled Monument
- Conservation Area

Listed Buildings

- Grade I
- Grade II
- Grade II*

NOTES:

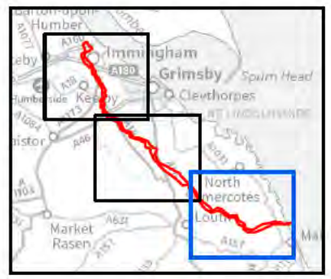

FIGURE TITLE

Figure 8-1 (3 of 3)
Location of Designated Heritage Assets

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_8-1

Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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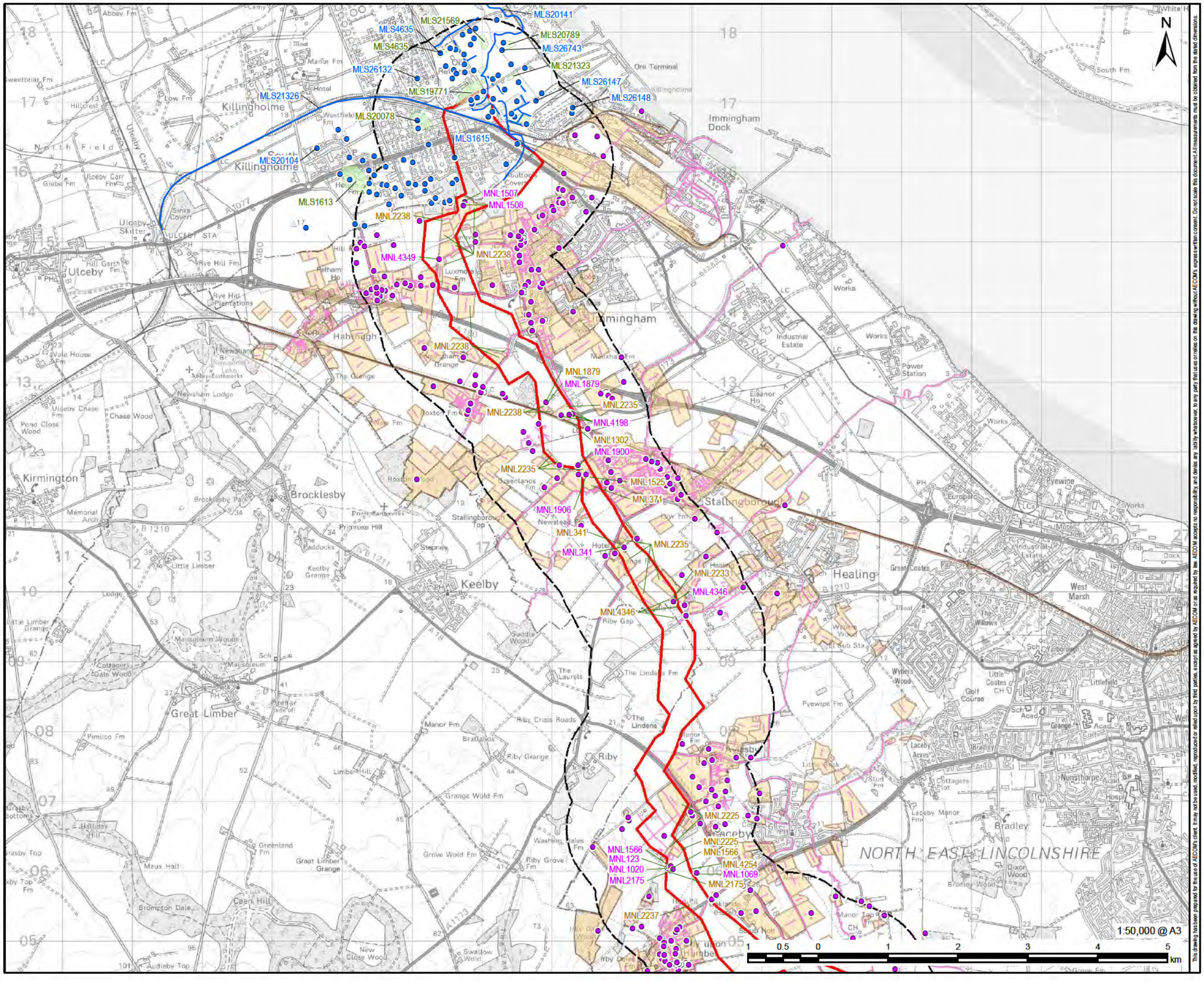

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PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 1km Study Area

North East Lincolnshire HER

- Heritage Asset Point
- Heritage Asset Line
- Heritage Asset Polygon

North Lincolnshire HER

- Heritage Asset Point
- Heritage Asset Line
- Heritage Asset Polygon

NOTES:
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FIGURE TITLE

Figure 8-2 (1 of 3)
Location of Non-Designated Heritage Assets

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_8-2

Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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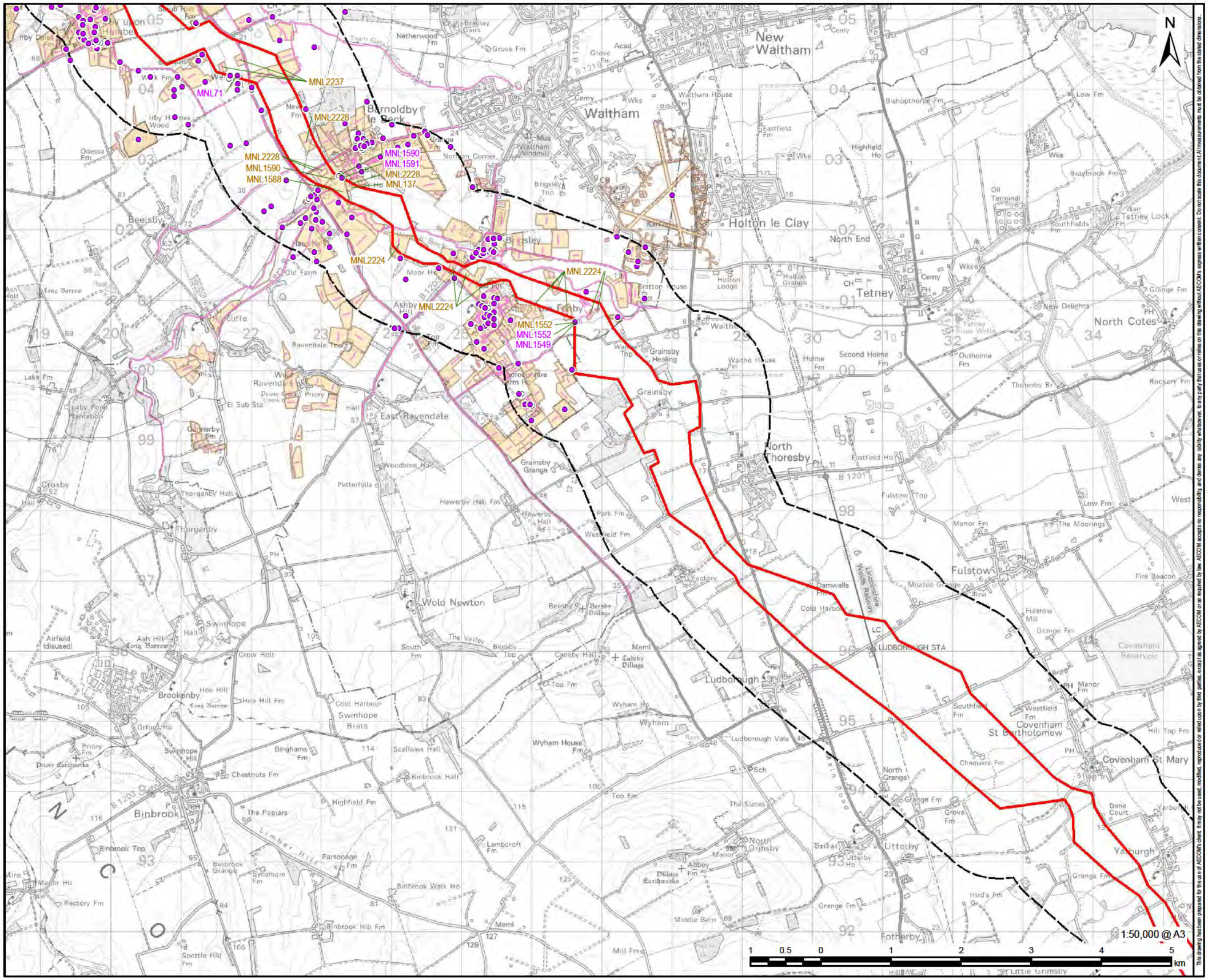

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PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 1km Study Area

North East Lincolnshire HER

- Heritage Asset Point
- Heritage Asset Line
- Heritage Asset Polygon

North Lincolnshire HER

- Heritage Asset Point
- Heritage Asset Line
- Heritage Asset Polygon

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FIGURE TITLE

Figure 8-2 (2 of 3)
Location of Non-Designated Heritage Assets

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

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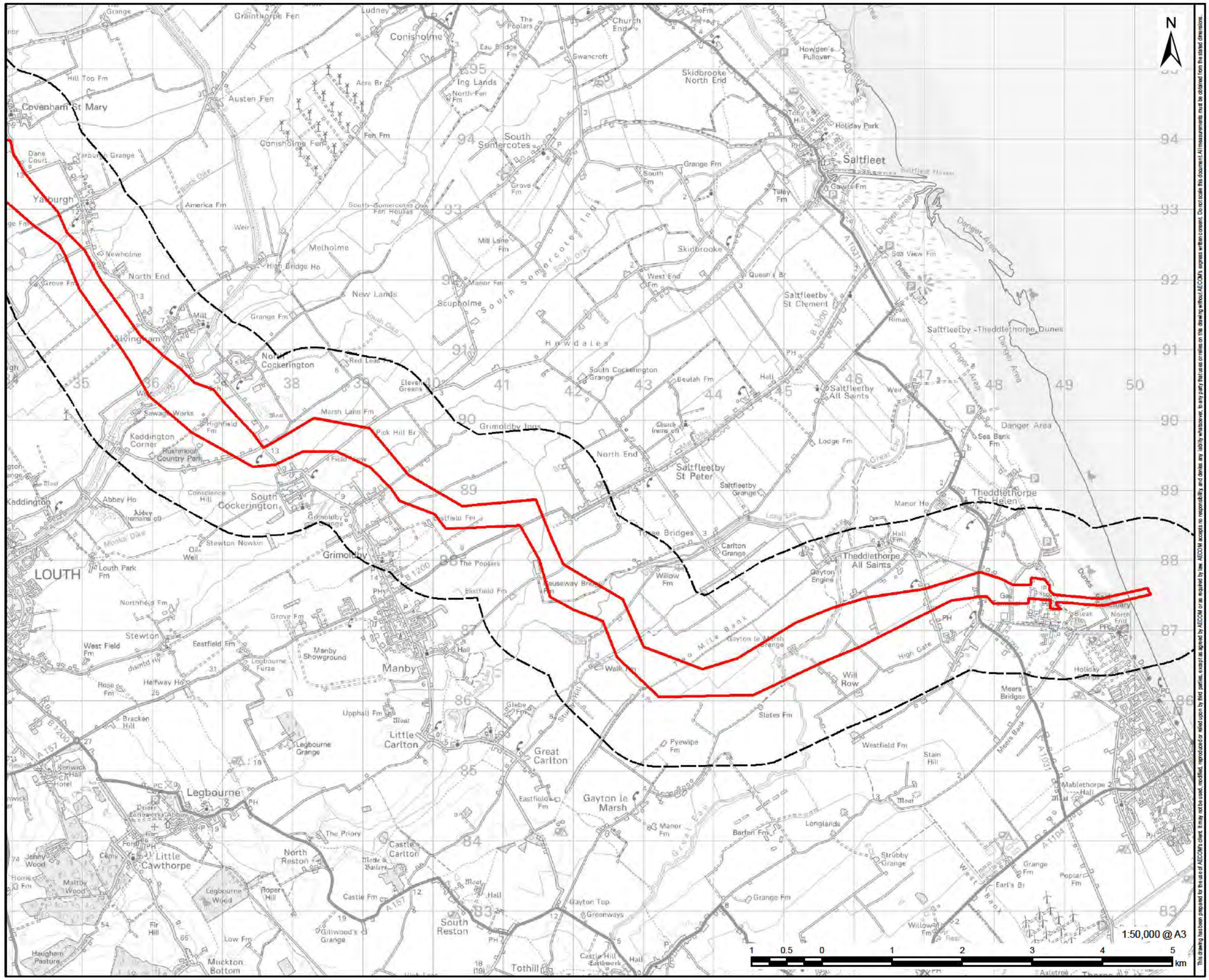

CONSULTANT

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North Lincolnshire HER

- Heritage Asset Point
- Heritage Asset Line
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NOTES:

FIGURE TITLE

Figure 8-2 (3 of 3)
Location of Non-Designated Heritage Assets

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

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8.4 Planned Surveys

Desk-based assessment

8.4.1 A cultural heritage Desk-Based Assessment (DBA) will be prepared in conformance with industry standards and best practice guidelines, namely the Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk-Based Assessment (2020) (Ref 8-1), and Historic England's Good Practice Advice in Planning Notes 2 (Ref 8-2), 3 (Ref 8-3) and 12 (Ref 8-4). The DBA will be produced in accordance with any responses received as part of the scoping phase and consultation on the Project. The DBA will inform the archaeology and cultural heritage chapter and form an appendix to the PEIR and ES chapters. It will also confirm whether any additional survey work is required to better determine the nature, extent and origin of buried archaeological remains, including deposits that may contain palaeo-environmental data, within the construction footprint of the Project.

8.4.2 A general Study Area comprising 1 km from the Scoping Boundary for non-designated assets and 2 km for designated assets will be used to gather detailed information on the cultural heritage baseline for the assessment. The 1 km Study Area will capture detail about known heritage assets and will allow proportionate and sufficient archaeological context to be gathered to understand the potential for previously unknown heritage assets to be present. Considering the nature of the Project and its likely visibility level within the landscape, the 2 km Study Area is assessed to be sufficient for identifying heritage assets that may experience temporary or permanent changes to their setting.

8.4.3 Where deemed necessary, a wider Study Area may be used to identify assets whose setting may change as a result of the construction and/ or operation of the Project. The wider Study Area will be informed by the site walkover, setting assessment, and the Zone of Theoretical Visibility (ZTV) although some assets beyond the ZTV may be considered where elements of their setting extend closer to, or include, the Project.

8.4.4 Desk-based research will use the following data sources:

- North Lincolnshire Council (NLC) HER for spatial and non-spatial data for non-designated heritage assets and previous archaeological investigations;
- North East Lincolnshire Council (NELC) HER for spatial and non-spatial data for non-designated heritage assets and previous archaeological investigations;
- Lincolnshire County Council (LCC) HER and Heritage Explorer map for spatial and non-spatial data for non-designated heritage assets and previous archaeological investigations;
- The NHLE held by Historic England, for spatial and non-spatial data on designated heritage assets;
- Relevant local authority conservation area appraisal and management documents;
- Historic Landscape Characterisation (HLC) mapping undertaken by local planning authorities;
- National Record of the Historic Environment (NRHE) held by Historic England;
- Aerial photography (12.5cm resolution) purchased for the Project;
- Additional aerial photographs held by Historic England, local authorities and other appropriate repositories and other readily available remote sensing results such as LiDAR data;

- Geological mapping and existing borehole information held by the British Geological Survey to identify the presence of peat deposits and assess palaeoenvironmental potential;
- Additional data from geotechnical ground investigations carried out for the Project to identify the presence of peat deposits and help assess palaeoenvironmental potential;
- Documentary, cartographic and other resources as deposited within local studies libraries, county libraries and archives, including historic Ordnance Survey maps, tithe, estate and other maps, and other relevant primary sources held at local authority archives, together with local studies libraries; and
- Additional data sources recommended as part of the scoping response.

Site walkover survey

8.4.5 An archaeological walkover survey will be carried out across the footprint of the proposed pipeline route, and temporary construction areas (once established) within the Scoping Boundary to assess known heritage sites and to determine the potential for previously unrecorded heritage assets to be present. The site walkover will also include visits to heritage assets within the 2 km Study Area so that an assessment of their baseline setting can be carried out.

Consultation and further surveys

8.4.6 Consultation will be carried out, as necessary, with the Historic Environment Advisors and conservation officers for NELC, NLC, LCC, West Lindsey District Council and East Lindsey District Council to ensure, as far as practicable, that risks to cultural heritage assets are recognised in the assessment process as early as possible. Consultation will also be carried out with Historic England if potential impacts to designated assets, or non-designated assets of high value, were anticipated.

8.4.7 These discussions will also be used to inform the scope of any further archaeological surveys that may be required pre-application. These further surveys would be part of a staged approach of archaeological evaluation, with the results of one stage informing the scope of the next and may include but not be limited to:

- Hand auger survey and/ or monitoring of geotechnical ground investigations to establish the geoarchaeological baseline conditions of the Project and to assess the potential for deposits containing palaeoenvironmental data to be present;
- Archaeological geophysical survey to identify potential archaeological anomalies within the footprint of the Project; and
- Archaeological trial trench evaluation (only if deemed appropriate) to confirm the results of the geophysical survey and to characterise the nature, extent and preservation level of archaeological remains in order to understand their heritage value.

8.5 Assessment Method

8.5.1 The potential effects of the Project upon heritage assets will be considered in the ES chapter in the context of relevant legislation, planning policy and guidance, including:

- Ancient Monuments and Archaeological Areas Act 1979 (Ref 8-5);
- Planning (Listed buildings and Conservation Areas) Act 1990 (Ref 8-6);
- National Planning Policy Framework 2021 (Ref 8-7);

- Relevant local planning policy;
- Planning Practice Guidance (Ref 8-8); and
- Guidance published by Historic England and the Chartered Institute for Archaeologists, including the Code of Conduct (Ref 8-9).

8.5.2 The methodology for assessing the impacts of the Project will broadly follow the criteria set out in Chapter 4: Approach to EIA of this Scoping Report. Further details are provided below.

Assessing the value of heritage assets

8.5.3 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary). Using professional judgement and the results of consultation, heritage assets are also assessed on an individual basis and regional variations and individual qualities are taken into account where applicable.

8.5.4 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary). Each identified heritage asset can be assigned a value in accordance with the criteria set out in **Table 8-1**. Using professional judgement and the results of consultation, heritage assets are also assessed on an individual basis and regional variations and individual qualities are taken into account where applicable.

8.5.5 Each heritage asset relevant to the assessment will be assigned a value in accordance with the criteria in **Table 8-1**. This table provides guidance, but professional judgment will be applied in all cases regarding the appropriate category for individual heritage assets. Where it is assessed that an asset is of greater or lower value than noted in the guidance table, justification will be provided.

Table 8-1: Criteria for determining the value of heritage assets

Value	Criteria
High	World Heritage Sites Scheduled Monuments Grade I and II* listed buildings Registered battlefields Grade I and II* registered parks and gardens Conservation areas of demonstrable high value Non-designated heritage assets (archaeological sites, historic buildings, monuments, parks, gardens or landscapes) that can be shown to have demonstrable national or international importance Well preserved historic landscape character areas, exhibiting considerable coherence, time-depth or other critical factor(s)
Medium	Grade II listed buildings Conservation areas Grade II registered parks and gardens Conservation areas Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable regional importance Averagely preserved historic landscape character areas, exhibiting reasonable coherence, time-depth or other critical factor(s) Historic townscapes with historic integrity in that the assets that constitute their make-up are clearly legible

Value	Criteria
Low	Locally listed buildings Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable local importance Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade Historic landscape character areas whose value is limited by poor preservation and/ or poor survival of contextual associations
Negligible	Assets identified on national or regional databases, but which have no archaeological, architectural, artistic or historic value Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade Landscape with no or little significant historical merit

Assessing the Magnitude of Change

8.5.6 Having identified the value of the heritage asset, the next stage in the assessment is to identify the level and degree of impact to an asset arising from the development. Impacts may arise during construction or operation and can be temporary or permanent. Impacts can occur to the physical fabric of the asset or may arise from changes within its setting.

Table 8-2: Criteria for determining the magnitude of impact

Magnitude of impact	Description of impact
High	Changes such that the heritage value of the asset is totally altered or destroyed. Comprehensive change to elements of setting that would result in harm to the asset and our ability to understand and appreciate its heritage significance.
Medium	Change such that the heritage value of the asset is significantly altered or modified. Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Low	Changes such that the heritage value of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Negligible	Changes to the asset that hardly affect heritage value. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the heritage value of the asset

Assigning the Significance of Effect

8.5.7 The significance of environmental effect is typically a function of the value (**Table 8-1**) of a receptor and the magnitude (**Table 8-2**) of an impact. An indicative matrix for the determination of significance is provided in Table 4-4. Effects can be neutral, adverse or beneficial.

8.5.8 The ES will report on the significance of effect in accordance with EIA methodology. Major and moderate effects will be considered to be significant.

8.5.9 Within the NPPF, impacts affecting the value of designated heritage assets are considered in terms of harm and there is a requirement to determine whether the level of harm to designated assets amounts to 'substantial harm' or 'less than substantial harm'. There is no direct correlation between the significance of effect as reported in the ES and the level of harm caused to heritage significance.

8.5.10 A major (significant) effect on a heritage asset will, however, more often be the basis by which to determine that the level of harm to the significance of the asset will be substantial. A moderate (significant) effect is unlikely to meet the test of substantial harm and will therefore more often be the basis by which to determine that the level of harm to the significance of the asset will be less than substantial. A minor or negligible (not significant) effect will still amount to a less than substantial harm, which triggers the statutory presumptions against development within section 66 of the Listed Buildings Act 1990; however, a neutral effect is classified as no harm. In all cases determining the level of harm to the significance of the asset arising from development impact is one of professional judgement.

8.5.11 An assessment of the predicted effect will be made both prior to the implementation of mitigation and after the implementation of mitigation. The first highlights where specific mitigation may be appropriate. The second highlights where the mitigation has been effective in reducing effects to enable an overall residual effect of the Project as a whole. It is important to stress that mitigation does not automatically reduce an effect but may be used to offset an adverse impact.

8.6 Identification of Potential Effects

Construction Phase

8.6.1 Temporary construction impacts that would last for all or part of the construction phase of the Project are likely to include the following:

- The presence and movement of construction plant that may alter the setting of heritage assets, including change arising from noise and dust; and
- The presence of construction compounds which may change the setting of heritage assets as a result of noise or light intrusion.

8.6.2 Permanent construction impacts that would last beyond the construction phase are likely to include:

- Physical impacts to known and previously unknown buried archaeological assets and key components of the historic landscape arising from construction activities within the permanent footprint of the project, including within the working width of the pipeline and from the establishment of the Pipeline Inlet Facility, shutdown valves and construction compound(s)

8.6.3 The construction of the Project has the potential to result in significant effects to non-designated heritage assets within the Scoping Boundary. This includes potential permanent impacts to buried archaeological remains associated with early prehistoric and potential Roman activity recorded in Section A; Early Medieval settlement in Section B; prehistoric and medieval settlement in Section C; and prehistoric, Early Medieval, and medieval settlement in Section E, as well as World War 2 defensive features.

8.6.4 The construction of the Project may result in temporary changes to the settings of designated heritage assets located within the Scoping Boundary. This includes the Grade II

listed The Mill (NHLE 1103468) and Royal Observer Corps monitoring post (NHLE 1403218) in Section A; the Grade II* listed Church of St. Nicholas (NHLE 1063111) and the adjacent Grade II listed Old Rectory (NHLE 1359936) within Section C, and Grade II listed Neves Farm House (NHLE 1062990) which is located within Section E.

8.6.5 Potential impacts to heritage assets arising from the construction of the Project will be included in the EIA.

Operational Phase

8.6.6 The operational pipeline would tie-in to existing infrastructure Theddlethorpe. Above ground components of the Project, comprising offshore pipeline tie-in and outlet at the former TGT site and pipeline metering and inlet facilities at the VPI Immingham, would be located within existing industrial sites and their operation is therefore unlikely to introduce noticeable change into the setting of heritage assets. Additional above ground infrastructure comprising new shutdown valves, with associated electrical and instrumentation kiosk with perimeter security fencing are likely to be required.

8.6.7 The presence of the shutdown valves and associated infrastructure, the final locations of which are to be determined, have the potential to result in changes to the settings of heritage assets. As such, impacts arising from the operational Project will be assessed in the EIA.

Decommissioning

8.6.8 Decommissioning of the Project is unlikely to result in additional temporary or permanent impacts to heritage assets as the pipeline infrastructure would be left in situ once operation ceases. As such, impacts arising from the decommissioning phase of the Project will be scoped out of the EIA.

8.7 Design, Mitigation and Enhancement Measures

8.7.1 The Project's emerging design has avoided physical impacts to designated heritage assets and was a key consideration during the routeing and siting work which was undertaken to inform the selection of the most appropriate pipeline route. Further Mitigation by Design will be built into the Project to minimise impacts to heritage assets and their setting, as far as possible, with particular consideration given to the listed buildings located within the Scoping Boundary. Mitigation options will be developed and refined during the impact assessment process and agreed with stakeholders including Historic England and the Historic Environment Advisors and conservation officers for the relevant local planning authorities.

8.7.2 The development of mitigation will follow guidance published by CIfA and may include detailed design to avoid or reduce impacts to heritage assets, or a programme of archaeological investigation and recording in advance of, or during, construction. Additional mitigation measures such as enlisting an archaeological watching brief would be implemented were required. Further details will be provided within the ES.

8.8 Summary

8.8.1 The construction of the Project has the potential to result in permanent impacts to archaeological remains dating to the early prehistoric, Roman, Early Medieval, medieval, post-medieval and modern periods. The construction of the Project may also result in temporary change to the settings of designated heritage assets located within the route corridor.

8.8.2 The operational Project may result in permanent impacts to heritage assets arising from changes within their settings. The decommissioning of the Project is unlikely to result in

additional temporary or permanent impacts to heritage assets as the infrastructure would be left in situ once operation ceases.

8.8.3 Due to the potential effects, the impacts on archaeology and cultural heritage assets as a result of the construction and operation of the Project, will be scoped into the EIA.

Table 8-3: Summary of scope for historic environment assessment

Element	Scoped in	Scoped out	Justification
Construction	✓		There is the potential to result in permanent impacts to archaeological remains dating to the early prehistoric, Roman, Early Medieval, medieval, post-medieval and modern periods. The construction of the Project may also result in temporary change to the settings of designated heritage assets located within the route corridor.
Operation	✓		The Project may result in permanent impacts to heritage assets arising from changes within their settings.
Decommissioning		✓	Unlikely to result in additional temporary or permanent impacts to heritage assets and therefore is not set to be included in the ES. However, as the exact strategy for decommissioning is not yet established, if in future it is determined necessary, an assessment would be included in the ES.

8.9 References

Ref 8-1 Chartered Institute for Archaeologists (2020) Standard and Guidance for Historic Environment Desk-based Assessment. Available online: [redacted]

Ref 8-2 Historic England (2016) Advice Note 2: Making Changes to Heritage Assets, Swindon: Historic England.

Ref 8-3 Historic England (2015) Advice Note 3: The Historic Environment and Site Allocations in Local Plans, Swindon: Historic England.

Ref 8-4 Historic England (2019) Advice Note 12: Statements of Heritage Significance, Swindon: Historic England.

Ref 8-5 Ancient Monuments and Archaeological Areas Act 1979 (c. 46). London: The Stationery Office. Available online: http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga_19790046_en.pdf.

Ref 8-6 Planning (Listed Buildings and Conservation Areas) Act 1990. London: The Stationery Office. Available online: https://www.legislation.gov.uk/ukpga/1990/9/contents

Ref 8-7 Ministry of Housing Communities and Local Government (MHCLG) (2021) National Planning Policy Framework. MHCLG, London.

Ref 8-8 Ministry of Housing Communities and Local Government (MHCLG) (2019) (as amended) Planning Practice Guidance: Noise. MHCLG, London. https://www.gov.uk/government/collections/planning-practice-guidance

Ref 8-9 Chartered Institute for Archaeologists (2020) Code of Conduct. Available online: [redacted]

9. Geology & Hydrogeology

9.1 Introduction

9.1.1 This chapter of the Scoping Report presents an initial baseline for geology and hydrogeology, an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects of the Project.

9.1.2 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 10: Agriculture & Soils.

9.1.3 This chapter is supported by **Figures 9-1** to **9-3** showing Superficial deposits, bedrock geology and source protection zones.

9.2 Baseline environment and Study Area

9.2.1 The following section provides a summary of the existing ground conditions within the Scoping Boundary, based on the sources of information identified in Section 9.8. In general, the receptors and sources of contamination, have been identified within the Scoping Boundary or within approximately 500m of the Scoping Boundary, as interaction between the Project and receptors, or sources, of contamination beyond 500m would generally not occur as a result of the ground conditions present in and around the Project. Where relevant for specific subtopics, such as groundwater Source Protection Zones, the Study Area extends to 500 m either side of the Scoping Boundary.

Geology

9.2.2 Published geological maps and the GIS data sourced from the British Geological Survey (BGS) (Refs 9-1 to 9-7) indicate that the Project is underlain by the geological succession summarised below in **Table 9-1**. Geological mapping for Section 1 is shown as **Figure 9-1** and **Figure 9-2**.

Table 9-1: Summary of Geology from BGS 1:625,000 and 1:50,000 mapping

Section of Scoping Boundary	Stratum Type	Description
Section A	Made Ground	The British Geological Survey (BGS) indicate areas of "artificial ground" located within the Scoping Boundary surrounding Immingham Docks. The composition of the Made Ground is unknown.
	Superficial	A review of publicly available British Geological Survey (BGS) geological maps indicates that the Scoping Boundary within this section travels over five different Superficial Deposits. Most of this section is underlain by Glacial Till comprising a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton). Tidal Flat Deposits are present within this section. Normally they comprise a consolidated soft silty clay, with layers of sand, gravel and peat.

Section of Scoping Boundary	Stratum Type	Description
		Glaciofluvial Deposits are also present within this section. Comprising sand and gravel with rare clay interbeds; often cross-bedded; of glacial origin. Alluvium is also present within this section. The alluvial deposits are observed to be present in localized channels between Immingham and Aylesby. The deposits comprise soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. Finally, Lacustrine Deposits are present within this section. They form small localized pockets are commonly laminated clay and silt and can contain thin layers of organic material or sand.
	Bedrock	The bedrock geology underlying this section is Chalk of the Burnham Chalk Formation. Comprising white, thinly-bedded chalk with common tabular and discontinuous flint bands; sporadic marl seams.
Section B	Made Ground	Small areas of Made Ground are present between Aylesby and Irby Upon Humber. The composition of the Made Ground is unknown.
	Superficial	The majority of this section is underlain by Glacial Till. Glaciofluvial deposits are also present throughout this section. Lacustrine Deposits are present surrounding Irby Upon Humber. Finally, Alluvial Deposits are also present between Aylesby and Brigsley.
	Bedrock	The northern part of this section is underlain by Chalk of the Burnham Chalk Formation. Chalk of the Welton Chalk Formation is present and underlies the majority of this section, the chalk tends to follow the orientation of A18 between Aylesbury and Brigsley. Generally comprising white, massive or thickly bedded chalk with common flint nodules, lacking tabular flint bands.
Section C	Made Ground	A small area of Made Ground is present immediately east of North Thoresby within this section. The composition of the Made Ground is unknown.
	Superficial	This section is predominantly underlain by Glacial Till. Alluvium, Lacustrine and Glaciofluvial Deposits are also present within this section but form smaller localized features.
	Bedrock	Most of the bedrock geology in this section comprises Chalk of the Welton Chalk Formation. Chalk of the Burnham Chalk Formation is also present in this section.
Section D	Superficial	Most of this section is underlain by Glacial Till. Lacustrine, Alluvial and Glaciofluvial Deposits are also present within this section.
	Bedrock	Bedrock geology in this section comprises Chalk of the Welton Chalk Formation.

Section of Scoping Boundary	Stratum Type	Description
Section E	Superficial	Most of this section is underlain by Glacial Till and Tidal Flat Deposits. Alluvium is also present in smaller localized channels cross cutting this section between Covenham St Mary and Manby.
	Bedrock	Most of this section is underlain by Chalk of the Welton Chalk Formation. As the section moves East past Great Carlton the bedrock geology is observed to change to Chalk of the Burnham Formation.
Source: References 9-1 to 9-8.		

Previous Ground Investigation

9.2.3 BGS Geo-Index online resources (Ref 9-8) record ground investigation data from many boreholes drilled within and surrounding the Scoping Boundary. The strata encountered in these exploratory locations generally correlate with information obtained from BGS mapping data. Strata encountered are summarised below in **Table 9-2**.

Table 9-2: Summary of BGS Geo-Index Boreholes

Stratum Type	Description
Superficial	Tidal Flat Deposits: Soft to very soft dark grey silty organic CLAY. Glacial Till: Firm to stiff slightly fissued grey brown slightly gravelly CLAY. Glaciofluvial Deposits: Medium dense orange brown slightly silty fine to medium SAND. Alluvium: Soft to firm sandy gravelly CLAY with localized silt. Lacustrine Deposits: Soft to firm laminated slightly sandy silty CLAY.
Bedrock	Welton Chalk Formation: Hard white thickly bedded CHALK with common flint nodules. Burnham Chalk Formation: White thinly bedded CHALK with common discontinuous flint bands and sporadic marl seams.
Made Ground	Within Section A Made Ground deposits are shown to generally comprise stiff to firm, yellow / grey silty CLAY. The origin for the described material is assumed to be re-worked Glacial Till. The composition of the Made Ground encountered throughout the remainder of the Scoping Boundary is unknown.

9.2.4 Within the BGS Geo-Index online resources record data from ground investigations undertaken within the Study Area, the majority of which are situated within and surrounding (within 500m) the Scoping Boundary. Selected representative borehole data have been used to describe ground conditions encountered within this Section of the Scoping Boundary. The strata encountered in these exploratory locations generally correlate with information obtained from BGS mapping data.

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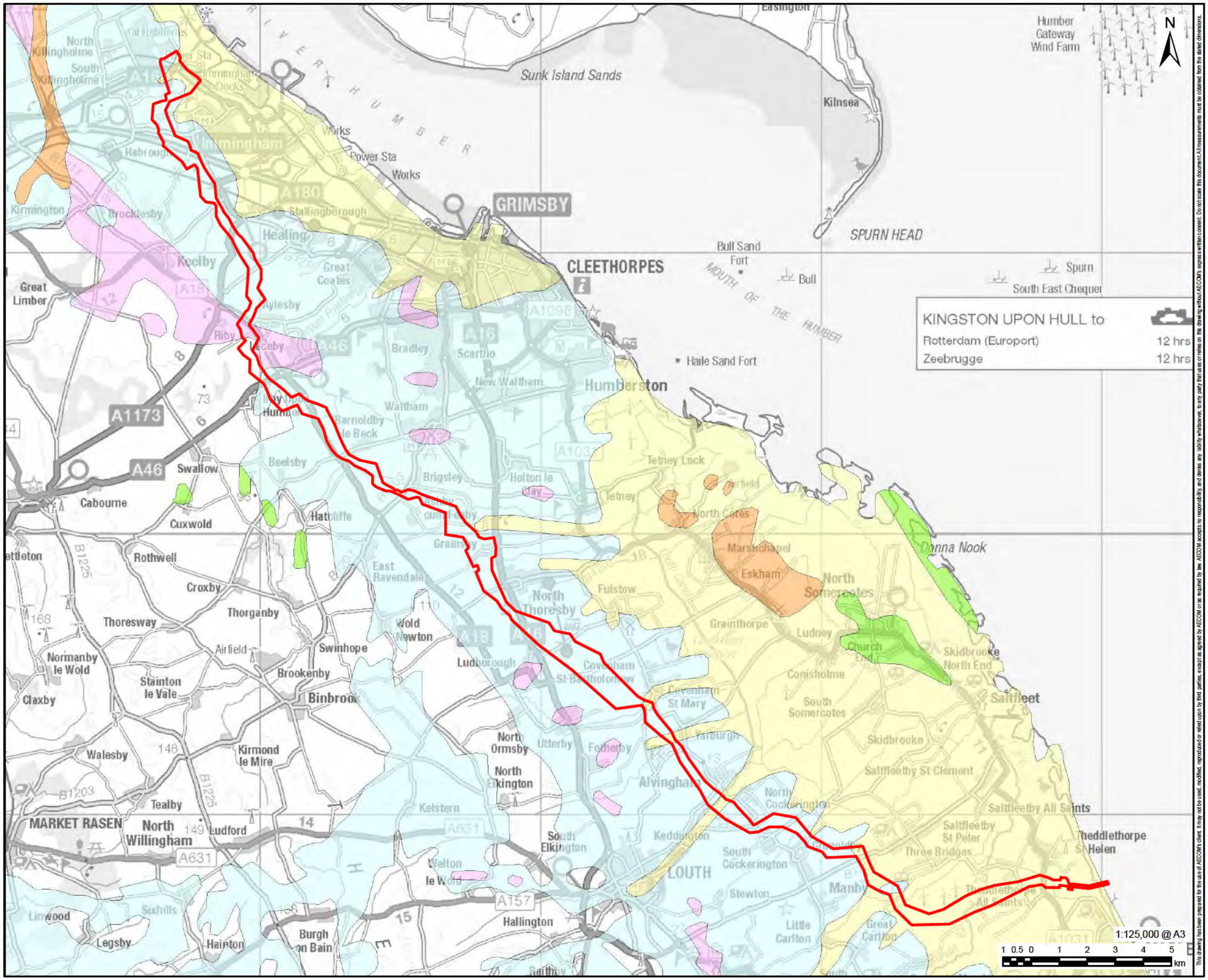

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Superficial Geology (625k):

- Alluvium - Clay, Silt and Sand
- Blown Sand - Sand
- Glacial Sand and Gravel - Sand and Gravel
- River Terrace Deposits (Undifferentiated) - Sand and Gravel
- Till - Diamicton

NOTES:

FIGURE TITLE
Figure 9-1
Superficial Deposits

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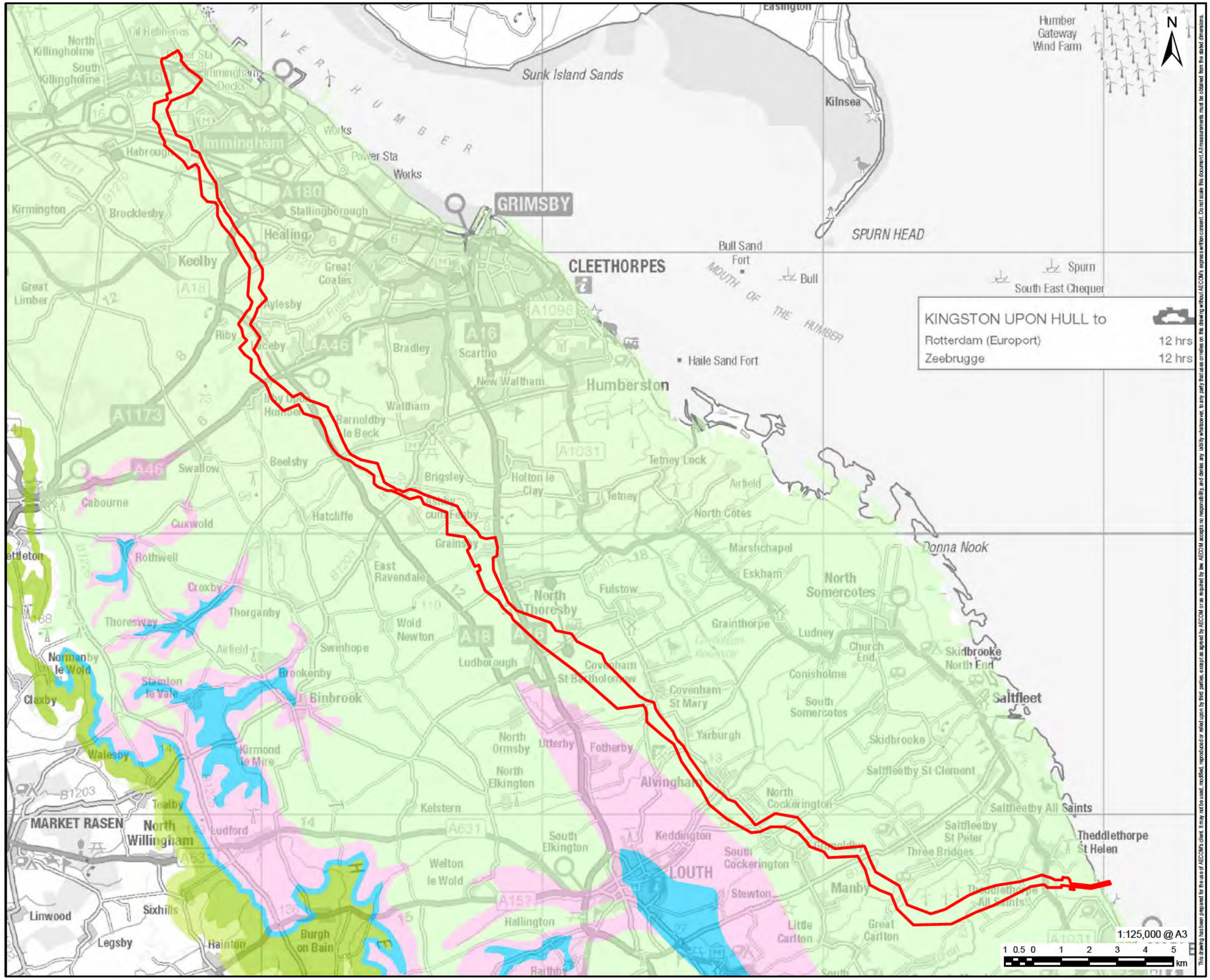

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LEGEND
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Bedrock Geology (625k):
- Grey Chalk Subgroup - Chalk
- White Chalk Subgroup - Chalk
- Lower Greensand Group - Sandstone and Mudstone
- Wealden Group - Mudstone, Siltstone and Sandstone
- Wealden Group - Sandstone and Siltstone, Interbedded

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FIGURE TITLE
Figure 9-2
Bedrock Geology

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Geological Sites of Special Scientific Interest and Regionally Important Geological Sites

9.2.5 A review of currently available information from MAGIC and relevant local councils did not identify any geological SSSIs, Regionally Important Geological Sites (RIGS) or Local Geological Sites within the Scoping Boundary. Further information on RIGS and Local Geological Sites will be requested from the relevant local councils during consultation and included within the Environmental Statement (ES) where provided.

Coal Mining and Shallow Mining

9.2.6 The Coal Authority online interactive map (Ref 9-9) indicates that the Scoping Boundary is situated within a surface coal resource area. Further review suggests that the Scoping Boundary is not within 500m of a coal mining reporting area or a development high risk area.

Mineral Sites and Designations

9.2.7 Review of publicly available records suggest that the Scoping Boundary is governed by three mineral planning authorities.

9.2.8 North Lincolnshire Council are present within the most northern section of the Scoping Boundary within Section A. There are no mineral safeguarding areas or active extraction sites present within 500m of the Scoping Boundary within this area.

9.2.9 North East Lincolnshire Council are present at Section A to Section C of the Scoping Boundary. Several mineral safeguarding areas for Sands and Gravels have been identified within the Scoping Boundary, predominantly between Riby and Grainsby; reference is made to NELC Local Plan 2013-2032. There are no active extraction sites with 500m of the Scoping Boundary.

9.2.10 Lincolnshire County Council are present for the remainder of the Scoping Boundary. There is no readily publicly available information regarding mineral safeguarding areas within Lincolnshire County Council. There are no active extraction sites within 500m of the Scoping Boundary.

Hydrogeology - Aquifer Classifications

9.2.11 Aquifer classification maps on DEFRA's 'MAGIC' mapping portal (Ref 9-12) indicate the following aquifer classifications are present underlying the Scoping Boundary:

Table 9-3: Summary of Aquifer Classifications

Stratum Type	Stratum	Aquifer Classification	Definition (Environment Agency)	Section within Scoping Boundary
Superficial	Tidal Flat Deposits	Secondary Undifferentiated	Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the unit type. These have only a minor value.	Section A and E
	Glacial Till	Unproductive	Unproductive strata are largely unable to provide usable water supplies and are unlikely to have	All sections

Stratum Type	Stratum	Aquifer Classification	Definition (Environment Agency)	Section within Scoping Boundary
			surface water and wetland ecosystems dependent on them.	
	Glaciofluvial Deposits	Secondary A	Secondary A aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.	Section A to D.
	Alluvium	Secondary A		All sections
	Lacustrine Deposits	Secondary B	Secondary B aquifers are 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	Sections A to D
Bedrock	Welton Chalk Formation	Principal	Principal aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.	Sections B, C, D and E
	Burnham Chalk Formation			Sections A, B, C and E

Water Framework Directive Groundwater Bodies

9.2.12 The following two Water Framework Directive (WFD) groundwater bodies have been identified within the Scoping Boundary:

- Grimsby Ancholme Louth Chalk Unit, Non-Licenced – a Principal aquifer
- Steeping Long Eau Little Eau Chalk Unit, Licenced – a Principal aquifer

Other Hydrogeological Classifications and Features

9.2.13 The following additional hydrogeological classifications and features have been identified and are summarised in **Table 9-4** below.

Table 9-4: Other Hydrogeological Classifications

Section of Scoping Boundary	Description of other Hydrogeological Classifications and Features
Section A	***Source Protection Zones*** This section of the Scoping Boundary contains two Source Protection Zones: Zone II – Outer Protection Zone, present from Immingham Docks to Immingham town Zone I – both Inner and Outer Protection Zone, present between Immingham and Aylesbury ***Drinking Water Safeguard Zones*** Within this section of the Scoping Boundary there are three Drinking Water Safeguard Zones (Ground Water): Ref: GWSGZ0281 – Present between Immingham and Brocklesby Ref: GWSGZ0284 – Present between Keelby and Riby Ref: GWSGZ0283 – Present between Riby and Aylesby There are no Drinking Water Safeguard Zones (Surface Water) this this section of the Scoping Boundary ***Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)*** This section is within a Nitrate Vulnerable Zone and can be split up into two sub zones: Surface Water S359 – North Beck Drain NVZ Surface Water S361 – Skitter Beck / East Halton Beck NVZ
Section B	***Source Protection Zones*** This section of the Scoping Boundary contains one Source Protection Zone: Zone II – Outer Protection Zone, present surrounding Riby and Barnoldby le Beck ***Drinking Water Safeguard Zones*** This section of the Scoping Boundary contains two Drinking Water Safeguard Zone (Ground Water): Ref: GWSGZ0015 – Present between Laceby and Barnoldby le Beck Ref: GWSGZ0282 – Present between Barnoldby le Beck and Brigsley This section of the Scoping Boundary is within a Drinking Water Safeguard Zone (Surface Water) ref: SWSGZ1001 ***Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)*** This section is within a Nitrate Vulnerable Zone and can be split up into two sub zones: Surface Water S357 - Lacby Beck / River Freshney Catchment (to N Sea) NVZ Surface Water S354 - Waithe Beck lower catchment (to Tetney Lock) NVZ
Section C	***Source Protection Zones*** This section of the Scoping Boundary contains two Source Protection Zones: Zone II – Outer Protection Zone, present surrounding Barnoldby le Beck Zone II – Outer Protection Zone, present surrounding North Thoresby ***Drinking Water Safeguard Zones*** Within this section of the Scoping Boundary there are three Drinking Water Safeguard Zones (Ground Water): Ref: GWSGZ0282 - Land surrounding Brigsley Ref: GWSGZ0288 – Present between Brigsley and Ashby cum Fenby Ref: GWSGZ0285 – Present between Keelby and Aylesby

Section of Scoping Boundary	Description of other Hydrogeological Classifications and Features
	All of this section is within a Drinking Water Safeguard Zones (Surface Water) ref: SWSGZ1001 ***Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)*** This section is within a Nitrate Vulnerable Zone and can be split up into two sub zones: Surface Water S354 - Waithe Beck lower catchment (to Tetney Lock) NVZ Surface Water S353 - Louth Canal NVZ
Section D	***Source Protection Zones*** This section of the Scoping Boundary contains two Source Protection Zones: Zone II – Outer Protection Zone, present surrounding North Thoresby Zone III – Total Catchment Protection Zone, present surrounding Covenham St Bartholmew ***Drinking Water Safeguard Zones*** This section of the Scoping Boundary is not within a Drinking Water Safeguard Zone (Ground Water). All of this section is within a Drinking Water Safeguard Zone (Surface Water) ref: SWSGZ1001 ***Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)*** This section is within a Nitrate Vulnerable Zone ref: Surface Water S353 - Louth Canal NVZ
Section E	***Source Protection Zones*** This section of the Scoping Boundary does not contain any Source Protection Zones. ***Drinking Water Safeguard Zones*** This section of the Scoping Boundary does not contain any Drinking Water Safeguard Zones (Ground Water). This section is within a Drinking Water Safeguard Zone (Surface Water): Ref: SWSGZ1001 - Present between Covenham St Bartholomew and North Cockerington Ref: SWSGZ1002 – Present between Manby and Theddlethorpe St Helen ***Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)*** Surface Water S353 - Louth Canal NVZ Surface Water S366 - South Dike and Grayfleet Drain NVZ Surface Water S365 - Great Eau (downstream of South Thoresby) NVZ

Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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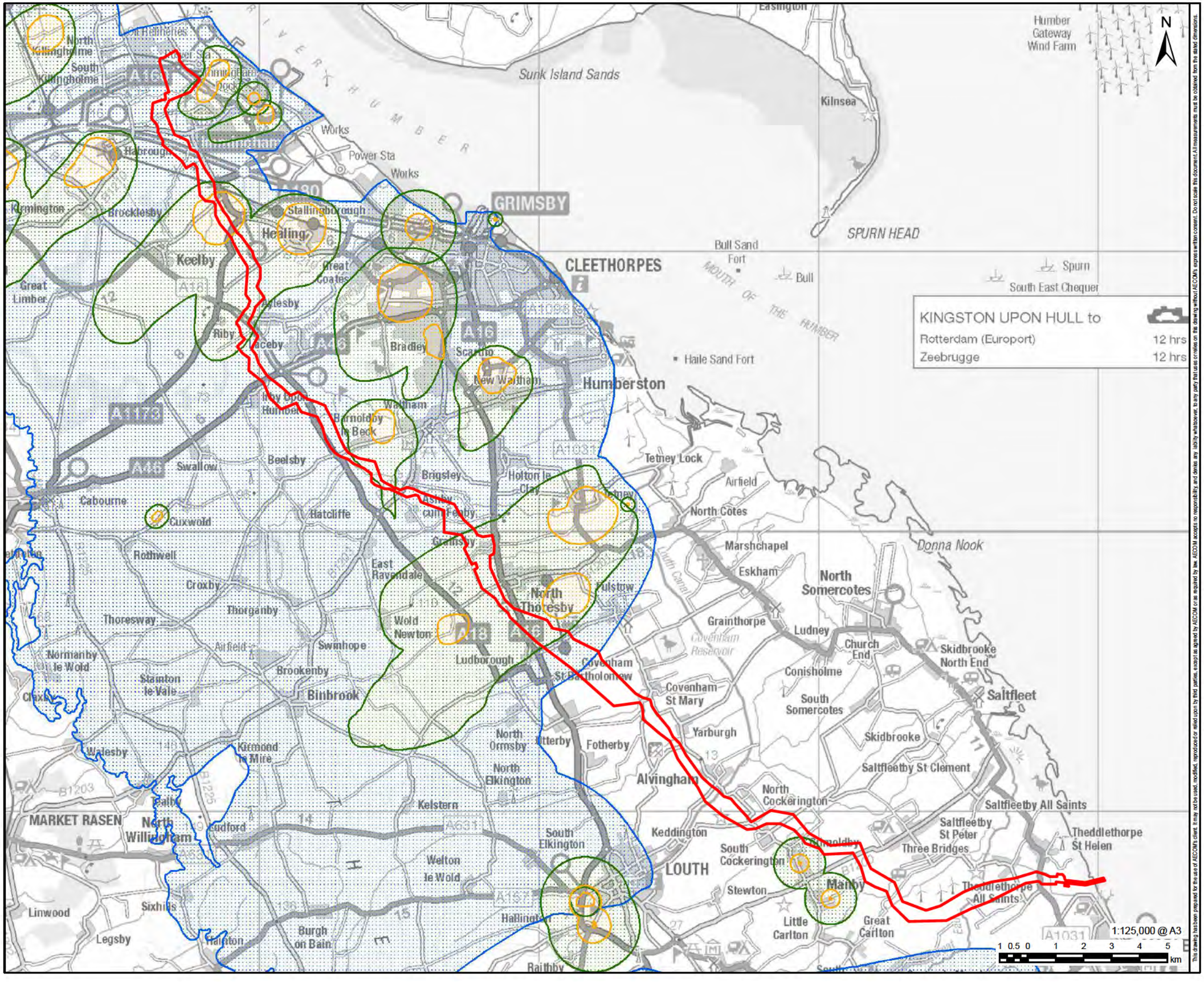

CONSULTANT
AECOM

CLIENT
Chrysaor Production (U.K.) Limited

PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Source Protection Zone:
- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone III - Total Catchment

NOTES:

FIGURE TITLE
Figure 9-3
Source Protection Zones

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_9-3

Current and Historic Potentially Contaminative Land Uses

9.2.14 A summary of current land use of the Scoping Boundary is summarised below in **Table 9-5** below.

Table 9-5: Current and Historic Potential Contaminative Land Uses

Section of the Scoping Boundary	Description of current land use
Section A	Current land use within this Section of the Scoping Boundary and surrounding study area is predominately agricultural. The Scoping Boundary in this section crosses the following major roads: A180; A1173; and A18. At the commencement of the pipeline the Project is located within industrial land associated with the Oil Refineries. According to North Lincolnshire Council data there are no brownfield sites within 500m of the Scoping Boundary.
Section B	Current land use within this Section of the Scoping Boundary and surrounding study area is predominately agricultural. The Scoping Boundary in this section crosses the A46 and A18 major roads.
Section C	Current land use within this Section of the Scoping Boundary and surrounding study area is predominately agricultural. The Scoping Boundary in this section crosses the B1203.
Section D	Current land use within this Section of the Scoping Boundary and surrounding study area is predominately agricultural. The Scoping Boundary in this section crosses two minor roads, Station Road and Pear Tree Lane.
Section E	Current land use within this Section of the Scoping Boundary and surrounding study area is predominately agricultural. The Scoping Boundary in this section crosses several minor roads. Industrial land is located at the former TGT site where the onshore pipeline will meet the offshore pipeline.

Current and Historic Landfills

9.2.15 Recorded current and historic landfills (Ref 9-17) identified within the study area are summarised below in **Table 9-6**.

Table 9-6: Summary of Current and Historic Landfills

Section of the Scoping Boundary	Landfill Type	Description
Section A	EA Historic Landfill	Site name: Lindsey Oil Refinery Site reference: EAHLD01515 Location: Approximately 500m North of the Scoping Boundary
		Site name: Conoco Site reference: 55/19/0148, 1480, 2000/5295 Location: Located within the Scoping Boundary

Section of the Scoping Boundary	Landfill Type	Description
		Site name: Mill Lane Site reference: 55/17/0026, 55/17/0029 Location: Approximately 250m East of the Scoping Boundary
	EA Permitted Waste Sites Authorised Landfill	There are no active landfill sites that have been identified within the study area.
Section B	EA Historic Landfill	Site name: Washingdales Site reference: 2000/0369 Location: Approximately 300m West of the Scoping Boundary
		Site name: Aylesby Site reference: 2000/0294 Location: Approximately 200m East of the Scoping Boundary
		Site name: Barton Street Site reference: 2000/0388 Location: Approximately 200m West of the Scoping Boundary
		Site name: Hatcliffe Top Site reference: 2000/0296 Site location: Approximately 500m South-West of the Scoping Boundary
	EA Permitted Waste Sites Authorised Landfill	There are no active landfill sites that have been identified within the study area.
Section C	EA Historic Landfill	There are no historic landfill sites that have been identified within the study area.
	EA Permitted Waste Sites Authorised Landfill	There are no active landfill sites that have been identified within the study area.
Section D	EA Historic Landfill	Site name: Os Field No 9000 Site reference: L163, EL-110-01/97, RD2-0309 Site location: Approximately 80m South-West of the Scoping Boundary
	EA Permitted Waste Sites Authorised Landfill	There are no active landfill sites that have been identified within the study area.
Section E	EA Historic Landfill	There are no historic landfill sites that have been identified within the study area.
	EA Permitted Waste Sites	There are no active landfill sites that have been identified within the study area.

Ground Gas

9.2.16 Ground gas including methane and carbon dioxide may be present associated with the natural strata and Made Ground deposits, where present, throughout the Scoping Boundary. Ground gas may also be associated with recorded landfills, as well as unregistered infilled land (e.g. backfilled sand and chalk pits).

Radon

9.2.17 Published radon data from UK Health and Security Agency indicates that the entire study area is in the lowest band of radon potential. Less than 1% of homes above the Action Level.

Unexploded Ordnance Potential

9.2.18 Online Zetica Unexploded Ordnance (UXO) risk mapping shows “Low Risk” (15 bombs per 1000 acres or less) for most of the study area. The study area between Immingham Docks and Grimsby (Section A) records an UXO “Moderate Risk” (15 to 49 bombs per 1000 acres). An assessment has been commissioned from Zetica of the Scoping Boundary in review of the UXO risk, the findings of which will be included within the ES.

9.3 Planned Surveys

9.3.1 Site walkover surveys will be conducted as part of the review of geology and hydrogeology baseline environment. These surveys will be undertaken following review of the available environmental data and the walkovers will serve as a ground truthing exercise, targeting those parts of the Study Area where potential higher risk factors have been identified. The surveys will look to identify on-site features that may not be directly identifiable from the environmental data set or may be used to confirm (or not) the presence of features identified in the desk-based review. Typical features that will be assessed during the site walkover surveys include:

- Description of site industrial processes/ potential contaminative processes;
- Ground cover;
- Local changes in ground level (gradients, slopes, embankments, retaining walls etc.);
- Evidence of ground disturbance or instability (slopes/depressions etc.);
- Surface water courses;
- Evidence of water logging/flooding/poor drainage; and
- Presence and condition of on-site structures with the potential to result in ground contamination (e.g. storage tanks).

9.4 Assessment Method

Legislation and Policy

9.4.1 In addition to the Planning Policy outlined in Section 3, the legislation and policy highlighted in **Table 9-7** applies specifically to the geology and hydrogeology assessment.

Table 9-7: Legislation and planning policy applicable to geology and hydrogeology

Legislation/ Policy	Document
Legislation	European The Water Framework Directive (2000/60/EC); The Groundwater Directive (2006/118/EC); Classification Labelling & Packaging (CLP) Regulation (2008/1272/EC), replacing The Dangerous Substances Directive (67/548/EEC) in 2016; and The Priority Substances Directive (2008/105/EC). National Environmental Protection Act, 1990; The Environment Act, 1995; The Contaminated Land (England) Regulations, 2006 SI 1380; Groundwater (England and Wales) Regulations, 2009 SI 2902; Environmental Damage (Prevention and Remediation) (England) Regulations, 2015 SI 810; The Water Act 2003; The Water Resources Act 1991 (as amended); The Land Drainage Act 1991 (as amended); The Environmental Permitting (England and Wales) Regulations 2016 SI 1154; and The Water Environment (Water Framework Directive) Regulations 2017 SI 407.
Policy	National Planning Policy Framework (2019). North Lincolnshire Council Local Plan. North East Lincolnshire Council Plan. Central Lincolnshire Local Plan. East Lindsey Local Plan.

Consultation

9.4.2 No formal consultation has been undertaken to date. Statutory consultees relevant to geology and hydrogeology are:

- Environment Agency (EA);
- Coal Authority;
- Natural England;
- English Heritage;
- Lincolnshire County Council;
- North Lincolnshire Council;
- North East Lincolnshire Council;
- East Lindsey District Council; and
- West Lindsey District Council.

9.4.3 Consultation with these bodies will be undertaken and their feedback will be considered as part of the assessment.

Assessment Methodology

9.4.4 The baseline and potential effects will be further established by a review of the following information:

- Environmental database information (such as Landmark Envirocheck or Groundsure);
- Records and geo-environmental data held by LPAs relating to current and historical contaminative land uses, including waste sites;
- Records and geo-environmental data held by LPAs relating to RIGS and quarrying/mining sites and/ safeguarding areas;
- Records held by LPAs of water abstractions and Private Drinking Water supplies;
- Site walkover of areas of interest such as potential sources of contamination; and
- Ground investigation information being derived for the Project.

9.4.5 Utilising this 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 development, and the potential effects of the development on the geology and hydrogeology.

9.4.6 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 9-21) and promoted by Defra and the EA. For there to be an identifiable risk, not only must there be contaminants present on the site (source) there must also be a receptor and a viable pathway which allows the source to impact on the receptor.

9.4.7 The overall assessment methodology is summarised in Chapter 4: Approach to EIA. 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 9-22) and LA 113 Road Drainage and the Water Environment (groundwater) (Ref 9-23). 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, sensitivity of receptors and significance in the context of DMRB assessment are presented below.

Sensitivity

9.4.8 The sensitivity of the receptor reflects the quality of receptor and its ability to absorb an effect without perceptible change. Sensitivity is defined in **Table 9-8**.

Table 9-8: 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	Geology UNESCO World Heritage Sites; SSSIs of international importance; or Global Geoparks. Contamination Very high sensitivity land use (e.g. residential). Hydrogeology

Sensitivity / Value	Description / Criteria	Typical Examples
	Nationally significant attribute of high importance.	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	Geology Of regional importance with limited potential for replacement. Hydrogeology Of moderate quality and rarity.	Geology RIGS. Contamination Medium sensitivity land use (e.g. commercial). Hydrogeology Aquifer providing water for agricultural or industrial use with limited connection to surface water; or Source Protection Zone 3.
Negligible	Geology Of local importance / interest with potential for replacement or little/ no local interest. Hydrogeology Lower quality.	Geology Non-designated geological exposures, former quarries / mining sites. No geological exposures. Contamination Low sensitivity land use (e.g. highways and rail); or No sensitive land use proposed. Hydrogeology Unproductive strata.

Magnitude

9.4.9 The magnitude of a potential effect 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 effects being temporary rather than permanent, short term rather than long term). Definitions for effect magnitude are described in **Table 9-9**. It is unlikely that any effects on geology and soils will be beneficial, so the examples of magnitude all relate to adverse effects.

Table 9-9: Criteria to Determine the Magnitude of Receptors

Magnitude	Criteria	Typical Examples
High	Geology Loss of feature/ designation and/ or quality and integrity, severe damage to key characteristics. Hydrogeology Loss of attribute and/or quality and integrity of the attribute.	Geology Destruction of features at a protected site; i.e. SSSIs of international importance; or Global Geoparks. Contamination 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. Hydrogeology 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; Reduction in water body WFD classification; or Loss or significant damage to major structures through subsidence or similar effects.
Medium	Geology Partial loss of feature / designation, potentially adversely affecting integrity; partial loss of/damage to key characteristics, features or elements. Hydrogeology Results in effect on integrity of attribute, or loss of part of attribute.	Geology Partial loss of features at a protected site; i.e. SSSIs; National Nature Reserves.. Contamination Contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria; 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.	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

Magnitude	Criteria	Typical Examples
	Hydrogeology Results in some measurable change in attributes, quality or vulnerability.	Best practice measures can be required to minimise risks to human health. Hydrogeology 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

9.4.10 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 4-4**. Effects can be beneficial, adverse or negligible and their significance Major, Moderate, Minor or Negligible.

9.4.11 Any effect predicted to be Negligible or Minor is considered to be 'Not Significant'. Effects assessed as Moderate or Major are considered to be 'Significant'.

9.5 Identification of Potential Effects

9.5.1 The following summarises potential 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 Phase

9.5.2 During construction the following effects could occur if appropriate mitigation is not implemented. It should be noted that no single location could be affected by all these effects, but each location could be affected by a combination of one or more of these effects:

- Chemical spillages and leaks from plant and machinery, and from chemicals and other contaminants stored on site causing pollution of ground or groundwater;
- Changes in subsoil structure and reduction of subsoil quality due to compaction or erosion during storage;
- Compaction of subsoil due to construction vehicle movements degrading soil quality and causing potential water logging;
- Requirement for dewatering, which may reduce flow to groundwater supported sites, abstractions and surface water bodies and change soil hydrology locally;

- Disturbance of geologically important sites;
- Disturbance of potentially contaminated soils, sediments and waters posing a risk to construction workers, groundwater, and geology;
- Importation of contaminated aggregates posing a potential risk to human health and underlying geology and groundwater;
- Part of the Scoping Boundary contains a UXO moderate risk area, so there is a possibility during construction that an Unexploded Ordnance device could be uncovered; and
- Trenchless techniques whereby excavations/ drilling creates a pathway for drilling fluids or other fluids used during construction to reach sensitive groundwater receptors (e.g. Principal Aquifers or abstractions) or sensitive surface water receptors.

Operational Phase

9.5.3 The routine operation of the Project is not likely to have significant effects on the underlying geology and groundwater. However, the foundations of structures may provide a preferential pathway for contaminants to migrate to non-contaminated soils, geology and groundwater. In addition, there is potential for aggressive ground contaminants posing a risk to the pipeline.

Decommissioning Phase

9.5.4 A decommissioning strategy is being developed. Whilst the decommissioning of some of the Project's structures, if implemented, is not likely to have significant effects on the underlying geology and groundwater, there still remains the risk of the following adverse effects:

- Chemical spillages and leaks from plant and machinery, and from chemicals and other contaminants stored on site; and
- Requirement for dewatering to remove structures, reducing flow to groundwater abstractions and surface water bodies, and changes to soil hydrology.

Design, Mitigation and Enhancement Opportunities

9.5.5 The Project will be designed to avoid important geological features or resources, and sources of contamination, through careful routeing and site selection.

9.5.6 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 through the development, and adherence to a Construction Environmental Management Plan.

9.5.7 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 Boundary are shown to pose a risk, if feasible, infrastructure would be moved to a different location. However, if it is not possible to move the infrastructure in contact with the ground remedial measures would be implemented. A remediation strategy would be devised and discussed with the regulatory authorities (Local Authorities and Environment Agency) 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.

9.5.8 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.

9.5.9 A site investigation will also be undertaken to drill boreholes at major crossing locations and where necessary, trial pits along the pipeline route to inform detailed design.

9.6 Assessment of Heat and Radiation

9.6.1 Schedule 4 1(d) of the EIA Regulations 2017 requires an estimate, by type and quantity, of the emission of heat and radiation as a result of the Project.

9.6.2 There are no significant sources of radiation anticipated and so it is proposed this topic is scoped out of the ES.

9.6.3 The pipeline proposed as part of the Project would be buried underground, to a minimum depth of 1.2 metres. However, while there are no relevant pathways or receptors currently identified which could lead to significant effects from the temperature of the CO_2 stream, further analysis relating to the temperature of the operational pipeline will be undertaken and included within the ES.

9.7 Summary

9.7.1 This chapter has identified baseline conditions and the potential effects of the Project on geology and hydrogeology characteristics within the Study Area.

9.7.2 The assessment has shown that the Scoping Boundary is mainly within a rural setting passing adjacent to built up areas. The Scoping Boundary is predominantly underlain by Glacial Till (Secondary Undifferentiated Aquifer) with some areas of Tidal Flat Deposits (Secondary Undifferentiated Aquifer) and Glaciofluvial Deposits (Secondary A Aquifer), the bedrock geology is Chalk (Principal Aquifer). A number of Source Protection Zones are present within the Scoping Boundary. However, no significant sources of potential ground contamination have been identified.

9.7.3 Further assessment of baseline conditions and potential effects will be undertaken as part of the ES through more detailed desk study, site walkovers, and consultation as the Project design progresses. The principal potential effects identified at this stage that could occur during the construction phase are those associated with spillages and leaks of fuel and chemicals during the operation of construction plant, degradation of soil quality during the handling and movement of soils, as well as dewatering affecting groundwater levels. In addition, there could be potential limited effects on human health and infrastructure from contamination.

9.7.4 During operation there are unlikely to be any significant effects. All of these effects will be effectively controlled through design and standard mitigation measures that require no bespoke solutions to be implemented.

9.7.5 **Table 9-10** presents a summary of the scope for the geology and hydrogeology assessment.

Table 9-10: Summary of Scope for geology and hydrogeology assessment

Element	Phase	Scoped in	Scoped out	Justification
Geology	Construction	✓		Potential for effects on geological receptors and for effects on the Project from land contamination.
Geology	Operation	✓		Potential for effects on geological receptors and for effects on the Project from land contamination.
Hydrogeology	Construction	✓		Potential for effects on hydrogeological receptors and for effects on the Project from land contamination.
	Operation	✓		Potential for effects on hydrogeological receptors and for effects on the Project from land contamination.
Geology and Hydrogeology	Decommissioning	✓		Potential for effects on geological and hydrogeological receptors and for effects on the Project from land contamination

9.8 References

Ref 9-1 British Geological Survey Map Sheet No. 80 Kingston upon Hull, Solid 1:50,000 Scale. Available at: [redacted]

Ref 9-2 British Geological Survey Map Sheet No. 80 Kingston upon Hull, Drift 1:50,000 Scale. Available at: [redacted]

Ref 9-3 British Geological Survey Map Sheet No. 81 Patrington, Soild and Drift 1:50,000 Scale. Available at: [redacted]

Ref 9-4 British Geological Survey Map Sheet No. 90 including sheet 91, Grimsby, Solid and Drift 1:50,000 Scale. Available at: [redacted]

Ref 9-5 British Geological Survey Map Sheet No. 103 Louth, Solid and Drift, 1:50,000 Scale. Available at: [redacted]

Ref 9-6 British Geological Survey Map Sheet No. 104 Mablethorpe, Solid and Drift 1:50,000 Scale. Available at: [redacted]

Ref 9-7 British Geological Survey Openmap viewer. Available at: [redacted]

Ref 9-8 British Geological Survey Geoindex. Available at: [redacted]

Ref 9-9 Coal Authority, Online Interactive Map. Available at: [redacted]

Ref 9-10 Coal Authority – Coal Mining Reporting Areas. Available at: [redacted]

Ref 9-11 Multi-Agency Geographic Information for the Countryside (MAGIC) website. Available at: https://magic.defra.gov.uk/

Ref 9-12 Nitrate Vulnerable Zones. Available at: https://environment.data.gov.uk/farmers/

Ref 9-13 East Riding of Yorkshire Council – East Riding Brownfield Register. 2018. Available at: https://www.eastriding.gov.uk/planning-permission-and-building-control/planning-policy-and-the-local-plan/housing-monitoring/

Ref 9-14 East Riding of Yorkshire Council – East Riding Contaminated Land Public Register. Available at: https://www.eastriding.gov.uk/business/licences-and-registrations/public-registers/other/contaminated-land/

Ref 9-15 Environment Agency Environmental Pollution Incidents Register. Available at: https://data.gov.uk/dataset/c8625e18-c329-4032-b4c7-444b33af6780/environmental-pollution-incidents-category-1-and-2

Ref 9-16 EA landfill site data. Available at: [redacted]

Ref 9-17 Radon Potential Map. Available at: https://www.ukradon.org/information/ukmaps

Ref 9-18 Zetica Unexploded Ordnance Regional Risk Maps. Available at: – [redacted]

Ref 9-19 North Yorkshire County Council Policies Map. Available at: https://maps.northyorks.gov.uk/connect/analyst/mobile/#/main?mapcfg=mwjp

Ref 9-20 Land Contamination Risk Management (LCRM), Environment Agency, 8 October 2020. Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

Ref 9-21 Design Manual for Roads and Bridges (DMRB), LA 109 Geology and Soils; Highways England, July 2019. Available at: [redacted]

Ref 9-22 Design Manual for Roads and Bridges (DMRB), LA 113 Road drainage and the Water Environment; Highways England, March 2020. Available at: [redacted]

10. Agriculture & Soils

10.1 Introduction

10.1.1 This chapter of the Scoping Report presents an initial baseline for agriculture and soils relevant to the V Net Zero Pipeline (hereafter referred to as the Project), identifies the need for additional surveys to ensure there is appropriate information to accurately characterise the baseline, and sets out the Study Area. In addition, the chapter provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects provisionally identified.

10.1.2 Agriculture and Soils interfaces with many other aspects and as such, should be considered alongside Chapter 6 Ecology and Biodiversity; Chapter 9: Geology and Hydrogeology; Chapter 11: Water Environment; and Chapter 15: Socio-economics. This chapter is supported by **Figures 10-1** and **10-2** which provide details on Agricultural Land Classification (ALC) and soil associations within the Study Area.

10.1.3 The following definitions are provided as they provide context to the chapter:

- **Agricultural Land Classification** (ALC) is a standardised method for classifying agricultural land according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage; i.e. ALC assesses land quality based upon the type and level of agricultural production the land can potentially support. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5). ALC is determined using the Ministry of Agriculture, Fisheries and Food (MAFF) Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land,1988 (Ref 10-1);
- **Best and most versatile (BMV)** agricultural land is described in the National Planning Policy Framework, 2021(NPPF) (Ref 10-2), which defines BMV agricultural land as land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3a) agricultural quality. BMV land is afforded a degree of protection against development within planning policy (**Table 10-1**). Moderate, poor and very poor quality land is designated Subgrade 3b or Grades 4 and 5, respectively, and is restricted to a narrower range of agricultural uses; and
- **Soil series** are the lowest category in the soil classification system and are precisely defined based upon particle-size distribution, parent material (substrate) type, colour and mineralogical characteristics. Soil Associations are groupings of related soil series.

10.2 Baseline Environment and Study Area

Study area

10.2.1 The initial Study Area for the Agriculture and Soils assessment is the Project's Scoping Boundary as defined in Chapter 4 and shown in **Figure 4-1,** excluding areas considered to be marine or intertidal which do not have the potential to contain soils or agricultural land. There is a discrepancy in the area coverage of the soil association data and ALC data, the former extending to cover areas of sand dune and other coastal habitat which is not covered by the ALC. The Study Area has therefore been drawn to include the full extent of the soils data and therefore excludes 3.3 ha of land north of Mablethorpe, which is identified as beach and sea, and for which neither soil association nor ALC data are available. The Study Area

therefore covers approximately 2,370 ha as shown in **Figure 10-1**. A buffer was not applied when describing the Study Area as the impacts to soils and agricultural land only occur on the land that is directly impacted by the Project.

10.2.2 There are 43.3 ha of land to the southern extent of the Study Area for which there are soil association data but no ALC data. Within the ALC calculations this land (which appears to be sand dune and other coastal habitat) has been recorded as non-agricultural, by reason of it being excluded from the ALC survey programme used to define the Provisional ALC mapping.

10.2.3 It is noted that through the iterative design process, the Study Area will become more refined overtime as the alignment is developed. The Study Area is therefore likely to change and evolve between scoping and final submission of the ES. Furthermore, it is expected that whilst scoping considers all land within the Project's Scoping Boundary, for the assessment of baseline conditions for the Study Area within the ES two areas will be considered with the same methodologies being applied to both. Firstly, data will be presented for the proposed working area of the cable installation corridor to provide an indication of the actual area of soil disturbance and land take due to the Project. Secondly, data will be presented for the whole of the Project's Order Limits to provide baseline conditions for the wider area to provide baseline conditions for the wider area in which the works (disturbance) could be located should changes to the assessed design freeze be required post-consent.

Data gathering methodology – Scoping

10.2.4 In preparation of this section of the Scoping Report, the following sources of published information have been used to establish the baseline conditions:

- LandIS Soils Guide (Ref 10-3);
- Provisional ALC 1:250,000 mapping of the East Midlands Region (1993) (Ref 10-4);
- Provisional ALC 1:250,000 mapping of the Yorkshire and the Humber (1993) (Ref 10-5);
- Aerial Photography from bluesky and from Google Earth;
- Cranfield University (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report (Ref 10-6); and
- Multi-Agency Geographical Information for the Countryside (MAGIC). (Ref 10-7).

10.2.5 Additionally, National Soil Map of England and Wales (NATMAP) Vector data was purchased from LandIS. This is the most detailed available soils mapping covering England and Wales and is based upon survey data from the Soil Survey of England and Wales, it provides soil association data at a 1:250,000 scale.

Current Baseline

10.2.6 There are no detailed published ALC survey reports or mapping available within the Study Area (Ref 10-7). The most detailed published ALC data covering the Study Area are the 1:250,000 scale Provisional ALC mapping (Ref 10-4 and 10-5). The scale of the mapping is not accurate at the field level as it generally does not pick up variations in ALC grade for areas less than approximately 80 ha. Additionally, it does not provide a subdivision of Grade 3 land into Subgrade 3a (good quality, BMV) and Subgrade 3b (moderate quality, non-BMV), and the Grade 3 land must therefore be considered as having the potential to be of BMV quality. The data do however provide a general indication of the predominant ALC grades within the Study Area and wider region.

10.2.7 As shown in **Table 10-1**, the vast majority of land within the Scoping Boundary (approximately 87.9%) is identified as Grade 3 agriculture land, with a small percentage (approximately 9.8 %) identified as Grade 2 agriculture land. The Grade 2 land is identified to the southern tip of Section A of the Scoping Boundary extending southwards into Section B, in and around the Lincolnshire Wolds AONB near Riby, Laceby and Irby upon Humber. Small areas (approximately 10.2 ha) of non-agricultural and urban land are also identified at the far north of the Scoping Boundary comprising industrial land at Immingham, and the decommissioned Theddlethorpe Gas Terminal (TGT). It is noted that the development of the TGT post-dates the Provisional ALC mapping and therefore this change of use has been edited within the Project mapping. Additionally, as described above, approximately 43.3 ha of land to the southern extent of the Study Area has been recorded as non-agricultural owing these sand dune and other coastal habitats being omitted from agricultural land survey during the collation of the ALC data (Ref 10-5), i.e. the land was considered to be non-agricultural and was therefore not included.

10.2.8 The geographical distribution of ALC grading within the Study Area is shown on **Figure 10-1**.

Table 10-1: Summary of ALC Grading within the Study Area

ALC Grade	Area (ha)	Percentage
Grade 1 (Excellent quality)	0.0	0.0
Grade 2 (Good quality)	233.1	9.8
Grade 3 (Good to Moderate quality)	2082.9	87.9
Grade 4 (Poor quality)	0.0	0.0
Grade 5 (Very Poor quality)	0.0	0.0
Non-agricultural / Urban	53.5	2.3
TOTAL	2369.5	100.0
Taken from the Provisional ALC data set (ref 10-4 and 10-5)		

10.2.9 As the Grade 3 land is treated as having the potential to be BMV quality a 50:50 split between Subgrade 3a and Subgrade 3b is assumed for the purposes of scoping. This will be revised during the preparation of the ES chapter following the methods described in Section 10.2.3 above. The 50:50 split is considered to be suitable for the purposes of scoping as a review of available detailed field scale survey data in the vicinity of the Project (mainly clustered around the fringes of Grimsby and Cleethorpes, with a small area to the north of Louth) showed the detailed ALC gradings on provisionally mapped Grade 2 and 3 land to be a combination of Grade 2, Subgrade 3a and Subgrade 3b with over 50% being Subgrade 3b. With the 50:50 split applied, the calculated area of Subgrade 3a (BMV) land within the Study Area is approximately 1,014.4 ha. Combined with the mapped Grade 2 land the total area of BMV land within the Study Area is calculated to be 1,274.5 ha or 53.8%.

10.2.10 Hence, there is a clear indication that the Project has the potential to impact upon some BMV land. As the route becomes more defined through the ongoing route alignment work, the total area of BMV land likely to be affected will be able to be more accurately established.

10.2.11 However, it is likely the area of land either temporarily or permanently lost to agricultural use and area of disturbance to soil resources due to the Project will be considerably less than the overall Study Area; this is primarily due to the temporary nature of the pipeline installation works and the areas of soil disturbance being largely restricted to a narrower set working

corridor within the Scoping Boundary. Additionally, the only confirmed permanent (built) development is the Pipeline Offtake Facility at Immingham, which may occur on pre-developed land which is either non-agricultural and/or has no soil cover; and the offshore pipeline tie-in and outlet at the former TGT which will occur on a pre-developed concrete slab resulting in no impacts to soils or agricultural land. Shutdown valves may also be required along the pipeline and will be considered as part of the detailed design process. Their footprint and scale is relatively small and there is substantial flexibility as to their location.

10.2.12 The purchased NATMAP Vector data identifies ten soil associations within the Study Area. These are listed (from North to South) within **Table 10-2** and shown in **Figure 10-2**. Erodibility data are taken from research by Cranfield University (Ref 10-6).

10.2.13 The main soil association mapped within the Study Area (70.2 %) is the Holderness Association (711u) which are slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. The next most common association is Wallasea 2 (813g) which occurs to the south of the Study Area from around Manby to the coast. The remaining eight soil associations are mapped as covering relatively small areas. Nine of the ten mapped associations (mainly comprising loamy and clayey soils) are at very small or small risk of erosion from water (Ref 10-6). The sandy soils of the Sandwich association (361) which commonly support sand dune and coastal wetland habitats, are however classed as being at high risk of wind erosion.

10.2.14 The current land-use has been informed by the use of aerial and Streetview© imaging provided by Google. The majority of the Study Area has been identified to be in arable production, this finding corroborates the ALC data presented above, as higher quality (BMV) land is more productive and better suited to arable use than land of lower quality. The arable land is interspersed with permanent pasture and some small to medium woodlands. Therefore, for the purpose of this assessment, it is assumed that agricultural land use is closely related to agricultural land quality and current land use is therefore reflected in the ALC assessment.

Revision: 3 Drawn: LC Checked: HT Approved: MW Date: 2022-03-23

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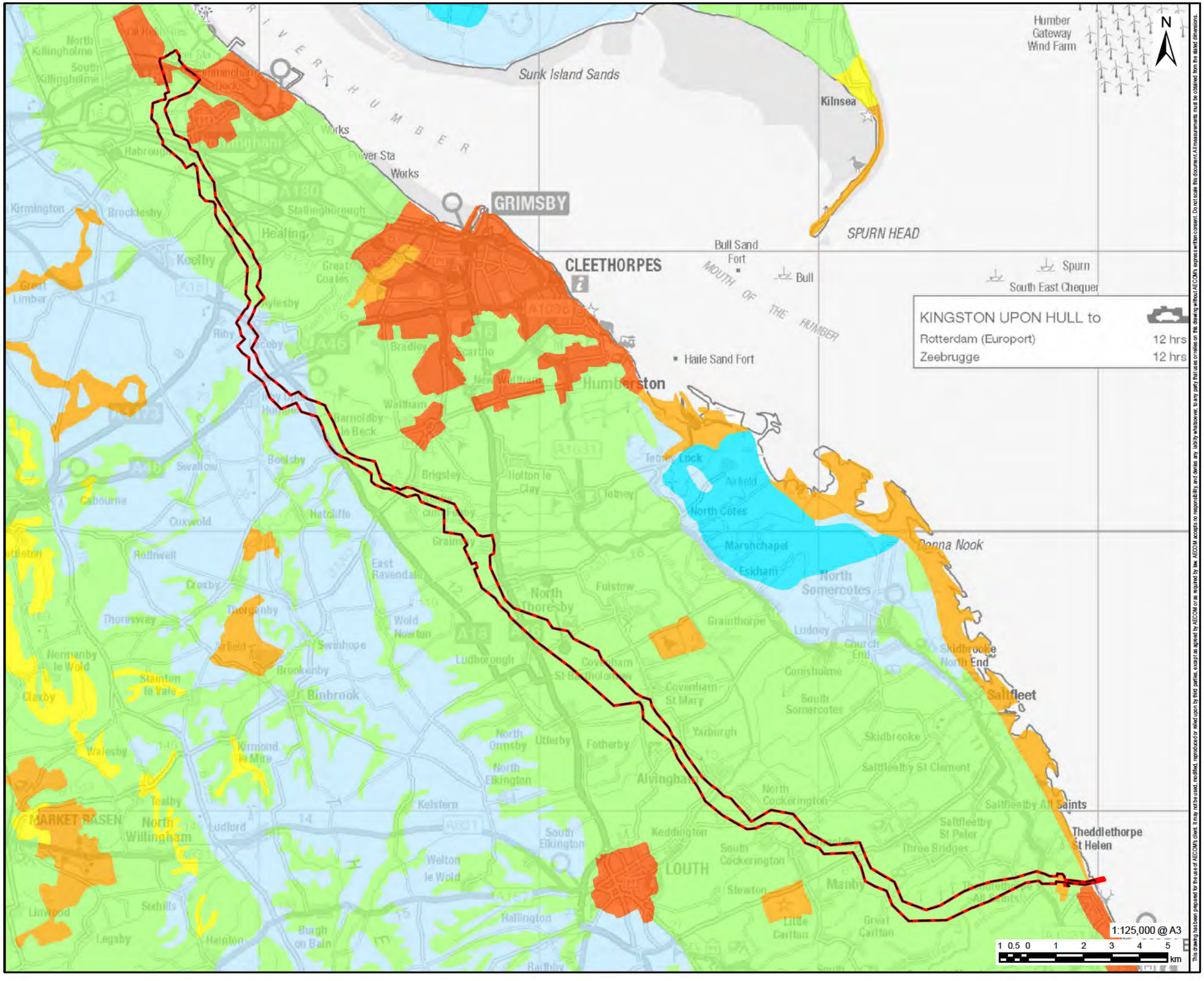

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PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Study Area

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

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FIGURE TITLE
Figure 10-1
Agricultural Land Classification

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_10-1

Revision: 2 Drawn: LC Checked: HS Approved: MW Date: 2022-03-23

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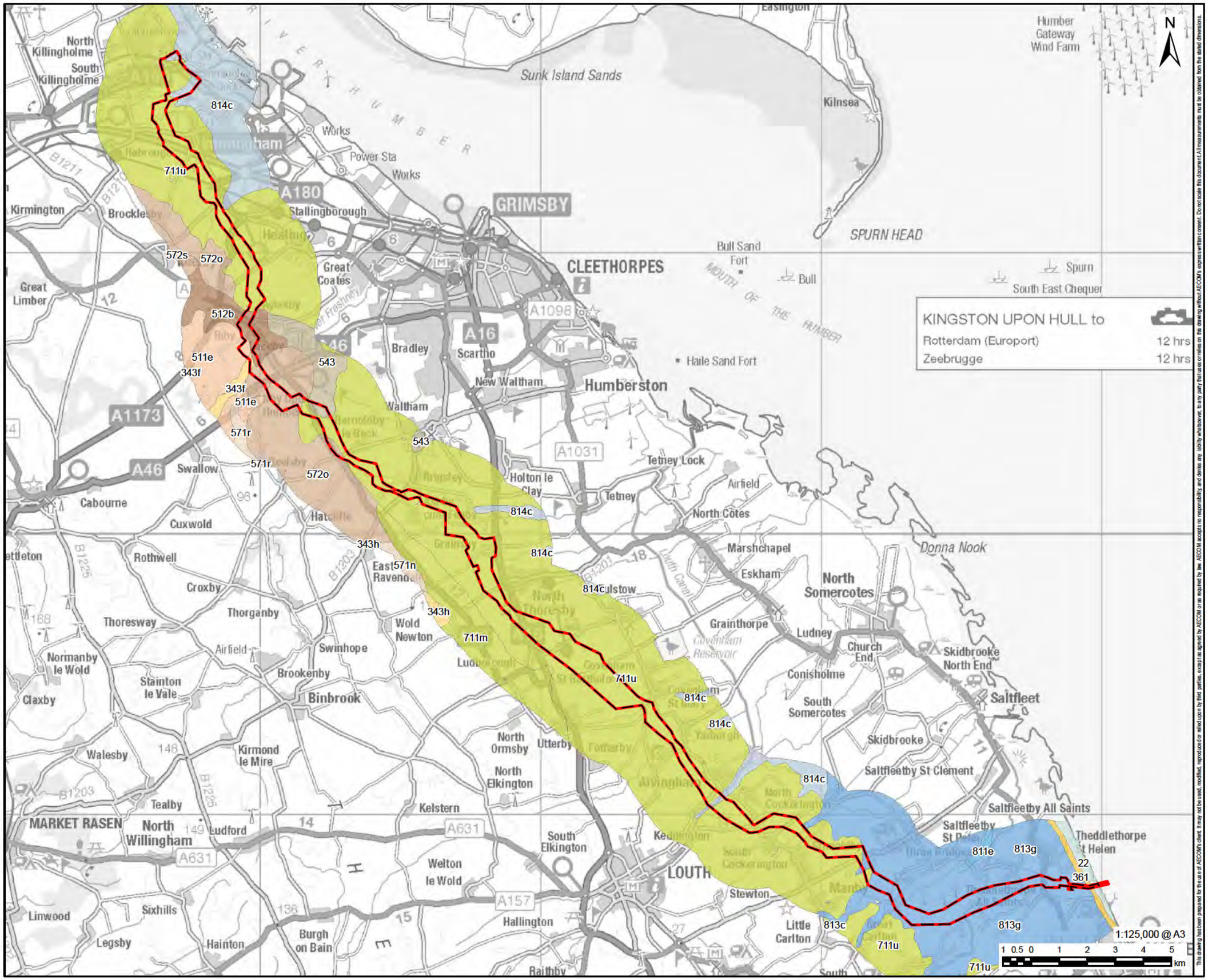

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PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Study Area

Soil Associations
- 22 - Saline 1
- 343f - Newmarket 1
- 343h - Andover 1
- 361 - Sandwich
- 511e - Swaffam Prior
- 512b - Landbeach
- 543 - Arrow
- 571n - Tathwell
- 571r - Hunstanton
- 572o - Burlingham 2
- 572s - Bishampton 1
- 711m - Salop
- 711u - Holderness
- 811e - Tanvats
- 813c - Fladbury 2
- 813g - Wallasea 2
- 814c - Newchurch 2

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FIGURE TITLE
Figure 10-2
Soil Associations

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_10-2

Table 10-2: Soil Associations within the Study Area

Soil Association	General Description	Erodibility*	Area (ha) (and % of Study Area)
Newchurch 2 (814c)	Loamy and clayey soils of coastal flats with naturally high groundwater developed over stoneless clayey marine alluvium. These soils are usually waterlogged for long periods in winter (Wetness Class IV)	Very small risk (water)	50.5 (21.1 %)
Holderness (711u)	Mainly slowly permeable fine loamy and moderately permeable coarse loamy soils on chalky till and glaciofluvial drift. Also includes narrow strips of clayey alluvial soils. Slowly permeable and seasonally waterlogged or occasionally waterlogged (Wetness Class III to II).	Small risk (water)	1,663.6 (70.2 %)
Landbeach (512b)	Permeable calcareous coarse loamy soils affected by groundwater over glaciofluvial sand and chalky gravel. Some deep, in part non-calcareous fine and coarse loamy soils affected by groundwater. The soils are permeable and either well drained or only occasionally waterlogged (Wetness Classes I or II).	Very small risk (water)	58.1 (2.5 %)
Swaffham Prior (511e)	Well drained calcareous coarse and fine loamy soils over chalk rubble. Some similar shallow soils. Deep non-calcareous loamy soils in places. Striped and polygonal soil patterns locally. Slight risk of water erosion.	Small risk (water)	20.8 (0.9 %)
Newmarket 1 (343f)	Shallow well drained calcareous sandy and coarse loamy soils over chalk or chalk rubble. Some similar deeper sandy soils, often in an intricate striped pattern. Well-drained (Wetness Class I).	Small risk (wind)	6.6 (0.3 %)
Burlingham 2 (572o)	Deep fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged fine loamy soils. Some well drained fine and coarse loamy soils.	Small risk (water)	119.6 (5.0 %)
Arrow (543)	Deep permeable coarse loamy soils affected by groundwater.	Small risk (water)	22.9 (1.0 %)
Wallasea 2 (813g)	Deep stoneless clayey soils developed over reclaimed marine alluvium. Calcareous in places. Some deep calcareous silty soils. (Wetness Class I to II).	Very small risk (water)	422.5 (17.8 %)

Soil Association	General Description	Erodibility*	Area (ha) (and % of Study Area)
Sandwich (361)	Mainly deep well drained calcareous and non-calcareous sandy soils supporting sand dune and some wetland habitats. Very limited agriculture and coniferous woodland use as the soils are droughty, and unstable when ploughed. Some sparsely vegetated unstable soils. Waterlogged soils in hollows locally. Shingle bars and spits locally extensive.	High risk (wind)	1.4 (0.1 %)
Saline 1 (22)	Soils of variable texture flooded by high tides developed over marine alluvium. Many are soft and unripened, others, often on higher sites or of sandy texture, are firm and ripened. Frequently calcareous.	Very small risk (water)	2.3 (0.1 %)
*From research by Cranfield University (Ref 10-6)			

Data gathering methodology for ES

10.2.15 Building on the work done for Scoping, the collection of the baseline Agriculture and Soils data for the ES will be undertaken following an accepted methodology, used previously for other large-scale linear infrastructure projects, as defined in the following paragraphs.

10.2.16 The 1:250,000 scale Provisional ALC mapping is the most detailed published ALC data covering the Study Area. However, as noted above, these data pre-date the revised ALC methodology issued in 1988 and as a result, the data do not provide a distinction between ALC Subgrades 3a (BMV) and 3b (non-BMV). The Provisional ALC mapping therefore provides an indication of the land quality in the Region, but the extent and distribution of BMV agricultural land within the study area cannot be defined from the Provisional mapping alone.

10.2.17 Therefore, for areas of temporary development, including for example the pipeline corridor, temporary access roads and construction compounds, the Provisional ALC Mapping will be used to directly determine the proportions of ALC Grades and were Grade 3 is identified, the relative proportions of Subgrade 3a and 3b will be calculated as follows. Given the very small footprint of the shutdown valves and the substantial flexibility as to their location, should they be included in the scheme it is proposed that a desk based methodology would also be used to define the baseline conditions for these elements.

10.2.18 Natural England's Likelihood of BMV mapping data will be purchased through LandIS (Ref 10-8) (these data may also be viewed online at Ref 10-18). These data spatially map the percentage chance (likelihood) of BMV land occurring within a particular area. The predictive mapping was devised by Natural England (NE) based on soil association data from the 1:250,000 scale national soil map. The methodology assessed each soil association on a regional basis using MAFF's 1988 ALC guidelines (Ref 10-1). The published ALC data used in the assessment were taken from detailed site surveys, where available, and the Provisional ALC mapping data; along with climatic data from the Met Office. The method is further described in Defra's 2001 explanatory note (Ref 10-9).

10.2.19 The data provide the likely proportion of BMV agricultural land to be encountered, using the following categories:

- *High Likelihood*: Areas where more than 60% of the land is likely to be BMV;

- *Moderate Likelihood:* Areas where 20% to 60% of the land is likely to be BMV; and
- *Low Likelihood:* Areas where less than 20% of the land is likely to be BMV.

10.2.20 For the purpose of this assessment and to provide a robust quantification of the area of BMV land within the Study Area, land mapped as High Likelihood will be considered as Subgrade 3a; whereas land mapped as Moderate Likelihood will be split 50/50 between Subgrades 3a and 3b. The land mapped as Low Likelihood will be considered as Subgrade 3b.

10.2.21 The combination of the areas identified as High Likelihood of BMV and 50% of the areas identified as Moderate Likelihood of BMV land on the LandIS Predictive ALC Grading (mapped as Grade 3 on the Provisional mapping); and the Provisionally mapped ALC Grades 2 land, will therefore provide the total potential area of BMV within the study area.

10.2.22 It is noted that, the relative proportions of Subgrade 3a and 3b within the Study Area can only be presented in a tabular form and not represented in a mapped format (due to the 50/50 split of the Moderate Likelihood of BMV land from the LandIS data). The lack of spatial information will not affect the reporting or impact assessment as this considers the total permanent loss of BMV land for the Project as a whole. It is noted that where shutdown valves occur on Provisionally mapped Grade 3 land which is of Moderate likelihood of BMV this would be considered as Subgrade 3a (BMV) within the impact assessment to provide a worst case scenario.

10.2.23 This methodology of applying a desk based approach to the gathering of baseline soils and ALC data for areas of temporary development has been used in other linear projects such as Viking Link (an interconnector from Denmark with 60 km underground cable through Lincolnshire), Scotland England Green Link 2 (an interconnector linking Peterhead in Scotland to Drax in England with *c.* 69 km underground cable through the East Riding of Yorkshire and Selby District) and will ensure that the baseline is adequately described to ensure that all potentially significant effects are identified and a thorough and robust impact assessment can be undertaken.

10.2.24 For both areas of temporary and permanent developments, the data on the erodibility of Soil Associations (Ref 10-6) will be used to identify potential areas of increased soil sensitivity. This assessment will be used to inform the iterative design process (mitigation by design), so that areas of high sensitivity can be avoided where practicable.

10.2.25 Apart from the shutdown valves, the only permanent above ground development associated with the Project is the construction of offtake and metering facilities at Immingham and the offshore pipeline tie-in and outlet at the former TGT Site. At Immingham the works are located within the industrial site and the land is non-agricultural, therefore no ALC survey is required. However, as there is soil cover, to maximise potential for reuse and ensure sustainable management of these resources a soil survey would be undertaken post-consent to classify these soils which are potentially disturbed containing rubble from previous works within the site. The GRT is to be constructed on a pre-existing concrete slab and therefore no soils or agricultural land would be impacted due to this aspect of the Project.

10.2.26 Further baseline data will be gained through consultation with the LPA's and through the Project's Lands Team. This information is likely to include site specific data gained from the Project Lands Team's discussions with farmers and landowners which will assist in defining the routeing and micrositing of infrastructure; and in describing project specific mitigation, if required, to ensure that the impact of construction and operation of the Project on soils and agriculture and agricultural operations are minimised.

10.3 Planned Surveys

10.3.1 A reconnaissance survey of the Study Area will be undertaken to provide an overview of the current land-use and characteristics of the agricultural land present. Due to the existing nature of the sites at Immingham and TGT, no additional surveys are expected to be undertaken in these locations prior to ES submission as the land is already industrial in nature.

10.3.2 It is anticipated that as agreed for other linear projects, to maximise potential for reuse and ensure sustainable management of soil resources, targeted soil surveys to inform the construction soil management planning (for example, pipeline corridor and temporary accesses and block valve locations) will be completed post-consent when the precise routeing and placement of infrastructure are known, ensuring the surveys are targeted to areas directly impacted by the Project. These post-consent surveys will also include any areas of soil resources within the permanent development area (offtake and metering facilities) at Immingham. As there is no agricultural land within the permanent development areas at Immingham and Theddlethorpe pre-construction surveys to inform the scale of permanent BMV loss are not required to inform the ES.

10.3.3 For all areas of agricultural land, the post-consent surveys will include an assessment of agricultural land quality using the ALC to provide a baseline against which restoration success can be measured. Surveys will be undertaken to standard guidelines (Ref 10-15).

10.4 Assessment Method

Relevant legislation, planning policy and technical guidance

10.4.1 This section identifies the relevant legislation, national and local policy and guidance which has informed the scope of the assessment relevant to agriculture and soils. The below policy and guidance are in addition to those listed within Chapter 3: Planning Policy Context.

10.4.2 A summary of the relevant planning policies is given in **Table 10-3**.

Table 10-3: Planning Policy Relevant to Agriculture and Soils

Policy Reference	Policy Context
National Policy	
Overarching National Policy Statement for Energy (EN-1) (Ref 10-10)	
Paragraph 5.10.8 of Section 5: Land use including open space, green infrastructure & Green Belt	Minimise impacts on BMV land and direct development towards non-agricultural land or land of poorer quality. Identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed.
Draft Update to EN-1	*Adds that where contamination is present, applicants should consider opportunities for remediation where possible. Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination.*
National Planning Policy Framework (NPPF) (Ref 10-2)	
Paragraph 174	Protection and enhancement of soils. Recognition of the economic and other benefits of the best and most versatile agricultural land.
Paragraph 175	Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.

Policy Reference	Policy Context
25 Year Environmental Plant 'Green Future: Our 25 Year Plan to Improve the Environment' (Ref 10-11)	
	Aims to protect the best agricultural land; manage soils in a sustainable way by 2030; and restore and protect peatland.

Legislation

10.4.3 A summary of the relevant legislation is given in **Table 10-4**.

Table 10-4: Legislation Relevant to Agriculture and Soils

Legislation Reference	Legislation Context
The Town and Country Planning (Development Management Procedure) (England) Order 2015 (Ref 10-12)	
Schedule 4, Part (y)	Requires that the local planning authority consults Natural England if the area of a proposed permanent development exceeds 20 ha of BMV land
The Agriculture Act, November 2020 (Ref 10-13)	
Chapter 1 'New Financial Assistance Powers'	The Secretary of State may give financial assistance for, or in connection with, …protecting or improving the quality of soil.

10.4.4 As the UK has now left the EU, the UK is not likely to adopt the Soil Framework Directive, however, the current government has stated its intention to match or better European environmental protection legislation and so it is likely that many of the principles of the Soil Framework Directive will be carried forward into UK policy. The implications of any new legislation which may come into force during the planning stages of the Project will be fully considered where applicable.

Technical Guidance

10.4.5 A summary of the relevant technical guidance is given in **Table 10-5**.

Table 10-5: Technical Guidance Relevant to Agriculture and Soils

Technical Guidance Document	Context
Planning Practice Guidance for the Natural Environment (PPGNE) 2019 (Ref 10-14)	
Paragraphs 001 and 002	Sets out the need for planning decisions to take into account the value of soils and agricultural land to enable informed choices on the future use of soil resources and agricultural land within the planning system.
Natural England (2012) Technical Information Note 049 (TIN049): Agricultural Land Classification: Protecting the Best and Most Versatile agricultural land (Ref 10-15)	
	Explains the Government Policy to protect agricultural land and the ALC system and uses.
Natural England (2021) Guide to assessing development proposals on agricultural land (Ref 10-17)	

	Further explains Government Policy to protect agricultural land and the ALC system and uses. Describes the ALC and its uses and provides advice on survey requirements.
Department for the Environment, Food and Rural Affairs (DEFRA): Construction Code of Practice for the Sustainable Use of Soil on Development Site (2009) (Ref 10-16)	
	Technical Guidance on the handling, storage and (re)use of soil within construction projects.
Ministry of Agriculture, Fisheries and Food (MAFF) Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land (Ref 10-1)	
	The current guidelines and criteria for grading the quality of agricultural land.

Assessment Methodology

10.4.6 The early detection of significant adverse environmental effects enables appropriate mitigation (e.g. measures to avoid, reduce or offset significant adverse effects) to be identified and incorporated into the design of a project (mitigation by design), or commitments to be made to environmentally sensitive construction methods and practices (project specific mitigation). The likely significant effects of the Project will therefore be identified and assessed, appropriate mitigation (Section 10.6) will be put forward (where required) and the residual (post-mitigation) effects reassessed to ensure that the overall effect of the Project on agriculture and soils is acceptable in planning terms.

10.4.7 The assessment methodology described below has been used and accepted on many projects where development potentially impacting soils and agricultural land has occurred, including the aforementioned Viking Link and Scotland England Green Link 2. However, it is noted that IEMA are about to launch their 'land and soils guidance for EIA'. The details of this guidance, or how this may affect the application of the methodology proposed below, are not known, however IEMA have stated that the guidance *'seeks to move practice away from a narrow focus on quantifying and financially compensating impacts on agricultural land, instead advocating a new and wider approach to assessing the soil functions, ecosystem services and natural capital provided by land and soils. It highlights and reinforces the importance of soil functions and ecosystem services to wider systems including, but not limited to, carbon and climate, hydrology, food production, biodiversity and ecology*.' Therefore, depending upon the requirements of the guidance changes to the proposed methodology set out below may be required.

Agricultural Land

10.4.8 BMV agricultural land (Grades 1, 2, and Subgrade 3a) is considered to be a finite national resource and is given special consideration under the NPPF (Ref 10-2). However, there are no defined criteria for the assessment of effects on agricultural land (understood as a permanent land use change to a built development), and no threshold given for BMV loss (permanent land use change) which should be regarded as significant.

10.4.9 Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015, Schedule 4, Part (y) (Ref 10-12), requires that the local planning authority consults Natural England if the area of a proposed permanent development exceeds 20 ha of BMV land. Although the guidance does not state that this threshold should be used to determine the significance of loss, for the purpose of environmental assessment, it is a guide to consider significance where 20 ha or more of BMV is affected by a development. To determine the level of significance, other factors are

considered, including whether the development is temporary or permanent and the extent of BMV in the locality.

10.4.10 Therefore, the loss of agricultural land will be assessed by estimating the amount and quality of land that may be affected by the Project, with a threshold of 20 ha of *permanent* BMV loss used to determine whether the loss is significant or not. Magnitude of effect and receptor sensitivity classifications are not assigned. Rather, any permanent BMV loss that exceeds 20 ha is assessed as significant, whilst any that is temporary or occupies less than 20 ha is assessed as not significant.

10.4.11 The assessment of the loss of agricultural land therefore does not consider temporary land use change, as this land would be returned to agricultural use once construction is complete. Within the loss of agricultural land assessment, the areas of temporary land use change will be reported for illustrative purposes only.

Soil Resources

10.4.12 There are no defined criteria, or policy guidance on the assessment of the effects of development on soil resources. Therefore, the assessment of the effect of permanent and temporary development as a consequence of the Project will be assessed in terms of the identified soil resources, their sensitivity, and the degree of loss of soil resource. The assessment criteria will be based on professional experience and which have been adopted in other assessments.

10.4.13 The disturbance of soil resources will be assessed by reporting the workability of topsoils and their suitability for reinstatement, and effects assessed on the assumption that good working practice is followed.

10.4.14 Assessing the sensitivity of soil resources to damage (i.e. resistance and resilience of the soil environment, not the importance of the land for agricultural use) is complicated, as soil resources provide a range of functions, such as supporting plant growth (including food and other crops), water filtration and regulation (role in flood control), nutrient transformation (e.g. role in the nitrogen cycle), carbon storage and sequestration, and supporting biodiversity. The sensitivity criteria for soil resources are based on the erodibility of soils or the presence of ecologically important soils, such as peat. The soil resources assessment will consider both temporary and permanent damage. The receptor sensitivity criteria are provided in **Table 10-6**. The magnitude of change from the baseline will be defined in terms of the damage to soil resource and loss of soil resources, as provided in **Table 10-7**.

10.4.15 Soil erodibility is a measure of the susceptibility of soils to loss both *in-situ* (i.e. as an undisturbed soil profile) and during soil stockpiling, due to wind or water erosion (natural erosion potential). Soil erodibility is considered in the rating of soil sensitivity, with the sensitivity classification of the different soils encountered based upon data compiled by Knox *et al* (Ref 10-6). Therefore, as a rule, heavy (clay rich) soils are classified as low sensitivity (low soil erodibility), whilst light sandy soils are classified as high sensitivity (high soil erodibility).

10.4.16 However, it is important to note that soils of differing texture and structural development may be subject to a range of potential impacts during and following reinstatement. For example, the incorrect handling/reinstatement of a heavy (clay rich) soil whilst in a plastic state may result in a reinstated soil profile with a reduced natural drainage compared to the natural soil profile and a subsequent increased risk of soil loss (erosion) due to surface water run-off. Whereas the permeable nature of light sandy soils means that the natural structural recovery and drainage potential of the soils is more easily maintained upon reinstatement. However, as standard good practice measures for soil management will mitigate against any potential adverse impacts during reinstatement regardless of the soil texture or

prevailing structure, only soil erodibility (i.e. the sensitivity of the undisturbed soil profile or soil stockpiles) is considered in the sensitivity criteria of the soil assessment.

Table 10-6: Receptor Sensitivity (Soils)

Receptor (Soil Resources)	Sensitivity	Justification
Soils with very high to high risk of erosion and organic soils (peat).	**High**	Development on those soils should be avoided, however if this is not possible, they require special consideration and careful planning of construction methods, e.g. use of temporary working surfaces, careful storage, protection from drying out, in order to preserve their functions. Soils of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change.
Soils with moderate risk of erosion.	**Medium**	Standard soil management measures would provide appropriate protection to these soils; however, damage is likely to occur if worked in less than ideal conditions, e.g. when wet. These soils should be given appropriate consideration because of their importance for agricultural production.
Soils with small or very small risk of erosion.	**Low**	These soils are generally more resistant to damage. Standard soil management measures would provide appropriate protection to these soils (except peat soils).
Poor quality soils with no risk of erosion.	**Negligible**	These soils are generally more resistant to damage. Standard soil management measures would provide appropriate protection to these soils (except peat soils).

10.4.17 The magnitude of effect will be assessed in terms of the change from baseline conditions, as defined in **Table 10-7**.

Table 10-7: Criteria to Assess the Magnitude of Impact (Soils)

Magnitude	Damage to Soil Resources	Loss of Soil Resources
High	Permanent irreversible or long-term reversible damage to soil quality through handling, and stockpiling. Storage for more than 2 years	<25% of soil resources suitable for reuse and retained on site.
Medium	Medium-term (6 months to 2 years) temporary disturbance. Reversible damage to soil quality through handling, stockpiling, machinery traffic, *etc.*	25-50% of soil resources suitable for reuse and retained on site.
Low	Short-term (<6 months) disturbance of soil resources. Reversible damage to soil quality through handling, stockpiling, machinery traffic, *etc.*	51-95% of soil resources suitable for reuse and retained on site.
Negligible	No damage or very small-scale surface damage equivalent to that done by a typical farm machinery traffic.	>95% of soil resources suitable for reuse and retained on site.

10.4.18 The classification of effects for loss and damage of soil resources will be assessed as a function of the sensitivity of the receptor and the magnitude of an impact. As indicative matrix for the determination of significance is provided in **Table 4-5**. Where effects are determined as major adverse or moderate adverse, the effect will be considered significant. Where effects are determined as minor adverse or negligible, the effect will be considered not significant.

10.5 Identification of Potential Effects

Potential Effects

10.5.1 The Project is considered to have the potential to impact on agriculture and soils, both temporarily and permanently.

Potential Receptors

10.5.2 The assessment will consider the following receptors within the Study Area:

- Agricultural land and land use in terms of the loss of BMV land; and
- Soil resources in terms of potential damage and loss.

10.5.3 As described in Section 10.2, a review of the available published ALC data for the study area indicates that BMV land is present within the Scoping Boundary. Therefore, there is the potential for this land to be significantly affected. In consequence, this receptor is to be taken forward for further consideration.

10.5.4 A review of the published soils information within the study area (Section 10.2) indicates the majority (99.9%) of soils within the Study Area are likely to be at a very small to small risk of water erosion (**Table 10-5**). However, the sandy soils of the Sandwich association (361) which form the sand dune and coastal habitats to the south of the Study Area, are classed as being at high risk of wind erosion. Soils may be damaged or lost during the construction of the Project due to inappropriate handling, storage and reinstatement. Therefore, there is potential for soils to be significantly affected through damage or loss and therefore, this receptor is also to be taken forward for further consideration.

Likely Significant Effects

10.5.5 The likely significant agriculture and soils effects that will be taken forward for assessment in the EAR are summarised in **Table 10-8**.

Table 10-8: Likely Significant Effects for Agriculture and Soils

Activity	Effect	Receptor
Construction Land preparations (including but not limited to): Stripping and stockpiling of topsoil and subsoil; Ground excavation; Levelling ground; Trenching; Haul road construction; and Vehicle movements on-site.	***Loss of agricultural land*** Through change of land-use to non-agricultural through placement of infrastructure but also through indirect effects such as field severance and separation of livestock from water supplies. Through loss of soil quality (damage and loss) reducing the ability of the land to be restored to its pre-development ALC status (BMV status).	Agricultural Land
	Damage to, or loss of soil resources through incorrect management including: Damage to the structure and compaction; Loss of nutrients (e.g. nitrogen);	Soil resources

Activity	Effect	Receptor
	Loss of soil biota (e.g. bacteria, fungi, earthworms) and reduction of its activity; Mixing of soil horizons (especially topsoil with subsoil) reducing their potential for reuse; and Unauthorised export.	
Construction Reinstatement of agricultural land and soils	Loss of BMV land following reinstatement (i.e. change of land-use to lower quality; arable to pasture, etc.)	Agricultural Land
	Disruption to normal farming activities due to limited access surrounding permanent infrastructure.	Agricultural Land Soil resources
	Damage to, or loss of soil resources through incorrect management (see above)	Soil resources
Operation considered to be the same types of operations as for construction only at a smaller scale during isolated maintenance activities.	Loss of agricultural land during maintenance activities. Considered to be temporary in nature	Agricultural Land
	Damage to, or loss of soil resources through incorrect management during maintenance activities (see above).	Soil resources
	Disruption to normal farming activities	Agricultural Land Soil resources

10.6 Design, Mitigation and Enhancement Measures

10.6.1 Wherever practicable the identified effects will be mitigated or 'designed out' through the iterative design process (mitigation by design). Where this is not possible project specific mitigation measures will be implemented.

Loss of agricultural land to development

10.6.2 The majority of land take for the Project will be temporary, with land excluded from agricultural use for the duration of construction operations only. Temporary land-take areas will be reinstated to agricultural use, and any agreed controls over the exact use will be clearly identified. Potential impacts to agricultural operations and farm business viability will be mitigated as far as is practicable through consultation with landowner(s)/farmer(s) but will not be specifically addressed or assessed in the Agriculture and Soils chapter of the ES.

10.6.3 The temporary loss of agricultural land and the impact of this loss can be reduced through appropriate mitigation.

10.6.4 Mitigation by design, where practicable and considering technical and other environmental considerations, is likely to include, but will not be limited to:

- avoidance of development in arable land (including mixed use and silage fields) in preference of permanent pasture where practicable;
- informed and sensitive positioning of pipeline routeing and access tracks to the edge of fields, in field boundaries, or through less productive areas of individual fields, should ensure that the maximum area of productive land remains in agricultural use during the construction period (micrositing);
- avoidance of higher quality agricultural land (where possible);

- mitigation of indirect effects such as field severance and separation of livestock from water supplies through informed route design; and
- appropriate management of soil resources (maintenance of soil volumes and quality to prevent loss/lowering of ALC grade between pre- and post-construction – potential loss of BMV status).

10.6.5 The only potential permanent development on agricultural land (permanent loss of agricultural land through built development) would be due to the installation of shutdown valves, should these be included in the Project. Where practicable the siting of shutdown valves in BMV land would be avoided. The remaining elements of permanent development (offtake and metering facilities at Immingham and the offshore pipeline tie-in and outlet at the former TGT site) occur on non-agricultural land.

10.6.6 With mitigation measures such as those described above, the permanent loss of agricultural land during the construction phase should be restricted to areas of block valve development, with BMV land avoided as far as is practicable.

Damage to and loss of soil resources

10.6.7 Soil resources would be protected against damage and loss by the adoption of industry standard methods for the handling and storage of soils appropriate to the soil types identified. The current guidelines (Defra, 2009, Ref 10-16) promote standard working methods and techniques to protect soil resources which include, but are not limited to, the following:

- handling of soil resources only when sufficiently dry to prevent compaction and damage to soil structure, generally limiting soil operations to the months April to October (although this period may be extended during dry periods);
- stripping, handling, storage and transportation of topsoil separately from subsoil;
- appropriate seeding of soil storage mounds if required for a period longer than six months, to prevent erosion and to maintain soil structure, nutrient content and biological activity;
- de-compacting of the subsoil before topsoil re-instatement;
- minimising the number of machine movements across topsoil to reduce compaction and retain soil structure; and
- development of an artificial land drainage strategy, led by a land drainage specialist, for both pre-construction and post-construction.

10.6.8 It is noted that due to their very sandy nature and high risk of wind erosion, should the soils of the Sandwich Association be disturbed by construction operations, specific measures (beyond those applied to the rest of the soils within the Study Area) may be required to ensure their protection. However, as shown in **Figure 10-1**, these soils coincide with the designated habitats of the Saltfleetby - Theddlethorpe Dunes SPA, Ramsar and SSSI and therefore it is likely that impacts to these habitats and hence the soils which support them will be avoided as far as is practicable.

10.7 Summary

10.7.1 A review of the available published ALC data for the Study Area indicates that BMV land is likely to be present within the Scoping Boundary. In the absence of appropriate mitigation (both mitigation by design and project specific mitigation), there is the potential for this land to be significantly affected. In consequence, this receptor is to be taken forward for further consideration.

10.7.2 The Project has the potential to result in the damage or loss of soil resources during the construction phase. Therefore, there is potential for soils to be significantly affected through damage or loss and this receptor is to be taken forward for further consideration.

10.7.3 No significant effects are anticipated to occur once the Project is operational due to the limited activities which will take place which could impact upon agriculture and soils. Consequently, this is scoped out. The decommissioning strategy is yet to be established, therefore the potential for significant effects cannot be ruled out at this stage and thus this will be taken forward for further assessment.

10.7.4 Appropriate mitigation measures will be implemented either during the iterative design process (mitigation by design) or through project specific mitigation measures. The mitigation measures proposed will ensure that impacts to soils and agricultural land are reduced as far as is practicable.

Table 10-9: Likely Significant Effects for Agriculture and Soils

Element	Phase	Scoped in	Scoped Out	Justification
Damage or loss to soils	Construction / Decommissioning	✓		
Damage or loss of BMV agricultural land	Construction / Decommissioning	✓		
Damage or loss to soils	Operational		✓	Limited activities will take place during the operational phase which would have the potential to lead to adverse agriculture and soil impacts
Damage or loss of BMV agricultural land	Operational		✓	

10.8 References

Ref 10-1 MAFF (1988) 'Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land'. Available at [redacted]

Ref 10-2 Department for Communities and Local Government (2021). The National Planning Policy Framework (NPPF). Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

Ref 10-3 LandIS Soils Guide. Available at: [redacted]

Ref 10-4 MAFF (1993). 1:250,000 Provisional Agricultural Land Classification Sheet, East Midlands Region (ALC005). Available at: [redacted]

Ref 10-5 MAFF (1993). 1:250,000 Provisional Agricultural Land Classification Sheet, Yorkshire and the Humber (ALC003). Available at: [redacted]

Ref 10-6 Cranfield University (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. Available at: [redacted]

Ref 10-7 Multi-Agency Geographical Information for the Countryside (MAGIC). Available at: https://magic.defra.gov.uk/MagicMap.aspx

Ref 10-8 LandIS BMV Likelihood Mapping. Available for purchase on the Web Shop: [redacted]

Ref 10-9 DEFRA (2001) Explanatory note for Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale maps (ALC021). Available at: [redacted]

Ref 10-10 Department for 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

Ref 10-11 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

Ref 10-12 HM Government (2015). Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015. Available at https://www.legislation.gov.uk/uksi/2015/595/contents/made

Ref 10-13 The Agriculture Act (2020). Available at: [redacted]

Ref 10-14 HM Government (2019). Planning Practice Guidance for the Natural Environment. Available at: https://www.gov.uk/guidance/natural-environment

Ref 10-15 Natural England (2012). Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land'. Available at: [redacted]

Ref 10-16 DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf

Ref 10-17 Natural England (2021). Guide to assessing development proposals on agricultural land. Available at https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land

Ref 10-18 Defra (2017). Likelihood of Best and Most Versatile Agricultural Land 1:250,00 scale mapping. Available at: [redacted]

11. Water Environment

11.1 Introduction

11.1.1 This chapter of the Scoping Report presents an initial baseline for the water environment and land drainage characteristics, an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects of the V Net Zero Pipeline (hereafter referred to as the Project).

11.1.2 After defining the Study Area, this chapter provides a review of the baseline hydrology, surface water quality and water resources, and areas of flood risk, and any designations that apply to them. The surveys and assessment methodology proposed to assess potential impacts on the water environment are presented. It also sets out the requirements and proposed approach to the Flood Risk Assessment (FRA) and a Water Framework Directive (WFD) compliance assessment. This chapter concludes by setting out the receptors and matters to be assessed in further detail by the EIA and ultimately presented in the ES.

11.1.3 This chapter should be read alongside Chapter 9: Geology and Hydrogeology which deals with impacts to groundwater. This chapter is supported by **Figure 11-1**: Waterbodies and **Figure 11-2**: Flood Risk.

11.2 Baseline Environment and Study Area

11.2.1 The local hydrological area of influence is defined by the potential for direct impacts on surface water resource and flood risk receptors (refer to Section 11.6) from the construction, operation and decommissioning of the Project.

11.2.2 The local hydrological area of influence (i.e. Study Area) is considered to be within the Scoping Boundary and a 500m buffer each side of the corridor. It is considered that this Study Area will allow all waterbodies that may be impacted to be identified. However, impacts to surface waterbodies and flood risk receptors could result in indirect impacts further upstream and downstream, or associated waterbodies and receptors downstream (including people, property and infrastructure) of the local hydrological area of influence. Attributes of any watercourses identified will be considered downstream by a distance depending on the zone within which adverse impacts may occur (which is usually a few kilometres). In terms of flood risk, the Study Area takes into consideration the crossing of Main Rivers and Ordinary Watercourses including the crossing of associated floodplains which may be physically impacted. The extent of the Study Area will be reviewed during the development of the ES and extended if deemed necessary.

11.2.3 For this Project, it is assumed that indirect impacts associated with the Project will be negligible to surface water resource receptors (excluding people, property and infrastructure) located over 2 km away from the Scoping Boundary. Therefore, only surface water resource receptors (excluding people, property and infrastructure) within the 2 km buffer will be assessed.

11.2.4 Groundwater is included in the baseline, however, this topic is considered further in Chapter 9 Geology & Hydrogeology. A buffer zone of 500m extending from the Scoping Boundary is considered an appropriate study area for the assessment of hydrogeological effects.

Data Sources

11.2.5 The baseline information for this Scoping Report has been derived from:

- Environment Agency Catchment Data Explorer (Ref 11-1);

- Environment Agency Flood Map for Planning (Ref 11-2);
- Environment Agency Long Term Flood Risk Map for Planning (Ref 11-3);
- Information downloaded from the Open Data Service (Ref 11-4);
- Environment Agency Main River Network Map (Ref 11-5);
- Information available from the Multi-agency geographical information for the countryside (MAGIC) website, such as Nitrate vulnerable zones, drinking water protected area and safeguard zones (Ref 11-6);
- Information available from the Natural England Designated Sites website (Ref 11-7);
- North and North East Lincolnshire Strategic Flood Risk Assessment 2011 (Ref 11-8);
- East Lindsey Strategic Flood Risk Assessment (Ref 11-9); and
- British Geological Survey GeoIndex (Ref 11-10).

11.2.6 A more detailed baseline study will be undertaken to establish the wider conditions of the environmental features with relevance to the water environment for the EIA. Information will be drawn from a variety of sources, including the Environment Agency, Natural England, Local Planning Authorities (LPAs) (i.e. Private Water Supplies), British Geological Society (BGS) website, Internal Drainage Boards and future site reconnaissance surveys. Other information to be gathered is illustrated in **Table 11-1**.

Table 11-1: Data required for the assessment

Data	Source
Hydraulic modelling (including existing flood model results, flood outlines, hydrology data and boundary conditions)	Environment Agency/ Local Lead Flood Authorities / Internal Drainage Boards
Topographic survey	Project
Unlicenced (private) Surface water abstractions	Local Authorities
NVZs Licenced abstractions, Surface water discharges and past water pollution events from the National Incident Recording Systems	Environment Agency
Statutory Designated sites (RAMSAR, SAC, SPA, MMO, SSSI, NVZ, LNR)	Natural England via Project ecology assessment
Non-statutory designated sites (LWS, SINC, PHI, SNCI)	Local Authority and Local Wildlife Trust via Project ecology assessment
Q95 - low flows	Environment Agency
Committed developments (for cumulative assessment)	Project
Qmed or bank full level	Environment Agency
Locations of weir or mills or other artificial impoundments	Environment Agency
DG5 registers of any recorded incidents, historic data and any pipe/sewer plans for the areas where the preliminary DC cable route alignment is going to cross	Local Lead Flood Authorities / Internal Drainage Boards / Anglian Water
Internal drainage board boundaries and maintained watercourses	Internal drainage boards

11.2.7 Other information required to assess the potential interactions between surface water and groundwater with implications for surface water resources is covered in Chapter 9: Geology & Hydrogeology.

Surface water features

11.2.8 Surface watercourses within the Study Area generally flow from west to east. The northern part of the Study Area is within Humber River Basin District (RBD) as set out in the Humber River Basin Management Plan (RBMP) (Ref 11-11), and the southern part of the Study Area is within the Anglian RBD as set out in the Anglian RBMP (Ref 11-12). The Project has the potential to affect a total of 14 WFD waterbodies. However, the WFD applies to all surface watercourses within each waterbody catchment including minor tributaries, ditches and surface water drains that are connected to the WFD waterbodies.

11.2.9 The Project has the potential to affect over 100 waterbodies. The watercourses in the Study Area are a mix of Main Rivers and Ordinary Watercourses. Main Rivers are usually larger rivers and streams. The Environment Agency carries out maintenance, improvement or construction work on Main Rivers to manage flood risk. An Ordinary Watercourse is defined as “every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a Main River”. Lead local flood authorities and internal drainage boards have responsibility for flood risk management on Ordinary Watercourses.

11.2.10 Surface watercourses are summarised below based on their WFD assessed waterbody - a more detailed breakdown of watercourses impacted by the Project will be provided in the PEIR and ES.

WFD Surface Waterbodies

11.2.11 The Project potentially effects (within 2 km Study Area) 14 WFD surface waterbodies. Ten of the waterbodies are within the Becks Northern Operational Catchment, and four are within the Steeping and Eaus Operational Catchment. All WFDs are shown in **Table 11-2** and **Figure 11-1**.

11.2.12 The WFD is implemented through RBMPs which set out statutory objectives for river, lake, groundwater, estuarine and coastal waterbodies and summarise the measures needed to achieve them. The Study Area is covered by the Humber RBMP and Anglian RBMP (both published in February 2016).

11.2.13 The status of the WFD surface waterbodies within the Study Area are detailed in **Table 11-2** and **Figure** 11-1. The WFD overall and ecological status is listed according to the current River Basin Management Plan, which is RBMP Cycle 2, dated 2015. Under the WFD, the Environment Agency is obligated to review and update RBMPs every six years, so Cycle 3 RBMPs were due to be published in 2021, however as of preparation of this report, have not yet been issued. It is important to note that waterbody WFD classifications and objectives may change and will need to be reviewed in the context of the proposed Project. It is also worth noting that during 2022 the UK Government is expected to publish at least one additional water quality target as they are required to do under the Environment Act 2021.

North Beck Drain
Mawnbridge Drain
Laceby Beck / River Freshney Catchment (to N Sea)
Buck Beck from Source to N Sea
New Dike Catchment (trib of Louth Canal)
Land Dike Drain to Louth Canal (West)
South Dike and Grayfleet Drain
Louth Canal
Great Eau (downstream of South Thoresby)
Trusthorpe Pump Drain (upper end)
Waithe Beck lower catchment (to Tetney Lock)
Poulton Drain Catchment (trib of Louth Canal)
Black Dyke Catchment (trib of Louth Canal)
Long Eau
MR01
MR02
MR03
MR04
MR05
MR06
MR07
MR08
MR09
MR10
MR11
MR12
MR13
MR14
MR15
MR16
Sunk Island Sands
Humber Gateway Wind Farm
SPURN HEAD
Bull Sand Fort
Haile Sand Fort
Spurn
South East Chequer
KINGSTON UPON HULL to
Rotterdam (Europort) 12 hrs
Zeebrugge 12 hrs
Kilnsea
Easington
Immingham
Grimsby
Cleethorpes
Humberston
New Waltham
Waltham
Barnoldby le Beck
Scartho
Bradley
Laceby
Riby
Aylesby
Great Coates
Healing
Stallingborough
Habrough
North Killingholme
South Killingholme
Oil Refineries
Immingham Docks
Works
Power Sta
Kirmington
Brocklesby
Great Limber
Keelby
Swallow
Beelsby
Cabourne
Caistor
Rothwell
Croxby
Thoresway
Thorganby
Normanby le Wold
Stainton le Vale
Claxby
Walesby
Tealby
MARKET RASEN
North Willingham
Ludford
Limwood
Sixhills
Legsby
Hainton
Welton
Burgh on Bain
Hallington
Raithby
Swinhope
Binbrook
Wrookenby
Airfield
Ludborough
North Thoresby
Fulstow
Wold Newton
East Ravendale
Grainsby
Hatcliffe
Holton le Clay
Tetney
Tetney Lock
North Cotes
Marshchapel
Eskham
North Somercotes
Donna Nook
Grainthorpe
Ludney
Conisholme
South Somercotes
Church End
Skidbrooke North End
Saltfleet
Saltfleetby St Clement
Saltfleetby All Saints
Three Bridges
St Helen
Manby
Stewton
Alvingham
North Ormsby
Utterby
Fotherby
North Elkington
South Elkington
North Cockerington
South Cockerington
Covenham St Bartholomew
Covenham St Mary
Louth
A16
A18
A46
A1173
A1031
A631
A1098
B1203
B1225
B1211
1:125,000 @ A3
1 0.5 0 1 2 3 4 5 km
N

CONSULTANT
AECOM

CLIENT
Chrysaor Production (U.K.) Limited

PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Main River (EA)
- Watercourse (OS Open Rivers)

WFD Overall Classification
- Moderate
- Poor
- Bad

NOTES:
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FIGURE TITLE
Figure 11-1
Watercourses and WFD Overall Classification

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
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Table 11-2: WFD surface waterbody status within the Becks Northern Operational Catchment and crossed by the Project

Operational catchment	Waterbody Name (ID)	Potential impact pathway	Hydromorphological designation	Current Status/Potential (2019)			Chemical Failing Elements	Reasons for not achieving good status	Objectives
				Ecological	Chemical	Overall			
Becks Northern	North Beck Drain (GB104029067575)	Crossed by Section A	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Suspect data, flow	Good by 2027
	Mawnbridge Drain (GB104029067540)	Crossed by Section A	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Physical modification, flow.	Good by 2027
	Laceby Beck / River Freshney (to N Sea) (GB104029067530)	Crossed by Section A and Section B	Heavily modified	Bad	Fail	Bad	Mercury and its Compounds, PBDE	Sewage discharge (continuous and intermittent), poor nutrient management, poor soil management, flood protection – structures, urbanisation, invasive species, groundwater abstraction, barriers – ecological discontinuity, land drainage, trade/industry discharge.	Moderate by 2027

Operational catchment	Waterbody Name (ID)	Potential impact pathway	Hydromorphological designation	Current Status/Potential (2019)			Chemical Failing Elements	Reasons for not achieving good status	Objectives
				Ecological	Chemical	Overall			
	Waithe Beck lower (to Tetney Lock) (GB104029062100)	Crossed by Section B and Section C	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Sewage discharge (continuous), poor nutrient management, flood protection.	Good by 2027
	Buck Beck from Source to N Sea (GB104029062110)	Downstream of Section B and Section C	Heavily modified	Moderate	Fail	Moderate	Benzo(b)fluoranthene, Benzo(g-h-i)perylene, Mercury and Its Compounds, PBDE	Urbanisation, flood protection – structures, poor nutrient management, sewage discharge (intermittent), physical modification.	Good by 2027
	New Dike (trib of Louth Canal) (GB104029062030)	Crossed by Section C and Section D	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Physical modification	Good by 2027
	Land Dike Drain to Louth Canal (West) (GB104029062162)	Crossed by Section D	Heavily modified	Bad	Fail	Bad	Mercury and its Compounds, PBDE	Saline or other intrusion, poor nutrient management, natural conditions, land drainage.	Good by 2027
	Poulton Drain (trib of Louth	Crossed by Section	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Land drainage, physical modification	Good by 2027

Operational catchment	Waterbody Name (ID)	Potential impact pathway	Hydromorphological designation	Current Status/Potential (2019)			Chemical Failing Elements	Reasons for not achieving good status	Objectives
				Ecological	Chemical	Overall			
	Canal) (GB104029 062010)	D and Section E							
	Black Dyke (trib of Louth Canal) (GB104029 062000)	Crossed by Section E	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Land drainage	Good by 2021
	Louth Canal (GB104029 061990)	Crossed by Section E	Heavily modified	Poor	Fail	Poor	Mercury and its Compounds, PFOS[8], PBDE.	Sewage discharge (continuous), urbanisation, poor livestock management, land drainage, presence of invasive species.	Moderate by 2027
Steeping and Eaus	South Dike and Grayfleet Drain (GB105029 061680)	Section E – Corridor 2	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Physical modification	Good by 2027
	Long Eau (GB105029 061670)	Section E – Corridor 2	Heavily modified	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Poor livestock management, sewage discharge (continuous), poor soil management,	Moderate by 2015

[8] Perfluorooctane sulphonate (PFOS)

Operational catchment	Waterbody Name (ID)	Potential impact pathway	Hydromorphological designation	Current Status/Potential (2019)			Chemical Failing Elements	Reasons for not achieving good status	Objectives
				Ecological	Chemical	Overall			
								urbanisation, land drainage, poor nutrient management, physical modification.	
	Great Eau (d/s of South Thoresby) (GB105029061660)	Section E – Corridor 2	Heavily modified	Poor	Fail	Poor	Mercury and its Compounds, PBDE	Poor nutrient management, poor livestock management, barriers – ecological discontinuity, flow, trade/industry discharge, physical modification, poor soil management, presence of invasive species.	Good by 2027
	Trusthorpe Pump Drain (upper end) (GB105029061640)	Section E – Corridor 2	Artificial	Moderate	Fail	Moderate	Mercury and its Compounds, PBDE	Sewage discharge (intermittent)	Good by 2027

Main Rivers

11.2.14 The project crosses seven watercourses classified as a Main River by the Environment Agency, with a further nine which are connected to a watercourse that is potentially impacted by the project. The Main Rivers potentially impacted by the Project are listed in **Table 11-3** and shown on **Figure 11-1**.

Table 11-3: Main Rivers potentially impacted by the Project

Corridor Section	ID	River Name	Description
Section A	MR01	North Beck Drain	North Beck Drain is crossed by the Scoping Boundary where the watercourse is classified as an Ordinary Watercourse, the river is classified as a Main River downstream of the route. The River originates in Suddle Wood and flows in a north-easterly direction to the Humber Estuary.
	MR02	Old Fleet Drain	Old Fleet Drain is within 2km of the Scoping Boundary and may receive flows from field drains which are crossed by the route. The Main River originates to the north of Healing and flows in a north-easterly direction to the Humber Estuary.
Section B	MR03	Laceby Beck / River Freshney	Laceby Beck / River Freshney is within 2km of the Scoping Boundary and receives flows from several ordinary watercourses crossed by the Project. Laceby Beck originates at Laceby Golf club and flows in a northerly direction to Laceby, and then in a north-easterly direction to Grimsby where it becomes the River Freshney. The river flows through Grimsby to the Humber estuary via the Grimsby Docks.
	MR04	Waithe Beck	Waithe Beck flows initially northwards from TF 1879 9399 through the villages of Brookenby, Thorganby, and Hatcliffe, at which point it turns to the east and crosses the route corridor (TA 2399 0205). At TA 3080 0065 it then flows into Tetney Drain, which eventually discharges into the North Sea via Louth Canal at TA 3354 0783.
	MR05	Tetney Drain	Tetney Drain is downstream and within 500m of the Scoping Boundary and receives flows from Waithe Beck. The watercourse flows in a north-easterly direction to the Louth Canal.
	MR06	Old Fleet Drain	Old Fleet Drain is within 500m of the Scoping Boundary and may receive flows from some unidentified field drains crossed by the route. The Old Fleet Drain originates east of the Scoping Boundary, to the south of North Thoresby, and flows in an easterly direction to Black Leg Drain, and then New Dike, prior to the confluence with the Louth Canal.
	MR07	Black Leg Drain	Black Leg drain is within 500 m of the Scoping Boundary. The watercourse originates to the south of North Thoresby, and flows in a north-easterly direction to New Dike, which then flows into the Louth Canal.
Section D	MR08	New Dike	New Dike is within 2 km of the Scoping Boundary. The watercourse receives flows from Old Fleet Drain, Black Leg Drain and Ordinary watercourses within 500m of the Scoping Boundary and may receive flows from unmapped field drains crossed by the Scoping Boundary. The Main River originates at Thoresby Road and flows in an easterly direction to the Louth Canal.

Corridor Section	ID	River Name	Description
	MR09	Poulton Drain	Poulton Drain approaches the village of Covenham St Mary from the southwest, entering the corridor at TF 3357 9389, just downstream of the village. Downstream of the village, it flows approximately 2km further and enters Louth Canal at TF 3683 9461.
Section E	MR10	Black Dike	Black Dike is downstream of and within 2km of the Scoping Boundary. The watercourse originates south of Little Grimsby where it is known as Yarburgh Beck (ordinary watercourse) which flows in a north-easterly direction across the Scoping Boundary, following which it becomes Black Dike. Black Dike flows into Louth Canal at TF 3716 9373.
	MR11	Louth Canal	Louth Canal begins in the town of Louth at TF 3212 8724. It flows through the canal and then north and east, through the corridor at TF 3628 9060, and is joined by numerous rivers and drains and discharges to the North Sea at TA 3354 0783.
	MR12	River Lud	The Lud flows within Louth Canal through the town of Louth, but then splits shortly after at TF 34552 88439. From this point, it runs alongside the canal, crossing into the corridor at TF 3639 9049. After passing through the corridor, it continues to flow alongside the canal and then splits into the Seven Towns North Eau and the Old Eau at the Eau Meet, just to the southeast of Alvingham.
	MR13	South Dike / North Creek	South Dike / North Creek is downstream of and within 2km of the Scoping Boundary. The river receives flows from Harrowsea Drain (ordinary watercourse) which is crossed by the Scoping Boundary. South Dike originates to the east of North Cockerington and flows in a south-easterly direction to Marsh Lane, and then flows in a north-easterly direction to Saltfleet, where the river becomes North Creek. North Creek discharges to Saltfleet Haven, which flows into the North Sea.
	MR14	Grayfleet Drain	Grayfleet Drain rises in the south of Louth at TF 3333 8636 and flows northeast, bisecting the villages of South Cockerington and Grimoldby, just before entering the corridor at TF 3910 8934. It then continues northeast, discharging into the North Sea at Saltfleet at TF 46963 93507.
	MR15	Long Eau	Rising to the east of Legbourne (TF 3574 8373), the Long Eau flows eastwards towards and past the village of Little Carlton, entering the corridor at TF 4235 8717. Once through the corridor, it continues flowing east, eventually joining the Great Eau at TF 4613 8939.
	MR16	Great Eau	The Great Eau flows northeast from TF 4028 7778, past Claythorpe and Withern and into the corridor at TF 4505 8633. It then continues northeast, is joined by the Long Eau at TF 4613 8939, and then discharges into the North Sea at Saltfleet at TF 46963 93507.

Ordinary Watercourses

11.2.15 In addition to these, an initial review indicates that there is likely to be over a hundred ordinary watercourses crossed by, or within 500m of, the Scoping Boundary. An initial high-level review of these has been undertaken based on the Ordnance Survey (OS) Open

Rivers data (Ref 11-13), the MAGIC map (Ref 11-6) and OS online mapping. These ordinary watercourses are likely to include natural streams, drainage dikes, field drains and other artificial waterbodies.

11.2.16 There is also the possibility that these ordinary watercourses are likely to be intermittently flowing or ephemeral along the Scoping Boundary, these will be identified (where reasonably practical to do so) following site visits undertaken for the PEIR and ES (see Section 11.3).

11.2.17 A full database and mapping of waterbodies will be developed during the PEIR and ES, following further review of aerial imagery, consultation with the EA, the Internal Drainage Boards (IDB) (see Section 11.4.10) and site visits.

11.2.18 However, it will not be possible to identify all of the smallest, minor and temporary ditches and thus the ES will include a general impact assessment to cover all of these minor features. More detailed pre-works surveys can then locate them and ensure that the suite of mitigation that will be described in the ES can be appropriately applied.

Standing Waterbodies

11.2.19 The Project's Scoping Boundary has the potential to impact upon a large number of standing waterbodies. These waterbodies generally comprise small farm or water treatment ponds, and none of these waterbodies is designated as a lake under the WFD.

11.2.20 The Scoping Boundary (Section E) is located 1.5 km west, and upstream of, the Covenham Reservoir, and therefore has the potential to be impacted by the Project.

11.2.21 Further information is provided in Chapter 6 Ecology & Biodiversity. A full database and maps of standing waterbodies will be developed for the PEIR and ES.

Internal Drainage Boards

11.2.22 Internal Drainage Boards are public bodies that manage water level and reduce the risk from flooding within an area (known as the internal drainage district), where there is specific need for drainage.

11.2.23 The Scoping Boundary crosses two internal drainage boards (IDB): North East Lindsey IDB which covers the coastal area around Immingham; and Lindsey Marsh Drainage Board, which covers the coastal area around Theddlethorpe.

11.2.24 North East Lindsey IDB extends over an area of 112.5 km^2 and covers the coastal area that extends from the Humber bridge southwards towards Grimsby. The board is responsible for a total of 130 km of watercourse of which 27 km are vital to the protection of intensely developed areas. Lindsey Drainage Board has the largest concentration of industry including petrochemical plants and other industrial complexes.

11.2.25 Lindsey Marsh Drainage Board is the largest drainage board in England, extending over an area 527.57 km^2 of covering a total 938 km of watercourse and 30 pumping stations.

11.2.26 Consultation with these two IDB will occur during the PEIR and full impact assessment stage and will be used to classify the significance of each of the receptors and define any mitigation that is required.

Water quality

11.2.27 **Table 11-4** provides a breakdown of physico-chemical criteria status for each waterbody potentially affected by the Project. This gives an indication of water quality for elements that can influence the ecological status/ potential of a waterbody. The most recently available WFD classifications are reproduced, so the data year varies between waterbodies.

11.2.28 To summarise **Table 11-4**, all of the waterbodies show an overall Physico-chemical classification of at least Moderate. A High status is given to every waterbody for pH and Acid

Neutralising Capacity (when measured), and all but one (North Beck Drain) for Biological Oxygen Demand (BOD) where it is classed as Bad. Temperature is classed as at least Good or High, whereas Dissolved Oxygen and Phosphate range from Bad/Poor to High.

11.2.29 More detailed water quality data for a broader range of parameters for each watercourse will be provided in the PEIR and ES, which is to be obtained from a review of online sources such as the Environment Agency's Water Quality Archive website.

Water Resources

11.2.30 The PEIR and ES will consider the potential impacts and effects to water resources within 500m of the Project and potentially up to 2 km downstream along impacted watercourses. The following data will be obtained to inform the assessment:

- Licenced water abstractions: No information is available at present with relation to licenced water abstractions within the study area. Covenham Reservoir is located 1.5 km to the east and downstream of the Scoping Boundary, information on the operation of the reservoir and other licenced abstractions will be obtained from the Environment Agency during the PEIR.
- Discharges: No information is available at present with relation to discharges. Information concerning the discharges for the study area will be requested from the Environment Agency.
- Pollution incidents: No information is available at present with relation to pollution incidents within the Study area. Information will be requested from the Environment Agency.

11.2.31 Chapter 9 Geology & Hydrogeology includes scoping information on Source Protection Zones (SPZs), Nitrate Vulnerable Zones (NVZs) and Private Water Supplies (PWS).

Designated Sites

11.2.32 There are a number of surface water dependent designated sites crossed by or in hydrological connectivity to the Project, some of which are of national importance, as shown in **Table 11-5**. These are assessed in further detail in Chapter 6: Ecology & Biodiversity.

Table 11-4: Overview of the physico-chemical status of waterbodies crossed by the Project

Corridor Section	WFD Waterbody (ID)	Physico-chemical quality elements	Acid Neutralising Capacity	Ammonia (Phys-Chem)	Biochemical Oxygen Demand (BOD)	Dissolved oxygen	pH	Phosphate	Temperature
Section A	North Beck Drain (GB104029067575)	Moderate (2014)	N/A	Bad (2014)	Bad (2014)	Moderate (2014)	High (2014)	N/A	Good (2014)
	Mawnbridge Drain (GB104029067540)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Section A & Section B	Laceby Beck / River Freshney (to N Sea) (GB104029067530)	Moderate (2019)	High (2019)	High (2019)	*N/A*	Good (2019)	High (2019)	Poor (2019)	High (2019)
Section B & Section C	Waithe Beck lower (to Tetney Lock) (GB104029062100)	Good (2019)	High (2019)	High (2019)	High (2016)	High (2019)	High (2019)	Good (2019)	High (2019)
	Buck Beck from Source to N Sea (GB104029062110)	Moderate (2019)	N/A	Moderate (2019)	N/A	High (2019)	High (2019)	Moderate (2019)	High (2019)
Section C Section D	New Dike (trib of Louth Canal) (GB104029062030)	Moderate (2016)	High (2016)	High (2016)	High (2016)	Moderate (2016)	High (2016)	High (2016)	Good (2016)
Section D	Land Dike Drain to Louth Canal (West) (GB104029062162)	Moderate (2019)	High (2019)	High (2019)	*N/A*	Poor (2019)	High (2019)	Good (2019)	High (2019)
Section D Section E	Poulton Drain (trib of Louth Canal) (GB104029062010)	Moderate (2016)	High (2016)	High (2016)	High (2016)	Moderate (2016)	High (2016)	Good (2016)	Good (2016)
Section E	Black Dyke (trib of Louth Canal) (GB104029062000)	Moderate (2016)	*N/A*	Good (2016)	High (2016)	Moderate (2016)	High (2016)	Good (2016)	Good (2016)

Corridor Section	WFD Waterbody (ID)	Physico-chemical quality elements	Acid Neutralising Capacity	Ammonia (Phys-Chem)	Biochemical Oxygen Demand (BOD)	Dissolved oxygen	pH	Phosphate	Temperature
	Louth Canal (GB104029061990)	Good (2019)	High (2019)	High (2019)	High (2016)	Good (2019)	High (2019)	Good (2019)	High (2019)
	South Dike and Grayfleet Drain (GB105029061680)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Long Eau (GB105029061670)	Moderate (2019)	*N/A*	High (2019)	High (2019)	Bad (2019)	High (2019)	Poor (2019)	High (2019)
	Great Eau (d/s of South Thoresby) (GB105029061660)	High (2019)	High (2019)	High (2019)	High (2019)	High (2019)	High (2019)	High (2019)	High (2019)
	Trusthorpe Pump Drain (upper end) (GB105029061640)	Moderate (2019)	*N/A*	Poor (2019)	*N/A*	Bad (2019)	High (2019)	Poor (2019)	High (2019)

Table 11-5: Designated sites within 5 km of the Project

Statutory Site Name	Potential impact pathway	Reference NGR	Reason(s) for Designation
Humber Estuary (Site of Special Scientific Interest (SSSI), Ramsar site, and Special Area of Conservation (SAC))	Downstream of all section, at closest location 0.2 km from Scoping Boundary	TA216184	There is a wide range of habitats within the 36,657.15-ha estuary such as salt meadows, sand dunes, sandbanks, intertidal mudflats, glasswort beds, and coastal lagoons. Combined, these are home to a variety of species: river lamprey (Lampetra fluviatilis), sea lamprey (Petromyzon marinus), and even grey seal at Donna Nook (Halichoerus grypus). The estuary is important for waterfowl over the winter, and acts as a summer breeding ground of national importance in the summer.
North Killingholme Haven Pits (SSSI)	2 km north, and potentially downstream of Section A	TA165198	Situated near Immingham, these pits have a 20.61-ha saline lagoon that have become important for waterfowl within the Humber estuary, along with a high number of specialist lagoon species.
Bradley and Dixon Woods Local Nature Reserve (LNR)	2 km east of Section B, however unlikely to be in hydrological connectivity	TA242059	A collection of ancient woodland, ponds, and meadows spread over 41.8-ha.
Tetney Blow Wells (SSSI)	3.4 km downstream of Section C	TA320007	Reedbeds and fern and swamp vegetation, with a diverse assemblage of water plants, including common duckweed (Lemna minor), ivy-leaved duckweed (Lemna triscula), and stoneworts (Callitriche stagnalis).
Saltfleetby – Theddlethorpe Dunes (SSSI)	Approximately 0.75 km east, and downstream of Section E	TF480910	A nationally important array of flats, dunes, and freshwater marsh spreading over 952.2-ha. It possesses a rich selection of plants and animal species, such as waterfowl, marsh grasses, and invertebrates.
Saltfleetby – Theddlethorpe Dunes National Nature Reserve (NNR)		TF467917	Lying within the SSSI of the same name, this NNR is an important area for a collection of species due to diverse array of habitats found within it.
Saltfleetby – Theddlethorpe Dunes and Gibraltar Point (SAC)		TF480906	This SAC is 967.5-ha of salt marshes, coastal sand dunes, and fens. The SAC contains three Annex I habitats that are responsible for its designation: Shifting dunes along the shoreline with Ammophilia arenaria, Fixed coastal dunes with herbaceous vegetation, and Dunes with Hippopha rhamnoides. These help to support a range of vegetation types such as lyme-grass

Statutory Site Name	Potential impact pathway	Reference NGR	Reason(s) for Designation
			(Leymus arenarius), and the rare pyramidial orchid (Anacamptis pyramidalis).
Louth Canal Drinking Water Protected Area (Surface Water)	Crossed by project (Section E)	TF 360 910	Currently at risk due to the presence of pesticides. Drinking Water Protected Areas cover areas where water is abstracted for drinking water.
Great Eau (downstream of South Thoresby) Drinking Water Protected Area (Surface Water)	Crossed by project (Section E)	TF 435 860	
Anglian and Humber Drinking Water Safeguard Zone SWSGZ1001	Crossed by project (Section B, Section C, Section D)	TF 301 974	Currently at risk due to the presence of pesticides. Safeguard zones are identified where land use is polluting drinking water sources, so that action can be taken to reduce the need for treatment.
Anglian and Humber Drinking Water Safeguard Zone SWSGZ1002	Crossed by project (Section E)	TF 440 865	Currently at risk due to the presence of pesticides. Safeguard zones are identified where land use is polluting drinking water sources, so that action can be taken to reduce the need for treatment.

Hydrogeology

11.2.33 **Table 11-6** and the following paragraphs outline the hydrogeology of the Scoping Boundary and the surrounding 500m buffer zone. More details of the Hydrogeology can be found in Chapter 9 Geology & Hydrogeology.

Table 11-6: Superficial and Bedrock Hydrogeology

Route Section of Pipeline Corridor	*Bedrock Hydrogeology*	*Superficial Hydrogeology*	*Vulnerability Status*	*Groundwater Levels in meters below ground level (mbgl)*
Section A	White Chalk Subgroup - Principal Aquifer	Alluvium (unproductive) Till – Diamicton (Secondary Undifferentiated) Glacial Sand and Gravel (Secondary A)	Alluvium (low) Till – Diamicton (medium) Glacial Sand and Gravel (medium - high)	3-5 mbgl
Section B		Till – Diamicton (Secondary Undifferentiated) Glacial Sand and Gravel (Secondary A)	Till – Diamicton (medium) Glacial Sand and Gravel (medium - high)	0.3-7 mbgl

Route Section of Pipeline Corridor	*Bedrock Hydrogeology*	*Superficial Hydrogeology*	*Vulnerability Status*	*Groundwater Levels in meters below ground level (mbgl)*
Section C		Till – Diamicton (Secondary Undifferentiated)	Till – Diamicton (medium)	5-18 mbgl
Section D		Alluvium (unproductive) Till – Diamicton (Secondary Undifferentiated)	Alluvium (low) Till – Diamicton (medium)	3-18 mbgl
Section E		Alluvium (unproductive) Till – Diamicton (Secondary Undifferentiated)	Alluvium (low) Till – Diamicton (medium)	0.2-6 mbgl

*Source: BGS GeoIndex Viewer (**Ref 11-10**) and MAGIC Maps (**Ref 11-6**)*

Superficial Hydrogeology

11.2.34 Superficial aquifers are located throughout the Scoping Boundary, and the surrounding 500m buffer zone. The aquifer is mostly built of Till-Diamicton unit and a Glacial Sand and Gravel Member. The majority of the area is classified as a Secondary (Undifferentiated) aquifer by the Environment Agency. In some locations the aquifer has been classified as a Secondary A aquifer.

11.2.35 The aquifer has been classified as having mostly medium vulnerability by the Environment Agency in the Till-Diamicton locations. Areas which are underlain by Sand and Gravel have a higher vulnerability with a classification of Medium to High. Groundwater is relatively shallow throughout the Scoping Boundary and 500m buffer zone ranging from 0.30m to 25m below ground level according the borehole records found on BGS GeoIndex (Ref 11-10). Alluvium is situated to the east along to coastline but has been classified unproductive by the Environment Agency.

Bedrock Geology

11.2.36 The White Chalk Subgroup which underlies the Study Area, and the surrounding 500m buffer zone has been classified as a Principal Aquifer by the Environment Agency.

Flood Risk

11.2.37 The Environment Agency carries out maintenance, improvement or construction work on Main Rivers to manage flood risk. Information on flood risk for this scoping report has been obtained from the Environment Agency Flood Maps for Planning (FMfP). Flood risk from all sources for the Project have been summarised in **Tables 11-7** to **11-11** and has been subsequently split by Scoping Boundary sections, see **Figure 11-2**.

11.2.38 Other rivers are called 'Ordinary Watercourses'. Lead local flood authorities, district councils and internal drainage boards carry out flood risk management work on ordinary watercourses. As noted in Section 11.2.22, the Scoping Boundary crosses two IDB: North East Lindsey IDB and Lindsey Marsh Drainage Board. The Scoping Boundary passes through two district councils, North East Lincolnshire Council and East Lindsey District Council (who will be the Lead Local Flood Authorities).

Flood Risk Summary

11.2.39 The Environmental Agency classifies areas at risk of fluvial, surface and reservoir flooding through the three magnitude rainfall events (Ref 11-2 and Ref 11-3):

- Zone 1, Low Probability: land assessed as having a less than 1 in 1,000 annual probability of flooding (<0.1% Annual Exceedance Probability (AEP)).
- Zone 2, Medium Probability: land assessed as having flooding between 1 in 100 (1% AEP) and 1 in 30 (3.3% AEP) annual probability of flooding.
- Zone 3, High Probability: land assessed as having greater than 1 in 30 annual probability of flooding (3.3% AEP).

11.2.40 The Strategic Flood Risk Assessments of North and North East Lincolnshire (Ref 11-8) and East Lindsey Strategic Flood Risk Assessment (Ref 11-9) will be reviewed during the ES to distinguish between Flood Zones 3a and 3b (functional floodplain). There are no Flood Storage Areas within the Scoping Boundary.

Table 11-7: Section A of Pipeline Corridor within Scoping Boundary

Flood Risk Source	Comments
Fluvial	This corridor is predominantly free from fluvial flood risk, except at one location which is associated with the North Beck Drain waterbody (TA 18622 11491) in which the corridor crosses Flood Zone 3.
Surface Water	In comparison to fluvial, there is generally a higher chance of flood risk from surface water sources within this corridor. The highest flood risk within this corridor is associated with the urban area of Immingham and around Mayflower Woods which varies from Flood Zone 1 to 3. Within the wider corridor there are patches of Flood Zone throughout that are generally associated with watercourses, ponds and topographic depressions.
Groundwater	Shallow Groundwater (3-5m below ground level) could risk groundwater flooding during excavations during construction phase.
Sewers	To be identified during PEIR and full impact stages following consultation.
Reservoirs	There is no risk associated with reservoir flooding in this corridor.
Tidal	Approximately the first 3 km of this corridor intersects with Flood Zone 2 and 3 associated with the tidal flooding from the Humber Estuary. The rest of the corridor area is free from tidal flooding risk.
Climate Change	Climate change allowances are to be included within the assessment of flood risk in line with Environment Agency published flood maps.
Residual Flood Risk	To be identified during PEIR and full impact stages.
Flood Alert Areas	The first 350m of this corridor lies within the Flood Risk Area that is associated with the tidal flooding near the South Humber Bank from Barton Upon Humber to Humberston. Hereafter this, the next 2 km of the corridor lies within a Flood Alert Area that is associated with the furthest extent of tidal flooding on the South Humber Bank from Whitton to Humberston.
Flood Warning Areas	The first 350m of this corridor lies within the Flood Risk Area that is associated with the tidal flooding of low-lying areas from New Holland to Immingham Dock. Hereafter, the next 2 km of the corridor lies within a Flood Warning Area that is associated with furthest extent of tidal flooding from South Killingholme to Grimsby.

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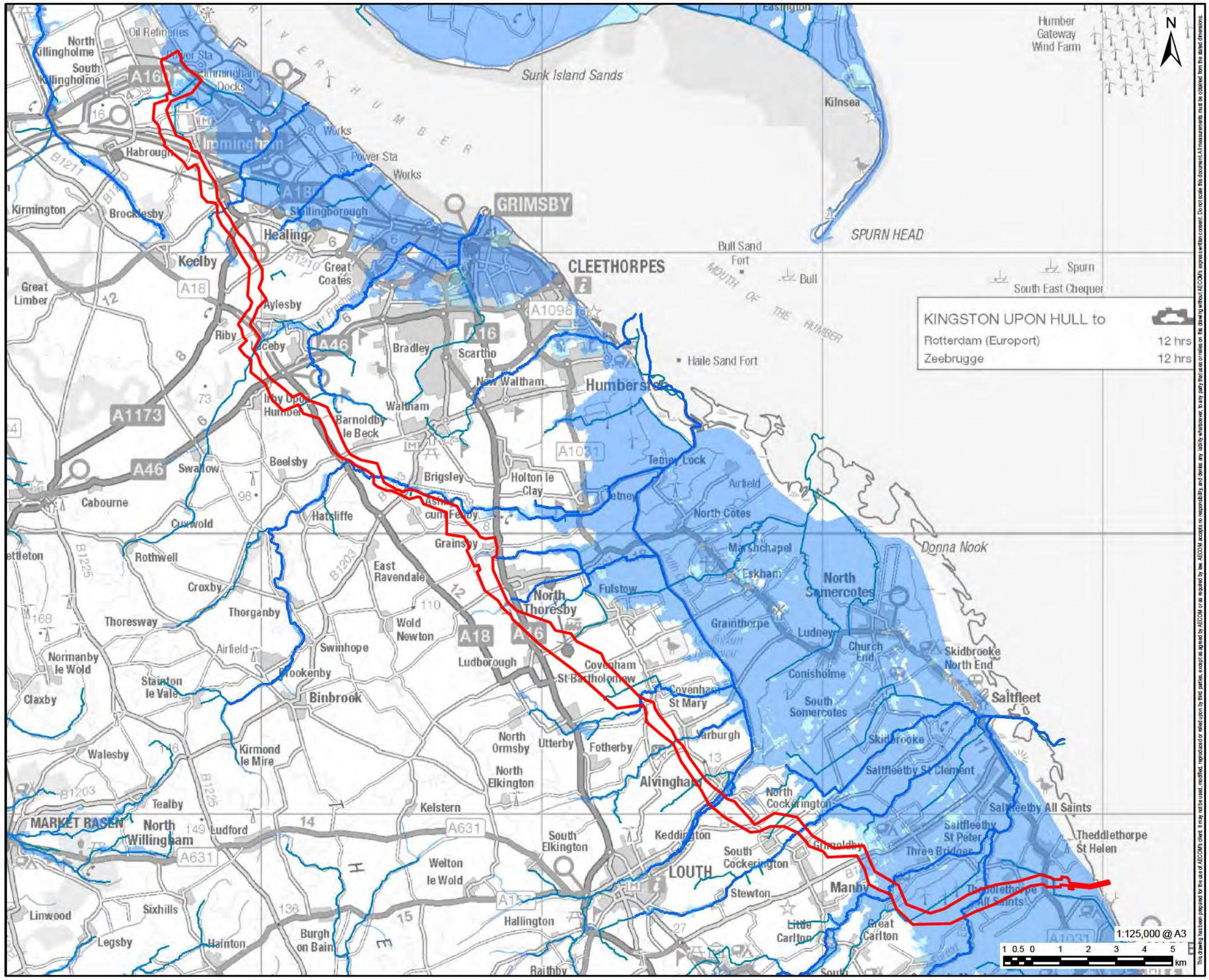

CONSULTANT
AECOM

CLIENT
Chrysaor Production (U.K.) Limited

PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- Main River (EA)
- Watercourse (OS Open Rivers)
- Flood Zone 3 (EA)
- Flood Zone 2 (EA)

NOTES:

FIGURE TITLE
Figure 11-2
Tidal / Fluvial Flood Risk

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_11-2

Table 11-8: Section B of Pipeline Corridor within Scoping Boundary

Flood Risk Source	Comments
Fluvial	The risk of fluvial water flooding is generally very low within this corridor, with isolated patches of Flood Zone 3 associated with drains. The where the corridor intersects Flood Zone 3 lies at TA19661 06330 (drain) and at TA 24189 02014 where the Waithe Beck waterbody intersects with the corridor.
Surface Water	The risk of surface water flooding is generally very low within this corridor, with isolated patches of Flood Zones 1- 3 associated with drains and waterbodies that are present within the area. The area most at risk of flooding is where the Waithe Beck waterbody and the corridor intersect.
Groundwater	Shallow Groundwater (0.3 -7m below ground level) could risk groundwater flooding during excavations during construction phase.
Sewers	To be identified during PEIR and full impact stages following consultation.
Reservoirs	There is no risk associated with reservoir flooding in this corridor.
Tidal	There is no risk associated with tidal flooding in this corridor.
Climate Change	Climate change allowances are to be included within the assessment of flood risk in line with Environment Agency published flood maps.
Residual Flood Risk	To be identified during PEIR and full impact stages.
Flood Alert Areas	This corridor intersects a Flood Alert Area that is associated with the Waithe Beck waterbody for a length of approximately 100m towards the farthest end of the corridor.
Flood Warning Areas	This corridor does not lie within a Flood Warning Area.

Table 11-9: Section C of Pipeline Corridor within Scoping Boundary

Flood Risk Source	Comments
Fluvial	Similarly, to Section B, the flood risk along this corridor is generally very low. There are two isolated patches of Flood Zone 2-3 that the corridor intersects that are associated with drains that lie directly north and south of North Thoresby.
Surface Water	This corridor intersects with several surface water food risk areas that range from Zones 1-3. The most significant of these areas correspond to the waterbodies and drains that cross the corridor, specifically Waithe Beck lower catchment (to Tetney Lock) which flows parallel to the corridor for a reach and the channels associated with this waterbody and Old Fleet drain. Within the wider corridor there are patches of Flood Zone 2 and 3 throughout that are generally associated with watercourses, ponds and topographic depressions.
Groundwater	Shallow Groundwater (5 - 18m below ground level) could risk groundwater flooding during excavations during construction phase.
Sewers	To be identified during PEIR and full impact stages following consultation.
Reservoirs	There is no risk associated with reservoir flooding in this corridor.
Tidal	There is no risk associated with tidal flooding in this corridor.

Flood Risk Source	Comments
Climate Change	Climate change allowances are to be included within the assessment of flood risk in line with Environment Agency published flood maps.
Residual Flood Risk	To be identified during PEIR and full impact stages.
Flood Alert Areas	Within this corridor, there is a small Flood Alert Area that is associated with the Waithe Beck waterbody around Brigsley village, where the northern boundary of the corridor intersects.
Flood Warning Areas	Within this corridor, there is a small Flood Warning Area that is associated with the Waithe Beck waterbody around Brigsley village, where the northern boundary of the corridor intersects.

Table 11-10: Section D of Pipeline Corridor within Scoping Boundary

Flood Risk Source	Comments
Fluvial	Fluvial flood risk through this corridor is extremely low, with isolated patches associated with the Poulton Drain waterbody at the southern end of the reach (Flood Zone 2-3).
Surface Water	This corridor intersects with several surface water flood risk areas (Zones 1-3) which are predominately associated with drains crossing the corridor. Within the wider corridor there are patches of Flood Zone 1-3 throughout that are generally associated with watercourses, ponds and topographic depressions.
Groundwater	Shallow Groundwater (3 - 18m below ground level) could risk groundwater flooding during excavations during construction phase.
Sewers	To be identified during PEIR and full impact stages following consultation.
Reservoirs	There is no risk associated with reservoir flooding in this corridor.
Tidal	There is no risk associated with tidal flooding in this corridor.
Climate Change	Climate change allowances are to be included within the assessment of flood risk in line with Environment Agency published flood maps.
Residual Flood Risk	To be identified during PEIR and full impact stages.
Flood Alert Areas	This corridor intersects a Flood Alert Area that is associated with the Poulton Drain waterbody for approximately 50m.
Flood Warning Areas	This corridor does not lie within a Flood Warning Area.

Table 11-11: Section E of Pipeline Corridor within Scoping Boundary

Flood Risk Source	Comments
Fluvial	This corridor carries the largest risk of flooding from fluvial sources due to the high number of river and drain crossings through this reach. The areas that carry the highest risk are Yarburgh Beck crossing (Zone 2-3), the River Yud crossing (Zone 2-3) and Grayfleet drain crossing (Zone 2-3).
Surface Water	This corridor carries the largest risk of flooding from surface water sources due to the high number of river and drain crossings throughout this reach. This is primarily exhibited within the first 10 km. The areas with the highest risk associated with them are the intersections with Yarburgh Beck, Louth Canal and its tributaries, Harrowsea Drain, Grayfleet Drain and New Gayton Engine Drain. Within the wider corridor there are patches of Flood Zone 1-3 throughout that are generally associated with watercourses, ponds and topographic depressions.
Groundwater	Shallow Groundwater (0.2 - 6m below ground level) could risk groundwater flooding during excavations during construction phase.
Sewers	To be identified during PEIR and full impact stages following consultation.
Reservoirs	There is no risk associated with reservoir flooding in this corridor.
Tidal	The last 9km (from the crossing of the B1200 onwards) of this corridor lies within the tidal flood zone 2-3 from the North Sea.
Climate Change	Climate change allowances are to be included within the assessment of flood risk in line with Environment Agency published flood maps.
Residual	To be identified during PEIR and full impact stages.
Flood Alert Areas	Within this corridor there are several Flood Alert Areas that are intersected. The first is associated with the Louth Canal waterbody, which covers the corridor for a length of approximately 60m. Approximately 2.3 km to the south east of this, the corridor intersects another area at risk from the Louth Canal waterbody that covers an area of approximately 320 m. The next area lies approximately 2.8 km to the south east of this where ethe corridor crosses Grayfleet drain. The last 9 km of this corridor intersects two overlapping Flood Alert Areas which are associated with the Great Eau, Long Eau waterbodies and the far extent of tidal flooding from the Lincolnshire Coastline.
Flood Warning Areas	Within this corridor, there are several Flood Warning Areas that are intersected. The first is associated with the Louth Canal waterbody and crosses the corridor for a length of approximately 305 m. The next area lies approximately 2.8 km to the south east of this where the corridor crosses Grayfleet drain. The last two areas cover entirety of the last 9km of the corridor which is associated with the furthest extent of tidal flooding from North Somercotes to Bilsby (North Sea) and the wider area at risk of tidal flooding between Theddlethorpe and Huttoft. There are also overlapping layers of Flood Warning Areas along this stretch including areas at risk from the Long Eau waterbody (TF 42372 87131) and the Great Eau waterbody (TF 45723 87181).

EIA consultation on flood risk

11.2.41 An initial introductory meeting has taken place between the Project team and the EA. Further discussions with the Environment Agency will be undertaken during the ES following scoping consultation by the Planning Inspectorate to identify any additional flood risk information.

11.2.42 The following Strategic Flood Risk Assessments will be reviewed to identify flood risk information for the PEIR and the ES:

- North and North East Lincolnshire Strategic Flood Risk Assessment (2011) (Ref 11-8).
- East Lindsey Strategic Flood Risk Assessment (2017) (Ref 11-9).

11.2.43 Consultation with the Lead Local Flood Authorities and the IDBs will also occur to identify historic floods, areas of sewer flooding, and any flood defences within the Scoping Boundary.

11.3 Planned Surveys

11.3.1 A combined Site Walkover and Geomorphic Survey will be carried out of the preferred pipeline route, including at the Theddlethorpe Gas Terminal (TGT) Site. The survey will ground truth waterbodies and make observations about current land use and topography. It is anticipated that many potential risk locations, such as surface water drainage extents shown by online mapping, can be screened out of detailed assessments by this reconnaissance. For example, many smaller channels may be intermittent or ephemeral and will not support aquatic habitats, thus will not need further WFD assessment.

11.3.2 The survey will cover all significant watercourses to be crossed by the pipeline route, preferably at the location of each crossing (access permitting) and for a minimum 100 m upstream and downstream. All surveys will be subject to feasible safe working and land access. The survey will focus only on the main crossings and key risk areas, given the large number of crossings. An additional site visit has been included at a later stage in the project to ensure to survey any new high risk crossings due to changes to the alignment or planned intrusive techniques.

11.3.3 The survey will identify hydromorphological features, processes and potential risks, in order to advise the design team on preferred methods to cross each watercourse, which will also be discussed with relevant statutory consultees. For larger channels on the route it is possible that the pipeline would be installed at a suitable depth beneath the bed by non-intrusive techniques (e.g. Horizontal Directional Drilling). Some watercourses may have significant thickness bed substrate and potential scour depths so drilling depths will need to be agreed with the Environment Agency, LLFA and IDB (as appropriate).

11.3.4 For smaller channels, risks and habitat values may be lower, and it may be possible to cross the watercourse using an intrusive technique, providing the bank and beds are reinstated. The survey will also serve as an initial record of the watercourses condition should it be ultimately decided to cross using an intrusive technique. The results of the survey will be included in a Watercourse Crossing Report that would be a technical appendix to the impact assessment chapter of the ES. An interdisciplinary meeting with Environment Agency, the LLFAs and IDBs together with the Ecology, Ground, and Design Teams to discuss the proposed watercourse crossing options would be arranged.

11.3.5 At this stage, it is not envisaged that other surveys, water quality monitoring or field investigations are required (given the availability of background data and the nature of the Project). Nonetheless, walkover surveys may identify further requirements for other type of

surveys (i.e. flow monitoring and water quality surveys), which if required will be agreed with the relevant statutory consultees.

11.4 Assessment Method

11.4.1 This section provides a description of the tools and techniques used to undertake the water environment impact assessment. It also outlines the significance criteria used with reference to any relevant legislation and/or guidance.

11.4.2 The assessment of impacts will be undertaken using a source-pathway-receptor model:

- *Source* – proposed Project change (e.g. release of chemical pollutant, physical impact to the form of a waterbody, or change in flood risk etc.);
- *Pathway* – the method or route by which the source could affect the receptor; and
- *Receptor* – the feature that may be affected by the outcomes of the Project.

11.4.3 The below policy and guidance is in addition to those listed within Chapter 4: Approach to EIA.

Relevant Legislation

11.4.4 The potential impact of the Project on the water environment is considered in relation to the following national legislation:

- Environment Act 2021;
- Water Act 2014;
- Flood and Water Management Act, 2010;
- Environment Act 1995;
- Land Drainage Act 1991 (as amended);
- Water Resources Act 1991 (as amended);
- Environmental Protection Act 1990;
- Salmon and Freshwater Fisheries Act 1975 (as amended);
- Control of Pollution Act 1974;
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- Environmental Permitting (England and Wales) Regulations 2016 (as amended 2017 & 2018);
- Environmental Damage (Prevention and Remediation) Regulations 2015;
- Flood Risk Regulations 2009;
- Eels (England and Wales) Regulations 2009;
- Groundwater (England and Wales) Regulations 2009;
- Control of Substances Hazardous to Health Regulations 2002 (as amended); and
- Control of Pollution (Oil Storage) (England) Regulations 2001.

Relevant Policies

11.4.5 Planning decisions for nationally significant infrastructure projects are based on National Policy Statements (NPS). There is no specific NPS for cross-country pipelines, although relevant planning policy can be assumed from other energy NPS as follows. Of most relevance is National Policy Statement for Energy (NPS EN-1), with particular reference to section 5.7 (flood risk), section 5.15 (water quality and resources). Additionally, paragraph 4.8.6 states that applicants for new energy infrastructure must take into account the potential impacts of climate change, including the most up to date UK climate change projections, and adopt appropriate mitigation or adaptation measures for the lifetime of the proposed infrastructure. A full review of relevant NPS will be provided at the PEIR stage.

11.4.6 Flood risk will also be assessed in line with the National Planning Policy Framework (NPPF), latest update July 2021, and relevant Planning Practice Guidance – Flood risk and coastal change (PPG-FRCC), latest update August 2021.

11.4.7 The water environment assessment will also take into account relevant local planning policy within the emerging North East Lincolnshire and East Lindsey District Council Local Plans – relevant policies will be detailed in the PEIR and ES.

11.4.8 Consideration will also be given to:

- River Basin Management Plans;
- The UK Government's 25 Year Environment Plan (2018);
- The UK Government's Future Water Strategy (2011);
- The Non-statutory technical standards for SuDS (2015); and
- The Building Regulations 2010 Approved Document H Drainage and Waste Disposal.

Guidance

11.4.9 Mitigation by Design, and Project Specific Mitigation will be taken into account with reference to best practice (e.g. Guidance on Pollution Prevention and reports prepared by the Construction Industries Research and Information Association (CIRIA)) and the requirements of local planning policy and any supplementary guidance.

Consultation

11.4.10 Consultation with relevant parties will be required to discuss impacts, mitigation and possible enhancement opportunities. Key stakeholders to be consulted include:

- Environment Agency;
- Lead Local Flood Authorities (LLFA);
- Internal Drainage Boards (IDB);
- Natural England;
- Canal & Rivers Trust; and
- Anglian Water.

11.4.11 Key items that will be discussed and agreed through technical stakeholder engagement are:

- Provision of baseline data (hydrology, flood risk and water quality);
- Confirmation of study area (e.g. how far downstream to consider fresh surface water dependent nature conservation sites or the risk from chemical spillages);

- Confirmation of what elements of the Project will require formal FRA or limited Flood Risk Review, if scoping assessment concludes that these are required;
- Scope of FRA and WFD if scoping assessment concludes that these are required;
- Management and maintenance of any future drainage ditches or SuDS facilities installed for Above Ground Installations;
- Mitigation measures; and
- Confirmation of other schemes to be considered in the assessment of cumulative effects.

Identification of Receptors

11.4.12 All the receptor categories identified below will be assessed within the zones of influence outlined in Section 11.2.

11.4.13 The potential receptors associated with the Project have been identified to include:

- Surface watercourses (including WFD designated, Main Rivers, and Ordinary Watercourse (including drains);
- Standing waterbodies (i.e. ponds);
- Water dependent designated and non-designated sites; and
- Water abstractions.

11.4.14 The importance and / or where appropriate, the sensitivity of the receptors will be defined during the PEIR and ES using the criteria outlined in **Table 11-12**.

11.4.15 The potential impacts to groundwater aquifers will be covered within Chapter 9 Geology & Hydrogeology.

Significance Criteria

11.4.16 The assessment will broadly follow the guidance and methodologies set out in the DMRB Sustainability and Environment; LA113 Road Drainage and the Water Environment (Ref 11-14). Whilst the DMRB is not specific to the assessment of a CO_2 pipeline, it provides an accepted approach to the assessment of development impacts in particular for linear projects.

11.4.17 Following a review of the baseline information, likely ‘impacts’ on the environment (i.e. the changes resulting from an action) and their ‘effects’ (i.e. the consequences of those impacts) will be identified.

11.4.18 Following the identification of an impact, the ‘magnitude’ of that impact will be defined, followed by the ‘sensitivity’ of the receiving receptor.

11.4.19 The magnitude of any predicted impact is dependent on its size, duration, timing and frequency with each defined impact being assigned a magnitude. The impact magnitude criteria are illustrated in Table 4-2.

11.4.20 The sensitivity or value of a hydrological receptor is largely determined by its quality, rarity and scale, see **Table 11-12**.

11.4.21 The significance of environmental effect is typically a function of the value (sensitivity) of a receptor and the magnitude (extent) of an impact. An indicative matrix for the determination of significance is provided in Table 4-4.

Table 11-12: Importance (and sensitivity) Criteria[1]

Importance	General criteria	Surface Water	Hydromorphology[2]	Flood Risk
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.	EC Designated Salmonid / Cyprinid fishery; Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0m3/s; site protected / designated under EC or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar site. Critical social or economic uses (e.g., public water supply and navigation).	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.	Essential Infrastructure or highly vulnerable development.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.	Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 < 1.0m3/s; Major Cyprinid Fishery; Species protected under EC or UK habitat legislation. Critical social or economic uses (e.g., water supply and navigation). Important social or economic uses such as water supply, navigation or mineral extraction.	Conforms closely to natural, unaltered state and will often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/or indirect channel, floodplain, bank modifications and/or catchment development pressures.	More vulnerable development.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental	Watercourse detailed in the Digital River Network but not having a WFD classification as shown in a RBMP. May be designated as a local wildlife site (LWS) and support a small / limited population of protected species. Limited social or economic uses.	Shows signs of previous alteration and/or minor flow / water level regulation but still retains some natural features or may be recovering towards conditions indicative of the higher category.	Less vulnerable development.

Importance	General criteria	Surface Water	Hydromorphology[2]	Flood Risk
	value or is of regional importance.			
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.	Surface water sewer, agricultural drainage ditch; non-aquifer WFD Class 'Poor' or undesignated. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses.	Substantially modified by past land use, previous engineering works or flow / water level regulation. Watercourses likely to possess an artificial cross-section (e.g., trapezoidal) and will probably be deficient in bedforms and bankside vegetation. Watercourses may also be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water resources use. Could be impacted by navigation, with associated high degree of flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches will fall into this category.	Water compatible development.
Negligible	The receptor is resistant to change and is of little environmental value	Not applicable.	Not applicable.	Not applicable.
Note 1: Professional judgement is applied when assigning an importance category to all water features. The WFD status of a watercourse is not an overriding factor, and, in many instances, it may be appropriate to upgrade a watercourse which is currently at poor or moderate status to a category of higher importance to reflect its overall value in terms of other attributes and WFD targets for the watercourse. Likewise, a watercourse may be below Good Ecological Status, this does not mean that a poorer quality discharge can be emitted. All controlled waters are protected from pollution under the Environmental Permitting (England and Wales) Regulations 2016 and the Water Resources Act 1991 (as amended), and future WFD targets also need to be considered. **Note 2:** Based on the waterbody 'Reach Conservation Status' presently being adopted for a major infrastructure project (and developed originally by Atkins) and developed from Environment Agency conservation status guidance as LA113 does not provide any criteria for morphology.				

* *As defined in Table 2 of the Planning Practice Guidance - Flood Risk and Coastal Change (March 2014), UK Government*

11.5 Water Quality Assessment (Operation Phase)

11.5.1 For the majority of the Project, once the pipeline has been installed and the ground reinstated, there will be no significant new impermeable areas or change to the existing runoff regime.

11.5.2 However, where new above ground installations are required these will contain new impermeable surfaces that will generate additional runoff. This runoff may contain pollutants derived from impermeable surfaces (e.g. inert particulates, litter, hydrocarbons, metals, nutrients and de-icing salts). This mixture of pollutants is collectively known as 'urban diffuse pollutants,' and although each pollutant may itself not be present in harmful concentrations, the combined effects over the long term can cause chronic adverse impacts. Changes in impermeable surfaced area within the Order limits may lead to increases in the rate and quantities of these pollutants being runoff to receiving watercourses. An assessment is therefore needed to determine the potential risk to the receiving waterbodies and to inform the development of suitable treatment measures. Thus, the appropriateness of the surface water drainage measures in terms of providing adequate treatment of diffuse pollutants will be assessed with reference to the Simple Index Assessment method described in the C753 SuDS Manual (CIRIA, 2015).

Hydromorphology

11.5.3 Potential hydromorphological impacts will be qualitatively appraised based on a desk study, a site walkover and a review of the proposed development that may affect the physical form of waterbodies.

11.5.4 Consideration has been given to how the Project is likely to impact upon the WFD objectives for the relevant watercourses within the WFD assessment. Effects are described according to the method for determining effect significance as outlined in this Chapter already.

WFD Assessment

11.5.5 The overarching aim of the WFD is to protect and enhance watercourses.

11.5.6 There is no fixed method for WFD assessment: the nature of the water environment and the breadth of the legislation mean that assessments are tailored on a case-by-case basis. However, a stepwise approach consisting of Screening, Scoping, and Impact Assessment is generally followed in order to: (a) rationalise the levels of WFD assessment and impact mitigation that are required; and (b) verify that proposals meet the requirements of the WFD (Ref 11-15).

11.5.7 Screening identifies the project's zone of influence, and if the activities associated with the Project represent a threat to the water environment, or if they do not require further consideration for WFD objectives. Scoping follows on from this by identifying the impacts of these activities on specific WFD receptors and their water quality elements. This involves the identification of WFD impact pathways, and the WFD waterbodies that may be affected, as well as the specific WFD quality elements within these waterbodies with the potentially to be adversely impacted. The Impact Assessment, which involves a rationalised assessment of elements identified within the scoping stage to identify any areas of WFD non-compliance, can then be conducted.

11.5.8 An initial qualitative WFD assessment will be prepared at PEIR stage.

Flood Risk Assessment (FRA)

11.5.9 As sections of the Project are within Flood Zone 3 (as shown on **Figure 11-2**), and development area is >1ha, an FRA will be required following NPPF.

11.5.10 A desk-based study FRA will be undertaken to assess the flood risk to the Project as well as any impacts to upstream and downstream receptors due to the Project.

11.5.11 The FRA will assess the risk of flooding from surface water, fluvial sources, tidal sources, sewers and drains and groundwater. It will also assess whether flood risk will be potentially increased elsewhere as a result of the Project. The impact of the Project on flood risk as a result of crossings of watercourses, and the potential change of drainage and flows by the below ground infrastructure, will also be assessed.

11.5.12 As the Project is a development for a cross-country pipeline, it may be classified as essential infrastructure, which is considered appropriate for development in areas within Flood Zone 3 following the application of the Exception Test (NPPF, para 160). As essential infrastructure, if the proposed development areas are within Flood Zone 3a then 'it should be designed and constructed to remain operational and safe during times of flood.'

11.5.13 If the Project requires development in areas within Flood Zone 3b then the following requirements need to be shown to have been met:

- Remain operational and safe for users in times of flood;
- Results in no net loss of floodplain storage;
- Not impede water flows; and
- Not increase flood risk elsewhere.

11.5.14 A drainage strategy will be produced by the design team for the Pipeline Offtake Facility, the offshore pipeline tie-in and outlet) and other above ground infrastructure (such as shutdown valves), required as part of the Project, which will incorporate flood risk mitigation.

11.6 Identification of Potential Effects

11.6.1 The potential water environment impacts associated with the Project have been split into construction, operation and decommissioning impacts. The Project has the potential to change the volume and quality of water discharge draining to WFD waterbodies in the Study Area. Therefore, the development associated with the Project has the potential to generate adverse impacts on local and catchment wide hydrological processes unless appropriate mitigation is included.

Construction Phase

11.6.2 During construction, there is a risk of pollution to surface water from activities involving polluting substances such as fuels, concrete and chemicals as well as from the disturbance of soil during earthworks, and potential effects to flood risk associated with construction activities, including:

- Pollution of surface waterbodies due to deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off;
- Temporary impacts on sediment dynamics and hydromorphology within watercourses and waterbodies, especially where watercourses need to be crossed by the pipeline or access tracks;
- Temporary changes in flood risk from changes in surface water runoff and exacerbation of localised flooding, due to deposition of silt, sediment in drains and ditches or works on the floodplain;
- Temporary changes in flood risk due to general site clearance, construction works, and the creation of site compounds and storage facilities, which alter surface water runoff;

- Potential impacts on local water supplies; and
- If hydrostatic testing of the pipeline is required, there is potential for effects to water resources (for abstraction and disposal) and potential of seepage into surface water receptors.

11.6.3 Impacts to groundwater are considered in Chapter 9: Geology & Hydrogeology.

11.6.4 The method to cross each watercourse would involve either trenchless or an open cut (intrusive) methods. This specification is yet to be determined and would be dependent on various factors inclusive of size of crossing and stakeholder feedback. In addition, watercourses would also be crossed by haul roads, but the location or design is yet to be determined for this.

Operational Phase

11.6.5 During operation of the Project, the following water environment impacts may occur:

- Impacts on water quality in waterbodies that may receive surface water runoff or be at risk of chemical spillages from above ground facilities for the Project (e.g. Pipeline Offtake Facility) from diffuse pollutants in runoff, operational discharges and the risk of chemical spillages;
- Hydromorphological impacts to waterbodies including changes to physical form (for example where outfalls or watercourse crossings are required) which underpin habitats;
- Impacts on flood risk from increased runoff from new impervious areas at above ground facilities for the Project;
- Potential impacts on hydrology as a result of the Project by changing the way water infiltrates into the ground and supports baseflow to waterbodies; and
- Permanent loss of floodplain within areas classified as Flood Zone 2 and 3.

Decommissioning Phase

11.6.6 The decommissioning phase of the Project may involve the removal of some infrastructure, although some infrastructure may be left in situ; the decommissioning strategy is not known at this stage of the project.

11.6.7 Decommission effects would be similar to construction effects and could result in a risk of pollution to surface water and potential effects to flood risk. Decommissioning would be subject to a further assessment in the future, however potential effects will be included within the PEIR and ES Chapters.

11.7 Design, Mitigation and Enhancement

Construction Phase

11.7.1 During the construction phase, standard pollution prevention and construction best practices would be adopted to mitigate potential impacts upon the water environment where required and reasonably practicable. Such measures would be included in a draft Construction Environmental Management Plan (CEMP).

11.7.2 The draft CEMP will be prepared and submitted as part of the DCO application and would be implemented by the Principal Contractor and would detail the types of risks pertinent to the construction works and the mitigation measures that would be required to avoid, minimise and reduce impacts of activities as far as practicable. Given the nature and scale of the Project, it is also recommended that in addition to the Draft CEMP a Water

Management Plan (WMP) is also prepared. The WMP would include more detail on the measures to manage excess fine sediment in runoff, spillage risk and spills, emergency response, and flood risk management. Specific examples of the types of mitigation likely required will be detailed within the PEIR and the ES. The WMP will also set out the scope of any water quality monitoring to be undertaken during the works.

11.7.3 The CEMP and WMP will comprise good practice methods that are established and effective measures to which the development will be committed through the development consent. The measures include:

- Setting out details of any water quality monitoring to be undertaken during construction.
- Controlling and minimising the risk of pollution to surface waters and groundwater by managing construction site runoff and the risk of chemical spillages;
- During construction an Incident Response Plan would be implemented to deal with any issues as soon as they occur for a particular site and to ensure that works are undertaken with the utmost care where they have the potential to lead to contamination of any watercourse.
- Measures to control the storage, handling and disposal of potentially polluting substances during construction;
- The management of activities within floodplains including storing materials outside of the floodplain as far as reasonably practicable and production of a Flood Risk Management Plan with floodplain control measures and contingency actions;
- Management of water removed from excavations. Managing the risk from groundwater flooding through appropriate working practices (during excavations) and with adequate plans and equipment in place for de-watering to ensure safe dry working environments; and
- Appropriate methods and mitigation measures when undertaking works within, over, under and adjacent to waterbodies'.

11.7.4 During the construction phase, discharges from the works to surface waterbodies or to ground containing potentially polluting substances may require an Environmental Permit from the Environment Agency. Works undertaken above, below or within 8 m of a watercourse or flood defence or on the floodplain may also require a Flood Risk Activity Permit from the Environment Agency, unless a defined exemption applies. Furthermore, dewatering operations, watercourse diversions and realignments may require abstraction, transfer or impoundment licences from the Environment Agency, again unless an exemption applies (e.g. compliance with a Regulatory Position Statement).

11.7.5 Any temporary or permanent works that may affect the flow in an Ordinary Watercourse may require a Land Drainage Consent from the LLFA and the design compliant with any byelaws. The Project will also develop an artificial land drainage strategy, led by a land drainage specialist, for both pre-construction and post-construction.

11.7.6 It is anticipated that monitoring of watercourses at risk of pollution during the construction phase will be required. This will need to include a period of baseline data collection in advance of the works.

11.7.7 During construction there will be a requirement to protect construction plant, materials and construction workers from impacts due to flooding. Such measures may include, for example, locating construction compounds and material/ plant storage areas outside of areas susceptible to flooding if possible, and having in place emergency flood response procedures. The management and subsequent implementation of such measures will also

seek to avoid any potential pollution of local watercourses by construction materials in the event of flooding.

11.7.8 The provisional mitigation measures which will be considered during the construction phase of the Project to appropriately manage the potential impacts are detailed in Section 11.7. Overall, the full suite of appropriate mitigation measures will be developed at PEIR stage and set out in detail in the final ES.

Operational Phase

11.7.9 The design of above ground infrastructure would include an appropriately designed surface water collection and treatment system, as well as design measures to ensure that the Project does not generate any adverse flood risks to adjacent areas (e.g. appropriate design of watercourse crossings and potential floodplain compensation provisions). Option-specific mitigation measures have not been identified at this stage - these will be identified where possible within the PEIR and considered in further detail in the ES.

11.7.10 Sustainable drainage systems (SuDS) would provide a way to attenuate runoff from the Project to a rate agreed with the Environment Agency and / or the LLFA to avoid increasing flood risk, but they are also important in reducing the quantities and concentration of diffuse urban pollutants found in runoff. Their design and use would depend on factors, such as site-specific constraints. Ponds, wetlands and swales are preferred sustainable solutions, as these options mimic natural drainage and can be used to deliver other environmental benefits. However, in some situations where space is constrained or there is a particularly high risk, sustainable measures may be proposed in a treatment train with proprietary measures such as vortex flow separators.

11.7.11 The development of SuDS would take account of Defra guidance on the use, design and construction of SuDS, and current best practice guidance on the planning for and design of SuDS treatment contained in CIRIA's SuDS Manual (CIRIA, 2015), DMRB CD532 Vegetated Drainage Systems for Highway Runoff (Highways England, 2020), and DMRB CG501 Design of Highways Drainage Systems (Highways England, 2020). The location, design and management of SuDS would be agreed with the relevant consultation bodies prior to construction.

11.7.12 It is assumed that the principal watercourses crossed by the Project would be non-intrusive and drilled / bored beneath the bed at a sufficient depth to avoid exposure. If required, the sensitive design of watercourse crossing points is an essential part of minimising this impact and would be considered as the Project's design progresses. Consultation with the Environment Agency, LLFAs and IDBs is required to agree the design of any required watercourse crossing structures.

11.7.13 Any increases in hardstanding within the surface water drainage catchment may increase surface water runoff and may impact on flood risk to and from the Project. An FRA will be undertaken during PEIR and ES. Any heightened flood risk must be mitigated through design or compensatory storage.

Decommissioning Phase

11.7.14 The decommissioning phase would apply similar design and mitigation measures as the Construction Phase. Standard pollution prevention and construction best practices would be adopted to mitigate potential impacts upon the water environment where required and reasonably practicable. Such measures would be included in an CEMP (Decommissioning).

11.7.15 The CEMP (Decommissioning) would be prepared and submitted prior to decommissioning of the Project for approval by the relevant bodies. The CEMP (Decommissioning) and would be implemented by the Principal Contractor and would detail the types of risks pertinent to the construction works and the mitigation measures that would be required to avoid,

minimise and reduce impacts of activities as far as practicable. Specific examples of the types of mitigation likely required for decommissioning will be detailed within the PEIR and the ES.

11.8 Summary

11.8.1 This chapter has identified baseline conditions and the potential effects of the Project on the surface water environment and flood risk within the Scoping Boundary and potential downstream receptors within the Study Area. Below is a summary of this scoping chapter:

- The Scoping Boundary crosses or is potentially in hydraulic connectivity to over 100 watercourses, including 16 watercourses designated as a Main River, and a large number of standing waterbodies (generally ponds).
- Surface watercourses along the Scoping Boundary generally flow from west to east to the Humber Estuary (which is a SSSI, Ramsar site, and SAC), and Section E flow into Saltfleetby – Theddlethorpe Dunes SSSI and SAC.
- The northern part of the Study Area is within both Humber RBD, and the southern part of the Study Area is within the Anglian RBD as set out in the Anglian RBMP. The Project has the potential to affect a total of fourteen WFD waterbodies, all of which are classified as heavily modified or artificial.
- The flood risk along the Scoping Boundary has been summarised from the Environment Agency online mapping:
  - There are fluvial floodplains associated with most Main Rivers along the entire Scoping Boundary;
  - There is surface water flood risk associated with minor watercourses, ponds and urban areas along the entire Scoping Boundary;
  - There is shallow groundwater along the entire Scoping Boundary, therefore there may be the risk of groundwater flooding;
  - The coastal area, associated with Section A and Section E , has a high risk (Flood Zone 2 and 3) of tidal flooding from the Humber Estuary.
  - There is no risk of reservoir flooding along the entire Scoping Boundary.
- The Scoping Boundary crosses two internal drainage boards (IDB): North East Lindsey IDB which covers the coastal area around Immingham; and Lindsey Marsh Drainage Board, which covers the coastal area around Theddlethorpe.

11.8.2 Further assessment of baseline conditions, including water resources, will be undertaken as part of the ES through more detailed desk study, site walkovers, and consultation as the Project's design progresses. A full database of the watercourses and standing waterbodies will be developed during the PEIR stage, based on OS data, aerial imagery and site visits. Impacts to groundwater are considered in Chapter 9: Geology & Hydrogeology.

11.8.3 The principal potential effects identified at this stage that could occur during the construction phase are those associated with:

- Deposition or spillage of soils, sediment, oils, fuels, or hydrostatic testing fluid, resulting in pollution of surface water features, local water supplies, hydromorphology, or flood risk;
- Temporary watercourse crossings that could impact on hydromorphology and flood risk; and

- Temporary changes in surface water runoff due resulting in changes to flood risk.

11.8.4 During the construction phase, standard pollution prevention and construction best practices would be adopted to mitigate potential impacts upon the water environment, which would be included in a CEMP. In addition, a WMP will also prepared, which would include more detail on the measures to manage water quality and flood risk. Specific examples of the types of mitigation likely required will be detailed within the PEIR and the ES. The WMP will also set out the scope of any water quality monitoring to be undertaken during the works.

11.8.5 During operation, there are unlikely to be any effects on water quality or hydromorphology, assuming that the principal watercourse crossings will be non-intrusive and drilled / bored beneath the bed at a sufficient depth to avoid exposure. The key potential effects at the operational phase are associated with above ground infrastructure (including the Pipeline Offtake Facility and the offshore pipeline tie-in and outlet). Above ground infrastructure could provide a source of surface water pollution, alter surface water flow paths and increase flood risk.

11.8.6 Above ground infrastructure would be designed to include an appropriately designed surface water collection and treatment system, and would take account of SuDS, and be documented in the Drainage Strategy. Infrastructure would include design measures to ensure that the Project does not generate any adverse flood risks to adjacent areas (e.g. appropriate design of watercourse crossings and potential floodplain compensation provisions). Any heightened flood risk must be mitigated through design or compensatory storage.

11.8.7 A separate WFD Assessment will be carried out in order to ensure compliance by further assessing the impacts of the Project on geomorphology, water quality and ecological elements during the PEIR and EIA stage of the project.

11.8.8 A separate FRA will be undertaken to establish the level of flood risk from all sources of flooding in the baseline and which remain after mitigation. The FRA will support the DCO application.

11.8.9 The potential effects that could occur during the decommissioning phase similar to the construction phase, and similar mitigation measures will be applied as for the construction phase. The decommissioning will be subject to a further assessment in the future, however the likely effects and mitigations will be included within the PEIR and ES chapters.

11.8.10 The following topics are scoped out of the assessment:

- *Foul drainage* – this would either connect under trade effluent consent to public sewer or otherwise be managed by a specialist company. This will be scoped out currently, however will be kept under review.
- *Potable water supplies* – not considered to be a significant issue, as the majority of the Project will not be staffed. Potable water is likely to come from an existing Anglian water mains and consultation with them will be carried out at a later stage.
- *Hydraulic modelling* – it is currently not anticipated that hydraulic modelling will be required, as the pipeline is assumed to be buried, including beneath watercourses. Therefore unlikely to result in significant changes to flood risk, other than locally.
- *Water Quality monitoring* – No water quality sampling is proposed to inform the assessment as we will use existing EA routine monitoring data for classifying watercourse importance.

Table 11-13: Summary of scope for Water Environment Assessment

Element	Phase	Scoped in	Scoped Out	Justification
Water quality effects	Construction, operation and decommissioning	✓		
Hydromorphological effects & WFD assessment	Construction, operation and decommissioning	✓		
Flood Risk effects and Flood Risk Assessment	Construction, operation and decommissioning	✓		
Foul Drainage	Construction, operation and decommissioning		✓	Not significant issue (low occupancy)
Potable water supplies	Construction, operation and decommissioning		✓	Not significant issue (low occupancy)
Hydraulic modelling	All phases		✓	Unlikely to be significant effects as pipeline is assumed to be buried

11.9 References

Ref 11-1 Environment Agency Catchment Data Explorer – (https://environment.data.gov.uk/catchment-planning) *[accessed January 2022]*

Ref 11-2 Environment Agency Flood Map for Planning (https://flood-map-for-planning.service.gov.uk/) *[accessed January 2022]*

Ref 11-3 Environment Agency Long Term flood risk map (Check for flooding in England - GOV.UK (check-for-flooding.service.gov.uk) *[accessed January 2022]*

Ref 11-4 Open Data portal (https://data.gov.uk/) *[accessed January 2022]*

Ref 11-5 Environment Agency Statutory Main River Map [redacted] *[accessed January 2022]*

Ref 11-6 Multi Agency Geographic Information Centre (MAGIC) web mapping (https://magic.defra.gov.uk/MagicMap.aspx) *[accessed January 2022]*

Ref 11-7 Natural England Designated Sites [redacted] *[accessed January 2022]*

Ref 11-8 North and North East Lincolnshire Strategic Flood Risk Assessment 2011 (SFRA) https://www.nelincs.gov.uk/planning-and-building-control/planning-policy/the-local-plan/local-plan-background-information/strategic-flood-risk-assessment-2011-sfra/ *[accessed January 2022]*

Ref 11-9 East Lindsey Strategic Flood Risk Assessment 2017 (https://www.e-lindsey.gov.uk/article/6200/Strategic-Flood-Risk-Assessment) *[accessed January 2022]*

Ref 11-10 British Geological Survey GeoIndex Onshore [redacted] *[accessed January 2021]*

Ref 11-11 Environment Agency Humber River Basin District River Basin Management Plan (2015). (https://www.gov.uk/government/publications/humber-river-basin-district-river-basin-management-plan)

Ref 11-12 Environment Agency Anglian River Basin District River Basin Management Plan (2015) (https://www.gov.uk/government/publications/anglian-river-basin-district-river-basin-management-plan)

Ref 11-13 Ordnance Survey OS Open Rivers [redacted] *[accessed July 2021]*

Ref 11-14 LA 113 – Road Drainage and the Water Environment. Design Manual for Roads and Bridges. Highways England. Revision 1, March 2020.

Ref 11-15 PINS Advice Note 18 – The Water Framework Directive (2017). National Infrastructure Planning

12. Air Quality

12.1 Introduction

12.1.1 This chapter sets out the proposed scope of the environmental assessment for air quality, which will consider the potential for effects on human and ecological receptors that may arise from the Project.

12.1.2 This chapter should be read in conjunction with Chapter 6: Ecology & Biodiversity, Chapter 14: Traffic & Transport and Chapter 16: Health & Wellbeing.

12.1.3 This chapter is supported by a series of figures (**Figures 12-1** to **12-4**) which provide an overview of air quality constraints and background concentrations for various pollutants.

12.2 Baseline Environment and Study Area

Study Area

12.2.1 The methodological approach to defining the spatial extent of the study area for air quality has been informed by Institute of Air Quality Management (IAQM) (2014, 2017 and 2019) guidance documents (Ref 12-1, Ref 12-2 and Ref 12-3). These guidance documents will be used in the screening process to consider for the requirement to undertake a detailed air quality modelling assessment and to inform the construction dust assessment.

12.2.2 An area within 10 km of the scoping boundary has been considered with respect to published baseline information on existing air quality.

12.2.3 The following Study Areas will be used where an assessment of dust emissions produced by construction activities is required:

- A human receptor within:
  - 350 m of the limits of construction activity within the site considered; or
  - 50 m of site access points (in relation to trackout); and
  - Vehicles on the public highway, up to 500 m from the site entrance(s).
- An ecological receptor within:
  - 50 m of the limits of construction activity within the site considered; or
  - 50 m of the route(s) used by construction vehicles; and
  - On the public highway, up to 500 m from the site entrance(s).

12.2.4 As the design and consultation processes progress and the Project is refined, the exact geographical scope of Study Areas may continue to evolve to accommodate any changes. To overcome this, the Scoping Boundary has been used initially to define the Study Area, to account for any uncertainty in design. Once the alignment has been more precisely defined the Study Area will be refined to focus on the assessment of effects within the distances listed above.

12.2.5 **Figure 12-1** (showing 350m buffer from study area/ 50 m buffer/ ecological receptors) shows all elements of the Project which will be used to inform the spatial area of the air quality assessment.

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Scunthorpe, AQMA

Grimsby, AQMA

KINGSTON UPON HULL to
Rotterdam (Europort) 12 hrs
Zeebrugge 12 hrs

N

1:200,000 @ A3

0 5 0 1 2 3 4 5 km

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LEGEND

- Scoping Boundary
- 350m Study Area
- Air Quality Management Area (AQMA)

Statutory Designated Sites

- Ramsar
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- Local Nature Reserve (LNR)
- Marine Conservation Zone (MCZ)

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FIGURE TITLE

Figure 12-1
Air Quality Constraints

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Summary of Data Sources

12.2.6 The following data sources have been used to inform the air quality baseline:

- North Lincolnshire Council (NLC) 2020 Annual Status Report (ASR) (Ref 12-4);
- North East Lincolnshire Council (NELC) 2021 ASR (Ref 12-5);
- West Lindsey District Council (WLDC) 2021 ASR (Ref 12-6);
- Mapped estimates of background concentrations provided by Defra's UK Air Information Resource (UK-air) (Ref 12-7);
- Air Quality Management Area (AQMA) boundaries provided by Defra's UK Air Information Resource (UK-Air) (Ref 12-8); and
- Designated ecological sites provided by Natural England's MAGIC maps (Ref 12-9).

12.2.7 East Lindsey District Council have not published their ASRs on the council website. The council's air quality officer will be contacted during collation of the air quality assessment for the ES in order to obtain information on monitoring undertaken within the district and to confirm there are no air quality sensitive locations in close proximity to the scoping boundary.

12.3 Current baseline

Dust Deposition

12.3.1 A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity. The concentrations of dust can vary depending on a range of parameters, such as meteorological conditions and time of year.

12.3.2 Ambient dust deposition rates are not monitored extensively in the UK. Monitoring that is undertaken is usually connected with specific activities such as mining and mineral extraction operations or specific large-scale construction programmes. Dust monitoring may also be undertaken to investigate specific complaints received by local authorities, who are then required to investigate dust nuisance under the Environmental Protection Act 1990 (Ref 11-13). Therefore, there is not any quantitative baseline information for dust deposition available in the Study Area.

Pollutant Concentrations

12.3.3 The proposed Study Area for the air quality assessment covers the local authority areas of NLC, NELC, WLDC and ELDC. **Table 12-1** details the AQMAs declared by these local authorities, which are also illustrated on **Figure 12-1**.

12.3.4 Based on the location of the AQMAs in relation to the Study Area, it is not expected that construction traffic would be routed through any of the existing AQMAs. Construction traffic passing Scunthorpe would do so on the M180 which is some distance from the AQMA centred around the steelworks, while the Grimsby AQMA covers a small stretch of road within the urban centre.

Table 12-1: AQMAs in the vicinity of the study area

Local Authority	AQMA	Declared for	Distance to Scoping Boundary (km)
NLC	Scunthorpe AQMA	PM_{10} 24 hour mean	21.5 km, W
NELC	Grimsby AQMA	NO_2 annual mean	7.8 km, E
WLDC	None declared	-	-
ELDC	None declared	-	-

12.3.5 As part of Local Air Quality Management (LAQM) duties, local authorities are required to monitor pollutant concentrations. There are no monitoring locations within the air quality scoping boundary, as shown in **Figure 12-1**. Pollutant concentrations recorded at monitoring locations within 10 km of the Scoping Boundary are presented in Appendix E. When construction routes are available, relevant monitoring locations will be reviewed.

12.3.6 Generally, annual mean concentrations of NO_2 within 10 km of the Scoping Boundary were below the annual mean Air Quality Objective (AQO) of 40 µg/m^3, between 2016 and 2020 as detailed in Appendix E. There were slight exceedances of the AQO at one roadside diffusion tube location within the Grimsby AQMA in 2016 and 2017, however it is remote from the Scoping Boundary and it is not expected that any construction traffic would be routed through this area. Since 2018, annual mean NO_2 concentrations have been below the AQO.

12.3.7 There is one currently operational PM_{10} monitor within 10 km of the Scoping Boundary, situated within 1.5 km of the northern end of the Scoping Boundary at Killingholme School. There were no exceedances of the AQOs at this monitoring location. The greatest PM_{10} annual mean concentration recorded at Killingholme School was in 2019 at 19 µg/m^3. The highest number of exceedances of the daily mean of 50 µg/m^3 was five, which is well within the short-term AQO of 35 exceedances. This continuous monitor is considered to be representative of conditions within Killingholme, however within the Scoping Boundary concentrations would be expected to be lower.

12.3.8 There are no $PM_{2.5}$ monitors within 10 km of the Scoping Boundary.

12.3.9 The UK-AIR website provides data for background concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$. These background concentrations represent 1 km^2 grid squares. **Figure 12-2** to **Figure 12-4** show the estimated background concentrations across the Study Area. As expected for all pollutants, background concentrations in the Study Area are low, due to the predominantly rural nature of the area, when compared to larger urban centres.

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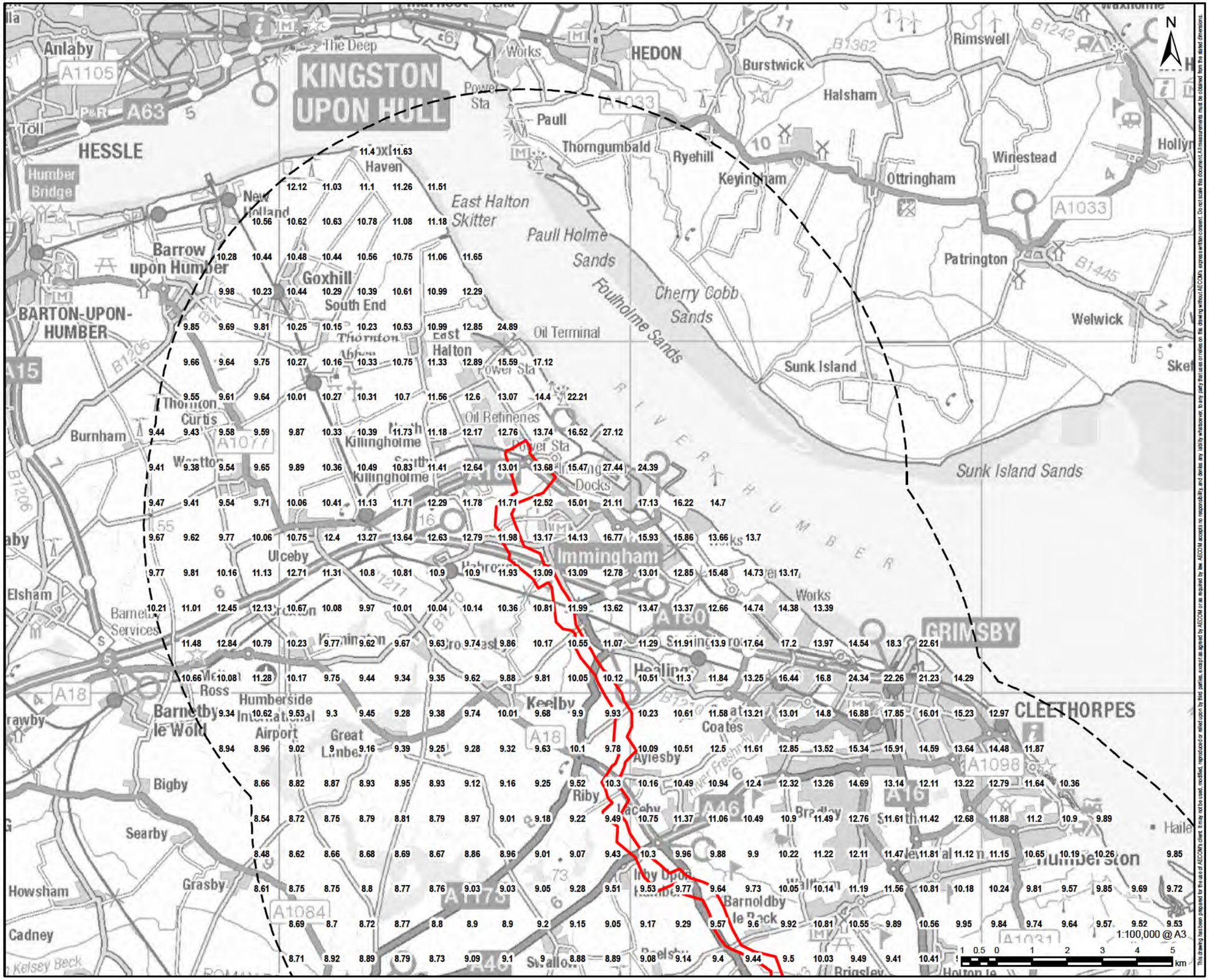

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LEGEND
- Scoping Boundary
- 10km Study Area

Values represent Nitrogen Dioxide (NO^2) Background Concentration within 1km OS Grid Square

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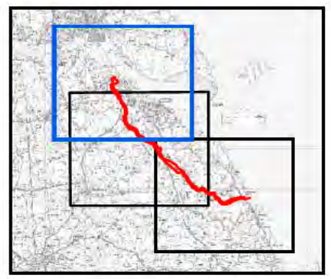

FIGURE TITLE
Figure 12-2 (1 of 3)
Nitrogen Dioxide (NO^2) Background Concentrations

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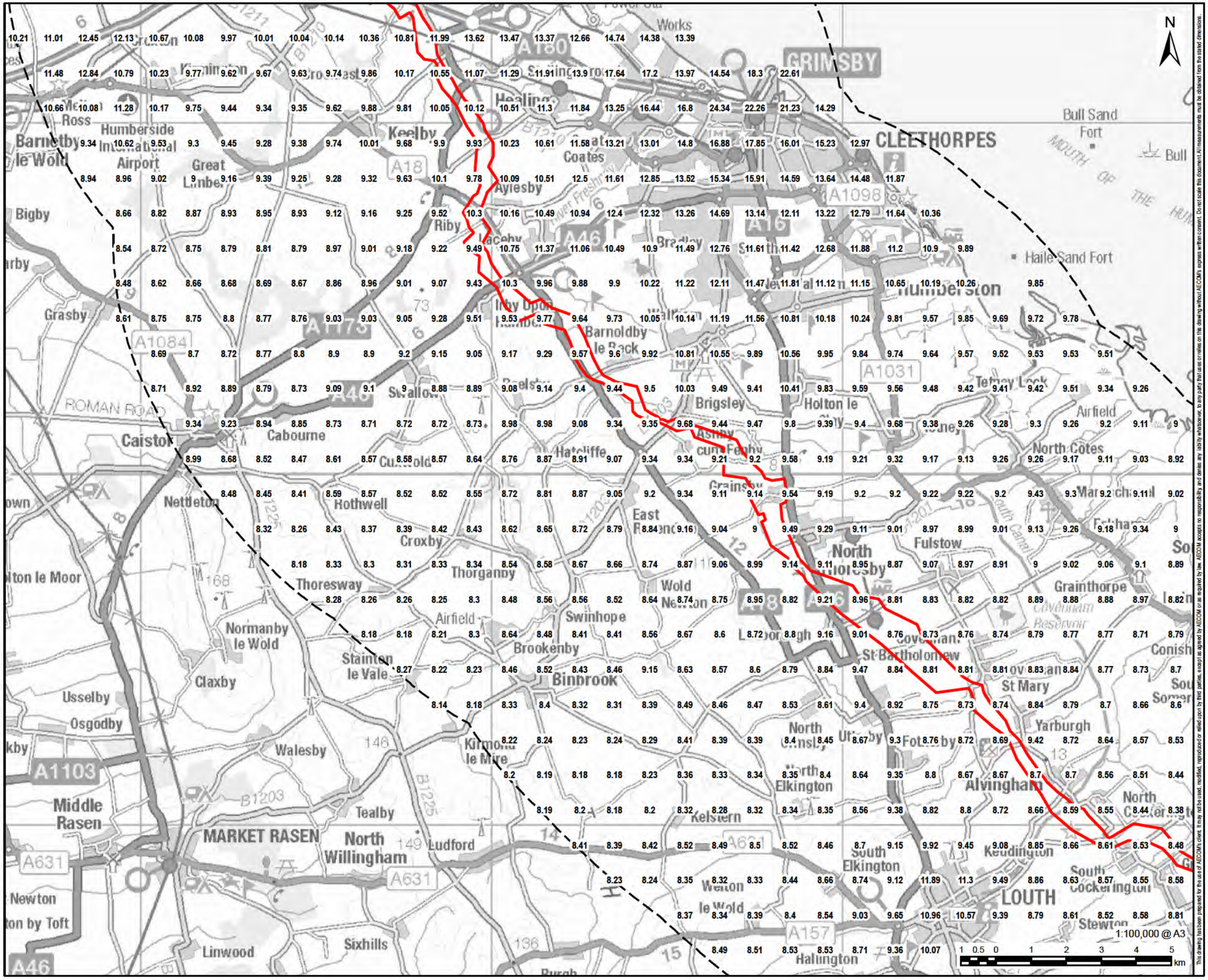

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LEGEND

- Scoping Boundary
- 10km Study Area

Values represent Nitrogen Dioxide (NO^2) Background Concentration within 1km OS Grid Square

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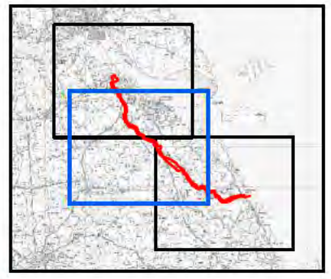

FIGURE TITLE

Figure 12-2 (2 of 3)
Nitrogen Dioxide (NO^2) Background Concentrations

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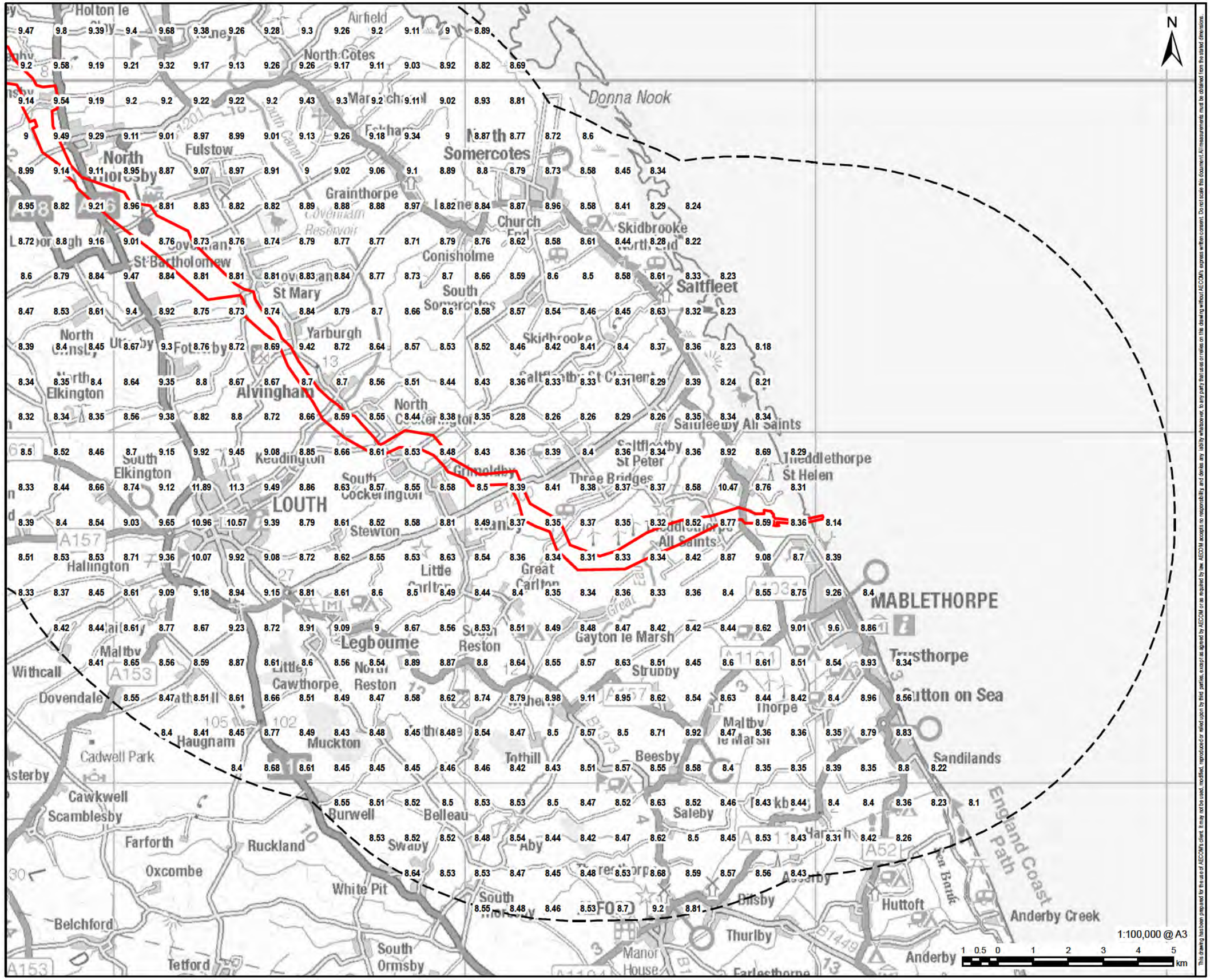

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LEGEND

- Scoping Boundary
- 10km Study Area

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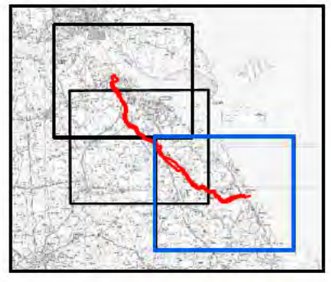

FIGURE TITLE

Figure 12-2 (3 of 3)
Nitrogen Dioxide (NO^2) Background Concentrations

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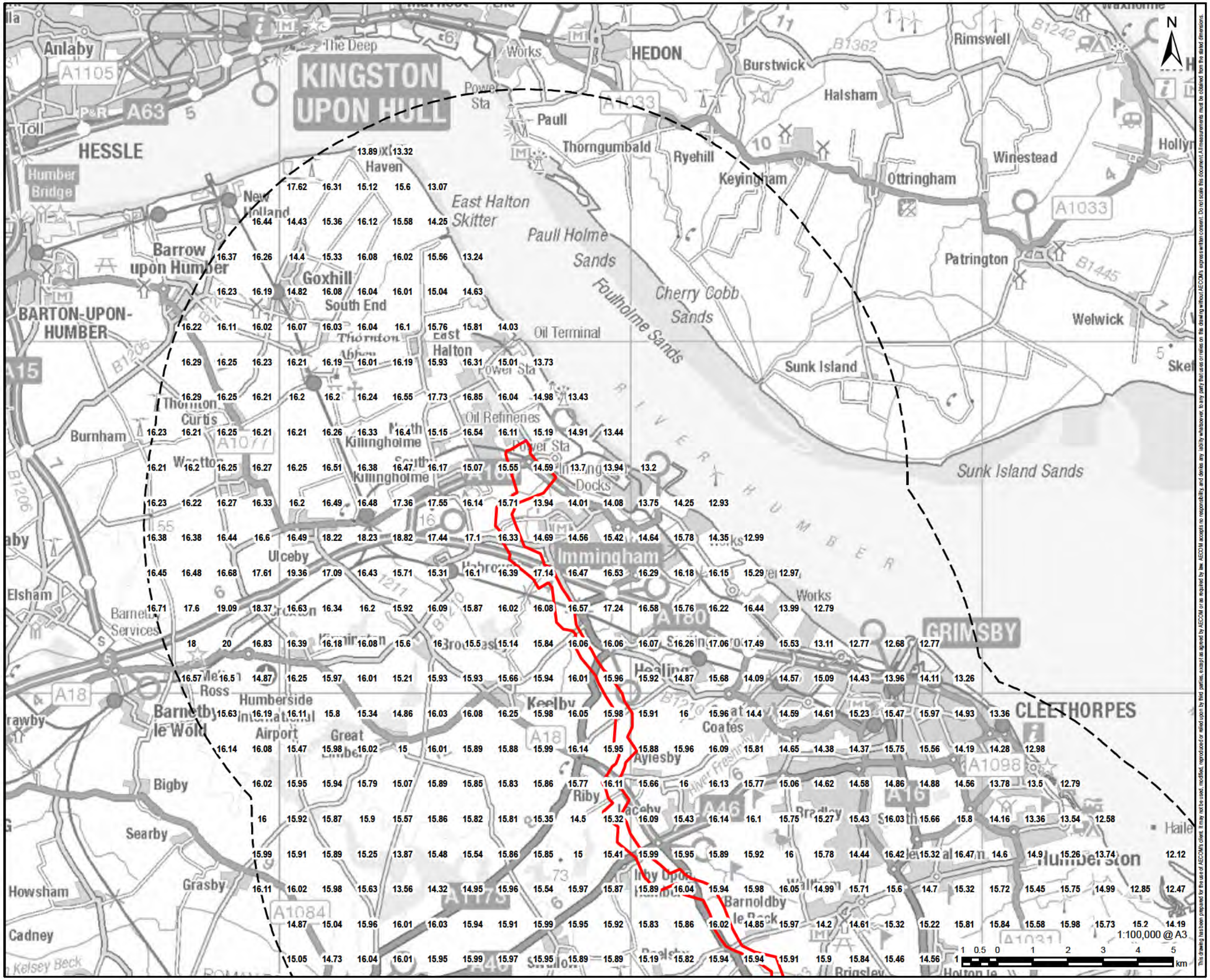

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LEGEND

Scoping Boundary

10km Study Area

Values represent PM_{10} Background Concentration within 1km OS Grid Square

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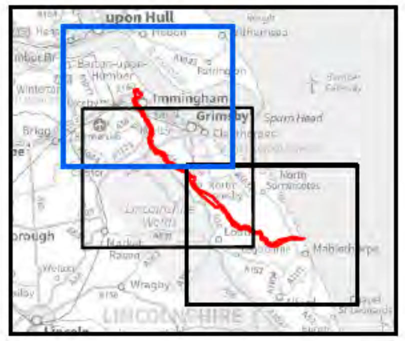

FIGURE TITLE

Figure 12-3 (1 of 3)
PM_{10} Background Concentrations

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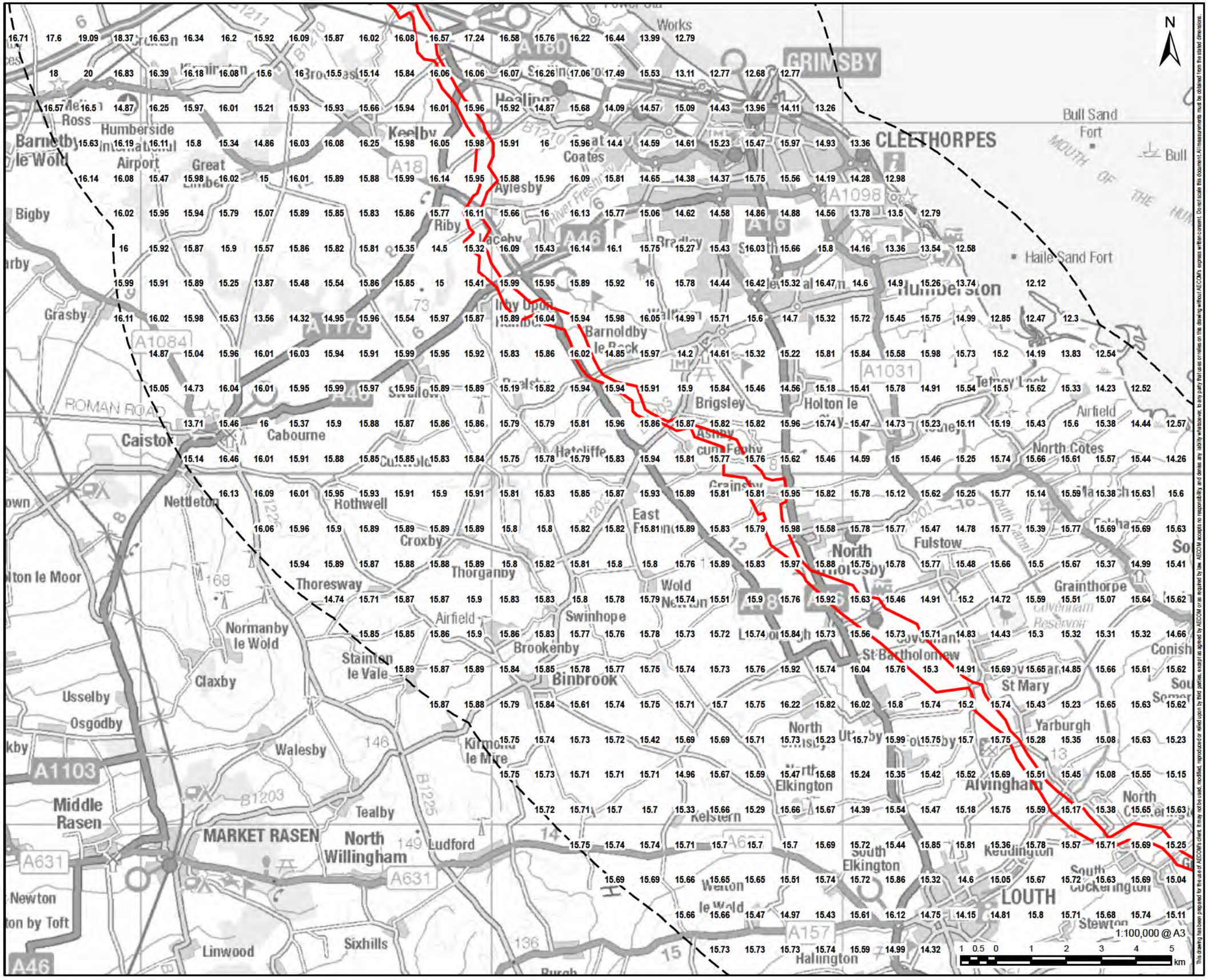

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LEGEND

- Scoping Boundary
- 10km Study Area

Values represent PM_{10} Background Concentration within 1km OS Grid Square

NOTES:

FIGURE TITLE

Figure 12-3 (2 of 3)
PM_{10} Background Concentrations

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PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_12-3

Revision: 3 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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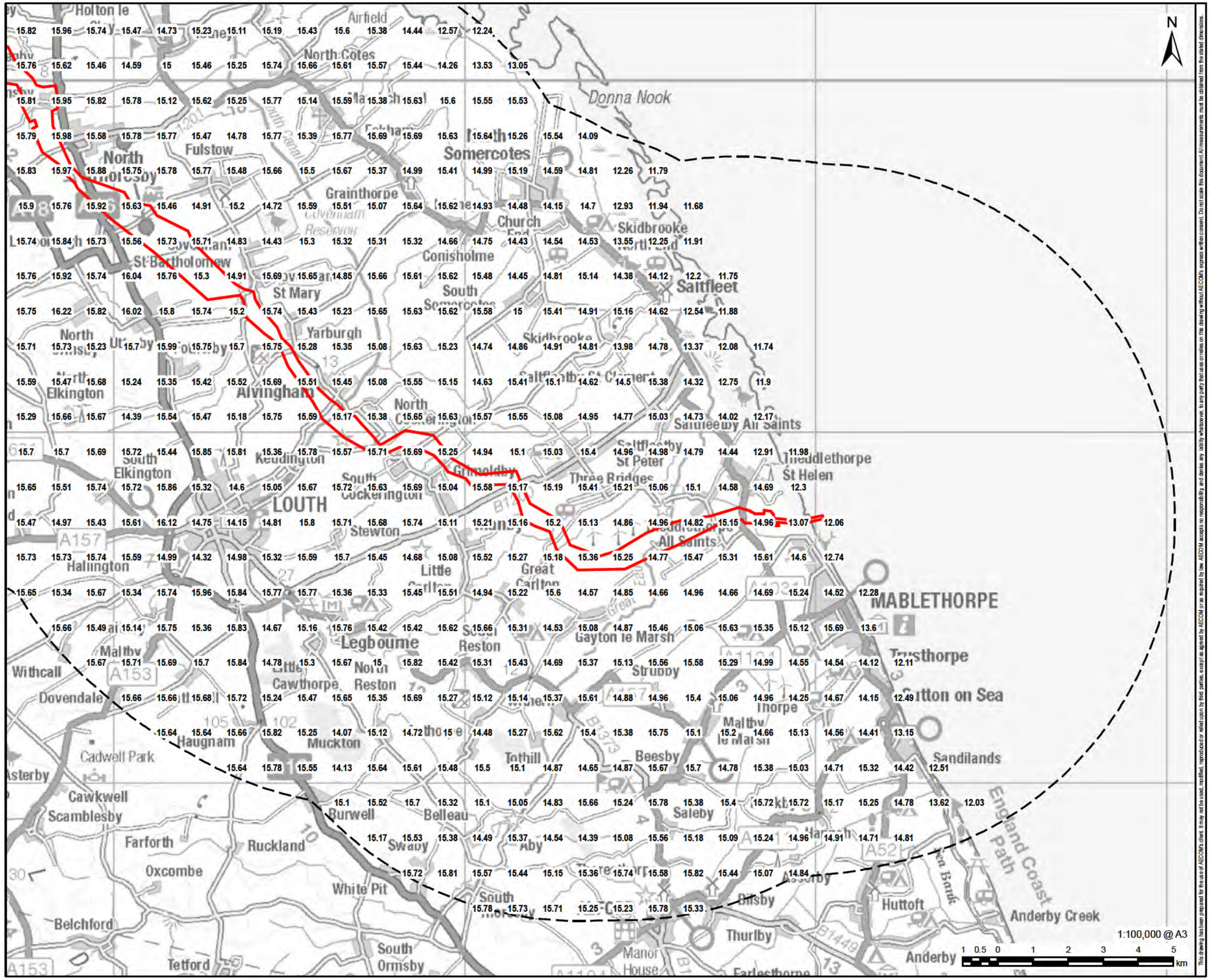

CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 10km Study Area

Values represent PM_{10} Background Concentration within 1km OS Grid Square

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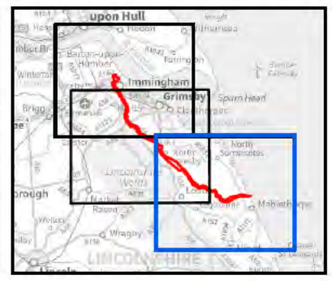


FIGURE TITLE

Figure 12-3 (3 of 3)
PM_{10} Background Concentrations

ISSUE PURPOSE

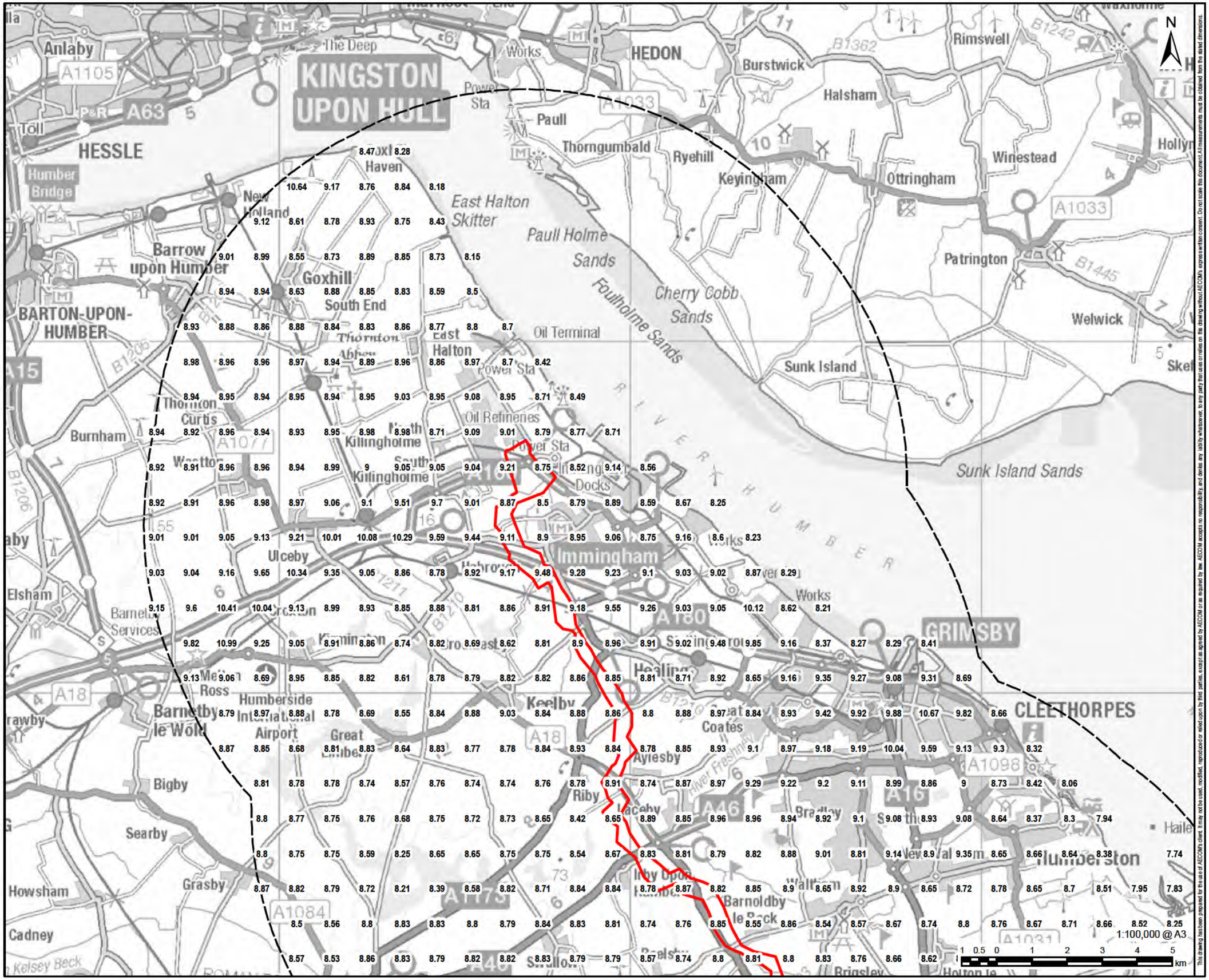
SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_12-3

Revision: 2 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

Filename: \\eu.aecomnet.com\EMA\UKIUKNCL2\Jobs\60668955\V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\Scoping Report\VNZ_SR_12-4_PM2.5 Background Concentrations_v2_20220323_ER.mxd



CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 10km Study Area

Values represent $PM_{2.5}$ Background Concentration within 1km OS Grid Square

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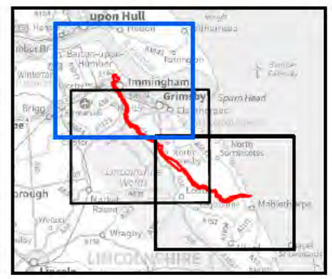

FIGURE TITLE

Figure 12-4 (1 of 3)
$PM_{2.5}$ Background Concentrations

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_12-4

Revision: 2 Drawn: ER Checked: LC Approved: MW Date: 2022-03-23

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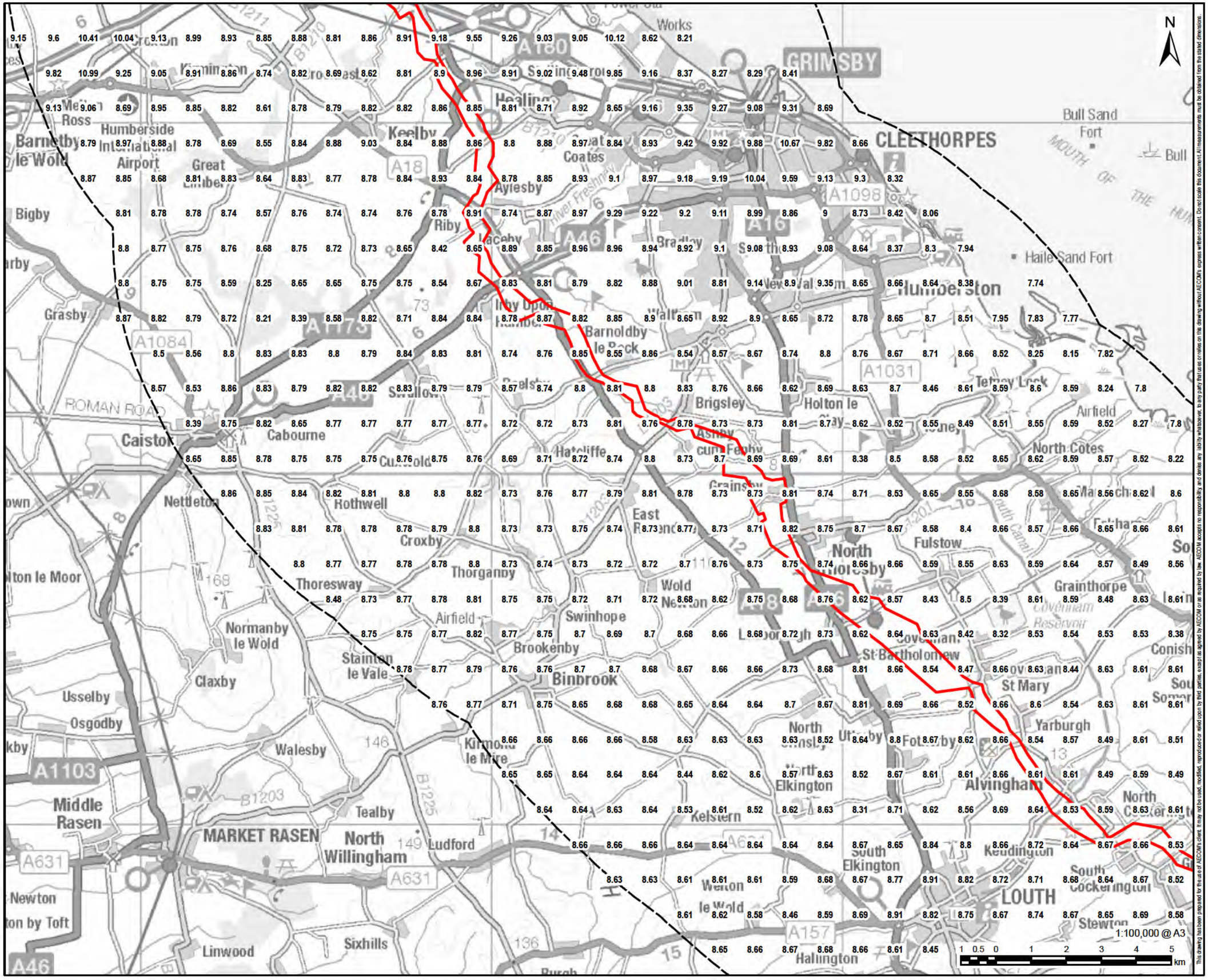

CONSULTANT
AECOM

CLIENT
Chrysaor Production (U.K.) Limited

PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- 10km Study Area

Values represent $PM_{2.5}$ Background Concentration within 1km OS Grid Square

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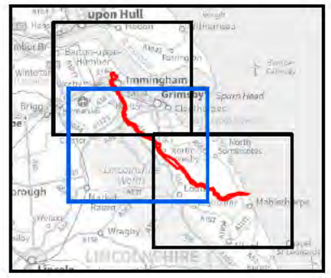

FIGURE TITLE
Figure 12-4 (2 of 3)
$PM_{2.5}$ Background Concentrations

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_12-4

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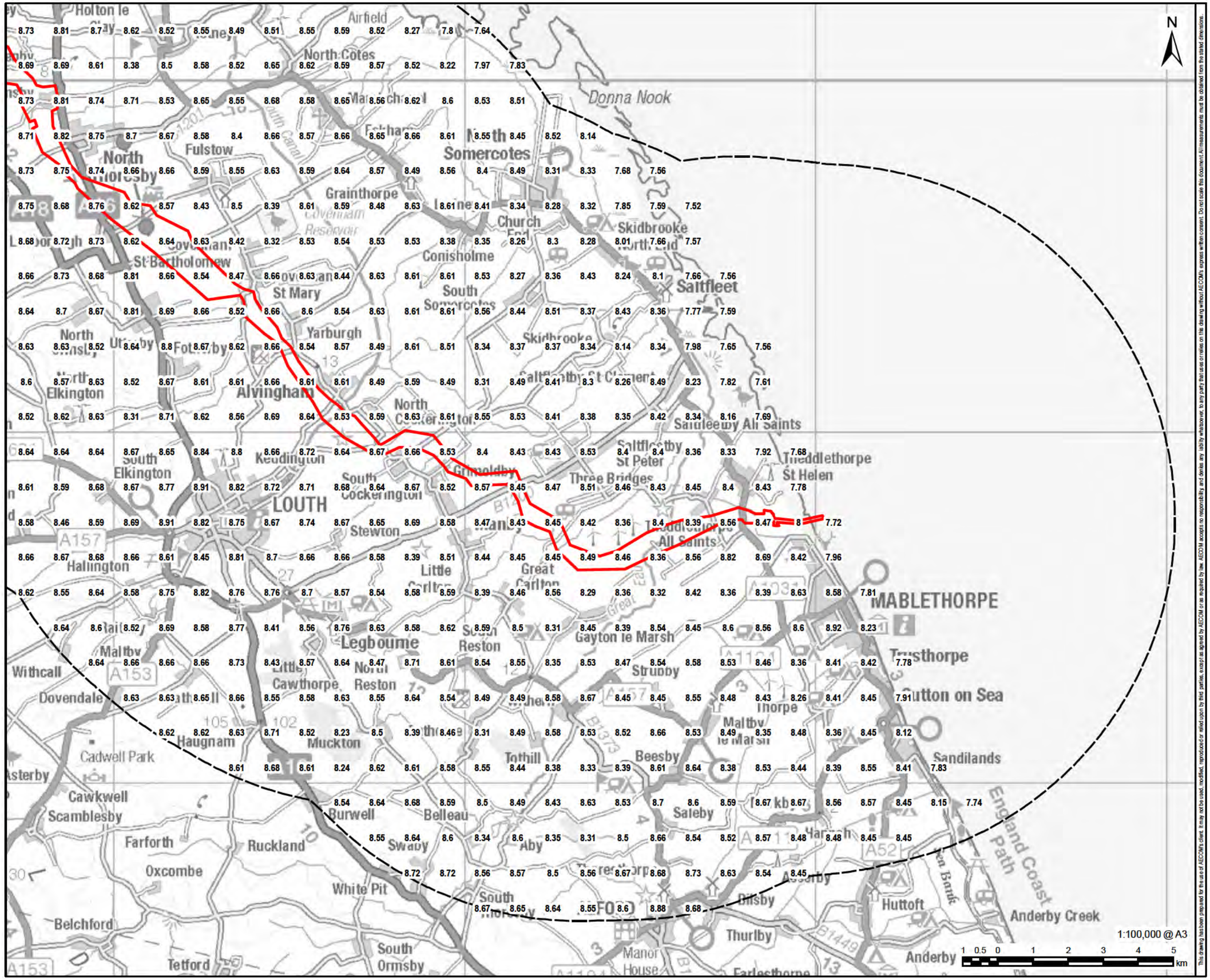
Filename: \\eu.aecomnet.com\EMEA\UK\NKC12\Jobs\60668955 V_Net_Zero_Project\600_CAD_GIS\920_GIS\02_Maps\Scoping Report\VNZ_SR_12-4_PM2.5 Background Concentrations_v2_20220323_ER.mxd



CONSULTANT

AECOM

CLIENT

Chrysaor Production (U.K.) Limited

PROJECT

V Net Zero Pipeline

LEGEND

- Scoping Boundary
- 10km Study Area

Values represent $PM_{2.5}$ Background Concentration within 1km OS Grid Square

NOTES:

FIGURE TITLE

Figure 12-4 (3 of 3)
$PM_{2.5}$ Background Concentrations

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER / REFERENCE

60668955 / VNZ_20220323_SR_12-4

Future Baseline

12.3.10 In the years up to 2029, it is expected there will be a gradual decline in pollutant concentrations as a result of expected improvements in air quality. These improvements are expected as a result from measures such as the implementation of the U.K. Government's Clean Air Strategy, its commitment to become net zero by 2050, improvements in real world emissions performance of road vehicles and more stringent emission limits for industrial sources in line with the requirements of the Industrial Emissions Directive. However, as a conservative approach, it is proposed that such anticipated reductions are not reflected in the future background should a detailed assessment be required.

12.3.11 With regard to the potential effects of climate change on the future air quality baseline, the 2007 report produced by the Air Quality Expert Group (AQEG) (Ref 12-10) indicated that the winter season may become windier with fewer less stable weather conditions by the end of the century, whilst summer seasons are anticipated to become hotter and sunnier, with an increase in unstable weather conditions by the 2040s. The net effect of these anticipated changes on the baseline air quality is difficult to establish but is unlikely to significantly alter the baseline air quality to an extent that it would affect the outcome of any assessment. Other factors such as changes in technology and the move away from combusting fossil fuels, driven by climate change mitigation, would potentially lead to decreases in emissions of the key pollutants considered in this assessment and a corresponding decrease in background concentrations of air pollutants into the future. Further details on climate change are included in Chapter 18.

12.4 Planned Surveys

12.4.1 Given the expected pollutant concentrations in the Study Area and the likely limited impact on local air quality, an air quality survey to inform the assessment will only be required if the need to model construction phase vehicle movements is identified through discussions with the LPAs. It is, therefore, not proposed at this time that any air quality surveys will be carried out.

12.4.2 Should the construction dust assessment identify the need for some form of dust monitoring to form part of the Construction Environmental Management Plan, or form part of a mitigation measure during stakeholder consultation, the extent and approach to such monitoring will be identified in the ES.

12.5 Assessment Method

12.5.1 Relevant Legislation, Planning Policy and Technical Guidance

Legislation

12.5.2 A summary of the relevant legislation is given in **Table 12-2**. **Table 12-3** provides the Air Quality Standards (AQS) and Air Quality Objectives (AQO) relevant to this assessment.

Table 12-2: Legislation relevant to air quality

Legislation	Legislation Context
The Environment Act 1995 (Ref 12-11)	The Environment Act 1995 and subsequent amendments and the Environmental Act 2021 relate to a wide range of environmental issues. The Act covers the control of pollution and lays out the responsibility of the governing bodies in the UK responsible for the enforcement of environmental laws. Part IV of the Environment Act 1995 requires that Local Authorities periodically review air quality within their individual areas. This process

Legislation	Legislation Context
	of Local Air Quality Management (LAQM) is an integral part of delivering the Government's Air Quality Objectives (AQOs).
The Air Quality Regulations 2000, United Kingdom (Ref 12-12)	Provides UK Air Quality Objectives (AQOs) for a range of different pollutants, unlike Air Quality Standards, there is no statutory obligation to meet AQOs; AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.
The 2007 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Ref 12-13)	The Environment Act 1995 required the adoption of an Air Quality Strategy containing standards, objectives and measures for improving ambient air quality. The 2007 Air Quality Strategy is designed to meet that requirement and provides a framework for improving air quality at a national and local level and supersedes the previous strategy published in 2000. It imposes a number of obligations on local authorities to manage air quality. Central to the Air Quality Strategy are health-based criteria for certain air pollutants; these criteria are based on medical and scientific reports on how and at what concentration each pollutant affects human health and mirror the Air Quality Objectives (AQOs) set out in the Air Quality (England) Regulations 2000. The AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.
The Air Quality Standards (England) Regulations 2010 (Statutory Instrument (SI) 2010/1001), as amended (Ref 12-14)	The Air Quality Standards (AQS) Regulations report limit values at differing averaging periods for certain pollutants. There are limits provided for the protection of human health for SO_2, NO_2, Benzene, CO and Pb. Target values have been set for the concentration of $PM_{2.5}$. A limit value for the concentration of $PM_{2.5}$ is also provided. All limit values included in these Regulations should not be exceeded. This regulation transposes the European Directive 2008/50/EC (as amended) (Ref 12-19) into UK law.
The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (SI 2018/764) (Ref 12-15)	The Non-Road Mobile Machinery (NRMM) Regulations provide the requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery. This regulation transposes the European Directive 97/68/EC (as amended) (Ref 12-21) into UK law.

Table 12-3: Relevant air quality standards and objectives

Pollutant	Averaging Period	Value (µg/m^3)
NO2	Annual mean	40
	1-hour mean (not to be exceeded more than 18 times per year)	200
PM10	Annual mean	40
	24-hour mean (not to be exceeded more than 35 times per year)	50
PM2.5	Annual mean	25

Planning Policy

12.5.3 A summary of the relevant planning policy is given in **Table 12-4**.

Table 12-4: Planning policy relevant to air quality

Policy Reference	Policy Context
National Policy	
Overarching National Policy Statement for Energy (EN-1) (Ref 12-16)	Paragraph 5.2.6 in Section 5.2 Air Quality and Emissions states "Where a project is likely to have adverse effects on air quality, an assessment of such impacts must be considered in the Environmental Statement. Paragraph 5.2.7 further states that the ES should describe: *any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;* *the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;* *existing air quality levels and the relative change in air quality from existing levels; and* *any potential eutrophication impacts.*
National Planning Policy Framework (NPPF) (Ref 12-17)	Paragraph 186 states: *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas (AQMAs) and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in AQMAs and Clean Air Zones is consistent with the local air quality action plan.".* The assessment will carefully consider the potential impact of the Project and establish whether it might constitute an obstacle to the achievement of strategic objectives that are set out within the air quality action plans of administrative authorities to bring about improvements in air quality within their AQMAs.
Clean Air Strategy 2019 (Ref 12-18)	Defra's Clean Air Strategy outlines the Government's proposed ambitions relating to reducing air pollution in order to protect health and nature, whilst boosting the economy. The strategy sits alongside three other UK government strategies: the Industrial Strategy, the Clean Growth Strategy and the 25 Year Environment Plan. Amongst others, the Clean Air Strategy proposes to halve the number of people living in locations where concentrations of particulate matter are above the World Health Organization (WHO) guideline limit of 10 $\mu g/m^3$ by 2025 and work in close collaboration with industry to explore further opportunities for industrial emissions reductions by developing a series of sector roadmaps to set standards aimed at making UK industry world leaders in clean technology.

Policy Reference	Policy Context
	The Project will not conflict with Government's aims of reducing exposure to $PM_{2.5}$ below the WHO guideline as appropriate mitigation will be implemented where necessary.
Local Policies	
Central Lincolnshire Local Plan 2012-2036 (West Lindsey) (Ref 12-19)	The Central Lincolnshire Plan was adopted in 2017 by WLDC, along with Lincoln City and North Kesteven. Policy LP26: Design and Amenity states that: *"The amenities which all existing and future occupants of neighbouring land and buildings may reasonably expect to enjoy must not be unduly harmed by or as a result of development. "* The policy goes on to say that proposals should demonstrate that *"Adverse impact upon air quality from odour, fumes, smoke, dust and other sources"* has been considered in relation to both the construction and life of the development.

Technical Guidance

12.5.4 A summary of relevant technical guidance is provided in **Table 12-5**.

Table 12-5: Technical guidance relevant to air quality

Technical Guidance Document	Context
Defra Local Air Quality Management (LAQM) Technical Guidance LAQM.TG16 (Ref 12-20)	Provides guidance for governmental and private sectors to discharge their obligations under the LAQM regime. It contains guidance on numerous areas including, for example, screening tools and methodologies, air quality monitoring, estimating emissions and dispersion modelling.
Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction v1.1 (2016)	Provides a four-step process for evaluating the risk associated with dust emissions from construction and demolition sites on different types of receptor with respect to dust soiling, health effects and ecological effects.
Environmental Protection UK & IAQM Land-Use Planning and Development Control: Planning for Air Quality (2017)	Provides a procedure for screening potential air quality effects of new development and a procedure for assessing the significance of air quality effects in planning applications.
IAQM Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites v.1.1 (2020)	Provides guidance on the air quality impacts of development on designated nature conservation sites but establishes that the assessment of the effects that air quality impacts may have on habitats and species should be the responsibility of a suitability qualified and experienced ecologist.
Highways England Design Manual for Roads and Bridges (DMRB) LA 105 (Ref 12-20)	Highways England Design Manual for Roads and Bridges (DMRB) LA 105

12.6 Scope of the Assessment

Potential Receptors

12.6.1 Receptors potentially affected by the Project comprise residents living in proximity to the Study Area as well as schools and recreational areas. In addition, there are also statutory and non-statutory biodiversity sites in the locality which may be susceptible to direct exposure to air pollutants emitted from the Project and through indirect effects associated with nitrogen and acid deposition.

Construction Site Emissions

12.6.2 Construction activities associated with the Project would include establishment and operation of a construction compound, construction of the pipeline offtake facility, shutdown valves and offshore pipeline tie-in and outlet, trench works and earth works associated with the installation of the underground pipeline and access road construction, as appropriate. More details on specific construction activities is available in Chapter 2: Project Description.

12.6.3 IAQM Guidance on 'Assessment of dust from demolition and construction' defines potentially sensitive receptors and is detailed in Section 12.2 Study Area.

12.6.4 **Figure 12-1** shows a 350 m buffer from the edge of the Scoping Boundary in which human receptors may be impacted by construction activities. The pipeline route is predominantly rural, however there are some inhabited areas within 350 m of the Scoping Boundary, including the outskirts of Immingham, Laceby, Irby upon Humber, Barnoldby le Beck, Brigsley, Ashby cum Fenby, Grainsby, North Thoresby, Ludborough, Covenham St Mary, Yarborough, Newholme, Alvingham, North Cockerington and South Cockerington, as well as isolated groups of properties or farms along the route.

12.6.5 There are no sensitive statutory ecological receptors within 50 m of the Scoping Boundary.

12.6.6 It should be noted that in line with IAQM guidance, distance of receptors from construction activities should be measured.

Construction Road Traffic Emissions

12.6.7 As mentioned previously, based on similar projects and review of AQMA locations, it is considered likely that the thresholds for detailed assessment of impacts on air quality from construction vehicles using dispersion modelling will not be exceeded and can therefore be scoped out from the need for assessment. These thresholds are >100 HDV outside of an AQMA for human receptors, or >200 HDV in combination with other projects at ecological receptors.

12.6.8 If, on review of construction vehicle routing and data (when available) and consultation with stakeholders, it is deemed necessary to carry out a detailed air quality assessment using dispersion modelling, sensitive human receptors will be selected. Guidance from Defra in LAQM.TG16 establishes that exceedances of the human health-based objectives should only be assessed at outdoor locations where members of the general public are regularly present over the averaging time of the objective. **Table 12-6** provides an indication of those locations that may be relevant for different averaging periods, as extracted from LAQM.TG16.

Table 12-6: Typical examples of relevant exposure for different averaging periods

Averaging Period	Objectives should apply	Objective should not apply
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other

Averaging Period	Objectives should apply	Objective should not apply
		location where public exposure is expected to be short term.
24-hour mean, and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

12.6.9 Similarly, should a detailed air quality assessment using dispersion modelling be required, sensitive ecological sites within 200 m of roads that exceed the DMRB threshold (i.e. >200 HDVs in-combination with other developments), along with any species sensitive to road traffic emissions, will be considered.

12.7 Assessment Method

12.7.1 The area within the Scoping Boundary shows that the route alignment currently avoids passing in close proximity to the more densely populated communities and conservation sites in the area. Inevitably, however, there are some dust and air quality sensitive receptors close enough to the route corridor that could be adversely impacted by the construction of the Project.

12.7.2 The key air quality constraints that will require attention within the ES are:

- Construction dust associated with the construction of the pipeline route and associated construction compounds.
- Vehicle emissions associated with the movement of construction materials, particularly on the approach to and from construction compounds, where the number of vehicle movements are likely to be greatest.
- Plant emissions from construction phase site plant, energy generation plant, and non-road mobile machinery.

12.7.3 An assessment of construction phase dust and particle matter (PM_{10}) emissions will be undertaken in line with the appropriate Institute of Air Quality Management dust from

demolition and construction guidance. The assessment will identify the likelihood of dust and PM_{10} impacts occurring, based on the scale of the works and the activities to be undertaken, and the sensitivity of the area to dust and PM_{10} impacts, based on the number and proximity of sensitive receptors (including those susceptible to amenity, human health and ecological impacts) and baseline PM_{10} concentrations. From this work, the assessment will recommend the level of dust control measures required to mitigate impacts to the extent that any effect would be not significant.

12.7.4 The same guidance will also be referred to for the consideration of site plant and Non-Road Mobile Machinery (NRMM) emissions, which will be dealt with in a qualitative manner based on the number of plant, the likely duration of their operation at any one area, the number and proximity of sensitive receptors and the baseline pollutant concentrations experienced there.

12.7.5 The recommended inputs into the Construction Environmental Management Plan will include discussion on the mitigation measures identified during the air quality assessment. The CEMP will also detail any commitment regarding air quality monitoring during the construction works, which will be agreed with stakeholders and may include dust monitoring prior to and during construction.

12.7.6 At this time, specific information about construction vehicle movements is not available. However, based on professional judgement of similar infrastructure projects, as well as liaison with the transport specialists for the Project, it is considered unlikely that a detailed air quality assessment will be required based on the screening criteria provided by IAQM and shown in **Table 12-7**.

Table 12-7: Screening criteria for detailed air quality assessment of road traffic emissions

Nature of Impact	Screening criteria for Detailed Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; or more than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: more than 25 AADT within or adjacent to an AQMA; or more than 100 AADT elsewhere.
Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
Introduce a new junction or remove an existing junction near to relevant receptors.	The introduction of a new junction or removal of a junction will lead to a detailed air quality assessment when this addition or removal causes traffic to significantly change vehicle acceleration or deceleration, for example, traffic lights, or roundabouts.
Introduce or change a bus station.	Where bus flows will change by: more than 25 AADT within or adjacent to an AQMA; or more than 100 AADT elsewhere.

Note: Taken from IAQM guidance Land-Use Planning and Development Control: Planning for Air Quality.

12.7.7 With regard to sensitive ecological receptors, screening criteria provided by DMRB of a change in AADT flows of 1,000 vehicles or 200 HDV, when considered in-combination with

other committed proposed developments in the vicinity may mean a detailed assessment is required.

12.7.8 Subject to confirmation that construction traffic volumes will not exceed the threshold for detailed air quality assessment using dispersion modelling no further assessment will be undertaken. Should it be determined a detailed air quality assessment is required, incremental changes to concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$ associated with construction phase road traffic movements will be predicted at receptors within 200 m of affected roads using the ADMS-Roads dispersion model and the latest emission factors from Defra's Emissions Factor Toolkit (EFT) that are available at the time of the assessment. The output from the model will be verified using the results from roadside diffusion tube monitoring, either undertaken by local authorities in the vicinity of the Project, as detailed in Appendix E, or through a programme of project specific monitoring.

12.7.9 It is not expected any further assessment will be required in terms of air quality based on the information available at the scoping stage, knowledge of similar projects and professional judgement. During operation, emissions would be restricted to those associated with road traffic movements during occasional inspection and maintenance activities. Similarly, it is not expected that decommissioning would require vehicle movements of a scale sufficient to trigger a detailed air quality assessment as set out in **Table 12-7**, or large scale earthworks or demolition.

12.8 Identification of Potential Effects

12.8.1 The construction dust assessment will use the IAQM guidance to identify the potential for impacts on amenity and health to occur, and to select the required level of dust control measures sufficient to mitigate impacts to the extent that any effect would be not significant.

12.8.2 The same guidance will also be referred to for the consideration of emissions from site plant and Non-Road Mobile Machinery (NRMM) emissions, to determine that the scale, duration and distance of construction activity to relevant receptors is not considered to be of a magnitude that would generate a significant effect.

12.8.3 The effects scoped out from further assessment in the ES are:

- Effects of pollutant emissions from road-going construction vehicles on both human and ecological receptors, as based on professional judgement and previous experience, it is unlikely that screening criteria in the IAQM's Land-Use Planning & Development Control: Planning for Air Quality will be met; and
- All effects relating to operation of the Project, as emissions during this phase would be restricted to occasional maintenance activities with little traffic generated.
- All effects relating to decommissioning.

12.9 Summary

12.9.1 Existing air quality within the Scoping Boundary is of a good standard, with pollutant concentrations well within the limit values set for the protection of human health. Much of the land within and around the Scoping Boundary is rural in nature and the alignment currently avoids close proximity to the more densely populated communities and conservation sites in the area. Inevitably, however, there are some dust and air quality sensitive receptors close enough to the route corridor that could be adversely impacted by the construction of the Project.

12.9.2 The key air quality constraints that will require attention within the ES are:

- Construction dust associated with the construction of the pipeline route and associated construction compounds.
- Vehicle emissions associated with the movement of construction materials, particularly on the approach to and from construction compounds, where the number of vehicle movements are likely to be greatest.
- Plant emissions from construction phase site plant, energy generation plant, and non-road mobile machinery.

12.9.3 The above subjects will be assessed in the ES, using a qualitative methodology and the assessment will recommend the level of control measures required to mitigate impacts to the extent that any effect would be not significant. A summary of the air quality items scoped in and out of the ES in shown in **Table 12-8**.

12.9.4 It is not expected that there will be any significant adverse effects on local air quality as a result of construction traffic movements associated with the Project, therefore it is proposed to scope out a consideration of road traffic from the main ES. This will be confirmed by review of construction traffic in relation to potentially sensitive receptors and sensitive areas (as determined by local authority monitoring data) when it is made available, then agreed with the relevant local authorities as necessary.

Table 12-8: Summary of scope for air quality assessment

Element	Phase	Scoped in	Scoped Out	Justification
Construction dust associated with the construction of the pipeline route and associated construction compounds.	Construction	✓		The pipeline route is predominantly rural, however there are some inhabited areas within 350 m of the Scoping Boundary as well as isolated groups of properties or farms along the route.
Road traffic emissions associated with the movement of construction materials, particularly on the approach to and from construction compounds, where the number of vehicle movements are likely to be greatest.	Construction		✓	This is subject to a review of construction vehicle routing and data (when available), but it is considered likely that the thresholds for detailed assessment of impacts on air quality from construction vehicles using dispersion modelling will not be exceeded.
Plant emissions from construction phase site plant, energy generation plant, and non-road mobile machinery.	Construction	✓		The pipeline route is predominantly rural, however there are some inhabited areas adjacent to the Scoping Boundary as well as isolated groups of properties or farms along the route.
All effects relating to operation of the Project.	Operation		✓	Emissions would be restricted to those associated with road traffic movements during occasional inspection and maintenance activities.

Element	Phase	Scoped in	Scoped Out	Justification
All effects relating to the decommissioning of the Project.	Decommissioning		✓	Would not require extensive ground works or vehicle movements of a scale sufficient to trigger a detailed air quality assessment.

12.10 References

Ref 12-1 Institute of Air Quality Management (IAQM). Guidance on the assessment of dust from demolition and construction. 2014. (online). Available from: [redacted]

Ref 12-2 Environmental Protection UK and Institute of Air Quality Management (IAQM). Land-Use Planning and Development Control: Planning For Air Quality. 2017. (online). Available from: [redacted]

Ref 12-3 Institute of Air Quality Management (IAQM). A guide to the assessment of air quality impacts on designated nature conservation sites. 2019. (online). Available from: [redacted]

Ref 12-4 North Lincolnshire Council. 2020 Annual Status Report. 2020.(online). Available from: [redacted]

Ref 12-5 North East Lincolnshire Council. 2021 Annual Status Report. 2021.(online). Available from: https://www.nelincs.gov.uk/assets/uploads/2021/11/NELC-Air-Quality-Annual-Status-Report-2021.pdf

Ref 12-6 West Lindsey District Council. 2021 Annual Status Report. 2021. (online). Available from: https://www.west-lindsey.gov.uk/my-services/my-community/environment/air-quality-and-smoke-control/west-lindseys-review-and-assessment-of-local-air-quality/

Ref 12-7 Department for Environment Food and Rural Affairs (Defra). UK-AIR Background Mapping data for local authorities. Available from: https://uk-air.defra.gov.uk/data/laqm-background-home

Ref 12-8 Natural England. Natural England Open Data Geoportal. (online). Available from: [redacted]

Ref 12-10 Air Quality Expert Group (AQEG). Air Quality and Climate Change: A UK Perspective. London: Defra. 2007. (online). Available from: https://uk-air.defra.gov.uk/assets/documents/reports/aqeg/fullreport.pdf

Ref 12-11 Parliament of the United Kingdom, The Environment Act 1995 (London, 1995).

Ref 12-12 Parliament of the United Kingdom, The Air Quality (England) Regulations 2000 (London, 2000).

Ref 12-13 Department for Environment Food and Rural Affairs (Defra). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. London: The Stationary Office, 2007.

Ref 12-14 Parliament of the United Kingdom, The Air Quality Standards Regulations 2010 (London, 2010).

Ref 12-15 Parliament of the United Kingdom, The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018. (London: 2018).

Ref 12-16 Department of Energy and Climate Change. Overarching National Policy Statement for Energy (EN-1). London: The Stationary Office, 2011.

Ref 12-17 Ministry of Housing, Communities and Local Government. National Planning Policy Framework. London: The Stationary Office, 2019.

Ref 12-18 Her Majesty's Government. The Clean Growth Strategy: Leading the way to a low carbon future. 2017. (online). Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf .

Ref 12-19 West Lindsey District Council. Central Lincolnshire Local Plan Preferred Options Consultation 2012-2036. (online). Available from: https://www.n-kesteven.gov.uk/central-lincolnshire//

Ref 12-20 Department for Environment Food and Rural Affairs (Defra). Local Air Quality Management Technical Guidance (TG16). 2018. (online). Available from: https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

Ref 12-21 Highways England, Transport Scotland, Welsh Government and Department for Infrastructure. Design Manual for Roads and Bridges (DMRB): LA 105 Air quality. 2019.

13. Noise & Vibration

13.1 Introduction

13.1.1 This chapter of the EIA Scoping Report presents an initial baseline for noise and vibration for the V Net Zero Pipeline (hereafter referred to as the Project), identifies the need for additional surveys to ensure there is appropriate information to accurately characterise the baseline and sets out the Study Area. In addition, the chapter provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects of the Project.

13.1.2 The scope of this Chapter considers noise and vibration effects on human receptors and excludes assessment of noise and vibration on ecological receptors. The potential disturbance of local ecological or heritage receptors from noise due to the introduction of the Project will be considered in Chapter 6: Ecology & Biodiversity and Chapter 8: Historic Environment . This chapter is supported by **Figure 13-1**.This chapter should also be read in conjunction with Chapter 15: Socioeconomics, and Chapter 16: Health & Wellbeing.

13.2 Baseline Environment and Study Area

13.2.1 For the purposes of providing an assessment of likely significant noise and vibration effects the Study Area has been determined by receptors within 300 m of the Scoping Boundary. This is based on BS5228:2009+A1:2014 which states that at *"distances over 300 m noise predictions have to be treated with caution, especially where a soft ground correction factor has been applied, because of the increasing importance of meteorological effects*".

13.2.2 Based on information presented in the 2017 (Round 3) DEFRA Strategic noise mapping dataset (Ref 13-1), the dominant sources of sound in the area are considered to be the local road network including the A16 and A18. Additional sound sources include agricultural activities on surrounding road networks along the extent of the pipeline route, the Humberside Airport and current extremely limited on site works at the Theddlethorpe Gas Terminal.

13.2.3 There are no identified Noise Important Areas and Noise Action Plan Priority Areas within the Study Area.

13.3 Planned Surveys

13.3.1 Baseline sound surveys will be carried out to establish the noise environment within the Study Area and to define baseline noise levels representative of surrounding noise sensitive receptors. Surveys will be carried out post-scoping, following the agreement of their scope and methodology in consultation with the Environmental Health Officers of the relevant Local Authorities including Lincolnshire County Council, North Lincolnshire Council, North East Lincolnshire Council, East Lindsey District Council and West Lindsey District Council. Suitable locations for monitoring will be agreed and will take into consideration the safety of the operators, security of monitoring equipment and accessibility.

13.3.2 At this stage the exact monitoring locations have not been finalised. It is envisaged that long-term unattended measurements will be undertaken at the Pipeline Offtake Facility at Immingham, offshore pipeline tie-in and outlet at former TGT Site, and intermediate actuated shutdown valves along the extent of the pipeline. Short-term attended measurements are proposed to be carried out at selected locations along the extent of the pipeline route.

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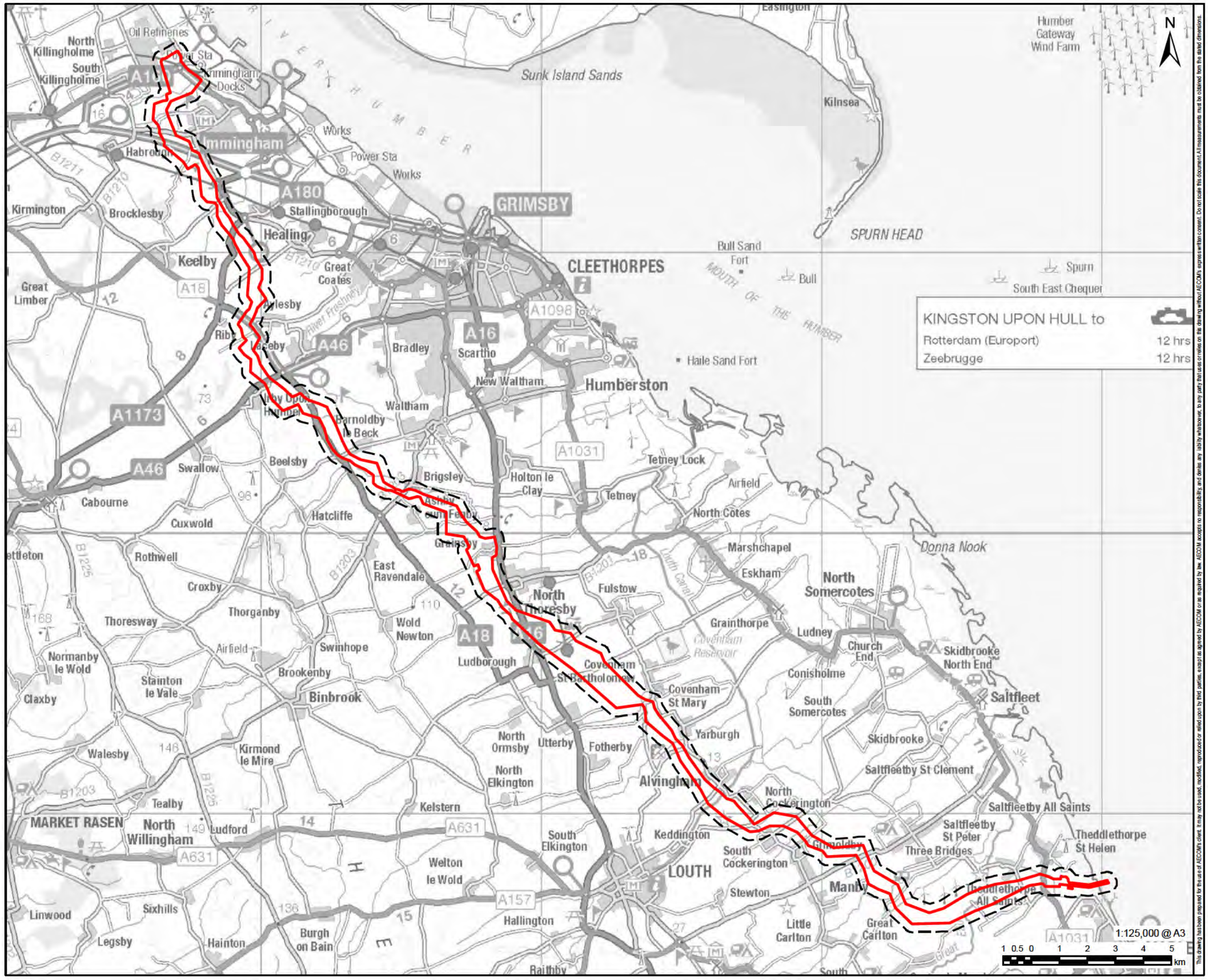

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AECOM

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Chrysaor Production (U.K.) Limited

PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- 300m Study Area

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FIGURE TITLE
Figure 13-1
Noise and Vibration Assessment Study Area

ISSUE PURPOSE
SCOPING REPORT

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60668955 / VNZ_20220323_SR_13-1

13.3.3 The monitoring procedures will follow guidance from British Standard (BS) 7445-1:2003 'Description and environment of environmental noise – Part 1: Guide to quantities and procedures' (Ref 13-2) and BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (Ref 13-3).

13.3.4 All noise measurements will include L_{Aeq}, L_{A90}, L_{A10} and L_{AFmax} sound level indicators over 15-minute contiguous periods. The surveys will be planned to avoid periods of high wind (>5m/s) and rainfall. Weather conditions will be checked beforehand to ensure appropriate conditions are met. A weather station will also be set up to record relevant weather parameters including wind speed and precipitation during the survey period.

13.3.5 It should be noted that, given the on-going Covid-19 pandemic, it may not be feasible to undertake a representative baseline sound survey depending on the timescales of the proposed DCO application. Baseline sound levels may differ to normal levels because typical road, air and rail transport usage has been reduced by travel restrictions and social distancing measures. Should this be the case, liaison with the LPAs will be undertaken in order to discuss potential alternative methods that can be used without a site visit e.g. use of previous survey data from recent applications for nearby sites, noise maps, noise prediction or the establishment of a worst-case scenario to use for the assessment.

13.3.6 Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort will be made to ensure that measurements are undertaken in such a way as to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions, and school holiday periods (which are often considered to result in atypical sound levels). However, a small degree of uncertainty will always remain in the values taken from such a measurement survey.

13.3.7 It is not proposed to undertake ambient vibration monitoring as no major vibration sources are identified in the study area, and any vibration impacts will be assessed on the absolute levels as discussed in the following assessment methodology section.

13.4 Assessment Method

13.4.1 Noise and vibration levels associated with construction works will be assessed (at chosen sensitive receptors, agreed with the Environmental Health Officers of the relevant Local Authorities) using the data and procedures given in BS 5228:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites Part 1: Noise and Part 2: Noise"* (Ref 13-4).

13.4.2 Construction works noise levels will be predicted following guidance from BS 5228 Part 1 which provides a realistic estimate of sound propagation from construction plant. The predictions will use representative noise levels, sourced from industry standard guidance documents such as BS 5228, for typical items of plant that are used in such developments. Construction noise will be assessed based on guidance from BS 5228 Part 1 (e.g. the 'ABC' method which compares predicted construction noise levels to existing levels of ambient noise).

13.4.3 BS 5228 Part 2 indicates that vibration effects generally only occur during heavy ground works (e.g. piling, excavation or ground compaction activities) when they are located less than 20 m from sensitive locations. The effect depends on the type of works taking place, ground conditions, and receptor distance. Vibration levels from plant and equipment activities will be estimated based on library measurement data from BS 5228 Part 2 and TRL Report 429 'Groundborne Vibration Caused by Mechanised Construction Works' (2000)

(Ref 13-5). Construction vibration will be assessed based on guidance from BS 5228 Part 2.

13.4.4 The temporary changes in road traffic noise levels along the local road network due to construction traffic will be informed by calculations of the change in road traffic noise levels according to the methodology outlined in the '*Calculation of Road Traffic Noise*' (CRTN) (1988) (Ref 13-6) and assessed based on guidance from the Institute of Environmental Management and Assessment (IEMA) '*Guidelines for environmental noise impact assessment*' (2014) (Ref 13-7).

13.4.5 Previous versions of the Highways Agency Design Manual for Roads and Bridges (DMRB) LA111 'Noise and Vibration' (2020) (i.e. HD 213/11 published in November 2011) (Ref 13-8) states that: "*a change in noise level of 1 dB $L_{A10,18h}$ is equivalent to a 25% increase or a 20% decrease in traffic flow, assuming other factors remain unchanged and a change in noise level of 3 dB $L_{A10,18h}$ is equivalent to a 100% increase or a 50% decrease in traffic flow*." DMRB HD 213/11 (Ref 13-9) also advises that a change in road traffic noise of 1 dB is the smallest that is considered perceptible. As such, where increases in traffic flow are below 25% of existing flow volumes, negligible impacts are expected. It is proposed that assessment of noise impacts arising from road traffic movement associated with the operations of the Project is scoped out on the basis that road traffic movements during operation are not expected to adversely affect noise sensitive receptors.

13.4.6 The impact of operational noise from the Pipeline Offtake Facility at Immingham, offshore pipeline tie-in and outlet at former TGT site, and intermediate actuated shutdown valves along the extent of the pipeline will be assessed following the methodology set out in BS 4142, whereby the rating level of noise emissions from activities are compared against the background sound level of the pre-development noise climate.

13.4.7 Predictions of operational sound pressure levels for identified noise generating activities will be based on available information on the operating conditions and the levels of noise generated by the plant equipment, and undertaken following guidance to ISO 9613-1:1993 '*Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere*' (Ref 12-10) and ISO 9613-2:1996 '*Part 2: General method of calculation'* (Ref 13-11).

13.4.8 It is also proposed that assessment of the vibration impacts arising from operation of the Project is scoped out of the assessment as operational activities are not expected to generate significant levels of vibration.

13.4.9 The Noise Policy Statement for England (NPSE) (2010) (Ref 13-12) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The Explanatory Note within the NPSE provides further guidance on defining 'significant adverse effects' and 'adverse effects' using the following concepts:

- *No Observed Effect Level (NOEL)* – the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- *Lowest Observable Adverse Effect Level (LOAEL)* – the level above which adverse effects on health and quality of life can be detected; and
- *Significant Observed Adverse Effect Level (SOAEL)* – the level above which significant adverse effects on health and quality of life occur.

13.4.10 With reference to the SOAEL, the NPSE states:

"It is recognised that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the

SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

13.4.11 Appropriate LOAEL and SOAEL thresholds will be defined in the ES for each of the construction and operational noise and vibration impact assessments. These thresholds will take into consideration the guidance and standards discussed above, the results of the baseline sound surveys, as well as further relevant guidance including the World Health Organization (WHO) '*Guidelines for Community Noise*' (1999) (Ref 13-13) and the WHO '*Environmental Noise Guidelines for the European Region*' (2018) (Ref 13-14).

13.5 Identification of Potential Effects

Construction

13.5.1 Potential noise and vibration effects during the construction phase are likely to result from work activities associated with the site preparation, construction of the Pipeline Offtake Facility and offshore pipeline tie-in and outlet, plant installation, shutdown valves, pipeline laying, and construction-related vehicle movements within the Scoping Boundary and along access routes. Although any noise and vibration effects from the construction phase will be temporary and reversible with no lasting residual effect, an assessment of them will be included within the ES.

Operation

13.5.2 During the operational phase of the Project, there would be the potential for some limited noise from the electrical and mechanical equipment associated with the Pipeline Offtake Facility, offshore pipeline tie-in and outlet, and shutdown valves. This would be a long-term operational sound source which may affect receptors within the study area. Consequently, this would be assessed within the ES.

13.5.3 Operational traffic movements are expected to be limited, and as such, changes in road traffic noise during the operational phase of the Project are also expected to be limited and not cause any significant effects. Consequently, potential operational impacts linked to traffic have been scoped out of the ES.

13.5.4 The new pipeline itself would be installed below ground and would not produce any operational noise emissions and has therefore also been scoped out of the assessment.

13.5.5 No major vibration sources are envisaged to be introduced during operation, and as such there would be no associated operational vibration effects. It is therefore proposed that operational vibration is scoped out of any further assessment and not included within the ES.

Decommissioning

13.5.6 An assessment of decommissioning impacts will be undertaken, which will be dependant upon the agreed decommissioning strategy which is currently being prepared.

13.6 Design, Mitigation and Enhancement

13.6.1 Measures to control construction noise as defined in Annex B of BS 5228 Part 1 and measures to control construction vibration as defined in Section 8 of BS 5228 would be adopted for the Project where reasonably practicable. These measures represent 'Best Practicable Means' (BPM) (as defined by section 72 of the Control of Pollution Act 1974)

(Ref 13-15) to manage noise and vibration emissions from construction activities. Suitable noise and vibration mitigation measures will be described within the ES.

13.7 Summary

13.7.1 Baseline sound surveys will be carried out to establish the noise environment within the Study Area and representative of surrounding noise sensitive receptors. The methodology (as agreed with relevant Local Authorities) and results will be presented in the ES.

13.7.2 Potential significant noise and vibration effects may occur during the construction phase due to works activities and construction-related traffic. Potential significant noise effects may occur during the operational phase due to operations of certain supporting components of the Project. These effects will be assessed in the ES.

13.7.3 It is not expected that significant noise effects due to operational traffic will occur, and thus this has been scoped out of the ES.

13.7.4 The noise and vibration assessments in the ES will focus on the likely significant effects and mitigation measures will be proposed to minimise significant adverse noise and vibration effects. Where significant effects are identified, mitigation measures to minimise any disturbance to sensitive receptors will be set out and the residual effect with these in place will be assessed.

Table 13-1: Summary of scope for noise and vibration assessment

Element	Phase	Scoped in	Scoped Out	Justification
Noise associated with construction work	Construction and decommissioning	✓		n/a
Road traffic noise	Construction and decommissioning	✓		n/a
Road traffic noise	Operation		✓	Changes in road traffic noise during the operational phase of the Project are also expected to be limited and not cause any significant effects.
Noise associated with Pipeline Offtake Facility at Immingham, offshore pipeline tie-in and outlet at former TGT site, and intermediate actuated shutdown valves	Operation	✓		n/a
Noise associated with the Project	Operation		✓	The Project itself would be installed below ground and would not produce any operational noise emissions and has therefore also been scoped out of the assessment.

Element	Phase	Scoped in	Scoped Out	Justification
Vibration	Operation		✓	No major vibration sources are envisaged to be introduced during operation.

13.8 References

Ref 13-1 https://www.gov.uk/government/publications/strategic-noise-mapping-2019

Ref 13-2 British Standards Institute (2003); BS 7445 – Description and environment of environmental noise – Part 1: Guide to quantities and procedures, BSi, London.

Ref 13-3 British Standards Institute (2014 with 2019 amendments); BS 4142 – Methods for rating and assessing industrial and commercial sound, BSi, London.

Ref 13-4 British Standards Institute (2009 with 2014 amendments) BS 5228:2009+A1:2014 – Code of practice or noise and vibration control on construction and open sites. Noise, BSi, London.

Ref 13-5 Hiller, D. M., and G. I. Crabb, (2000); Groundborne Vibration Caused by Mechanised Construction Works. TRL Report 429.

Ref 13-6 Department of Transport/Welsh Office (1988); Calculation of Road Traffic Noise.

Ref 13-7 Institute of Environmental Management and Assessment (2014); Guidelines for environmental noise impact assessment.

Ref 13-8 Highways Agency (2020); Design Manual for Roads and Bridges LA 111 Noise and Vibration Revision 2.

Ref 13-9 Highways Agency (2011); Design Manual for Roads and Bridges HD 213/11 Noise and Vibration Revision 1.

Ref 13-10 International Standards Organization (1993) ISO 9613 – Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere, ISO

Ref 13-11 International Standards Organization (1996) ISO 9613 – Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation, ISO

Ref 13-12 Department for Environment Food and Rural Affairs (Defra) (2010); Noise Policy Statement for England

Ref 13-13 World Health Organization (1999); Guidelines for Community Noise.

Ref 13-14 World Health Organization (2018); Environmental Noise Guidelines for the European Region.

Ref 13-15 Her Majesty's Stationery Office (1974); Control of Pollution Act

14. Traffic & Transport

14.1 Introduction

14.1.1 This chapter of the Scoping Report relates to the potential traffic and transport effects of the V Net Zero Pipeline (hereafter referred to as the Project). The objectives of the chapter are to:

- Describe the baseline environment in relation to traffic and transportation;
- Outline the methods and assessment to be undertaken for inclusion within the ES; and
- Identify any potential effects on users of the local transport network, including Public Rights of Way (PRoW) and cycle routes (including the National Cycle Network), that may arise because of the Project and any potential mitigation measures.

14.1.2 This chapter should be read in conjunction with Chapter 12 Air Quality and Chapter 13 Noise & Vibration.

14.2 Baseline Environment and Study Area

Study Area

14.2.1 The traffic and transport study area will include the anticipated construction routes serving the Project, shown in **Figure 14-1**: Proposed ATC Locations and Existing DfT Counters.

14.2.2 As a minimum, it is anticipated that the following strategic/primary links will likely be used by construction vehicles to access the Project:

- A160
- A180
- A18
- A46;
- A16;
- B1200; and
- A1031.

14.2.3 Alongside these a variety of smaller routes will also be included for assessment purposes.

Summary of Data Sources

14.2.4 This section describes the main data sources from which information will be obtained to inform the traffic and transportation baseline and subsequent assessment of environmental effects. The main data considered fundamental to the assessment of traffic and transport effects will be traffic flow data and personal injury accident data (PIA).

14.2.5 The PIA data will be obtained from the relevant highway authority for the most recent five-year period this will provide information on each collision including severity as well as the factors which attributed to the collision.

14.2.6 It is anticipated that Automated Traffic Counts (ATCs) will be required to obtain traffic flow data, which will be undertaken on the roads identified in **Figure 14-1** (see Section 14.3 Planned Surveys for more information).

14.2.7 Average Annual Daily Traffic (AADT) flows will be derived from the ATC data. Traffic generation at compounds and other sites for construction staff will be obtained, with a profile of daily Light Goods Vehicle (LGV) and Heavy Goods Vehicle (HGV) arrivals and departures across the construction period.

14.2.8 A review of the planning portal will also be undertaken to identify planning applications which may include representative traffic data collected prior to the COVID-19 pandemic.

14.2.9 Data obtained from the DfT and Webtris for the most recent, pre-COVID, period available (2018 or 2019 dependant on the quality of the data), provides an estimated AADTs for roads across the UK which are classified by vehicle type (pedal cycles, two wheeled motor vehicles, cars and taxis, buses and coaches, LGV as well as HGV). However, the data limitations of such counters are acknowledged as not all counters provide data for the full week, month or year.

14.3 Planned Surveys

14.3.1 ATCs will be undertaken during a neutral month during 2022 and will provide two-way traffic flows and be classified by vehicle type, including HGVs. In line with TAG Unit M1.2 (Ref 14- 2) neutral periods are defined as Monday to Thursday from March through to November (excluding August) and avoiding the weeks before / after Easter, surveys may be carried out outside these months if the conditions being surveyed are representative. The locations and timings of the surveys will be agreed with the relevant highway authority.

14.3.2 Inital ATC locations have been selected, subject to agreement, which will provide a basis for a robust baseline for assessment, including local routes within the corridor close to potential sensitive receptors, and routes along key strategic links. The proposed ATC locations and existing DfT traffic counters are shown on **Figure 14-1**. Due to proximity to the coast and the Lincolnshire Wolds AONB further data could potentially also be collected during the peak tourist season; this will be confirmed with the relevant local highway authorities.

14.3.3 Due to travel restrictions associated with the COVID-19 pandemic it may not be possible to undertake ATCs that are representative of the normal traffic conditions in the study area. If sufficient data are available, local factors can be calculated to be applied to the ATC data collected in 2022 making it more representative of the normal network operations in any particular location, as the nature of the lockdown effects will likely vary throughout the route. This will be confirmed with the relevant local highway authorities.

14.3.4 However, it is acknowledged that for purposes of the ES, lower baseline flows may provide a worst-case basis for the assessment as the ES utilises a percentage-based assessment methodology; therefore, the impact of the Project is likely to be higher where there are lower baseline flows. On this basis, any data collected in 2022 may be deemed as robust for purposes of the ES, subject to assessment of the data collected to check the validity of the data to previous years. Although, again the level of any robustness may vary across the route due to differing lockdown effects on traffic flows. This will be discussed, and the approach agreed with the LPA's highways officer(s) as appropriate.

14.3.5 If representative surveys cannot be undertaken, it is proposed to utilise existing traffic counters from the DfT and Webtris.

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KINGSTON UPON HULL to

Rotterdam (Europort)	12 hrs
Zeebrugge	12 hrs

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PROJECT
V Net Zero Pipeline

LEGEND
- Scoping Boundary
- ATC Location
- Existing DfT Counter Location

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FIGURE TITLE
Figure 14-1
Proposed ATC Locations & Existing DfT Counters

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_14-1

1:125,000 @ A3

1 0.5 0 1 2 3 4 5 km

14.4 Assessment Method

14.4.1 The methodology for assessing the impact of development-generated traffic will be based on that outlined in Institute of Environmental Assessment's (IEA, now known as the Institute of Environmental Management and Assessment (IEMA)) 'Guidelines for the Environmental Assessment of Road Traffic' (January 1993) (Ref 14-3). The IEA guidelines state that a link on the highway network should be included within the study if one of the following 'rules of thumb' is met:

- Rule 1 - Traffic flows increase by more than 30% (or HGV flows increase by more than 30%); or
- Rule 2 - Traffic flows in sensitive areas increase by more than 10%.

14.4.2 Alongside this all routes that have additional traffic on will be reported on as part of the assessment.

14.4.3 The IEMA guidelines recommend that several environmental effects may be considered important when considering traffic from an individual development. This chapter will consider the following effects:

- Severance;
- Pedestrian delay;
- Pedestrian amenity;
- Fear and Intimidation and
- Accidents and safety.

14.4.4 Although not identified specifically in the IEA guidance, it is also proposed that effects relating to fear and intimidation will be considered.

14.4.5 Each Highway Authority will be consulted in regard to the scope of the Transport Assessments, the proposed traffic surveys, proposed construction routes alongside all other elements included as part of the assessment.

14.4.6 Other potential traffic related effects are considered under other topics. Temporary noise and vibration effects resulting from construction traffic are considered in Chapter 13 Noise & Vibration and effects relating to air quality are considered in Chapter 12 Air Quality. The potential effects of construction traffic on sites of ecological and nature conservation value are dealt with in detail in Chapter 6 Ecology & Biodiversity . Any traffic effects on tourists, visitor attractions and other businesses, are considered in Chapter 15 Socio-economics. The type of traffic which is anticipated to be generated by the Project will be categorised as follows; primarily general traffic, LGVs, HGVs and Abnormal Indivisible Loads (AILs). The vehicle routeing and movement associated with the Project's construction will be considered in detail and will be discussed through consultation with the relevant Highway's Authorities.

14.4.7 Once the locations and volumes of the proposed traffic have been identified it will be necessary to identify those receptors that may be impacted upon, due to the increase in vehicle movements. This will be done by identifying the percentage increase in vehicular activity along the identified construction routes following the collection of traffic data. The ATCs will be used to derive baseline AADT for individual links, subdivided into 24 hour and 18 hour counts for total traffic and HGVs.

14.4.8 Typically, when assessing the impacts of traffic effects, there are a range of particular groups and locations which may be sensitive to changes in traffic conditions compliant with the 'rules of thumb' previously outlined.

14.4.9 These are outlined in the IEMA Guidance as 'Affected Parties', as follows:

- People at home;
- People in workplaces;
- Sensitive groups including children, elderly and disabled;
- Sensitive locations, e.g. hospitals, churches, schools, historic buildings;
- People walking;
- People cycling;
- Open spaces, recreational sites, shopping areas;
- Sites of ecological/nature conservation value; and
- Sites of tourist/visitor attraction.

14.4.10 The IEA guidance states that this list of affected parties is not exhaustive. One affected party that is not on the list but will nevertheless be considered in this assessment is 'other road users'. All of the affected parties have one thing in common which is that their potential exposure to changes in traffic volumes comes about through their proximity to a construction traffic route.

14.4.11 It is important to note that the IEA methodology does not consider the duration of effect, especially whether it is temporary (construction only) or permanent (operational traffic). As such effects that, using this methodology, may appear to be significant, may be considered not significant if the effect is temporary or infrequent (occurring only occasionally during construction).

14.4.12 To calculate the trip distribution of workers travelling to and from the proposed construction compounds each day, a simple gravity model will be developed. Construction traffic associated with the Project will be distributed onto the local highway network to calculate the resultant percentage increase on each link.

14.4.13 Assessments will be undertaken at the peak of construction, and this may cover more than one year as the peak year for traffic volumes can vary along various routes depending on which section of the Project they serve.

14.4.14 Currently, it is anticipated that the construction may take approximately 2 years. If historical data are utilised, base traffic flows will be growthed to the base year in order to establish baseline flows and then growthed to the identified peak year of construction. Growth factors derived from TEMPro v7.2 with MSOA area adjusted for relevant areas impacted by the Project. Meanwhile, the peak construction traffic flows will be derived by analysing construction traffic data and construction programmes provided by Design Engineers.

Transport Assessment

14.4.15 The ability of the highway network to accommodate the development traffic will be assessed and reported in a Transport Assessment (TA) which will form a technical annex to the ES Chapter. The TA will include information on:

- A review of relevant national, regional and local policies;
- Description of the existing baseline conditions - a thorough description of the roads, railway lines, footpaths, bridleways and cycle paths crossed by the route. Traffic flows on these routes and levels of use on bridleways, footpaths and cycle paths will be measured through site observations and agreed with the relevant planning authority;

- A review of the road safety data for the most recent five-year period within the identified search cordon;
- Description of the Project setting out timescales for construction, identification of route sections, typical working width layout, compound locations, access routes to compounds, construction methods for individual railway and road crossings;
- Traffic generation of compounds and any other relevant sites for construction staff with a profile of arrivals and departures for the day and HGV traffic with a profile of arrivals and departures for the day;
- Distribution and assignment of trips to the network with construction traffic distributed based on a gravity model of worker catchment area and HGV's assigned from the A road network;
- Mitigation measures; and
- Summary and conclusions.

Sensitivity, Value or Importance

14.4.16 The general criteria for defining the importance or sensitivity of receptors are set out in **Table 14-1**. Key factors influencing this include:

- The value of the receptor or resource based upon empirical and/or intrinsic factors, for example considering any legal or policy protection afforded which is indicative of the receptor or resources' value internationally, nationally or locally; and
- The sensitivity of the receptor or resource to change, for example is the receptor likely to acclimatise to the change. This will consider legal and policy thresholds which are indicative of the ability of the resource to absorb change.

Table 14-1: Categorising the Overall Sensitivity of a Highway Link

Affected Party	Built Environment Indicator along Highway Link	Highway Link Sensitivity to Changes in Traffic Flow
People at home	Residential Properties	**Medium**: Where there are a number of properties with direct frontage to the highway link being used as a construction route.
		Low: Where there are few properties with direct frontage to the highway link being used as a construction traffic route.
People in workplaces	Offices, industrial units, employment uses	**Low**
Sensitive groups (children,	Schools, play areas, care/retirement homes, disabled parking bays	**High:** Where there are multiple indicators of sensitive groups with direct frontage onto the highway link being used as a construction traffic route

Affected Party	Built Environment Indicator along Highway Link	Highway Link Sensitivity to Changes in Traffic Flow
elderly and disabled)		**Medium:** Where one indicator of sensitive groups is present with direct frontage onto the highway link being used as a construction traffic route
		Low: Where no indicator of sensitive groups are present
Sensitive locations (Hospitals, places of worship, schools historic buildings)	Hospitals, places of worship, schools, historic buildings	**High:** Where there are multiple indicators of sensitive locations
		Medium: Where one indicator of a sensitive location is present
		Low: Where no indicator of sensitive locations are present
People walking	Footways, PRoW, crossings	**Medium:** Indicators present on highway link
		Low: Indicators not present on highway link
People cycling	On/off-road designated cycle routes	**Medium:** On-road designated cycle routes present along highway link
		Low: Off-road designated cycle routes present along highway link
Open spaces, recreational sites, shopping areas	Parks, play areas, shops, community centres	**High:** Where there are multiple instances or indicators likely to be used by sensitive groups (i.e. children)
		Medium: Where one indicator is present that is likely to be used by sensitive groups (i.e. children)
		Low: Indicators that are unlikely to be used by sensitive groups
Road users	Roads, junctions, road classification, baseline traffic volumes, signage.	Determined by the presence of other affected parties in this table

14.4.17 The link sensitivity will be based upon an average sensitivity of the whole link with a separate assessment of high/very high receptors. Some links will be broken down into sensible sections where appropriate e.g. between two main junctions or villages.

14.5 Magnitude

14.5.1 This assessment will consider a range of potential effects that could be experienced during the construction stage of the Project and this section identifies how magnitude will be considered for each.

14.5.2 Severance is considered here in the context of driver severance, when there is difficulty accessing onto a heavily trafficked road. The assessment will consider both total traffic and the proportion of HGVs. The guidance for thresholds of magnitude is taken from DMRB Volume 11, Section 3, Part 8.

14.5.3 Pedestrian Delay occurs when there is difficulty crossing a heavily trafficked road. Effects are only likely to be realised when the total two way traffic on the carriageway exceeds 1,400 vehicles per hour (IEMA Guidelines).

14.5.4 Pedestrian Amenity is similar to Pedestrian Delay in that there needs to be a fairly significant proportional increase in traffic for baseline effects to be considerably worsened. The IEMA guidelines suggest that traffic needs to double for effects to become significant. This assessment acknowledges that lower proportional increases may have minor or moderate impacts.

14.5.5 Fear and Intimidation occurs through a combination of traffic flow, speed, proportion of HGVs and the proximity of the above to people or receptors on highway links. These indicators are often heightened by a perceived lack of protection or buffers from the highway or through narrow or non-existent footways. The assessment has considered each road on a case by case basis, however there are indicative thresholds provided in the IEMA guidelines which are presented in **Table 14-2**.

14.5.6 Driver Delay is an effect cited in the IEMA guidance and relates to incremental increases in traffic (as outlined in **Table 14-2**). As a further consideration, where any temporary road closures or traffic management is likely to be in place to enable the construction of the Proposed Development, any additional delay caused because of following diversion routes has been reported.

14.5.7 Highway safety considers PIA data obtained from CrashMap for the last five years at junctions and links along the proposed construction traffic routes. These have been used to assess whether the additional traffic during construction of the Proposed Development would be likely to have a detrimental effect of road safety.

14.5.8 PRoWs are assessed in a similar fashion to Driver Delay. Increases to traffic flows where PRoW intersect with highway links are considered on a percentage increase basis. However, where PRoWs are diverted or closed in part these are considered on the basis of how long disruption to the existing route would occur for.

14.5.9 **Table 14-2** summarises the criteria that are assessed in Section 9 mitigation and residual effects, along with the thresholds used to determine whether effects are considered Very Low, Low, Medium or High. Within this table, neither the sensitivity of receptors, nor the duration of effects, is taken into consideration. This table is formed using IEMA Guidelines, DMRB and professional judgement.

Table 14-2: ES Magnitude Criteria

Impact	Very Low	Low	Medium	High
Severance	Increase in total traffic flows of 29% or under (or increase in HGV flows under 10%).	Increase in total traffic flows of 30-59% (or increase in HGV flows of between 20%-39%.	Increase in total traffic flows of 60%-89% (or increase in HGV flows between 40%-89%.	Increase in total traffic flows or HGV flows of 90% and above.
Pedestrian Delay	Total traffic flows under 1,400 per hour.	Where traffic flows exceed 1,400 vehicles per hour the severity of the impact will be determined on a case-by-case basis based on receptor sensitivity.		
Pedestrian Amenity	Increase in total traffic flows of 49% or under.	Increase in total traffic flows of 50-69%.	Increase in total traffic flows of 70%-99%.	Increase in total traffic flows of 100% or above.
Fear and Intimidation	Increase in total traffic flows or HGV flows of 29% or under (or increase in HGV flows under 10%).	Increase in total traffic flows of 30-59% (or increase in HGV flows of between 10%-39%.	Increase in total traffic flows of 60%-89% (or increase in HGV flows between 40%-89%)	Increase in total traffic flows or HGV flows of 90% and above.
Driver Delay	Increase in total traffic flow of less than 29%.	Increase in total traffic flow of between 30% and 59%.	Increase in total traffic flow of between 60% and 89%.	Increase in traffic flow of 90% and above.
Highway Safety	Increase in total traffic flows of 30% or under (or increase in HGV flows under 10%).	All links estimated to experience increases in total traffic flows above 30% or increases in HGV flows above 10% are analysed further on a case by case basis.		
PRoW	Increase in total traffic flows or HGV flows of 29% or under (or increase in HGV flows under 10%) on a link intersecting a PRoW. Or Where there would be a temporary	Increase in total traffic flows of 30-59% (or increase in HGV flows of between 10%-39% on a link intersecting a PRoW. Or Where there would be a temporary increase in pedestrian journey length	Increase in total traffic flows of 60%-89% (or increase in HGV flows between 40%-89%) on a link intersecting a PRoW Or Where there would be a temporary increase in pedestrian journey length	Increase in total traffic flows or HGV flows of 90% and above on a link intersecting a PRoW. Or Where there would be a short term closure of the PRoW without a diversion route for more than four weeks in any 12 month period

Impact	Very Low	Low	Medium	High
	increase in pedestrian journey length along a road or other PRoW of one to five days due to short term closure (managed) of the PRoW	along a road or other PRoW of one to four weeks due to short term closure (managed) of the PRoW	along a road or other PRoW for more than four weeks due to short term closure (managed) of the PRoW	

Duration

14.5.10 **Table 14-2** above sets out the proposed magnitude thresholds for the respective environmental effects to be considered. Except for PRoW effects, all effects have a magnitude that does not, initially, consider the duration over which an effect is likely to be experienced.

14.5.11 Duration is considered when assessing the overall significance of residual effects, noting that the DMRB Volume 11 Section 2 Part 5 states in Paragraph 1.47:

'Recognition should be made that permanent impacts will be more significant than those of a temporary nature. For example, the impact may only occur during a single phase of the project construction and may be temporary. Alternatively, the impact may be long-term or irreversible and hence permanent. It is, therefore, important that the assessment distinguishes between permanent and temporary impacts'.

14.5.12 The traffic and transport effects associated with the Proposed Development would be temporary effects. Some temporary effects would be likely to last longer than others, and these will be clearly reported. Following the quantified assessment, residual effects will be reported, taking into account professional judgement on the duration over which effects are likely to be experienced.

14.6 Significance

14.6.1 Effects will be considered significant or not significant in EIA terms by judging the relationship between the magnitude of effect of each assessment criteria to be assessed, with the sensitivity of each receptor. A Major or Moderate effect is typically considered to be significant. A Minor or Negligible effect is not considered significant. **Table 14-3** presents a matrix that will be used to help determine the significance of effects.

Table 14-3 Significance of Effects Matrix

Sensitivity of receptor	Magnitude			
	High	Medium	Low	Very Low
High	Major– Significant	Major– Significant	Moderate– Significant	Minor– Not Significant
Medium	Major– Significant	Moderate– Significant	Minor– Not Significant	Negligible – Not Significant
Low	Moderate– Significant	Minor– Not Significant	Negligible – Not Significant	Negligible – Not Significant
Very Low	Minor– Not Significant	Negligible – Not Significant	Negligible – Not Significant	Negligible – Not Significant

14.6.2 As well as considering the duration that effects are likely to be experienced over, other factors will be taken into consideration when determining the significance of effects, such as any contingency route designations, and the specific nature of the receptor itself.

14.7 Identification of Potential Effects

Construction Phase

14.7.1 During construction there will be temporary increases in traffic flows on the road network that will be used by construction vehicles to access the construction compound(s). The network of roads affected will be relatively extensive, stretching from the coast at Immingham Dock to an area north of Mablethorpe, plus any wider routes that could potentially be used to deliver construction plant and materials. A key change from the baseline position is the number and percentage of HGVs using local roads.

14.7.2 Other aspects of the construction phase could lead to a significant effect, such as:

- Significant severance to communities caused by a large increase in traffic for a longer period;
- Increased risk of road traffic accidents caused by a large increase in traffic for a longer period;
- Temporary road closures, diversions and widening;
- Construction traffic using temporary bell mouths and site entrances for access to construction areas; and
- Temporary closures or diversions of PRoW and other public access routes.

Operational Phase

14.7.3 It is anticipated that the operational traffic will be scoped out from the assessment as this is likely to be negligible, being associated with periodic maintenance.

Decommissioning phase

14.7.4 The decommissioning strategy identified will determine if further assessment is required. Options will include leaving the pipeline in situ and/or dismantling above ground

installations. Further assessment will be undertaken within the ES once more details are available.

14.8 Likely Design, Mitigation and Enhancement Measures

14.8.1 Based on the potential for significant effects generated by the Project on traffic and transport, it is likely that mitigation will be required to reduce the potential impacts.

14.8.2 Mitigation by Design and Project Specific Mitigation including travel planning and HGV management will be incorporated into a Construction Traffic Management Plan (CTMP) to be submitted with the DCO application.

14.8.3 Programming of HGV movements may be subject to restricted periods of the day and the working week. It is envisaged that such periods could be restricted to 08:30-16:00 Monday to Friday and 09:00-13:00 Saturday with no working on Sundays or Public Bank Holidays.

14.8.4 Other minor highway improvements could potentially be carried out in sensitive locations to reduce the impact of the construction traffic.

14.8.5 The assessment of routes from the A road network to individual construction compounds and other sites will determine the feasibility of routes and where mitigation works are required. The impact of any cut & cover road crossings will be assessed to determine whether traffic light-controlled shuttle working, or full road closure is required.

14.8.6 It is anticipated that all mitigation required will be set out within the outline designs where required for route improvements between the A road network and compounds and the compound access junctions. Swept path analysis will be presented to support these designs. Temporary diversion or other mitigation measures for footpaths and cycle paths will be proposed where necessary.

14.9 Summary

14.9.1 This chapter of the Scoping Report sets out the traffic and transport assessment methodology and discusses potential mitigation measures to reduce any significant effects of the Project during the construction period. The assessment will be undertaken in line with the IEA guidelines, with modifications where these will provide greater clarity, such as the consideration of duration.

14.9.2 It is anticipated that ATCs will be undertaken during a neutral month during 2022, or other agreed time, and will provide two-way traffic flows and be classified by vehicle type along the anticipated construction routes serving the Scoping Boundary. These will provide the baseline for the assessment; however, as discussed within this chapter there might be data collection limitations associated with COVID-19, appropriate mitigation measures have been identified for robust assessment subject to agreement with the relevant highway authority.

14.9.3 The ATCs will be used to derive AADT for individual links, subdivided into 24 hour and 18 hour counts for total traffic and HGVs as part of the assessment to be included within the ES.

14.9.4 As part of the ES, the trip distribution of workers will also be included travelling to and from the construction compounds along the pipeline alignment each day. This will be achieved by development of a simple gravity model. Construction traffic associated with the Project will be distributed onto the local highway network to calculate the resultant percentage increase on each link.

14.9.5 It is anticipated that the operational traffic phase will be scoped out and not included in the ES.

14.9.6 Furthermore, to reduce the potential for significant effects generated by the Project on traffic and transport, several mitigation measures have been identified including an Outline TMP, and detailed mitigation measures will be provided within the ES.

14.9.7 A summary of the scope for the traffic and transport assessment are presented in **Table 14-4**.

Table 14-4:Summary of scope for traffic and transport assessment

Element	Phase	Scoped in	Scoped Out	Justification
Effects on traffic and transport as a result of construction traffic associated with the Project.	Construction	✓		During construction there will be temporary increases in traffic flows on the road network that will be used by construction vehicles to access the construction compound(s).
Severance Pedestrian delay Pedestrian amenity Fear and Intimidation Accidents and Safety	Construction	✓		These are based on IEMA guidelines recommendations.
	Operation		✓	The change in traffic is likely to be negligible, being associated with periodic maintenance.
Effects on traffic and transport as a result of traffic associated with the maintenance of the Project.	Operation		✓	The change in traffic is likely to be negligible, being associated with periodic maintenance.
Effects on traffic and transport as a result of construction traffic associated with the Project.	Decommissioning	✓		The Decommissioning strategy is not yet established. The decommissioning solutions identified will determine if further assessment is required. At this stage, decommissioning impacts will be scoped in for further consideration

14.10 References

Ref 14-1 Department for Transport, (2008); 'Design Manual for Roads and Bridges'. London: Department for Transport.

Ref 14-2 Department for Transport (2020) TAG Unit M1.2 Data Sources and Surveys, London: Department for Transport.

Ref 14-3 Institute of Environmental Assessment, (1993); 'Guidelines for the Environmental Assessment of Road Traffic'. London: Institute of Environmental Assessment.

Ref 14-4 Ministry of Housing, communities and Local Government, (2021); National Planning Policy Framework

15. Socio-economics

15.1 Introduction

15.1.1 This chapter of the Scoping Report presents an initial baseline for aspects relating to socio-economics, relevant to the V Net Zero Pipeline (hereafter referred to as the Project), identifies the need for additional surveys to ensure we have appropriate information to accurately characterise the baseline and sets out the Study Area. In addition, the chapter provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects provisionally identified.

15.1.2 This will include considering potential impacts on the following:

- Employment (including training and apprenticeship opportunities) and effects on local community;
- Users of recreational routes and Public Rights of Way (PRoW);
- Community severance;
- Private assets (including residential properties, development land, local businesses, community facilities, open space and visitor attractions relevant for tourism)

15.2 Baseline Environment and Study Area

Study Area

15.2.1 The Study Area varies depending on the effect or type of resource being assessed, as discussed further below.

15.2.2 Effects on users of recreational routes and PRoW will consider all such resources likely to be affected by alterations in distribution and flows. The types of resources considered include PRoWs themselves, National Cycle Network (NCN) routes and long-distance walking routes located within the Scoping Boundary.

15.2.3 The Study Area for 'community severance' will be extended to include communities that may potentially be directly and indirectly affected by the Project, for example, through severance effects. These will include communities directly connected by the recreational routes and PRoW. The communities that could be impacted are within 1km of the Scoping Boundary.

15.2.4 The Study Area for 'private assets' (including residential properties, local businesses, community facilities) will consist of the land parcels required to accommodate the Project during both construction and operation.

15.2.5 The commercial agreement for land, including productive land, between the proponent and land owners is beyond the scope of this assessment and the future Environmental Statement (ES) documentation.

Baseline Conditions

15.2.6 This Section establishes a high-level summary of key socio-economic indicators in the Study Area as well as the provision and condition of facilities and routes serving local communities for the defined Study Area (see above). Information gathered and presented has been identified through a desktop study.

15.2.7 The high-level summary of key socio-economic indicators has been based on the following sources and will be built upon as part of the ES:

- Office of National Statistics (ONS), (2021); Mid-Year Population Estimates (Ref 15-1);

- ONS, (2021): Claimant count by sex and age (January 2021) (Ref 15-4);
- ONS, (2020), Annual Population Survey (January 2020 to December 2020) (Ref 15-3); and
- Ministry of Housing, Community and Local Government (MHCLG), (2020), English Indices of Deprivation (2019) (Ref 15-2).

Overview

15.2.8 The Project is located within the local authorities of North Lincolnshire, North East Lincolnshire, East Lindsey and West Lindsey which have estimated populations of 172,700, 159,400, 142,000, and 96,200 respectively (Ref 15-1) (2020). Part of the pipeline also passes through the Lincolnshire County Council area.

15.2.9 The Study Area surrounding the Project comprises a mix of agricultural land and urban developments. Killingholme, a village located in North Lincolnshire, and Immingham, a town located in North East Lincolnshire, can be found to the west and south respectively of the Pipeline Offtake Facility. These settlements are located approximately 17 km south of Hull and 12 km north west of Grimsby.

15.2.10 As the pipeline corridor travels south east, it passes approximately 7 km south west of Grimsby and approximately 5 km north east of Louth before it arrives the offshore pipeline tie-in and outlet at the former Theddlethorpe Gas Terminal (TGT) site. TGT is located approximately 3 km north of the coastal town of Mablethorpe. These towns are the main locations for services and community facilities in the Study Area.

15.2.11 The Scoping Boundary also passes by a number of villages, including Stallingborough, Healing, Aylesby, Laceby, Irby upon Humber, Barnoldby le Beck, Brigsley, Ashby cum Fenby, Grainsby, North Thoresby, Ludborough, Covenham St Mary, Yarburgh, Alvingham, South Cockerington, Grimoldby, and Theddlethorpe. These villages offer a limited range of services and community facilities.

15.2.12 The Study Area is intersected by a network of A and B roads (including the A180, A1173, A18, A46, A16, A1031, B1210, B1203, and B1200) as well as numerous PRoWs.

15.2.13 Approximately 11% and 8% of Lower Layer Super Output Areas (LSOAs) located in North Lincolnshire and West Lindsey respectively are ranked in the top 10% most deprived in the country (Ref 15-2). Out of the 317 local authorities in England, North Lincolnshire and West Lindsey rank as the 115th and 136th most deprived (where 1 is the most deprived) respectively. In comparison, approximately 30% and 16% of LSOAs located in North East Lincolnshire and East Lindsey respectively are ranked in the top 10% most deprived in the country and the Districts are ranked as the 29th and 39th most deprived authorities respectively (Ref 15-2).

Labour Market

15.2.14 In 2020, the proportion of the population that was of working-age (16-64 years) in North Lincolnshire (59.7%) and North East Lincolnshire (59.7%) was slightly lower than the proportion for Yorkshire and The Humber (62.1%) and England and Wales (62.2%) (Ref 15-1). The proportion of the population that was of working-age (16-64 years) in East Lindsey (54.4%) and West Lindsey (57.7%) was significantly lower than the proportion for the East Midlands (61.8%) and England and Wales (62.2%) (Ref 15-2).

15.2.15 In 2020, the unemployment rate in North East Lincolnshire (5.2%) and West Lindsey (4.9%) was similar to the average recorded rates for Yorkshire and The Humber (4.6%), the East Midlands (5%), and England and Wales (4.8%) (Ref 15-3). However, the unemployment

rates in 2020 in North Lincolnshire (6.2%) and East Lindsey (7.3%) was higher than the regional and national averages (Ref 15-3).

15.2.16 In 2020, the economic activity rate in North Lincolnshire was 77.9%, similar to the average rates for Yorkshire and The Humber (77.8%), the East Midlands (79.5%), and England and Wales (79.2%) (Ref 15-3). However, the economic activity rates in 2020 in North East Lincolnshire (76.8%), East Lindsey (75.2%), and West Lindsey (72.5%) were lower than the regional and national averages (Ref 15-3).

15.2.17 In 2020, the unemployment rate in North East Lincolnshire (5.2%) and West Lindsey (4.9%) was similar to the average recorded rates for Yorkshire and The Humber (4.6%), the East Midlands (5%), and England and Wales (4.8%) (Ref 15-3). However, the unemployment rates in 2020 in North Lincolnshire (6.2%) and East Lindsey (7.3%) was higher than the regional and national averages (Ref 15-3).

15.2.18 More recently, the claimant count (as a proportion of residents aged 16-64 years) recorded in November 2021 in North Lincolnshire and West Lindsey was 4.3% and 3.7% respectively. For both authorities this is lower in comparison to the averages for their respective regions, Yorkshire and The Humber (4.9%) and the East Midlands (4%) and also England and Wales (4.7%) (Ref 15-4). However, the claimant count (as a proportion of residents aged 16-64 years) in North East Lincolnshire (5.2%) and East Lindsey (4.3%) is higher in comparison to the averages for their respective regions. Whilst the claimant count for East Lindsey is still below the average for England and Wales, the claimant count for North East Lincolnshire is above this average (Ref 15-4).

15.2.19 In terms of educational attainment, in 2020, the proportion of the population that held an NVQ Level 4+ in North Lincolnshire (32.4%), North East Lincolnshire (25.5%), East Lindsey (29.1%), and West Lindsey (31.1%) was significantly lower than the average rates for Yorkshire and The Humber (37%), the East Midlands (37.2%), and England and Wales (42.6%) (Ref 15-3).

15.2.20 The proportion of the population with no formal qualifications in North Lincolnshire (7.2%) is similar to the average rate for Yorkshire and The Humber (7.1%), but higher than the average rate for the East Midlands (6.2%) and England and Wales (6.3%) (Ref 15-3). The proportion of the population with no formal qualifications in North East Lincolnshire (11.7%) and East Lindsey (8.4%) is higher than both the regional and national averages. Conversely, the proportion of the population with no formal qualifications in West Lindsey (3.5%) is significantly lower than both the regional and national averages (Ref 15-3).

Recreational Routes and PRoWs

15.2.21 There is a network of recreational routes and PRoWs in the study area, including NCN routes. As the Scoping Boundary travels south east from the Pipeline Offtake Facility at Killingholme, it is intersected by NCN Route 110. There are also a number of PRoWs which intersect the Scoping Boundary, these routes connect Immingham, Grimsby, Louth, and Mablethorpe with the surrounding villages.

Community Severance

15.2.22 Community severance is the separation of residents from the facilities and services they use within their community. Residents in Immingham, Grimsby, Louth, Mablethorpe, and the surrounding villages are served by a wide range of services and facilities, as set out in **Table 15-1.**

Table 15-1: Community Facilities

Settlement	Type	Details
Immingham	Primary Schools	▪ Coomb Briggs Primary School ▪ Allerton Primary School ▪ Eastfield Primary Academy ▪ The Canon Peter Hall Church of England Primary School
	Secondary Schools	▪ Oasis Academy
	Hospital	▪ N/A
	GP Surgeries	▪ Pilgrim Primary Care Centre
	Libraries	▪ Immingham Library
Grimsby	Primary Schools	▪ Littlecoates Primary School ▪ Macaulay Academy ▪ Ormiston South Parade Academy ▪ Strand Community School ▪ St Mary's First and Middle School ▪ Weelsby Primary School ▪ Great Coates Primary School ▪ Wybers Wood Primary School ▪ Willows Primary School ▪ Laceby Acres Academy ▪ Western Primary School ▪ Grange Primary School ▪ Cambridge Park Academy ▪ Nunsthorpe Community School ▪ Woodlands Primary School ▪ St James' School ▪ St Martin's Preparatory School ▪ Scartho Infant School ▪ Lisle Marsden C Of E Primary Academy ▪ Welholme Academy ▪ Edward Heneage Primary School ▪ Old Clee Primary Academy ▪ Queen Mary Avenue Infant and Nursery School ▪ William Barcroft Junior School ▪ St Joseph's Roman Catholic Primary Voluntary Academy
	Secondary Schools	▪ John Whitgift Academy ▪ Franklin College ▪ The East Coast School of Art and Design ▪ Ormiston Marine Academy ▪ Grimsby Institute of Further and Higher Education ▪ The Orchard School ▪ St James School ▪ Sevenhills Academy ▪ Oasis Academy Wintringham ▪ Linkage College ▪ Havelock Academy

Settlement	Type	Details
	Hospital	▪ Diana, Princess of Wales Hospital ▪ St Hugh's Hospital
	GP Surgeries	▪ Stirling Medical Centre ▪ Quayside Medical Centre ▪ Weelsby View Health Centre ▪ Birkwood Surgery ▪ Cromwell Primary Care Centre ▪ Church View Health Centre ▪ Freshney Green Primary Care Centre ▪ Little Coates Road Medical Surgery
	Libraries	▪ Grimsby Central Library
Louth	Primary Schools	▪ Greenwich House Independent School ▪ Louth Kidgate Primary School ▪ St Michael's Church of England School ▪ Lacey Gardens Junior School ▪ Louth Eastfield Infants' and Nursery School ▪ St Bernard's School
	Secondary Schools	▪ Louth Academy ▪ St Bernard's School
	Hospital	▪ County Hospital Louth
	GP Surgeries	▪ James Street Surgery ▪ Newmarket Medical Practice
	Libraries	▪ Louth Library
Mablethorpe	Primary Schools	▪ Mablethorpe Primary Academy
	Secondary Schools	▪ The Mablethorpe Tennyson High School
	Hospital	▪ N/A
	GP Surgeries	▪ The Marisco Medical Practice
	Libraries	▪ Mablethorpe Library

Private Assets

Residential Properties

15.2.23 The Study Area comprises a mix of sparsely populated rural properties and urban settlements. The main settlements surrounding the Scoping Boundary are Immingham, Grimsby, Louth, and Mablethorpe. There are smaller villages and hamlets across the Study Area which contain residential properties that are also located close to the Scoping Boundary; including Stallingborough, Healing, Aylesby, Laceby, Irby upon Humber, Barnoldby le Beck, Brigsley, Ashby cum Fenby, Grainsby, North Thoresby, Ludborough, Covenham St Mary, Yarburgh, Alvingham, South Cockerington, Grimoldby, and Theddlethorpe. Dispersed dwellings and farms are also scattered through the Study Area.

Business Premises

15.2.24 There are no business premises lying directly on the Scoping Boundary for the Project. As the Scoping Boundary travels south east from the Pipeline Offtake Facility at Killingholme, the Scoping Boundary passes just east of Humber Refinery and just west of Immingham

Dock and a range of businesses in Immingham, including supermarkets, retail, hot-food takeaways, public houses, and accommodation facilities.

15.2.25 Further south east, the Scoping Boundary passes close to Irby upon Humber, Ashby cum Fenby, Covenham St Mary, Yarborough, and Alvingham. In these villages, business premises include supermarkets, retail, hot-food takeaways, public houses and accommodation facilities.

15.2.26 The Scoping Boundary then passes the town of Louth, which comprises supermarkets, retail, hot-food takeaways, public houses and accommodation facilities. In addition, Louth contains the Fairfield Industrial Estate.

15.2.27 Further south east, the town of Mablethorpe includes a variety of businesses such as supermarkets, retail, hot-food takeaways, public houses and accommodation facilities. In addition, within Mablethorpe, premises include vehicle repair shops and a pharmaceutical company.

15.2.28 The proposed offshore pipeline tie-in and outlet at the former TGT site are located within close proximity to DMJ Drainage, Golden Sands Holiday Park and Swallow Park caravan site.

Community Facilities

15.2.29 In addition to the education facilities, GP surgeries, and libraries described in **Table 15-1**, community facilities can be found in the towns and villages located in close proximity to the Scoping Boundary. There are community centres in Immingham (Bert Boyden Community Centre), Grimsby (West Marsh Community Centre, City Church Community Hall, Little Coates Community Centre, Scartho Village Community Centre, and St Hugh's Centre), Louth (Welbeck Way Community Centre), and Mablethorpe (Linkage Community Support and Community Hall Mablethorpe).

15.2.30 The nearest general hospitals are the Diana, Princess of Wales Hospital in Grimsby and County Hospital Louth in Louth. Larger hospitals are located in Hull, Scunthorpe and Lincoln.

Visitor Attractions

15.2.31 A range of visitor attractions are located within relatively close proximity to the Scoping Boundary. These comprise Immingham Skate Park, Laceby Manor, Beelsby Model Flying Club, Lincolnshire Wolds Railway (Ludborough), Rushmoor Farm Park, and Gayton Engine Pumping Station Museum.

15.2.32 There are also a number of hotels, guesthouses, campsites and holiday parks located within close proximity to the Scoping Boundary, most notably in Immingham, Louth and Mablethorpe. Immediately east of TGT is Swallow Park caravan site.

Open Space

15.2.33 Within the Scoping Boundary at Immingham is a former golf course and an area of woodland. The nearest other open spaces are Roxton Wood and Riby Park which are located approximately 2 km and 1 km, respectively, west of the Scoping Boundary. Other open spaces, in close proximity to the Project, are located within settlement areas.

15.2.34 The Scoping Boundary also briefly passes through the Lincolnshire Wolds AONB at Irby upon Humber. However, the careful routeing of the pipeline corridor has been designed to minimise the length of the corridor that is within the Lincolnshire Wolds AONB.

Development Land

15.2.35 North of the Offtake Site at Killingholme and the existing Immingham Port is a local plan allocation (SS10) for 900ha of strategic employment site. As the pipeline travels south, there are a number of residential site allocations east of the Project in Immingham, these are HOU002, HOU004, HOU006, and HOU233.

15.2.36 Further south, and east of the Scoping Boundary, there are a number of residential local plan site allocations in Laceby, these are HOU066, HOU068A, and HOU075A. North Thoresby also contains a number of residential local plan site allocations, these are NTH307, NTH308, and NTH313.

15.2.37 There are solar farm developments planned in proximity to the scoping boundary. These include developments north of Aylesby, adjacent to Section A of the scoping boundary; at Manor Farm in Laceby, 250m east of the scoping boundary; and Little Beck Farm, 260m of Section E of scoping boundary.

15.2.38 There are Mineral Safeguarding Areas located along the Scoping Boundary.

15.3 Planned Surveys

15.3.1 No surveys are proposed as part of the socio-economic assessment, with the study being desk-based. Should a subsequent survey need arise, details will be included within the ES. It is important to note however, that information gathered during the non-statutory and statutory consultation events will be used as appropriate to help inform the scope of the assessment.

15.4 Assessment Method

15.4.1 An assessment of potential impacts will be undertaken to determine the effect of the Project on the baseline socio-economic conditions. The methodology for assessing socio-economic impacts will follow standard EIA guidance and will entail:

- Assessment of the likely scale, permanence and significance of effects associated with socio-economics, recreation & tourism receptors; and
- An assessment of the potential cumulative impacts with other projects within the surrounding area.

15.4.2 The assessment of potential socio-economic impacts will use policy thresholds and expert judgment to assess the scale and nature of the impacts of the Project against baseline conditions. For socio-economics, recreation and tourism there is no accepted definition of what constitutes a significant (or not significant) socio-economic effect. It is however recognised that effects are categorised based upon the relationship between the scale (or magnitude) of effect and the sensitivity (or value) of the affected resource or receptor.

15.4.3 As such, the socio-economics, recreation and tourism effects will be assessed on the basis of:

- *Consideration of sensitivity to impact*: specific values in terms of sensitivity are not attributed to socio-economic resources/receptors due to their diverse nature and scale, however the assessment takes account of the qualitative (rather than quantitative) ‘sensitivity’ of each receptor and, in particular, their ability to respond to change based on recent rates of change and turnover (if appropriate);
- *Scale of impact*: this entails consideration of the size of the impact on people or business in the context of the area in which effects will be experienced; and

15.4.4 The assessment aims to be objective and quantifies effects as far as possible. However, some effects can only be evaluated on a qualitative basis. Effects are defined as follows:

- *Beneficial classifications of effect:* indicate an advantageous or beneficial effect on an area, which may be minor, moderate, or major in effect;
- *Negligible classifications of effect*: indicate imperceptible effects on an area;
- *Adverse classifications of effect:* indicate a disadvantageous or adverse effect on an area, which may be minor, moderate or major in effect; and
- *No effect classifications:* indicate that there are no effects on an area.

15.4.5 Based on consideration of the above, where an effect is assessed as being beneficial or adverse, the scale of the effect has been assigned using the below criteria:

- *Minor*: a small number of receptors are beneficially or adversely affected. The effect will make a small measurable positive or negative difference on receptors at the relevant area(s) of effect;
- *Moderate*: a noticeable number of receptors are beneficially or adversely affected. The effect will make a measurable positive or negative difference on receptors at the relevant area(s) of effect; and
- *Major*: all or a large number of receptors are beneficially or adversely affected. The effect will make a measurable positive or negative difference on receptors at the relevant area(s) of effect.

15.4.6 Those effects which are found to be moderate or major are considered to be 'significant' and those which are minor or negligible are 'not significant'.

15.4.7 Duration of impact is also considered, with more weight given to reversible long-term or permanent changes than to temporary ones. Temporary impacts are considered to be those associated with the construction works. Long-term reversible impacts are generally those associated with the completed and operational development. For the purposes of this assessment, short term impacts are considered to be of one year or less, medium term impacts of one to four years and long-term impacts for five or more years.

15.5 Identification of Potential Effects

15.5.1 This section of the Scoping Report identifies the potential effects of the Project on socio-economic receptors.

Construction

15.5.2 This section considers potential impacts during construction of the Project. It should be noted that impacts associated with the installation of the pipeline would be temporary in nature as it would be buried, with above ground infrastructure only located at either end of the pipeline and at block valve locations.

15.5.3 During construction, the Project may lead to the following potential effects:

Employment, economic growth and training

- temporary employment opportunities, both directly at work sites and indirectly in the supply chain, during the construction phase of the Project;
- gross value added (GVA) to North Lincolnshire, North East Lincolnshire, East Lindsey, and West Lindsey during the construction phase of the Project; and

- creation of training and apprenticeship opportunities upskilling local unemployed residents and vulnerable groups during construction within North Lincolnshire, North East Lincolnshire, East Lindsey, and West Lindsey

Recreational Routes and PRoWs

15.5.4 Land take during installation of the pipeline itself (typically comprising a 36 m working corridor) and any required shutdown valves may lead to the following potential impacts in terms of recreational routes and PRoWs:

a. temporary land take leading to the closure or diversion of PRoWs and recreational routes, including potential impacts on NCN route 110; and

b. beneficial or adverse impacts on active travel and physical activity through removal or provision of opportunities for walking and cycling.

15.5.5 Disruption to PRoWs, NCN or other recreational routes during construction would be avoided as far as possible. Suitable diversions would be agreed with North Lincolnshire Council, North East Lincolnshire Council, East Lindsey District Council, West Lindsey District Council, and Lincolnshire County Council and implemented where temporary closures are required. The permanent closure of PRoWs, NCN or other recreational routes is deemed avoidable; therefore, no permanent impacts on PRoWs, NCN or other recreational routes are expected.

Community Severance

15.5.6 Land take during installation of the underground pipeline may lead to the following potential impacts in terms of community severance:

a. temporary severance of access to community facilities for residents leading to deterioration of social cohesion and affecting mental health; and

b. temporary severance of access to healthcare services and other social infrastructure.

15.5.7 Disruption to PRoWs, NCN or other recreational routes which provide access to community facilities and healthcare services during construction would be avoided as far as possible and suitable diversions would be agreed with the local authorities and implemented where temporary closures are required. The permanent closure of PRoWs, NCN or other recreational routes is deemed avoidable; therefore, no permanent impacts arising from severance of access to community facilities or healthcare services are expected.

Private Assets

15.5.8 Identified potential impacts on residential properties, business premises, community facilities, visitor attractions and open space during construction include:

a. temporary loss of open space, such as at Immingham;

b. temporary land take during installation of underground pipeline, shutdown valves and the use of a temporary construction compound;

c. potential for noise and vibration, air quality and visual effects arising from construction activities associated with the construction of the Project to impact on the amenity of residential properties, business premises, community facilities, visitor attractions and open space;

d. potential temporary disruption of access to residences during and after construction; and

e. potential temporary disruption of access to visitor attractions or open space leading to impact on residents' physical activity and health.

Development Land

15.5.9 Potential effects on development land at housing and employment site allocations during construction are identified as including:

a. severance or disruption to access during construction.

Operation

15.5.10 All socio-economic effects during the operational phase have been scoped out of the environmental assessment. Justification for this is provided below.

Employment, economic growth and training

15.5.11 During operation, the Project may lead to the following potential impacts in terms of socio-economics:

a. creation of long-term employment opportunities, both direct and indirect, once the Project is operational including consideration of any existing employment uses on-site; and

15.5.12 Whilst there is potential for the creation of training and apprenticeship opportunities upskilling local unemployed residents and vulnerable groups during operation, these are likely to be very limited based on the scale of the operational employment generated. As such, this impact has been scoped out.

Recreational Routes and PRoWs

15.5.13 Operational activities at the above ground infrastructure including the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet would not lead to any potential impacts in terms of PRoWs, NCN and recreational routes during the operation phase. Any recreational routes or PRoWs impacted during the construction phase would revert to their previous route or be permanently redirected. As the pipeline itself will be buried, during the operation phase this would expect to lead to no significant impacts. Therefore, this has been scoped out of the assessment.

Community Severance

15.5.14 The operational phase of the Project is not anticipated to lead to any significant community severance effects. Operational activities at the Offtake Site and TGT, and the operation of the pipeline, would not lead to any potential impacts in terms of community severance. Any severance that could be experienced during the construction phase would not be anticipated to extend to the operational phase. As such this impact during the operational phase has been scoped out.

Private Assets

15.5.15 Operational activities at the above ground infrastructure including the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet could lead to operational impacts. The nature and extent of these impacts would be considered as part of the socio-economic chapter. As the pipeline itself will be buried, this would expect to lead to no significant impacts from the pipeline element of the Project. As such, this impact at the operational stage has been scoped in.

Development Land

15.5.16 Operational activities at the above ground infrastructure including the Pipeline Offtake Facility, shutdown valves and offshore pipeline tie-in and outlet will not lead to any potential impacts on development land during operation, with the only impact anticipated at the construction stage. As the pipeline itself will be buried, this would expect to lead to no

significant impacts on Development Land during the operational phase. As such, this impact at the operational phase has been scoped out.

15.6 Design, Mitigation and Enhancement

15.6.1 Mitigation measures will be included in the design (Mitigation by Design) where practicable to help avoid, prevent or reduce effects on the environment.

15.6.2 Additionally, during construction, Project Specific Mitigation would be implemented to ensure accessibility to recreational routes and PRoWs, community facilities and healthcare facilities, private assets and development land in the study area is maintained. This should be achieved through the use of best practice measures, regard to phasing of works and if necessary, providing diversions for users. Severance can also be reduced through careful siting of construction compounds and lay down areas, and careful planning of construction activities through consultation with landowners. Where temporary disruption to PRoWs, NCN or other recreational routes during construction is unavoidable, suitable diversions would be agreed with the relevant LPA(s) and implemented where temporary closures are required.

15.6.3 The permanent closure of PRoWs, NCN or other recreational routes is deemed avoidable.

15.6.4 Direct impacts to land use would be managed through negotiations with stakeholders including landowners and owners of businesses to mitigate impact.

15.7 Summary

15.7.1 Potential significant effects (temporary and permanent) on employment, recreational routes, PRoWs, community severance, private assets and development land may occur as a result of the construction of the Project. The assessment will focus on these likely significant effects and mitigation measures will be proposed to minimise significant adverse effects. Where significant effects are identified, mitigation measures to minimise any disturbance to sensitive receptors will be set out and the residual effect with these in place will be assessed.

15.7.2 Socio-economic effects during the operational phase have been scoped out of the environmental assessment.

Table 15-2: Summary of scope for socio-economic assessment

Element	Phase	Scoped in	Scoped Out	Justification
Employment, economic growth and training	Construction and Decommissioning	✓		n/a
Recreational Routes and PRoWs	Construction	✓		n/a
Community Severance	Construction	✓		n/a
Private assets	Construction	✓		n/a
Development land	Construction	✓		n/a

Element	Phase	Scoped in	Scoped Out	Justification
Employment, economic growth and training	Operation		✓	There is potential for the creation of training and apprenticeship opportunities upskilling local unemployed residents and vulnerable groups during operation. However, these are likely to be limited based on the operational requirements needed for the Project
Recreational Routes and PRoWs	Operation		✓	Any effects on Recreational Routes and PRoWs during the construction phase of the Project would not extent to the operational phase.
Community Severance	Operation		✓	Any severance that could be experienced during the construction phase would not be anticipated to extend to the operational phase.
Private assets (at above ground infrastructure)	Operation	✓		
Private assets (pipeline)	Operation		✓	By the point of operation, the pipeline itself will be buried and so would have no effect on private assets.
Development land	Operation		✓	Any impact to development land would be would not be anticipated to extend to the operational phase.

15.8 References

Ref 15-1 ONS, (2021), Mid-Year Population Estimates (2020).

Ref 15-2 MHCLG, (2020), English Indices of Deprivation (2019).

Ref 15-3 ONS, (2020), Annual Population Survey (January 2020 to December 2020).

Ref 15-4 ONS, (2021); Claimant count by sex and age (November 2021)

16. Health & Wellbeing

16.1 Introduction

16.1.1 This chapter of the Scoping Report presents an initial baseline for health and wellbeing, an overview of the assessment methodology to be followed during the environmental assessment and identifies the potential effects of the Project.

16.1.2 The Infrastructure Planning (EIA) Regulations 2017 require the consideration of the likely significant direct or indirect effects of projects on 'population and human health'. This chapter aims to consider the potential for health impacts to the local and wider population as a result of the Project during the construction and operational phases.

16.1.3 Details on specific construction activities are available in Chapter 2 Project Description of this Scoping Report.

16.1.4 A Health Impact Assessment (HIA) assesses the likely effects of proposed projects, both positive and negative, on the health and wellbeing of the population. With no statutory guidance for assessing health impacts, the approach to HIA remains flexible and scalable to meet individual project requirements which will be determined by the nature of the proposal, timescales involved and resources available.

16.1.5 The chapter is supported by **Figure 16-1** and should be read in conjunction with Chapter 12: Air Quality; Chapter 13: Noise & Vibration; Chapter 14: Traffic & Transport; and Chapter 15: Socio-economics.

16.2 Legislation, Policy & Guidance

16.2.1 This section outlines the key national and local policies which are relevant to the Health and Wellbeing chapter for the Study Area. While this includes all relevant details with respect to the scope of the assessment, when undertaking the assessment a wider range of policies and guidance appropriate to individual impacts and their mitigation will be drawn on. These comprise the list below and further policy information is provided in Appendix H.

- National Planning Policy Framework;
- NHS Long Term Plan 2019;
- Spatial Planning for Health: An evidence resource for planning and designing healthier places (2017);
- Public Health England: Strategy 2020 to 2025;
- North Lincolnshire Council Draft Local Plan (as of October 2021);
- North East Lincolnshire Council's Local Plan (2013);
- Central Lincolnshire Local Plan (2017); and
- East Lindsey District Council Local Plan (2018).

Guidance

16.2.2 Where a project is subject to statutory or voluntary environmental impact assessment, a health impact assessment may be merged into the EIA or undertaken as a stand-alone reporting process.

16.2.3 There is no prescriptive or statutory method for scoping 'Health and Wellbeing'. Whilst preparing the baseline community profile and signposting to where human health will be

assessed in the wider environmental impact assessment reports, guidance has been drawn from the following sources:

- Planning Practice Guidance: Health and Wellbeing; and
- Healthy Urban Development Unit (HUDU) (this is also known as the NHS Planning for Health Rapid HIA Toolkit) (0).

16.2.4 This report also acknowledges the "*Health Impact Assessment for Planning Applications: Guidance Note*" (0) formed as part of the 2012 Central Lincolnshire Local Plan, which represents a relevant policy document for the district of West Lindsey. This guidance note is based on the same principles developed by HUDU and NHS guidance, and as such, this scoping report's assessment methodology has been informed by this local level guidance note.

16.3 Baseline Environment and Study Area

Study Area

16.3.1 At present, a wide definition of the spatial area for consideration for the health assessment applies. This includes the Scoping Boundary, along with the surrounding areas based on administrative boundaries to align with how the Government publishes official data and with the boundaries of health service planning areas, which are typically at district / borough level. Study Areas defined by other topics for each environmental aspect of relevance to health and wellbeing are also relevant in the assessment where effects are identified that inform the health and wellbeing assessment (for example air quality, noise and transport) and are as set out in the relevant chapters of this Scoping Report.

16.3.2 For the purposes of the Baseline environment section, the Local Authorities areas (North East Lincolnshire, North Lincolnshire, East Lindsey, and West Lindsey), are regarded as 'the Study Area', and the data for this area are compared to the relevant regions (East Midlands and the Humber) and England as a whole.

Baseline Environment

16.3.3 The following section of the Scoping Report has been prepared using existing desk-based knowledge and accessible evidence base to give an overview of the existing health baseline of the Study Area.

16.3.4 The baseline data takes account of relevant district, regional and national statistics. These describe the characteristics of people and households by area and are built on information including age, ethnicity, deprivation, and population change.

16.3.5 The local Study Area statistics that are discussed in the following sections show Census (2011) data for the above areas, as well as more recent data from Mid-year Population estimates (2020), Annual Population Survey (2020) and from Public Health England (2017-2020). Given the large number of district level areas under consideration, tables have been used to display the relevant data as follows.

16.3.6 With no statutory definition of 'health', a widely accepted definition is offered by the World Health Organisation (WHO) as '*a state of complete physical, social and mental wellbeing, and not merely the absence of disease or infirmity*'.

16.3.7 The determinants of health are well reported and accepted. Health determinants can be described as lifestyle (diet, physical activity, alcohol consumption etc.), social and community influences (social isolation, culture, social support etc.), living/environmental conditions (built environment, housing, noise, air and water quality etc.), economic (unemployment, income, workplace conditions etc.), access and quality of services (medical

services, public amenity, education etc.) and macro-economic (government policies, economic development, climate etc.).

16.3.8 Whilst this offers a broad view, no one list of health determinants can be totally exhaustive, owing to the cross-cutting nature of human health. **Figure 16-1** illustrates a common model which summarises these determinants.

Figure 16-1:The 'Determinants of Health Model' - A Socio-Economic Model of Health

16.3.9 At the time of writing, the COVID-19 pandemic continues to be a part of daily life throughout the UK, which may influence the discussion on health in this chapter. This is because the data used in this section varies by year, with some data falling within 2020, when the UK was impacted by the COVID-19 pandemic. However, the construction, operation and subsequent decommissioning of the Project is not expected to have any direct and indirect impacts in relation to COVID-19.

Population

16.3.10 The table below shows the total population of the Wards and Counties considered for the community profile based on 2020 Mid-year Population Estimates from the ONS. There are 570,300 people in the four districts, which crosses the regional borders of the East Midlands and Yorkshire and the Humber. Combined, the study area local authorities account for 5% of the two regions' total population.

Table 16-1: Population of EIA Scoping study area

Council areas / Regions / National	Total population
Unitary / District Council areas	
North East Lincolnshire	159,364
North Lincolnshire	172,748
East Lindsey	142,030
West Lindsey	96,186
Regions	
East Midlands	4,865,583
Yorkshire and The Humber	5,526,350
National	
England	56,550,138

Source: Mid-year Population Estimates, ONS, 2020

Age breakdown

16.3.11 The age profile of a community or population can help to indicate any future trends, any signs of an ageing population and sets out the requirements of future generations.

16.3.12 As shown in **Table 16-2**, all of the district local authorities considered (North East Lincolnshire, North Lincolnshire, East Lindsey and West Lindsey) have a lower percentage of working age population cohorts (aged between 16-64) compared to the National average of 62.3%, with East Lindsey the lowest at 54.4%. This is also true when compared to regional proportions. Conversely, all four district local authorities have larger proportions of people aged 65 and over than the national average of 18.5%. This is a theme that is consistent when also comparing to regional averages.

Table 16-2: Percentage of population in age range

District/ Regional / National level	Percentage of population in age range	
	16-64 (%)	65+ (%)
North East Lincolnshire	59.7%	20.9%
North Lincolnshire	60.0%	21.6%
East Lindsey	54.4%	30.4%
West Lindsey	57.7%	25.2%
East Midlands	61.8%	19.6%
Yorkshire and The Humber	62.1%	18.9%
England	62.3%	18.5%

Source: Mid-year Population Estimates, ONS, 2020.

Ethnicity

16.3.13 **Table 16-3** below, from the Annual Population survey, shows the number of people stating their ethnicity as not White (not any White category) as a percentage of the total number of respondents to the survey in 2020.

Table 16-3: Ethnicity

District/ Regional / National level	Ethnicity (% of population not White)
North East Lincolnshire	2.1%
North Lincolnshire	5.2%
East Lindsey	0.8%
West Lindsey	1.5%
East Midlands	10.3%
Yorkshire and The Humber	8.8%
England	13.8%

Source: APS, ONS, 2020

16.3.14 The four local authorities in the Study Area have substantially smaller proportions of non-White residents compared to the national average of 13.8% of the population. This is also true at a regional level.

Education, Skills and Training

16.3.15 Education, skills and training are important socio-economic factors with potential to influence a person's lifestyle, self-efficacy, employment, income and quality of housing and health.

16.3.16 Baseline data for the education, skills and training are provided in the Chapter 15 Socio-economics of this Scoping Report

Employment and Income

16.3.17 The Annual Population Survey provides data on economic activity, which can indicate trends in employment, unemployment, and economic inactivity within an area.

16.3.18 In 2020, the proportion of economically active working age people in the study area averaged between 72.5% (West Lindsey) and 77.9% (North Lincolnshire). All four district local authorities presented a lower proportion of economically active working age people than nationally (79.4%).

16.3.19 As seen in the economically active trends, unemployment varies among the district local authorities in the study area. This ranges from as low as 4.9% in West Lindsey to as high as 7.3% in East Lindsey. West Lindsey's proportion of unemployment is in line with national averages, along with North East Lincolnshire (5.2%). However, both North Lincolnshire (6.2%) and East Lindsey are above these national levels, as well as regional levels.

Table 16-4: Economic Activity

District/ Regional / National level	Economically Active (Source: APS, ONS, 2020)	
	16-64 economically active (%)	16-64 unemployed (%)
North East Lincolnshire	76.8	5.2
North Lincolnshire	77.9	6.2
East Lindsey	75.2	7.3
West Lindsey	72.5	4.9
East Midlands	79.5	5.0
Yorkshire and The Humber	77.8	4.6
England	79.4	4.9

Indices of Multiple Deprivation

16.3.20 The Index of Multiple Deprivation (2019) – Deprivation Score (IMD score) (0) is an overall measure of multiple deprivation experienced by people living in an area. The 2019 Indices of Deprivation are based on 37 indicators across seven domains of deprivation. These are combined using appropriate weighting to give an overall IMD score. Using a standardised scoring system like this allows areas to be compared based on their overall deprivation.

16.3.21 Baseline data for the Indices of Multiple Deprivation are provided in the Chapter 15 Socio-economics of this Scoping Report.

Life Expectancy

16.3.22 The most recent life expectancy data, shown in **Table 16-5** considers a three-year period from 2018 to 2020, sourced from Public Health England (0). There is a relatively low spread of life expectancy by gender across the district local authorities in the Study Area, ranging from 78.0 to 79.5 for males and 81.6 to 83.4 for females. Only West Lindsey represents a higher life expectancy for both males and females than the national average (79.4 for males, 83.1 for females) however, this is marginal.

Table 16-5: Life Expectancy

District/ Regional / National level	Life Expectancy Males	Life Expectancy Females
North East Lincolnshire	78.0	82.2
North Lincolnshire	78.7	82.7
East Lindsey	78.2	81.6
West Lindsey	79.5	83.4
East Midlands region	79.2	82.7
Yorkshire and the Humber region	78.4	82.2
England	79.4	83.1

Source: Life expectancy at birth, Public Health England, 2018-2020

Health, Wellbeing and Mortality

16.3.23 **Table 16-6** provides a profile of health and wellbeing in the area surrounding the Project, focusing on key indicators identified by Public Health England (**0**) at local authority level including a comparison of these to regional and national averages.

Table 16-6: Key health indicators

Indicator	North East Lincolnshire	North Lincolnshire	East Lindsey	West Lindsey	*East Midlands region*	*Yorkshire and the Humber region*	*England*
Under 75 mortality rates from all cardiovascular diseases, 2017-19	92.0	72.2	90.9	66.3	72.1	80.2	70.4
Admission episodes for alcohol-specific conditions, 2019/20	732.4	517.1	519.5	327.9	548.9	641.8	644.1

Indicator	North East Lincolnshire	North Lincolnshire	East Lindsey	West Lindsey	*East Midlands region*	*Yorkshire and the Humber region*	*England*
Percentage of physically active adults, 2019/20, %	61.9	64.4	62.7	67.6	65.9	65.4	66.4
Percentage of adults (aged 18+) classified as overweight or obese, 2019/20	74.6	71.5	73.3	59.2	65.4	65.2	62.8
Under 75 mortality rate from cancer, standardised rate, per 100,000	152.6	136.9	141.6	125.8	131.3	137.5	129.2

Source: Local Authority and Regional Health Profiles, Public Health England, 2017-2020.

16.4 Assessment Method

16.4.1 The wider environmental assessment of the Project will cover a range of environmental topics with individual ES topic chapters written accordingly as outlined in Chapter 4 of this Scoping Report. The relationship to those likely to affect human health are summarised below.

16.4.2 There is no consolidated methodology or practice for the assessment of effects on human health. The Health and Wellbeing section will consider the impacts of the Project on both the mental and physical health of local residents, the workforce and visitors that may arise from the construction, operation and decommissioning phases. Best practice principles are provided in NHS England's Healthy Urban Development Unit's Rapid Health Impact Assessment (HIA) Toolkit 2019 and forms the basis of the approach to be adopted to assess impacts on health and wellbeing. Based on this, the impacts of the Project on human health are assessed qualitatively using professional judgement, best practice and draw upon other assessments where practicable.

16.4.3 The qualitative assessment of human health effects will consider the following health and well-being determinants of relevance:

- Access to healthcare services and other social infrastructure;
- Access to open space and nature;
- Air quality, noise and neighbourhood amenity;
- Accessibility and active travel;
- Access to work and training;
- Social cohesion and neighbourhoods; and
- Climate change

16.4.4 The assessment will consider the potential consequences for health and wellbeing from the construction, operation and decommissioning phases of the Project and draw upon the information reported within:

- Air Quality;
- Noise and Vibration;

- Transport and Access; and
- Socio-Economic and Land Use.

16.4.5 As part of the Health & Wellbeing chapter there will be engagement with stakeholders to supplement the desk-based analysis, and to capture any local data or local knowledge that might not be accessible in the public domain. Key stakeholders that would be engaged are likely to include health officials from relevant local authorities and the local health boards, including the NHS East Lincolnshire CCG, and NHS Lincolnshire CCG.

16.5 Identification of Potential Effects

16.5.1 Due to the diverse nature of health determinants and outcomes which are assessed, the assessment of human health effects describes the likely qualitative health outcomes and it is not possible to quantify the severity or extent of effects.

16.5.2 The methodology set out in the HUDU Toolkit does not include a temporal scale of considerations of the effects. It does not provide a methodology for assessing the significance of outcomes or effects and as such none is proposed here.

16.5.3 The potential health outcomes during construction, operation and decommissioning are described using the criteria as outlined in **Table 16-7**.

16.5.4 Where an impact is identified, actions will be proposed to mitigate any negative impact on health, or to realise opportunities to create health benefits. It should be noted that in many cases, mitigation is embedded within the Project and the implementation of this is an underlying assumption of the assessment.

Table 16-7: Health and Wellbeing impact categories

Impact Category	Impact Symbol	Description
Positive	+	A beneficial impact is identified
Neutral	0	No discernible health impact is identified
Negative	-	An adverse impact is identified
Uncertain	?	Where uncertainty exists as to the overall impact

16.5.5 The Project may generate a range of health outcomes, some of which would be temporary, whilst others would be permanent. For the purposes of this report, due consideration will be given to the impacts in terms of the following:

- Impact on access to healthcare and other social services due to accessibility restriction and/or increase in traffic during construction, operational and decommissioning phases;
- Impact during the construction and decommissioning periods on emission of dust, noise, vibration, and odours;
- Impact on air/noise pollution linked with traffic during construction, operational and decommissioning phases and on air/noise pollution linked with onsite activities during operational phase;
- Impact of the Project on accessibility to open space and on active travel both during construction and decommissioning phases (temporary impact) and operational phase;

- Impact of the Project on vulnerable populations within the local area.
- Impact of the Project on access to employment and training, particularly for local residents; and
- Contribution to social cohesion and engagement with existing communities to encourage social interaction.

16.6 Summary

16.6.1 Potential outcomes in regard to health and wellbeing that could occur as a result of the Project will be considered.

16.6.2 The assessment will focus on the likely impacts considered in this chapter of the Scoping Report, and where effects are identified, then mitigation will be proposed where necessary to minimise any disturbance to receptors during the construction, operation and decommissioning phases.

16.6.3 A summary of the scope of the health and wellbeing assessment is in **Table 16-8**.

Table 16-8: Summary of scope for Health & Wellbeing assessment

Element	Phase	Scoped in	Scoped Out	Justification
Access to healthcare services and other social infrastructure	Construction, operation and decommissioning	✓		n/a
Access to open space and nature		✓		
Air quality, noise and neighbourhood amenity		✓		
Accessibility and active travel		✓		
Access to work and training		✓		
Social cohesion and neighbourhoods		✓		
Climate change		✓		
Vulnerable populations		✓		

16.7 References

Ref 16-1 NHS, Long Term Plan (2019). Available at: [redacted]

Ref 16-2 Public Health England, Spatial Planning for Health. An evidence resource for planning and designing healthier places (2017). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729727/spatial_planning_for_health.pdf.

Ref 16-3 Public Health England, PHE Strategy 2020 to 2025 (2019). Available at: https://www.gov.uk/government/publications/phe-strategy-2020-to-2025

Ref 16-4 NHS England's Healthy Urban Development Unit's (HUDU) Rapid Health Impact Assessment (HIA) Toolkit (2019). Available at: [redacted]

Ref 16-5 Central Lincolnshire, Central Lincolnshire Local Plan: Health Impact Assessment for Planning Applications Guidance Note (2012).

Ref 16-6 ONS, Census 2011 (2011).

Ref 16-7 ONS, Mid-year Population estimates (2020).

Ref 16-8 ONS, Annual Population Survey (2020).

Ref 16-9 Public Health England, Local Authority Health Profiles (2017-2020).

Ref 16-10 Ministry of Housing, Communities and Local Government (MHCLG), English Indices of Deprivation (2019).

17. Materials & Waste

17.1 Introduction

17.1.1 This chapter of the Scoping Report presents an initial baseline for material and waste relevant to the Project, identifies the need for additional surveys to ensure there is appropriate information to accurately characterise the baseline and sets out the Study Area. In addition, the chapter provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects provisionally identified.

17.1.2 This chapter follows the methodology set out in the Institute of Environmental Management and Assessment (IEMA) guide to: Materials and Waste in Environment Assessment, Guidance for a Proportionate Approach (referred from herein as the 'IEMA Guidance') (Ref 17-1).

17.1.3 For the purpose of this scoping report, materials and waste comprise:

- The consumption of materials (key construction materials only); and
- The generation and management of waste.

17.1.4 Materials are defined in the IEMA Guidance materials as "physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt and steel."

17.1.5 Other material assets considered include built assets such as landfill void capacity and allocated/safeguarded mineral and waste sites.

17.1.6 Waste is defined as per the Waste Framework Directive (E Waste FD) (Ref 17-2) as *"any substance or object which the holder discards or intends or is required to discard".*

17.2 Baseline Environment and Study Areas

Study Areas

17.2.1 The Study Areas for the assessment of impacts related to materials and waste have been defined in line with the IEMA Guidance.

17.2.2 Within this section, Study Areas are defined for the following:

- Construction and operational waste generation;
- Use of construction and operation materials (key construction materials only);
- Non-hazardous, inert and hazardous construction waste management;
- Non-hazardous, inert and hazardous operational waste management;
- Availability of key construction materials;
- Impact on allocated/safeguarded mineral and waste sites; and,
- Presence of Mineral Safeguarding Areas (MSAs).

Project Study Area

17.2.3 The Project Study Area for construction and operational waste generation and use of construction and operation materials (key construction materials only) comprises the Scoping Boundary. The Study Area is deemed to include the footprint of the proposed works,

together with any temporary land requirements during the construction. This may include temporary offices, compounds and storage areas.

17.2.4 The Project Study Area for the impacts on allocated/safeguard mineral and waste sites is defined by the Scoping Boundary. Impacts on allocated/safeguarded waste sites are not included in the IEMA Guidance however are included for completeness and a high-level assessment of impacts on such sites will be considered in the assessment if appropriate. There are currently no allocated/safeguarded waste sites within the Scoping Boundary.

17.2.5 Impacts on MSAs are not assessed in the materials and waste assessment in accordance with the IEMA Guidance. MSAs are included for context in the baseline since MSAs are a planning consideration and further consultation and assessment in accordance with Mineral Planning Authority policies may be required at a later stage.

Expansive Study Area

17.2.6 The expansive Study Area for non-hazardous waste management comprises the East Midlands and Yorkshire and the Humber. The Study Area includes the following sub-regions as outlined in the Environment Agency's (EA) 2020 Waste Summary Tables for England - Version 1 (Ref 17-3):

- Lincolnshire, Derbyshire, Leicestershire, Northamptonshire and Nottinghamshire;
- Former Humberside, North Yorkshire, South Yorkshire, West Yorkshire.

17.2.7 The expansive Study Area for non-hazardous and inert waste management is defined based on professional judgement and informed by consideration of the proximity principle and value for money. The Study Area has been determined to comprise the wider region within which landfill capacity is located i.e. East Midlands region and the Yorkshire and the Humber region since the project is located close to the northern border of the East Midlands and waste could be managed in either region.

17.2.8 The expansive Study Area for hazardous waste management is England. The Study Area is defined based on professional judgement and informed by consideration of the proximity principle and value for money. The proximity principle for hazardous waste in England is outlined in Principle 2 - Infrastructure Provision in the Strategy for Hazardous Waste Management in England *"We look to the market for the development of hazardous waste infrastructure, which implements the hierarchy for the management of hazardous waste and meets the needs of the UK to ensure that the country as a whole is self sufficient in hazardous waste disposal, facilities are put in place for hazardous waste recovery in England, and the proximity principle is met"* (Ref 17-4). Planning for hazardous waste management is also undertaken at a national level.

17.2.9 The expansive Study Area for availability of key construction materials (aggregates, asphalt, concrete and steel) is national (United Kingdom (UK) or Great Britain (GB) dependent on baseline information availability). Regional information on availability of key construction materials is included in the baseline for context.

Current Baseline

Regional and National Availability of Key Construction Materials

17.2.10 At the time of writing the exact quantities of key construction materials required for the Project are unknown as the design is in early development.

17.2.11 United Kingdom (UK) and Great Britain (GB) data has been used to establish a quantitative national baseline of the consumption for key constructional materials. **Table 17-1** summarises national consumption in 2018 for aggregates, asphalt, concrete and steel (the most recent years for which data is available), which are the key construction materials

expected to be used during the construction of the Project. Regional data is presented in **Table 17-2** to provide regional context, however this data is not used within the assessment. Construction material sales by region are provided for the regions surrounding the Project. It is assumed that the majority of key construction materials would be sourced locally, taking into account the proximity principle and value for money.

Table 17-1: National Consumption and Demand for Key Construction Materials

Material	National consumption (million tonnes, year)	Baseline data year	Data description
Steel	17	2018	UK total consumption (Ref 17-29)
Aggregates of which:	251	2018	Minerals and mineral products sales in Great Britain (Ref 17-30)
Crushed rock	117.3		
Sand and gravel - land won	48.9		
Sand and gravel - marine	13.7		
Recycled and secondary	71		
Asphalt	25.4		
Concrete of which:	86.2		
Ready-Mixed Concrete	54.2		
Concrete products	32		

Table 17-2: Construction Material Sales by Region (Ref 17-30)

Construction material	East Midlands	Yorkshire and the Humber
Crushed rock (million tonnes)	26.5	11.5
Sand and gravel (million tonnes)	6.1	2.3
Ready-mixed concrete (million m^3)	1.4	1.2
Asphalt (million tonnes)	2.8	2.1

17.2.12 Potential recycled contents for the main construction materials are outlined in **Table 17-3**. These "good practice" rates are derived from WRAP's Designing Out Waste Tool for Civil Engineering (Ref 17-31).

Table 17-3: Potential Recycled Content

Material type	Potential recycled content (% by weight)
Concrete	16
Asphalt	25
Aggregates	50
Steel reinforcement	100
Structural steel	60

17.2.13 There is no publicly available information on any potential long-term changes to this national demand by the time of construction of the Project. Construction material demand such as ready mixed concrete is closely aligned to both the quantity of construction taking place and the general economy therefore it is deemed inappropriate to forecast future demand as the demand is unlikely to be linear. It is therefore not possible to set a future baseline for resources. Therefore, future consumption is assumed to same as the current baseline as outlined in **Table 17-1**. In addition to the material's listed above, bentonite is also likely to be required as part of the HDD works.

Mineral Safeguarding Areas, Allocated/Safeguarded Mineral and Waste Sites

17.2.14 In North East Lincolnshire the Scoping Boundary passes through the MSA for sand and gravel. The Scoping Boundary does not pass through any MSAs in any other local authorities.

17.2.15 The Scoping Boundary does not pass through any MSAs in any other local authorities.

17.2.16 The Scoping Boundary does not pass through any allocated/safeguarded waste site.

17.2.17 However, the North East Lincolnshire Local Plan 2013 to 2032 (adopted 2018) (Ref 17-23) records one licensed waste operator which borders the boundary of the Scoping Boundary. The details of which are presented in **Table 17-4** below. This site is not recorded on the North East Lincolnshire Policy Map. However, the site appears to sit in North Lincolnshire.

Table 17-4: Safeguarded Waste Facilities

North East Lincolnshire Local Plan reference	Operator	Site location
WM04, Policy 48	SAR Recycling Ltd	Pelham Industrial Estate, Manby Road, Immingham

Landfill capacity

17.2.18 **Table 17-5** remaining landfill capacity at the end of 2020 as outlined on the EA's 2020 Waste Summary Tables for England – Version 1 (Ref 17-3) for the non-hazardous and inert waste expansive study area (East Midlands and Yorkshire and the Humber) and the hazardous waste study area (England).

17.2.19 Merchant landfills are operated for commercial purposes accepting waste from construction projects and operating businesses. Merchant landfills are therefore considered to form the baseline. In contrast, restricted landfills are sites that deal with their own produced waste (i.e. not operating for commercial purposes) and therefore additional capacity is excluded from the baseline. Some non-hazardous landfill have a Stable Non-Reactive Hazardous Waste Cell (SNHRW) e.g. for asbestos.

Table 17-5: Landfill Capacity (2020) in East Midlands, Yorkshire and The Humber, and England

Landfill type	Sub-Region			
	East Midlands	Yorkshire and the Humber	Total in East Midlands and Yorkshire and the Humber	England
	Capacity ('000s m^3)			
Hazardous merchant	962	2,387	3,349	15,571

Landfill type	Sub-Region			
	East Midlands	Yorkshire and the Humber	Total in East Midlands and Yorkshire and the Humber	England
Non-hazardous with SNRHW cell	16,438	1,243	17,681	66,969
Non-hazardous	14,912	25,598	40,510	137,457
Inert	20,780	25,040	45,820	140,192

17.2.20 The EA published landfill capacity trends for 2004 to 2020 in 2021. **Figure 17-1** presents the historic trend for remaining landfill capacity for the East Midlands and Yorkshire and the Humber. **Figure 17-2** presents the historic trend for remaining landfill capacity for England. Data is only available for "Inert" (inert landfill only) and "Non-Inert" (non-hazardous landfill sites, non-hazardous landfill sites with a SNHRW cell and merchant hazardous landfill sites) therefore the categories do not align with the 2020 landfill capacity data which is split by hazardous, non-hazardous and inert.

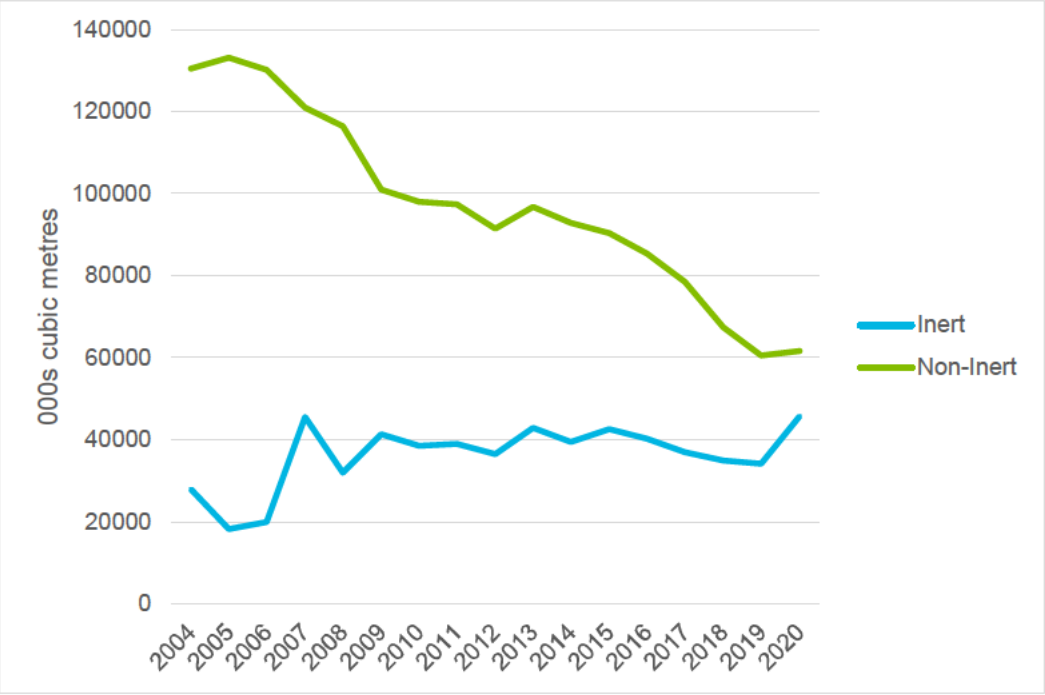


Figure 17-1: Historic Trend for Landfill Void Capacity in East Midlands and Yorkshire and the Humber

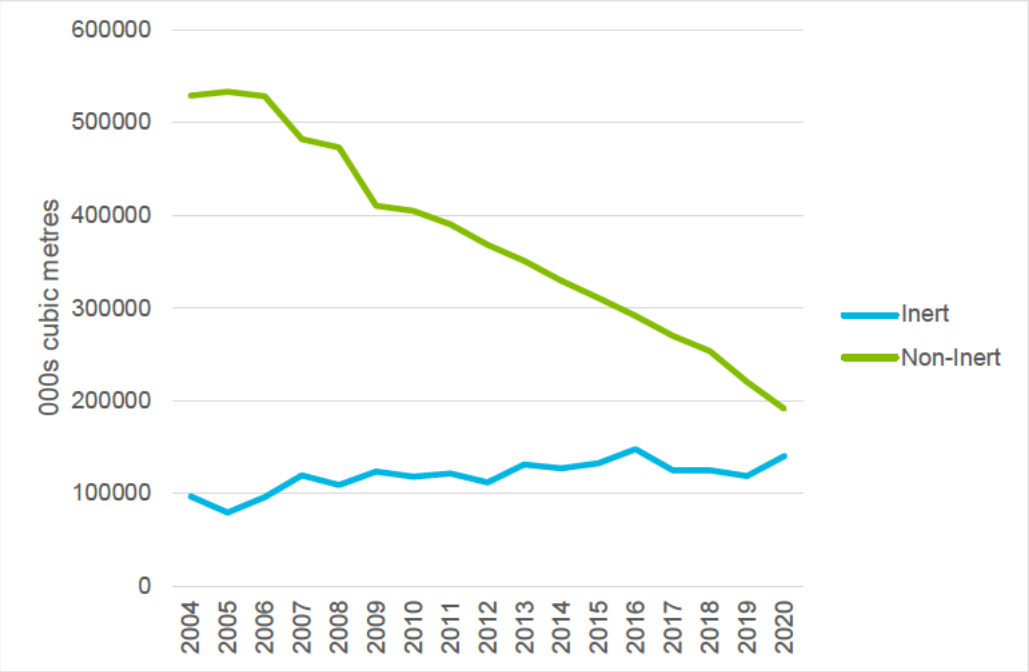


Figure 17-2: Historic Trend for Landfill Void Capacity in England

17.2.21 There is no publicly available information on any potential changes to this landfill capacity by the time of the construction of the Project. Due the cyclic nature of inert landfill capacity it is not realistic forecast future landfill capacity since this may result in an increase in landfill capacity. Therefore, inert landfill capacity is assumed to same as the current baseline as outlined in **Table 17-5**. For non-inert landfill (which includes hazardous waste) capacity using the current rate of decline of landfill capacity and forecasting into the future would lead to the inevitable conclusion that there would be no void space remaining. However, this is not a credible scenario: if there is still a need for landfill, then the waste planning authority will need to consent new landfill capacity to replace that which has been used up. Therefore, non-hazardous and hazardous landfill capacity is assumed to be the same as the current baseline as outlined in **Table 17-5**.

Waste Management Infrastructure

17.2.22 The capacity of waste management infrastructure (aside from landfill) is not publicly available; however, capacity can be inferred from annual waste inputs. Data is collated for the expansive study areas from the EA's Waste Data Interrogator 2020 – Waste Received (Excel) – Version 1 (Ref 17-32) and presented in **Table 17-6**. Inputs are not totalled since the double counting of waste in the Waste Data Interrogator cannot be discounted.

Table 17-6: Summary of Waste Inputs by Facility

Facility type	East Midlands (tonnes received)	Yorkshire and the Humber (tonnes received)
Landfill	3,566,637	3,750,118
MRS	771,983	1,729,752
On/In Land	804,784	1,295,756
Transfer	4,138,630	5,020,150
Treatment	7,150,818	12,880,167
Combustion	138,035	297,010

Facility type	East Midlands (tonnes received)	Yorkshire and the Humber (tonnes received)
Incineration	997,400	2,647,529
Mobile Plant	354,060	900,685
Mining	6,826	-
Storage	166,157	331,485
Processing	220,498	653,844

17.2.23 The IEMA guidance (page 14) "does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources." Therefore, a full list of waste management infrastructure is not included in the baseline.

Historic and Permitted Landfills

17.2.24 The Scoping Boundary does not pass through any "Authorised Landfill Permitted Waste Sites" as outlined in the EA's Permitted Waste Sites - Authorised Landfill Site Boundaries spatial data (Ref 17-33).

17.2.25 Historic landfills are potentially relevant to this assessment since excavations in historic landfill can give rise to waste that would require management. The EA's Historic Landfill Sites spatial data (Ref 17-34) identifies one historic landfill site which falls within the boundaries of the Scoping Boundary. This is referred to as "Conoco" and lies towards the northern extent of the corridor at approximate grid reference TA 17120 416024 and appears to lie within the site of the Phillips 66 Humber Refinery. The first input date is given as 30/06/1975 and the waste type is listed as industrial and liquid sludge.

17.2.26 One further historic landfill site, referred to as "Os Field No 9000" does not lie within the corridor but is located within metres of the Scoping Boundary. The license holder is listed as J E Churchill Earthworks Limited of Cleatham Road, Kirton Lindsey, Gainsborough, Lincolnshire. The license surrender date is given as 13/01/1993 and waste type is inert.

Targets

17.2.27 The national target for recovery of construction and demolition waste is 70% by weight, as set out in the E Waste FD (Ref 17-2) and the Waste Management Plan for England (Ref 17-16). The target specifically excludes naturally occurring materials with European Waste Catalogue (EWC) Code 17 05 04 (17 05 04 soil and stones other than those mentioned in 17 05 03* (soils and stone containing dangerous substances)). Recovery is deemed to include reuse, recycling and other recovery e.g. energy recovery.

17.2.28 A good practice landfill diversion target of 90% has been achieved and exceeded by major UK developments as outlined in the IEMA Guidance. In 2018, the UK generated 67.8 million tonnes of non-hazardous C&D waste, of which 62.6 million tonnes was recovered. This represents a recovery rate of 92.3% (Ref 17-35).

17.2.29 Standard, good and best practice recovery rates by material are provided by WRAP (Ref 17-36). Recovery rates for key construction materials and other construction wastes relevant to the Project are provided in **Table 17-7**.

Table 17-7: Standard, Good and Best Practice Recovery Rates by Material

Material	Standard practice recovery (%)	Good practice recovery (%)	Best practice recovery (%)
Metals	95	100	100
Packaging	60	85	95
Concrete	75	95	100
Inert	75	95	100
Plastics	60	80	95
Miscellaneous	12	50	75
Electrical equipment	Limited information	70	95
Cement	Limited information	75	95
Liquids and oils	100	100	100
Hazardous	50	Limited information, cannot be 100% since some hazardous waste e.g. asbestos must be landfilled.	

17.3 Assessment Method

Legal context

17.3.1 The following legislation is taken into account:

- E Waste FD (Ref 17-2);
- The Environmental Protection Act (1990) (Ref 17-5);
- The Hazardous Waste (England and Wales) Regulations (2005) as amended (Ref 17-6);
- The Waste (England and Wales) Regulations (2011) as amended (Ref 17-7);
- The Environmental Permitting (England and Wales) Regulations (2016) (Ref 17-8); and
- The Environment Act 2021 (Ref 17-9).

17.3.2 The Waste (England and Wales) Regulations 2011 (as amended) (Ref 17-7) transpose the requirements of the E Waste FD (Ref 17-2) in England and Wales and require the Secretary of State to establish waste prevention programmes and waste management plans that apply the waste hierarchy. The waste hierarchy is defined in the E Waste FD and prioritises waste prevention, followed by preparing for reuse, recycling, recovery and finally disposal as means of management of waste.

17.3.3 The Waste (England and Wales) Regulations 2011 (as amended) (Ref 17-7) require businesses to apply the waste hierarchy when managing waste, and also require that measures are taken to ensure that, by the year 2020 and beyond, at least 70% by weight of non-hazardous construction and demolition waste is subjected to material recovery. The target specifically excludes naturally occurring materials with European Waste Catalogue (EWC) Code 17 05 04 (17 05 04 soil and stones other than those mentioned in 17 05 03* (soils and stone containing dangerous substances)).

17.3.4 The following considerations must also be taken into account:

- Environmental protection principles of precaution and sustainability;
- Proximity principle for treatment and disposal of waste to be as close to its source as possible;
- Technical feasibility and economic viability;
- Protection of resources; and
- Overall environmental, human health, economic and social impacts.

Planning Policy

17.3.5 The Project will be assessed with consideration to national and local policy that address the use of material and waste generation and its management.

17.3.6 The National Policy Statements (NPSs) that are considered to be of relevance to the Project include:

- Overarching National Policy Statement for Energy (EN-1) (Ref 17-10); and,
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 17-11).

17.3.7 The following national policies are also relevant to the Project:

- National Planning Policy Framework (NPPF) (2021) (Ref 17-12);
- National Planning Policy Guidance for Minerals (2014) (Ref 17-13):
- National Planning Policy Guidance for Waste (2015) (Ref 17-14);
- National Planning Policy for Waste (2014) (Ref 17-15);
- The Waste Management Plan for England (2021) (Ref 17-16);
- A Green Future: Our 25 Year Plan to Improve the Environment (2018) (Ref 17-17): and,
- Our Waste, Our Resources, A Strategy for England (Resources and Waste Strategy for England) (2018) (Ref 17-18).

17.3.8 Planning policy relevant to Material and Waste is presented in Appendix G.

17.3.9 Additional guidance to be considered includes:

- Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoWCoP), v2 (2011) (Ref 17-27);
- Waste and Resources Action Programme (WRAP) Designing Out Waste: A Design Team Guide for Civil Engineering (Ref 17-28).

Assessment Methodology

17.3.10 This section outlines the methodology that will be employed for assessing the likely significant effects associated with materials and waste. The IEMA Guidance offers two methods for the assessment of waste. Method W1 – void capacity has been selected as this is a more detailed methodology and is appropriate for larger and more complex projects.

Scope of the Assessment

17.3.11 The assessment of materials and waste will consider the following:

- Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site where it is generated is transferred to a suitably licensed facility for further treatment or disposal;

- Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a license, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves;
- As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas; and
- Minerals Planning Authorities (MPAs) are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

17.3.12 The following matters will be scoped out of the assessment of materials and waste:

- Waste arising from extraction, processing and manufacture of construction components and products. This is based on the assumption that these products and materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the UK or the world and therefore outside of the geographical scope of this study. Such matters cannot be accurately predicted and assessed in the ES as they relate to procurement decisions that cannot be assured.
- Other environmental impacts associated with the management of waste from the Project e.g., on water resources, air quality, noise or traffic resulting from the generation, handling, on-site temporary storage or off-site transport of materials and waste are addressed separately in other relevant chapters.
- Direct impacts on safeguarded/allocated mineral sites. The Scoping Boundary does not pass through any such sites therefore this aspect is scoped out of the assessment.
- Direct impacts on safeguarded/allocated waste sites. The Scoping Boundary does not pass through any such sites therefore this aspect is scoped out of the assessment.
- Direct impacts on MSAs. The Scoping Boundary does pass through a MSA for sand and gravel however impacts are not assessed in the materials and waste assessment in accordance with the IEMA Guidance. MSAs are included for context in the baseline since MSAs are a planning consideration and further consultation and assessment in accordance with Mineral Planning Authority policies may be required at a later Project stage.
- Effects on the availability of materials during operation: forecast effects are (using professional judgement) considered negligible in relation to the scale and nature of the development.
- Effects of the Project on regional inert and non-hazardous waste landfill capacity and national hazardous waste landfill capacity during operation. Effects associated with the operational phase are proposed to be scoped out due to the nature of the Project, and knowledge of similar Projects' limited operation material usage and waste disposal requirements.
- Effects associated with decommissioning as the Project has a long design life and such it is not considered possible to reliably forecast decommissioning requirements and infrastructure far in the future.

17.3.13 Due to the limitation on information available at this stage, and the uncertainty about the nature of mitigation(s) and the method by which mitigation(s) would be secured, material use and waste generation during the construction of the Project is scoped into the assessment.

17.3.14 The sensitive receptors for this assessment of construction impacts are:

- Landfill void capacity in the expansive study areas of East Midlands and Yorkshire and the Humber (non-hazardous landfill void capacity) and England (hazardous landfill void capacity) – as defined in the IEMA guidance "*landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities, This requires the depletion of natural and other resources which, in turn, adversely impacts the environment.*"
- Materials, national consumption of key construction materials – as outlined in the IEMA guidance "materials are, in their own right, sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary material) long-term availability; this results in the depletion of natural resources and adversely impacts the environment."

17.3.15 The IEMA guidance "does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources."

17.3.16 The sensitivity of receptors and magnitude of impacts materials and waste will be assessed through the following:

Materials

- Establishing the baseline for national consumption of key materials (construction materials) by weight;
- Assessing the sensitivity of materials as related to the availability and types of materials to be consumed by the Project in construction;
- Establishing the quantities of key construction materials required for the construction of the Project; and
- Comparing the total quantities of key construction materials with the most recent national demand (utilising a percentage approach).

Waste

- Establishing the baseline landfill void capacity in the expansive study areas;
- Assessing the sensitivity of landfill void capacity;
- Establishing the quantities of construction, demolition and excavation waste to be generated during the construction of the Project;
- Comparing the total waste arising from the construction of the Project against the landfill void capacity (utilising a percentage approach).

Assessment Criteria

Sensitivity

17.3.17 The sensitivity of materials relates to the availability and type of construction material to be consumed by the Project. The IEMA guidance criteria described within **Table 17-8** will used to determine the sensitivity of materials.

Table 17-8: Materials Receptor Sensitivity

Effects	Criteria for materials receptor sensitivity
Negligible	On balance, the key materials required for the construction of the Proposed Development 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*
Low	On balance, the key materials required for the construction of the Proposed Development 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.
Medium	On balance, the key materials required for the construction of the Proposed Development 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.
High	On balance, the key materials required for the construction of the Proposed Development 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.
Very High	On balance, the key materials required for the construction of the Proposed Development are forecast are known to be insufficient in terms of production, supply and/or stock. *And/or* Comprise no sustainable features and benefits compared to industry-standard materials.
** 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.*	

17.3.18 The sensitivity of waste relates to availability of landfill capacity in the absence of the Project. As outlined in the IEMA Guidance *"landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste"*. The sensitivity of landfill capacity is assessed based on a review of historic landfill void capacity trends where available and information from relevant policy documents.

17.3.19 The criteria described within **Table 17-9** and **Table 17-10** will be used to determine the sensitivity of landfill capacity.

Table 17-9: Inert and Non-hazardous Landfill Capacity Sensitivity

Effects	Criteria for inert and non-hazardous landfill capacity sensitivity
Negligible	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity expected to remain unchanged, or is expected to increase through a committed change in capacity.
Low	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is expected reduce minimally by <1% as a result of wastes forecast.
Medium	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is: expected reduce noticeably by 1-5% as a result of wastes forecast.
High	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is: expected reduce considerably: by 6-10% as a result of wastes forecast.
Very High	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is: expected to reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.

Table 17-10: Hazardous Landfill Capacity Sensitivity

Effects	Criteria for hazardous landfill capacity sensitivity
Negligible	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is expected to remain unchanged, or is expected to increase through a committed change in capacity.
Low	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is expected to reduce minimally: by <0.1% as a result of wastes forecast.
Medium	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is: expected to reduce noticeably: by 0.1-0.5% as a result of wastes forecast.
High	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is expected to reduce considerably: by 0.5-1% as a result of wastes forecast.
Very High	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is:

Effects	Criteria for hazardous landfill capacity sensitivity
	expected to reduce very considerably (by >1%); end during construction or operation: is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.

Magnitude

17.3.20 The magnitude of impact describes the degree of variation from the baseline conditions as result of the Project. The methodology for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of construction materials use on the baseline national demand from the construction of the Project. The criteria used to assess the magnitude of impact for materials are provided within **Table 17-11**.

Table 17-11: Materials Magnitude of Impacts

Effects	Criteria for materials magnitude of impacts
No change	Consumption of no materials is required.
Negligible	Consumption of no individual material type is equal to or greater than 1% by volume of the national* baseline availability.
Minor	Consumption of one or more materials is between 1-5% by volume of the national* baseline availability.
Moderate	Consumption of one or more materials is between 6-10% by volume of the national* baseline availability.
Major	Consumption of one or more materials is >10% by volume of the national* baseline availability.
**a national baseline is used in the absence of regional construction material consumption data.*	

17.3.21 The methodology for assessing the magnitude of impact for waste comprises a percentage-based approach that determines the influence of waste generation from the construction Project on the baseline landfill capacity. The criteria used to assess the magnitude of impact for resources and waste are provided within **Table 17-12** and **Table 17-13**.

Table 17-12: Inert and Non-hazardous Waste - Magnitude of Impact

Effects	Criteria for waste magnitude of impacts
No change	Zero waste generation and disposal from the development.
Negligible	Waste generated by the development will reduce expansive study area landfill capacity baseline# by <1%
Minor	Waste generated by the development will reduce expansive study area landfill capacity baseline# by 1-5%
Moderate	Waste generated by the development will reduce expansive study area landfill capacity baseline# by 6-10%.
Major	Waste generated by the development will reduce expansive study area landfill capacity baseline# by >10%
# forecast as the worst-case scenario, during a defined construction and/or operational phase.	

Table 17-13: Hazardous Waste - Magnitude of Impact

Effects	Criteria for waste magnitude of impacts
No change	Zero waste generation and disposal from the development.
Negligible	Waste generated by the development will reduce expansive study area landfill capacity baseline# by <0.1%
Minor	Waste generated by the development will reduce expansive study area landfill capacity baseline# by <0.1-0.5%
Moderate	Waste generated by the development will reduce expansive study area landfill capacity baseline# by <0.5-1%
Major	Waste generated by the development will reduce expansive study area landfill capacity baseline# by >1%
# forecast as the worst-case scenario, during a defined construction and/or operational phase.	

Significance

17.3.22 **Table 17-14** describes the effect thresholds used in determining the significance of potential effects and **Table 17-15** shows the significance of the effects.

Table 17-14: Effect Thresholds

		Magnitude of impact				
		No change	Negligible	Minor	Moderate	Major
Sensitivity of Receptor	Very High	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Table 17-15: Significance of Effect

Effect	Materials	Waste
Neutral	Not significant	Not significant
Slight		
Moderate	Significant	Significant
Large		
Very large		

17.4 Design, Mitigation and Enhancement Measures

17.4.1 Throughout the EIA, where applicable, the way that likely environmental effects have been or would be avoided, prevented, reduced or offset through design and/or management measures will be described. These are measures that are inherent in the design (also known

as ‘primary measures’) and construction of the Project (also known as ‘embedded measures’). Other embedded measures are required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices (also known as ‘tertiary mitigation’). Some of these embedded measures have been identified at the scoping stage and are described below.

17.4.2 The Project will aim to prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill as per the waste hierarchy.

17.4.3 The following mitigation measures will be considered and implemented where applicable during the design phases and subsequent construction work:

- Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other projects;
- Design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content;
- Design for off-site construction: maximising the use of pre-fabricated structure and components, encouraging a process of assembly rather than construction;
- Design for the future (deconstruction and flexibility): identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be maximised at end of first life;
- Design for waste and material asset efficient procurement: identify and specify materials that can be acquired responsibly, in accordance with a recognised industry standard; and
- Engineering plan configurations and layouts that show how the most effective use of materials and arisings can be achieved.

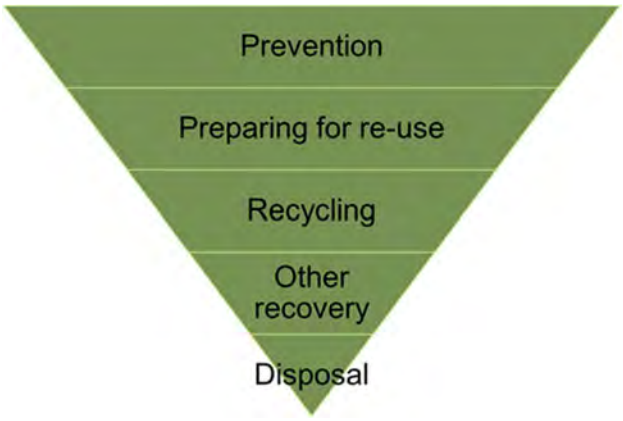


Figure 17-3: The Waste Hierarchy, from Defra's Guidance on Applying the Waste Hierarchy, recreated by AECOM

17.4.4 The construction of the Project would be subject to measures and procedures defined within a Construction Environmental Management Plan (CEMP). The CEMP would include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as the control of dust and the approach to waste management on site. A Draft CEMP will be included alongside the ES, the construction contractor will use this document to produce their CEMP prior to works commencing on site, this would include a Site Waste Management Plan (SWMP).

17.4.5 A Materials Management Plan (MMP) will be developed under the CL:AIRE Definition of Waste: Development Industry Code of Practice (Ref 17-27) by the construction contractor to support the re-use of excavated materials, minimize off-site disposal; and to demonstrate the necessary lines of evidence to support the proper reuse/offsite disposal of materials and ensure compliance with regulatory guidance.

17.4.6 Embedded measures will be considered prior to the assessment of effects to avoid considering assessment scenarios that are unrealistic in practice, i.e. do not take account of such measures even though they are likely to be standard practice (tertiary mitigation) and/or form part of the design of the Project (Mitigation by Design). These will then be followed through the assessment to ensure that realistic likely environmental effects are identified. Where likely significant adverse effects are identified after considering these embedded measures, '*Project Specific Mitigation*' will be considered, developed and proposed, where possible.

17.4.7 All 'Mitigation by Design' will be described within the ES with the rationale for the inclusion of the identified embedded measures clearly stated.

17.5 Summary

17.5.1 This chapter presents an initial baseline for materials and waste, an overview of the assessment methodology to be followed during the environmental assessment and identifies the potential effects of the Project.

17.5.2 **Table 17-16** outlines which activities and aspects of the Project are scoped in and out.

Table 17-16: Summary of scope for material and waste assessment

Element	Phase	Scoped in	Scoped Out	Justification
Changes in demand for materials	Construction	✓		Due to the limitation on information available at this stage, and the uncertainty about the nature of mitigation(s) and the method by which mitigation(s) would be secured, material use and waste generation during the construction of the Project is scoped into the assessment.
Changes in available landfill capacity	Construction	✓		
Changes to safeguarded mineral sites.	Construction		✓	The Scoping Boundary does not pass through any such sites.
Changes to safeguarded allocated waste sites.	Construction		✓	
Changes in demand for materials.	Operation		✓	Effects associated with the operational phase are proposed to the scoped out due to the nature of the Project, and knowledge of similar Projects' limited operation material usage and waste disposal requirements.
Changes in available landfill capacity	Operation		✓	

Element	Phase	Scoped in	Scoped Out	Justification
Waste arising from extraction, processing and manufacture of construction components and products.	Construction		✓	It is assumed that waste arising from the extraction, processing and manufacture of construction components and products that would be used during Project are being produced in manufacturing facilities with their own waste management plans, facilities, and supply chain. These manufacturing facilities and their supply chains, which are potentially in different regions of the UK or the world, and therefore are outside of the geographical scope of this assessment.
Other environmental impacts associated with the management of waste from the Project e.g., on water resources, air quality, noise or traffic resulting from the generation, handling, on-site temporary storage or off-site transport of materials and waste.	Construction		✓	The impacts are addressed separately in other relevant chapters.
Direct impacts on MSAs.	Construction		✓	The Scoping Boundary does pass through a MSA for sand and gravel however impacts are not assessed in the materials and waste assessment in accordance with the IEMA Guidance. MSAs are included for context in the baseline since MSAs are a planning consideration and further consultation and assessment in accordance with Mineral Planning Authority policies may be required at a later Project stage.
Changes in demand for materials and available landfill capacity.	Decommissioning		✓	The Project has a long design life and such it is not considered possible to reliably forecast decommissioning requirements and infrastructure far in the future.

17.6 References

Ref 17-1 IEMA, (2020), Guide to: Materials and Waste in Environment Impact Assessment, Guidance for a Proportionate Approach

Ref 17-2 European Union, (2008), Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (2008/98/EC)

Ref 17-3 Environment Agency (2021), 2020 Waste Summary Tables for England - Version 1.

Ref 17-4 Defra, (2010), The Strategy for Hazardous Waste Management in England.

Ref 17-5 Her Majesty's Stationary Office (HMSO), (1990); Environmental Protection Act 1990 (as amended).

Ref 17-6 HMSO, (2005), Hazardous Waste (England and Wales) Regulations 2005 (as amended).

Ref 17-7 HMSO, (2011), Waste (England and Wales) Regulations 2011 as amended, SI 1889.

Ref 17-8 HMSO, (2016), The Environmental Permitting (England and Wales) Regulations 2016.

Ref 17-9 HMSO, (2021), The Environment Act.

Ref 17-10 Department of Energy and Climate Change (DECC), (2011). Overarching National Policy Statement for Energy (EN-1)

Ref 17-11 (DECC), (2011). National Policy Statement for Renewable Energy Infrastructure (EN-3)

Ref 17-12 Ministry of Housing, Communities & Local Government, (2021), Revised National Planning Policy Framework (NPPF).

Ref 17-13 Ministry of Housing, Communities & Local Government, (2014), Planning Policy Guidance for Minerals.

Ref 17-14 Ministry of Housing, Communities & Local Government, (2015), Planning Policy Guidance for Waste.

Ref 17-15 Ministry of Housing, Communities & Local Government, (2014), National Planning Policy for Waste.

Ref 17-16 Department for Environment, Food & Rural Affairs, (2021), The Waste Management Plan for England.

Ref 17-17 Department for Environment, Food & Rural Affairs, (2018), A Green Future: Our 25 Year Plan to Improve the Environment.

Ref 17-18 Department for Environment, Food & Rural Affairs, (2018), Our Waste, Our Resources: A Strategy for England.

Ref 17-19 Lincolnshire County Council, (2016), Lincolnshire Minerals and Waste Local Plan – Core Strategy and Development Management Policies.

Ref 17-20 Lincolnshire County Council, (2017), Lincolnshire Minerals and Waste Local Plan – Site Locations

Ref 17-21 North Lincolnshire Council, (2011), The North Lincolnshire Local Development Framework – Core Strategy.

Ref 17-22 North Lincolnshire Council, (2021), The North Lincolnshire Local Plan Publication Draft.

Ref 17-23 North East Lincolnshire Council, (2018), North East Lincolnshire Local Plan 2013 to 2032.

Ref 17-24 North East Lincolnshire Council (2018), Policy Map.

Ref 17-25 East Lindsey District Council, (2018), East Lindsey Local Plan Core Strategy.

Ref 17-26 Central Lincolnshire Joint Strategic Planning Committee, (2017), Central Lincolnshire Local Plan.

Ref 17-27 Contaminated Land: Applications in Real Environments (CL:AIRE), (2011). Definition of Waste: Development Industry Code of Practice (DoWCoP), Version 2.

Ref 17-28 WRAP (undated). Designing Out Waste: A Design Team Guide for Civil Engineering.

Ref 17-29 Make UK, (2019): A new deal for steel: laying the foundations for a vibrant UK steel industry (published July 2019).

Ref 17-30 MPA, (2020); Profile of the UK Mineral Products Industry (2020 Edition)

Ref 17-31 WRAP, (undated), Designing Out Waste Tool for Civil Engineering (no longer available online).

Ref 17-32 Environment Agency, (2021). 2020 Waste Data Interrogator.

Ref 17-33 Environment Agency, (2021), Permitted Waste Sites - Authorised Landfill Site Boundaries.

Ref 17-34 Environment Agency, (2021), Historic Landfill Sites.

Ref 17-35 Department for Environment, Food & Rural Affairs (Defra), (2021). UK Statistics on Waste.

Ref 17-36 WRAP, (2007). Waste Recovery Quick Wins. Improving Recovery Rates without Increasing Costs.

Ref 17-37 Department for Environment, Food & Rural Affairs, (2011). Guidance on Applying the Waste Hierarchy.

18. Climate Change

18.1 Introduction

18.1.1 This chapter of the Scoping Report addresses both the potential for likely significant effects to the climate as a result of the V Net Zero Pipeline (hereafter referred to as the Project), and the effects to the Project as a result of climate change.

18.1.2 To align with the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations') (Ref 18-1), consideration has been given within this chapter to the following aspects of climate change assessment:

- *Greenhouse Gas (GHG) Impact Assessment*: The effects on the climate of GHG emissions arising from the Project over its lifetime, including how it would affect the ability of government to meet its carbon reduction plan targets;
- *Climate Change Resilience (CCR) Assessment*: The resilience of the Project to future climate change impacts; and
- *In-combination Climate Change Impact (ICCI) Assessment*: The combined impact of the Project and future climate change on receptors in the surrounding environment.

18.2 Legislation & Policy

18.2.1 A brief overview of the policy, legislative and guidance relevant to the climate change assessment have been reviewed and summarised in **Table 18-1**.

Table 18-1: Climate change policy, legislation and guidance

Policy, legislation or guidance name	Relevance to Climate Change
International	
United Nations Framework Convention on Climate Change Paris Agreement (UNFCCC, 2016) (Ref 18-6)	The Paris Agreement is an agreement within the UNFCCC requiring all signatories to strengthen their climate change mitigation efforts to keep global warming to below 2°C this century and to pursue efforts to limit global warming to 1.5°C.
National	
UK Nationally Determined Contribution (Ref 18-7)	In 2020, the UK communicated its new Nationally Determined Contribution to the UNFCCC. Within this, the UK has committed to reducing GHG emissions by at least 68% by 2030 compared to 1990 levels.
Climate Change Act 2008 (Ref 18-2) and Climate Change Act (2050 Target Amendment Order 2019) (Ref 18-8)	The Climate Change Act 2008 set a legally binding target for the UK to reduce its GHG emissions from 1990 levels by at least 80% by 2050. This target is supported by a system of legally binding five-year 'carbon budgets' and an independent body to monitor progress, the Climate Change Committee (CCC). The UK carbon budgets restrict the amount of GHG emissions the UK can legally emit in a defined five-year period. The Act was amended in 2019 to revise the existing 80% reduction target and legislate for Net Zero emissions by 2050 (through the Climate Change Act 2008 (2050 Target Amendment) Order 2019). In December 2020, the 6th Carbon Budget (Ref 17-28) was published by the CCC for consideration by Government and is

Policy, legislation or guidance name	Relevance to Climate Change
	the first budget to reflect the amended trajectory to Net Zero by 2050.
The Infrastructure Planning (Environmental Impact Assessment) Regulations ('the EIA Regulations') (Ref 18-1)	State that an EIA (where relevant): *"must include a description of the likely significant effects of the development on the environment resulting from… the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change".*
Planning Policy Context	
National Planning Policy (Department for Energy and Climate Change (DECC), 2011) (Ref 18-9)	National Policy Statement (NPS) EN-1 describes the national policy for energy infrastructure in relation to climate impacts and adaptation; adverse effects and benefits; in relation to the EU Directive and ES requirements; in relation to adaptation measures in response to climate projections; and in relation to climate projections, flood risk and the importance of relevant mitigation. EN-1 promotes Carbon Capture and Storage as an emerging technology that the Government is aiming to facilitate and encourage, including for gas-fired generating stations. Paragraph 2.2.23 of EN-1 states that Carbon, Capture and Storage (CCS) is part of the UK's plans to "reduce its dependence on fossil fuels, particularly unabated combustion". This Policy Statement further states the benefits of having a diverse mix of power generation, including energy supply security as fossil-fuel generation that can be brought online quickly to meet demand and can complement baseload supply from nuclear and renewables. However, these fossil-fuel power generators will need CCS to be low carbon. In addition, NPS EN-4 regarding gas supply infrastructure applies to the climate change assessment, in particular Section 2.2 which sets out considerations to ensure that new energy infrastructure is resilient to climate change.
The National Planning Policy Framework (Ministry of Housing, Communities and Local Government (MHCLG), 2021) (Ref 18-10)	The revised National Planning Policy Framework (NPPF) sets out the Government's planning policies for England. While the NPPF does not set specific policies for Nationally Significant Infrastructure Projects (NSIP), its policies may be of relevance to decision making. Those policies of relevance to climate change and sustainability assessment include those achieving sustainable development and meeting the challenge of moving to a low carbon economy, climate change, flooding and coastal change. The NPPF states that the planning system should support this transition by supporting low carbon energy and associated infrastructure.
National Planning Policy Guidance on Climate Change (MHCLG, 2019) (Ref 18-11)	This guidance describes how to identify suitable mitigation and climate adaptation measures to incorporate into the planning process, stating that: *"Effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases… Planning can also help increase resilience*

Policy, legislation or guidance name	Relevance to Climate Change
	to climate change impact through the location, mix and design of development."
Net Zero Strategy (Department for Business, Energy & Industrial Strategy (BEIS), 2021) (Ref 18-12)	This strategy sets out policies and proposals for decarbonising all sectors of the UK economy to meet a net zero target by 2050. The strategy includes an ambition to deliver four carbon capture, usage and storage (CCUS) clusters, capturing 20-30 $MtCO_2$/year across the economy, including 6 $MtCO_2$/year of industrial emissions, per year by 2030. Teesside and the Humber, Merseyside and North Wales are identified among potential carbon capture cluster locations.
Local Planning Policy and Strategy	
Greater Lincolnshire Local Enterprise Partnership (GLLEP) (Ref 18-22)	The GLLEP is a business led partnership made up of private and public sector leaders with the aim of driving economic growth for the region. The GLLEP is responsible for developing the Local Industrial Strategy which will set locally agreed economic priorities of Greater Lincolnshire to 2030 and beyond. The Humber Zero Carbon Capture Project is identified as a key project.
North Lincolnshire Council Local Development Framework (North Lincolnshire Council, 2011) (Ref 18-23)	Sets out the council's spatial vision, strategy and policies to deliver the strategy up to 2026. The Core Strategy covers several policies related to climate change, including the following, which will be considered in the assessment: ▪ Policy CS16 North Lincolnshire Landscape, Greenspace and Waterscape; ▪ Policy CS17 Biodiversity; ▪ Policy CS18 Sustainable Resource Use and Climate Change; ▪ Policy CS19 Flood Risk; and ▪ Policy CS20 Sustainable Waste Management.
North Lincolnshire Carbon Management Strategy (North Lincolnshire Council, 2017) (Ref 18-24)	Details the local council's plan for reducing carbon from 2017 to 2022. It states that this area is one of the top five most vulnerable coasts in the UK.
North East Lincolnshire Council Environmental Policy Statement (2016) (Ref 18-25)	Sets out North East Lincolnshire's priorities towards consuming resources more efficiently, eliminating waste and supporting & developing the green economy & infrastructure, including a commitment to support environmentally responsive local economic growth.
East Lindsey District Council Environment Policy (2020) (Ref 1-26)	The East Lindsey District Council Environment Policy Theme Two covers mitigating and adapting to climate changes, including working collaboratively to support the wider District in taking action to tackle climate change with urgency and working with local businesses to support the development of a low carbon economy
West Lindsey District Council Sustainability, Climate Change and Environment Strategy (2021) (Ref 18-27)	West Lindsey District Council's Sustainability, Climate Change and Environment Strategy and action plan are designed to achieve the ambition of net zero carbon emissions across the district by 2050.
Guidance	

Policy, legislation or guidance name	Relevance to Climate Change
IEMA: Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017) (Ref 17-13)	In the absence of any widely accepted guidance on assessing the significance of the impact effect of GHG emissions, the EIA Guidance published by IEMA in 2017 will be followed. This provides a framework for the consideration of GHG emissions in the EIA process, in line with the 2014 European Union (EU) Directive. The guidance sets out how to: ▪ Identify the GHG emissions baseline in terms of GHG current and future emissions; ▪ Identify key contributing GHG sources and establish the scope and methodology of the assessment; ▪ Assess the impact of potential GHG emissions and evaluate their significance; and Consider mitigation in accordance with the hierarchy for managing project related GHG emissions (avoid, reduce, substitute, and compensate).
IEMA: Environmental Impact Assessment Guide to: Climate Chance Resilience and Adaptation (2020) (Ref 18-14)	The IEMA Guidance for assessing climate change resilience and adaptation in EIA will be followed. It provides guidance for consideration of the impacts of climate change within project design. The guidance sets out how to: ▪ Define climate change concerns and environmental receptors vulnerable to climate factors; ▪ Define the environmental baseline with changing future climate parameters; and ▪ Determine the resilience of project design and define appropriate mitigation measures to increase resilience to climate change.
The GHG Protocol (World Resources Institute and World Business Council for Sustainable Development (WRI & WBCSD), 2015) (Ref 18-15)	The GHG Protocol provides overarching guidance on developing GHG inventories and reporting standards

18.3 Baseline Environment and Study Area

GHG Impact Assessment

18.3.1 The current and future baseline for the assessment of the impact of the Project on climate is a 'business as usual' scenario where the Project is not constructed and operated. The baseline comprises of existing carbon stock and sources of GHG emissions within the boundary of the existing site activities.

18.3.2 The baseline for the lifecycle GHG impact assessment will be established by quantifying the GHG emissions through a desk-based study, and analysis of data from other relevant technical disciplines, for example, transport and materials and waste.

18.3.3 Based on initial assessment the current land use within the Scoping Boundary consists of predominantly arable land, and managed hedgerows and trees. Trees are present individually in some areas, as well as in rows and within small woodland areas. The abundance of vegetation within the Scoping Boundary suggests a relatively high carbon sink potential. Also, current land use within the Scoping Boundary has minor levels of associated GHG emissions as the land use is largely agricultural. Baseline agricultural GHG emissions are dependent on soil and vegetation types present, and fuel use for the operation of vehicles and machinery.

18.3.4 There are emissions associated with existing road and rail networks within the Scoping Boundary. However, there is not expected to be significant impact on road or rail operations as a result of the Project.

18.3.5 The Study Area for the GHG impact assessment covers all direct GHG emissions arising from activities undertaken within the Scoping Boundary during the construction, operation, and decommissioning of the Project. It also includes indirect emissions embedded within the construction materials arising as a result of the energy used for their production, as well as emissions arising from the transportation of materials, waste and construction workers.

18.3.6 The study area also includes activities that may be avoided or displaced as a result of the Project, including consideration of the emissions which are expected to be avoided as a result of the delivery of the wider V Net Zero (VNZ) Transportation and Storage Scheme, as discussed in Section 18.5.2 GHG Impact Assessment.

18.3.7 The environmental impact associated with GHG emissions is a national and global issue. Consequently, the potential significance of the proposed Project's lifecycle GHG emissions will be assessed by comparing the estimated GHG emissions from the Project against the reduction targets defined in the Climate Change Act 2008 (Ref 18-2) and associated five-year, legally binding carbon budgets.

Climate Change

18.3.8 The current baseline for the assessment of the climate change risks to the Project (the CCR assessment) and combined risks to surrounding receptors (the ICCI assessment) will be based on historic climate data obtained from the Met Office (Ref 18-3) recorded by the closest meteorological station (Cleethorpes, 13 miles from Humber) for the period 1981-2010. This data is listed in **Table 18-2** below.

Table 18-2: Historic Climate Data 1981-2010

Climatic Variable	Month	Value
Average annual maximum daily temperature (o C)	-	13.6
Warmest month on average (ºC)	August	20.69
Coldest month on average (ºC)	January	1.72
Mean annual rainfall levels (mm)	-	587.94
Wettest month on average (mm)	November	60.18

18.3.9 The Met Office historic 10-year averages for the 'England and North East England' region identify gradual warming (although not uniformly so) between 1969 and 2018, with increased rainfall also. Information on mean maximum annual temperatures (°C) and mean annual rainfall (mm) is summarised in **Table 18-3**.

Table 18-3: Historic 10-year Averages for Temperature and Rainfall for the England Southeast and Central South Region

Climate Period	Climate Variable	
	Mean maximum annual temperatures (°C)	Mean annual rainfall (mm)
1971-1980	12.0	710
1981-1990	12.2	732.1
1991-2000	12.6	750.8
2001-2010	13.1	801.5
2011-2020	13.3	803.5

18.3.10 The future climatic baseline will be determined through the UK Climate Impacts Programme UK Climate Projections 2018 (UKCP18) (Ref 18-4) detailed in **Table 18-4** and **Table 18-5**.

18.3.11 As the design life of the Project is expected to be 40 years, the vulnerability assessment has considered a scenario that reflects a high level of greenhouse gas emissions at the 10%, 50% and 90% probability levels up to the 2070s' time period and to assess the impact of climate change over the whole lifetime of the Project as possible.

18.3.12 For the purpose of the assessment, UKCP18 probabilistic projections for pre-defined 20-year periods for the following average climate variables have been obtained and will be further analysed:

- Mean annual temperature;
- Mean summer temperature;
- Mean winter temperature;
- Maximum summer temperature;
- Minimum winter temperature;
- Mean annual precipitation;
- Mean summer precipitation; and
- Mean winter precipitation.

18.3.13 Projected temperature and precipitation variables are presented in **Table 18-4** and **Table 18-5**, respectively. UKCP18 probabilistic projections have been analysed for the 25 km grid square in which the Project is located. These figures are expressed as temperature/precipitation anomalies in relation to the 1981-2000 baseline.

18.3.14 UKCP18 uses a range of possible scenarios, classified as Representative Concentration Pathways (RCPs), to inform differing future emission trends. These RCPs "*… specify the concentrations of greenhouse gases that will result in total radiative forcing increasing by a target amount by 2100, relative to preindustrial levels.*" RCP8.5 has been used for the purposes of this assessment as a worst-case scenario.

18.3.15 The vulnerability assessment will use a project life span of 40 years in line with the baseline scenarios and guidance from The Carbon Budgets Order, which set five yearly carbon budgets until 2032 currently.

Table 18-4: Projected Changes in Temperature Variables (°C), 50% Probability (10% and 90% probability in parenthesis)

Climate Variable	Time Period	
	2020-2049	2060-2089
Mean annual air temperature anomaly at 1.5 m (°C)	+1.0 (+0.4 to +1.7)	+2.8 (+1.4 to +4.3)
Mean summer air temperature anomaly at 1.5 m (°C)	+1.2 (+0.5 to +2.0)	+3.4 (+1.4 to +5.5)
Mean winter air temperature anomaly at 1.5 m (°C)	+0.9 (-0.03 to +2.0)	+2.5 (+0.8 to +4.2)
Maximum summer air temperature anomaly at 1.5 m (°C)	+1.3 (+0.4 to +2.3)	+3.7 (+1.3 to +6.3)
Minimum winter air temperature anomaly at 1.5 m (°C)	+0.9 (-0.1 to +2.0)	+2.5 (+0.7 to +4.4)

Table 18-5: Projected Changes in Precipitation Variables (%), 50% Probability (10% and 90% probability in parenthesis)

Climate Variable	Time Period	
	2020-2049	2060-2089
Annual precipitation rate anomaly (%)	+0.9 (-3.6 to +5.3)	-0.01 (-5.3 to +5.3)
Summer precipitation rate anomaly (%)	-8.1 (-24 to +7.7)	-22.9 (-47.8 to +2.5)
Winter precipitation rate anomaly (%)	+4.2 (-3.9 to +12.7)	+14.3 (-1.6 to +31.4)

18.4 Planned Surveys

18.4.1 No surveys are planned as part of the climate change considerations, but engagement will be undertaken with relevant environmental disciplines and the engineering design team to discuss the climate change assessment and identify mitigation measures for incorporation into the design of the Project.

18.5 Potential Effects and Mitigation

18.5.1 For the purposes of this assessment, it has been considered that any increase in GHG emissions compared to the baseline has the potential to have an impact, due to the high sensitivity of the receptor (global climate) to increases in GHG emissions. This is in line with the IEMA guidance (Ref 18-13), which states that all GHG emissions have the potential to be significant. The application of the standard EIA significance criteria is not considered to be appropriate for climate change mitigation assessments. GHG impacts will be put into context in terms of their impact on the UK's five-year carbon budgets, which set legally

binding targets for GHG emissions. The specific nature of the Project itself will also be taken into account as appropriate once the Project is operational.

GHG Impact Assessment

18.5.2 The key anticipated GHG emission sources during the construction, operation and decommissioning phase are set out in **Table 18-6**. This approach is consistent with the principles set out in the BS EN 15804 (Ref 18-29), PAS 2050 (Ref 18-30) and IEMA guidance (Ref 18-13 and Ref 18-14). The GHG assessment will consider the direct impact of the proposed construction and operation of the works, against the baseline scenario

Table 18-6: Potential sources of GHG emissions

Lifecycle Stage	Activity	Primary emission sources
Product Stage	Use of products and/or materials required to build the proposed pipeline and associated infrastructure.	Embodied GHG emissions associated with extraction and manufacturing of the required raw materials.
Construction process stage	On-site construction activity including emissions from construction compounds.	GHG emissions from grid electricity use during construction. GHG emissions from fuel consumed by construction vehicles and plant use.
	Land use change	GHG impact of changes to carbon sink value of the Site.
	Water Use	GHG emissions from the provision and treatment of water.
	Travel of construction workers Transportation of construction materials (where these are not included in product-stage embodied GHG emissions)	GHG emissions arising from the fuel use for vehicles transporting workers to the construction site.
	Disposal of waste materials generated by the construction process.	Emissions arising from the treatment of waste. Emissions arising from the transportation of the waste to the place of treatment.
Operation stage	Operation and maintenance of the Proposed Development	Emissions arising from fuel consumed by maintenance vehicles and plant. Residue recycling. Embodied GHG emissions within the materials used for maintenance. Grid electricity use during operation of the development (lighting/signs)
Decommissioning stage	On-site decommissioning activity.	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on site, and workers commuting.

Lifecycle Stage	Activity	Primary emission sources
	Worker travel	GHG emissions from fuel consumption for transportation of workers
	Transportation and disposal of waste materials.	GHG emissions from energy use and from fuel consumption for transportation of waste

18.5.3 It is recognised that the Project will be delivered as part of the wider V Net Zero (VNZ) Transportation and Storage Scheme, which intends to capture and store carbon dioxide (CO_2) emissions from existing industrial sources in the Humber industrial cluster. The GHG impact assessment for this Project will give consideration to the indirect emissions which are expected to be avoided as a result of the delivery of the wider Scheme, however care will be given not to double count emissions reductions which may ultimately be assumed by the emitters.

18.5.4 A draft Construction Environmental Management Plan (CEMP) will be submitted as part of the DCO application and would be implemented by the selected Principal Contractor to include a range of best practice construction measures, such as:

- Specification of alternative materials with lower embodied GHG emissions; and
- Low carbon design specifications such as energy-efficient lighting and durable construction materials to reduce maintenance and replacement cycles.

18.5.5 The final selection of any mitigation measures, if required, will be detailed as part of the lifecycle GHG impact assessment in the ES. This may include GHG emission mitigation measures concerning construction, operation and decommissioning of the Project.

In-combination climate change impact assessment

18.5.6 In-combination climate impact assessment identifies how the resilience of various receptors in the surrounding environment is affected by a combination of future climate conditions and the Project. The climate parameters relevant to the Project are detailed in **Table 18-7** below together with the rationale for scoping. On the basis of the information presented in **Table 18-7**, an in-combination climate change impact assessment is proposed to be scoped out.

Table 18-7: Climate parameters for the in-combination climate change impact of the Proposed Development

Parameter	Scoped In/ Out	Rationale for Scoping Conclusion
Temperature change	Out	While impacts are expected as a result of projected temperature increases, these temperature increases in combination with the Project are not expected to have a significant impact upon receptors identified by other environmental disciplines.
Sea level rise	Out	The Project is located in an area that is susceptible to sea level rise. However, the impacts of sea level rise on receptors is not expected to be exacerbated by the Project i.e. the Project is not expected to restrict adaptation for coastal ecological or residential communities. Mitigation measures for this climate risk will be addressed within other

Parameter	Scoped In/ Out	Rationale for Scoping Conclusion
		technical assessments of the EIA Report (e.g. landscape and visual, and flood risk).
Precipitation change (frequency and magnitude of precipitation events and droughts)	Out	Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding or changes to groundwater levels. However, no significant impacts on surface water or groundwater levels are expected as a result of precipitation changes, in combination with the Project, as the flow of precipitation to ground will not be significantly hindered. The Project, in combination with projected changes in precipitation, is also not expected to have a significant impact upon receptors identified by other environmental disciplines.
Wind	Out	The Project, in combination with projected changes in wind patterns, is not expected to have a significant impact upon receptors identified by other environmental disciplines.

Climate change resilience review

18.5.7 The climate change resilience review will qualitatively assess the Project's resilience to climate change. This will be completed in liaison with the project design team and the other EIA technical disciplines by considering the climate projections for the geographical location and timeframe of the Project.

18.5.8 Climate parameters relevant to the climate change resilience review are detailed in **Table 18-8** below.

Table 18-8: Parameters scoped into the Climate Change Resilience Review

Parameter	Scoped In/ Out	Rationale for Scoping Conclusion
Extreme weather events	In	The Project may be vulnerable to extreme weather events such as storm damage to structures and assets.
Increased average temperatures and incidence of heatwaves	In	Extremes in temperatures may result in heat stress of materials and structures.
Increased frequency of heavy precipitation events	In	The Project may be vulnerable to changes in precipitation, for example, land subsidence and damage to structures and drainage systems during periods of heavy rainfall.
Increase in strong wind events	In	The Project may be vulnerable to changing wind patterns, for example, high winds and falling trees could damage structures and assets.
Sea level rise	In	The Project is located in an area that is susceptible to sea level rise. Specifically, approximately the first 3 km of the Scoping

Parameter	Scoped In/ Out	Rationale for Scoping Conclusion
		Boundary (Section A – Corridor 1) intersects with Flood Zone 2 and 3 associated with the tidal flooding from the Humber Estuary. Additionally, the last 9km (from the crossing of the B1200 onwards) of this corridor (Section E – Corridor 2) lies within the tidal flood zone 2-3 from the North Sea.

18.5.9 Based on the above, the vulnerability assessment is proposed to be scoped into the EIA. The design of the Project will be assessed to understand how potential risks arising from future climate change such as an increase in the frequency and severity of precipitation and increased temperatures may impact the proposed development's operation.

18.5.10 A statement will be provided within the ES to describe how the Project will be adapted to improve its resilience to future climate conditions.

18.6 Assessment Method

Consultation

18.6.1 Consultation will be undertaken with statutory parties including the Environment Agency and the relevant Local Planning Authorities on climate change targets, aims, commitments, other projects, plans and policy that affect climate and baseline data, as well as any known future developments in close proximity to the Project.

Assessment Methodology

GHG Emissions

18.6.2 In order to quantify the magnitude of emissions, GHG-emitting activities need to be identified and emissions quantified. The key anticipated GHG emission sources during Project's construction, operation and decommissioning phase are set out in **Table 18-6**. This approach is consistent with the principles set out in IEMA guidance (Ref 18-13 and Ref 18-14), BS EN 15804 (Ref 18-30) and PAS 2080 (Ref 18-30). The approach will follow Defra (Ref 18-16) methodology for calculating greenhouse gas emissions based on the document energy recovery for residual waste.

18.6.3 GHG emissions will be assessed using a calculation-based methodology as per the below equation:

Activity data x GHG emissions factor = GHG emissions value.

18.6.4 A set of standard data quality principles will be applied so that the results from the GHG assessment are as accurate and representative as possible:

- **Age:** Activity data and GHG emissions factors applicable to the study period will be used.
- **Geography:** Activity data will reflect the design of the Project. GHG emissions factors will be representative of the UK construction industry and UK transport sector.
- **Technology:** The default solution will be to apply data which is representative of the UK construction industry and transport sector. However, technology specific data may be used for the purpose of developing scenarios of the future.
- **Methodology:** Activity data will be gathered from the Project's engineering and design teams to enable consistency and completeness of data collection.

- **Competency:** Data gaps will be addressed through, for instance, peer reviewed papers (published in recognised journals) or industry specific literature (e.g. UK construction trade associations). GHG emissions factors from a range of sources will be used: EPDs (adhering to BS EN 15804 standard), LCA tools (aligned with best practice), and industry specific and UK Government sources.

18.6.5 In line with applicable guidelines from the World Business Council for Sustainable Development (WBCSD)/ World Resources Institute (WRI) Greenhouse Gas Protocol initiative (Ref 18-15), the GHG emissions study will be reported as tonnes of carbon dioxide equivalent (tCO_2e) and consider the seven Kyoto Protocol gases:

- Carbon-dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF_6)
- Nitrogen Trifluoride (NF_3)

18.6.6 Where insufficient data is available to quantify GHG emissions industry benchmarks or approximations based on other similar projects will be used.

18.6.7 Due to the absence of any defined industry guidance for assessing the significance of GHG emissions impacts in EIA, standard GHG emissions accounting and reporting principles will be followed to determine the impact magnitude. In GHG accounting, it is common practice to consider exclusion of emission sources that are <1% of a given emissions inventory on the basis of a de minimis contribution.

18.6.8 The PAS 2050 (Ref 18-30) specification allow emissions sources of <1% contribution to be excluded from emission inventories, and these inventories are still be taken into account for verification purposes. This would, therefore, suggest that a development with emissions of <1% of a relevant carbon budget would be minimal in its contribution to the wider national GHG emissions. This criteria will be used to contextualise the significance of the GHG emissions, as outlined in **Table 18-9**.

18.6.9 The global climate has been identified as the receptor for the purposes of the lifecycle GHG emissions impact assessment. However, to enable significance evaluation of the estimated GHG emissions arising from the Project, the UK national carbon budgets will be used as a proxy for the global climate. GHG emissions will be contextualised against the relevant UK 5-year carbon budget, and associated reduction targets for the appropriate timeframe for each project stage (construction, operation, decommissioning). Consideration will be given to the emissions which are expected to be avoided as a result of the delivery of the wider V Net Zero (VNZ) Transportation and Storage Scheme, noting that the Project should not double count emissions reductions which may ultimately be assumed by the emitters.

18.6.10 There is no standard definition for receptor sensitivity to GHG emissions set out in the IEMA guidance (Ref 18-13). The sensitivity of the receptor, the UK carbon budget (as a proxy for the global climate), has been defined as high. The rationale is as follows:

- Any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future carbon budgets; and
- The extreme importance of limiting global warming to below 2°C above industrial levels, while pursuing efforts to limit such warming to 1.5°C as set out in the Paris

Agreement and a recent report by the Intergovernmental Panel on Climate Change highlighted the importance of limiting global warming below 1.5°C.

Table 18-9: Significance criteria for the GHG impact assessment

Significance	Magnitude Criteria
Major Adverse	GHG emissions represent an increase of equal to or more than 1% of total emissions from the relevant annual UK carbon budget in which they arise
Minor Adverse	GHG emissions represent an increase of less than 1% of total emissions from the relevant annual UK carbon budget in which they arise
Major Beneficial	GHG emissions represent a reduction of equal to or more than 1% of total emissions from the relevant annual UK carbon budget in which they arise
Minor Beneficial	GHG emissions represent a reduction of equal to or more than 1% of total emissions from the relevant annual UK carbon budget in which they arise

18.6.11 **Table 18-10** shows the current and future UK carbon budgets. The Committee on Climate Change published their recommendations for the UK's sixth carbon budget in early December 2020 (Ref 18-28).

Table 18-10: UK Carbon Budgets

Carbon Budget	Total Budget ($MtCO_2e$)
3rd (2018-2022)	2,544
4th (2023-2027)	1,950
5th (2028-2032)	1,725
6th (2033-2037)	965

18.6.12 Appropriate emissions factor datasets, including but not limited to the following, will be used BEIS 2021 emissions factors (Ref 18-17) and embodied carbon data from the University of Bath Inventory of Carbon and Energy (ICE) (Ref 18-18) will be used as the source data for calculating GHG emissions.

Climate Change Resilience Assessment

18.6.13 An assessment of climate change risk will be undertaken for the Project to identify potential climate change impacts, and to consider their potential consequence and likelihood of occurrence, taking account of the measures incorporated into the design of the Project.

18.6.14 The types of receptors considered vulnerable to climate change, are:

- construction phase receptors (e.g. workforce, plant and machinery);
- the Project assets and their operation, maintenance and refurbishment (e.g. structures, earthworks and drainage, technology assets, etc.); and
- end-users (e.g. staff and commercial operators etc.).

18.6.15 The potential climate change impacts identified in the CCR assessment are determined based on the UKCP18 projections. There is no single prescribed format for undertaking such assessments; therefore, the approach adopted to undertaking and reporting the assessment has drawn on good practice from other similar developments and studies and is aligned with existing guidance such as that of IEMA (Ref 18-14).

18.6.16 The CCR assessment identifies potential climate change impacts and considers their potential consequence and likelihood of occurrence. The following key terms and definitions relating to the CCR assessment are used:

- **Climate hazard** – an acute weather or chronic climate related event, which has potential to do harm to environmental or community receptors or assets, for example, increased winter precipitation;
- **Climate change impact** – an impact from a climate hazard which affects the ability of the receptor or asset to maintain its function or purpose; and
- **Consequence** – any effect on the receptor or asset resulting from the climate hazard having an impact.

18.6.17 The assessment includes all infrastructure and assets associated with the Project. It assesses the resilience against both gradual climate change and the risks associated with an increased frequency of severe weather events as per the UKCP18 climate change projections.

18.6.18 For the operational phase of the Project, once potential impacts have been identified, the likelihood and consequence of each impact occurring to each receptor (where relevant) are assessed for the selected future time frame for operation. The same approach would be applied to the decommissioning phase.

18.6.19 Criteria used to determine the likelihood of an event occurring, based on its probability and frequency of occurrence, are detailed in **Table 18-11**. The consequence of an impact has been measured using the criteria detailed in **Table 18-12**.

18.6.20 The event is defined as the climate event (such as heatwave) and the hazard (such as overheated electrical equipment) occurring in combination

Table 18-11: Description of likelihood for climate change hazard

Likelihood Category	Description (probability and frequency of occurrence)
Very likely	90-100% probability that the hazard will occur.
Likely	66-90% probability that the hazard will occur.
Possible, about as likely as not	33-66% probability that the hazard will occur.

Table 18-12: Measure of consequence for climate change risk

Consequence of Impact	Measure of Consequence for Climate Change Resilience
Very high	Permanent damage to structures/assets; Complete loss of operation/service; Complete/partial renewal of infrastructure; Serious health effects, possible loss of life; Extreme financial impact; and Exceptional environmental damage.
High	Extensive infrastructure damage and complete loss of service; Some infrastructure renewal; Major health impacts; Major financial loss; and Considerable environmental impacts.
Medium	Partial infrastructure damage and some loss of service; Moderate financial impact; Adverse effects on health; and Adverse impact on the environment.
Low	Localised infrastructure disruption and minor loss of service; No permanent damage, minor restoration work required; and Small financial losses and/or slight adverse health or environmental effects.

Consequence of Impact	Measure of Consequence for Climate Change Resilience
Very low	No damage to infrastructure; No impacts on health or the environment; and No adverse financial impact.

18.6.21 The significance of each effect will then be evaluated through a matrix as detailed in **Table 18-13**. Any significant conclusions will be based on and incorporate confirmed design and mitigation measures. Any further design and mitigation measures will then be incorporated, and then residual risks will be reassessed until a non-significant acceptable level is achieved.

Table 18-13: Significance Criteria for Climate Change Resilience Assessment

		Likelihood of climate change hazard occurring				
		Very unlikely	Unlikely	Possible	Likely	Very likely
Consequence	Very low	Negligible	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Minor	Minor	Minor	Minor
	Medium	Negligible	Minor	Moderate	Moderate	Moderate
	High	Negligible	Minor	Moderate	Major	Major
	Very high	Negligible	Minor	Moderate	Major	Major

18.7 Summary

18.7.1 In summary, it is proposed that the GHG impact assessment and CCR assessments are scoped into the EIA and will be included within the ES to determine the potential for likely significant effects to and from climate change as a result of the construction, operation and decommissioning phases of the Project.

18.7.2 An in-combination climate change assessment has been scoped out as the Project, in combination with projected changes in wind patterns, is not expected to exacerbate impacts upon receptors identified by other environmental disciplines.

18.7.3 Best practice methods and guidance will be used in these assessments, as described within this Chapter.

Table 18-14 Summary of scope for climate change assessment

Element	Phase	Scoped in	Scoped Out	Justification
GHG Impact Assessment	Construction, operation and decommissioning	✓		
Climate change resilience review assessments	Construction, operation and decommissioning	✓		
In-combination climate change	Construction, operation and decommissioning		✓	The Project is not expected to exacerbate or contribute to effects of temperature changes, sea level rise, or changes in precipitation or wind.

18.8 References

Ref 18-1 Her Majesty's Stationery Office (HMSO) (2011) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended by The Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018). Available at: http://www.legislation.gov.uk/uksi/2017/572/pdfs/uksi_20170572_en.pdf and http://www.legislation.gov.uk/uksi/2018/695/pdfs/uksi_20180695_en.pdf [Accessed 11 January 2022].

Ref 18-2 HMSO (2008) Climate Change Act 2008. Available at: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf [Accessed 11 January 2022].

Ref 18-3 Met Office (2021). UK Climate Averages (online). Available: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages [Accessed 10 January 2022]

Ref 18-4 UK Climate Impacts programme (UKCIP) (2018) UK Climate Projections 2018 (UKCP18). Available at: https://www.metoffice.gov.uk/research/collaboration/ukcp [Accessed 10 January 2022].

Ref 18-5 HMSO (2009) The Carbon Budgets Order 2009. Available at: http://www.legislation.gov.uk/uksi/2009/1259/pdfs/uksi_20091259_en.pdf [Accessed 10 January 2022].

Ref 18-6 UNFCCC (2016). Conference of the Parties, Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. FCCC/CP/2015/10 (online). Available: [redacted] [Accessed 10 January 2021]

Ref 18-7 UK Government (2020). United Kingdom of Great Britain and Northern Ireland's Nationally Determined Contribution (online). Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943618/uk-2030-ndc.pdf [Accessed 10 January 2022]

Ref 18-8 HMSO (2019) The Climate Change Act 2008 (2050 Target Amendment) Order 2019. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111187654.

Ref 18-9 Department of Energy and Climate Change (DECC) (2011) 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 11 January 2022].

Ref 18-10 Ministry of Housing, Communities and Local Government (MHCLG) (2021) National Planning Policy Framework (NPPF). Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 [Accessed 11 January 2022].

Ref 18-11 MHCLG (2014, updated March 2019) National Planning Practice Guidance: Climate Change. Available at: https://www.gov.uk/guidance/climate-change [Accessed 11 January 2022].

Ref 18-12 Department for Business, Energy & Industrial Strategy (BEIS) (2021) .Net Zero Strategy: Build Back Greener. Available at: https://www.gov.uk/government/publications/net-zero-strategy [Accessed 11 January 2022].

Ref 18-13 IEMA (2017). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (online). Available: [redacted] [Accessed 30 November 2021]

Ref 18-14 IEMA (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (online). Available: [redacted] [Accessed 30 November 2021]

Ref 18-15 WRI & WBCSD (2015). The GHG Protocol. A Corporate Accounting and Reporting Standard. Revised Edition (online). Available: [redacted] [Accessed 10 January 2022]

Ref 18-16 Defra (2009). Guidance on how to measure and report your greenhouse gas emissions (online). Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69282/pb13309-ghg-guidance-0909011.pdf [Accessed 10 January 2022]

Ref 18-17 BEIS (2020). Greenhouse Gas Reporting: Conversion Factors 2021 (online). Available: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021 [Accessed 10 January 2022]

Ref 18-18 University of Bath (2019). The Inventory of Carbon and Energy. Version 3 (online). Available: [redacted] [Accessed 10 January 2022]

Ref 18-19 Kendon, M., McCarthy, M., Jevrejeva, S., Matthews, A., Sparks, T., and Garforth, J. (2020). State of the UK Climate 2019. International Journal of Climatology. Volume 40, Number S1, July 2020.The Royal Meteorological Society Journal of Climate Science (online). Available: [redacted] [Accessed 10 January 2022]

Ref 18-20 Department of Energy and Climate Change (2013). Guidance on Annual Verification for emissions from Stationary Installations.

Ref 18-21 British Standards Institution (2011). PAS 2050:2011. Specification for the assessment of the life cycle greenhouse gas emissions of goods and services.

Ref 18-22 Greater Lincolnshire Local Enterprise Partnership. Available at: [redacted]

Ref 18-23 North Lincolnshire (2011) Local Development Framework. Available at:https://www.northlincs.gov.uk/planning-and-environment/planning-policy-local-development-framework/#1591178700859-b856fc83-069c [Accessed12 January 2022]

Ref 18-24 North Lincolnshire (2017) Carbon Management Plan 2017-2022. Available at: https://www.northlincs.gov.uk/wp-content/uploads/2019/05/Carbon-Management-Plan-2017.pdf [Accessed 12 January 2022]

Ref 18-25 North East Lincolnshire Council (2016) Environmental Policy Statement. Available at: [redacted] [Accessed 12 January 2022]

Ref 18-26 East Lindsey District Council (2020) Environment Policy. Available at: https://www.e-lindsey.gov.uk/media/17771/Environment-Policy-FINAL/pdf/Environment_Policy_FINAL.pdf?m=637468277570800000 [Accessed 12 January 2022]

Ref 18-27 West Lindsey District Council (2021) Sustainability, Climate Change and Environment Strategy. Available at: https://www.west-lindsey.gov.uk/my-services/my-community/sustainability-climate-change-and-environment/sustainability-climate-change-and-environment-strategy/

Ref 18-28 Climate Change Committee (2020) The Sixth Carbon Budget - The UK's path to Net Zero. Available at: [redacted] [Accessed 14 January 2022]

Ref 18-29 BS EN 15804:2012 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.

Ref 18-30 British Standards Institution (2011). PAS 2050:2011. Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

19. Cumulative Effects

19.1 Introduction

19.1.1 This chapter of the Scoping Report provides a summary of the proposed assessment of cumulative effects arising from the V Net Zero Pipeline Project (hereafter referred to as the Project). The requirement for the consideration of cumulative effects is set out in the EIA Directive. A range of public sector and industry-led guidance is available on the approach to assessing cumulative effects but at present there is no single, agreed industry standard method. As the Project is classified as an NSIP, the approach to the assessment of intra-project and inter-project effects follows the guidance set out in the Planning Inspectorate Advice Note Seventeen (Ref 19-1).

19.1.2 IEMA's report recognises two major sources of cumulative effects:

- **Intra-project effects:** These effects occur where a single receptor is affected by more than one source of effect arising from different aspects of the project. An example of an intra-project effect would be where a local resident is affected by dust, noise and traffic disruption during the construction of a scheme, with the result being a greater nuisance than each individual effect alone; and
- **Inter-project effects:** These effects occur as a result of a number of developments, which individually might not be significant, but when considered together could create a significant cumulative effect on a shared receptor and will include developments separate from and related to the project.

19.1.3 The assessment will be based on the best available data from other proposed and committed developments and associated information which is currently in the public domain or has been provided to the Project. The assessment will assume that publicly available information is accurate; the assessment is also reliant on collaboration with a range of statutory consultees, neighbouring authorities and other developers to identify changes in information which may be pertinent to the assessment.

19.1.4 Where there are specific limitations associated with data, they will be highlighted as the assessment progresses.

19.2 Approach to Cumulative Assessment

19.2.1 In conjunction with professional judgement, Planning Inspectorate Advice Note Seventeen (Ref 19-1) will be used to inform the scope of the cumulative effects' assessments, and to assist the identification and mitigation of likely significant effects.

Assessment of Intra-project effects

19.2.2 The assessment of intra-project effects will consider whether an individual environmental receptor or resource will likely be affected by more than one type of impact as a result of the construction and/or operation of the Project. The assessment methodology will involve the identification of impact interactions associated with the Project upon separate environmental receptors and resources, in order to understand the overall environmental effect of the Project.

19.2.3 Potential interactions will be identified by reviewing the topic conclusions within the environmental assessment topics identified in this Scoping Report, in order to establish where individual impacts may combine and result in likely significant effects. The significance of intra-project effects upon environmental receptors and resources will be

determined using professional judgement, with input provided by from those responsible for the production of the individual topic assessments.

Assessment of Inter-project effects

19.2.4 In accordance with the approach contained within Advice Note Seventeen (Ref 19-1), the approach to cumulative assessment will follow a staged approach, as summarised in **Figure 19-1** and detailed below.

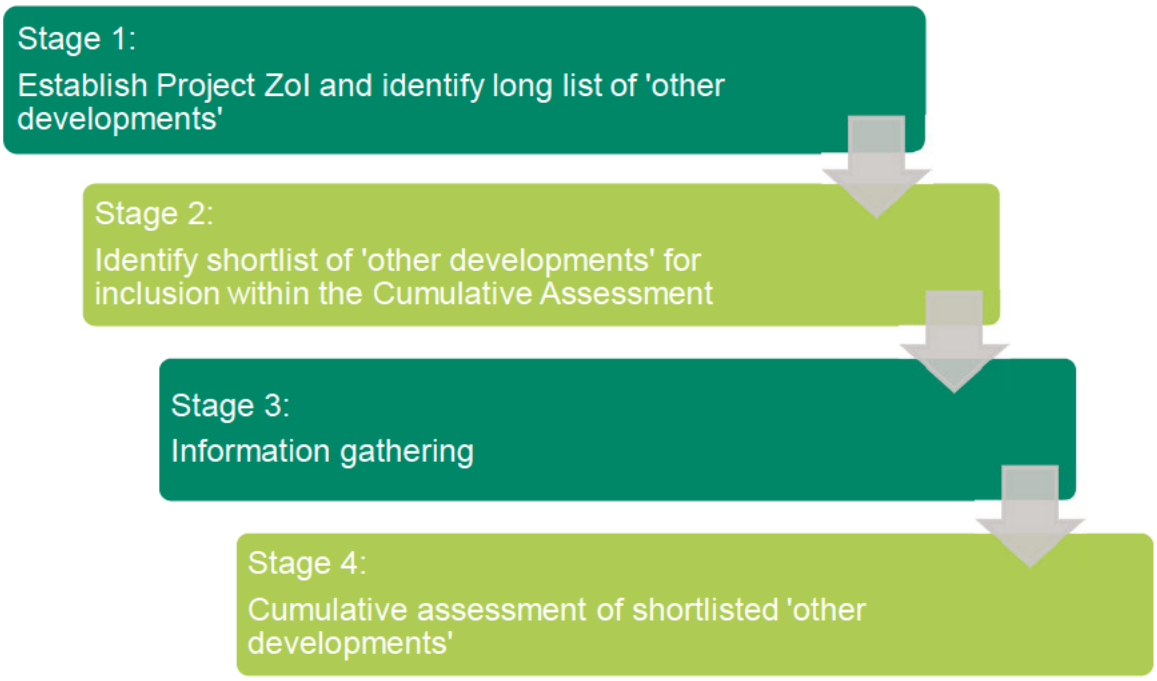


Figure 19-1: Staged approach to cumulative assessment

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

19.2.5 This stage involves establishing the Project's Zone of Influence (ZoI) associated with the topic areas assessed, within which a long list of other planned developments and development allocations will be identified. We have provisionally commenced this stage of work (see Section 19.3 below) and identified a preliminary list of other potential developments (**Table 19-1**) which will be issued to the relevant consultees. If any further developments which are likely to result in inter-project effects with the Project are identified, these will be added for consideration.

19.2.6 Development have been included on the initial long-list based on the following criteria:

- Development currently under construction;
- Approved applications which have not yet been implemented (covering the past five years and taking account of those that received planning consent over three years ago and are still valid but have not yet been completed);
- Submitted applications not yet determined;
- Refused applications, subject to appeal procedures not yet determined;
- On the National Infrastructure Planning Programme of Projects;
- Development identified in the relevant Development Plan (and emerging Development Plans); and

- Development identified in other plans and programmes which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

19.2.7 The provisional list will be further defined as the stage 1 work progresses and the criteria used to help filter development will be clearly identified and set out within the ES.

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

19.2.8 At Stage 2, any developments of a nature or scale without the potential to result in cumulative impacts will be excluded, following discussion with the local planning authorities and consideration of the likely zone of influence for each environmental topic. The justification for including or excluding developments from the long list will be provided in a matrix, modelled on the example given within Matrix 1 (Appendix 1) of the Planning Inspectorate's Advice Note 17.

Stage 3: Information Gathering

19.2.9 This stage will involve reviewing the available information relating to the shortlisted development(s), in order to establish the details of their likely environmental effects.

19.2.10 Information relating to other developments will be collected from the appropriate source (which may include the local planning authorities, the Planning Inspectorate or directly from the applicant/developer) and will include, but not be limited to:

- Proposed design and location information;
- Proposed programme of demolition, construction, operation and/or decommissioning; and
- Environmental assessments that set out baseline data and effects arising from 'other development'.

19.2.11 The criteria for determining the significance of any cumulative effect will be based upon:

- The duration of effect, i.e. will it be temporary or permanent;
- The extent of effect, e.g. the geographical area of an effect;
- The type of effect, e.g. whether additive or synergistic;
- The frequency of the effect;
- The 'value' and resilience of the receptor affected; and
- The likely success of mitigation.

Stage 4: Assessment

19.2.12 Those developments which meet the inclusion criteria set out in the above stages shall be incorporated into the final assessment, which will involve identifying where effects are likely to occur and assessing the significance of those effects on environmental receptors and resources, taking into account any mitigation measures.

19.2.13 The list of other relevant developments to be considered as part of the inter-project effects assessment will be developed in parallel with undertaking the EIA considering temporal scope, shared receptors or pathways for effects. This will include:

- Developments for which consent applications have been approved and construction has started;

- Developments for which consent applications have been approved but construction has not yet started but which may coincide with the Project;
- Developments for which consent applications have been submitted but have yet to be determined but which may coincide with the Project; and
- Developments which are identified in relevant local plans or other relevant plans and programmes and which could reasonably be expected to come forward in a similar timescale to the Project

19.2.14 This will be documented in a matrix, in line with Matrix 2 (Appendix 2) of the Planning Inspectorate's Advice Note 17 (Ref 19-1) which includes the following:

- A brief description of the development;
- An assessment of the cumulative effect with the Scheme;
- Proposed mitigation applicable to the Scheme including any apportionment; and
- The likely residual cumulative effect.

19.3 Initial Screening of Other Development Projects and Allocations (Stage 1)

19.3.1 As part of the scoping exercise, a preliminary review has been undertaken to identify other development projects and development plan allocations that may require due consideration within the assessment of cumulative effects.

19.3.2 An initial review of the National Infrastructure Planning website (Ref 19-2) and planning portals for North East Lincolnshire Council, North Lincolnshire Council, West Lindsey District Council, East Lindsey District Council and Lincolnshire County Council (Ref 19-3 to 19-7) has identified an initial list of potential other developments that may be considered as part of the cumulative assessment for the Project.

19.3.3 These other developments have been identified as they are of such a nature and proximity to the Scoping Boundary to have the potential to generate inter-project effects when considered in context to the development of the Project.

19.3.4 The other developments have been initially identified through an initial Zone of Influence set at a distance of 250 m around the Scoping Boundary and based on the following criteria:

- *Time Frame and Status*: those planning applications from the last 10 years and formal requests for EIA screening / scoping opinion within the last 5 years.
- *Major Developments*: those planning applications which fell within the definition of a major development within the Town and Country Planning Act 1990 as below:
    - *the winning and working of minerals or the use of land for mineral-working deposits;*
    - *waste development;*
    - *the provision of dwelling houses where –*
        - *the number of dwelling houses to be provided is 10 or more; or*
        - *the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);*
    - *the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or*
    - *development carried out on a site having an area of 1 hectare or more.*

19.3.5 A further scoping exercise was undertaken to further filter out the development proposals unlikely to be significant in terms of their nature and scale to the extent to cause inter-project effects.

19.3.6 An overview of these other developments and their potential relationship with the Project is included in **Table 19-1**. This list will be further refined throughout the EIA as the exact location of the proposed pipeline route is established, as well as temporary construction areas.

Table 19-1: Other Developments with the Potential for Inter-Project Impacts

Development Name and Details	*Reference*	*Development Status and Programme*	*Approx. Distance from the Project*
Nationally Significant Infrastructure Projects			
Hornsea Project Four Offshore Wind Farm (Generation Stations) The Hornsea Four onshore export cable corridor consists of an 80 m onshore temporary easement (although a wider corridor of 120 m is provided for at the crossing of the National Rail Network at Beswick). The permanent easement width will be 60m except where obstacles are encountered such as the Network Rail Crossing near Beswick (where the permanent footprint is may be extended up to 120m to facilitate HDD of the railway line), and on the approach to the landfall and onshore substation.	EN010098	Accepted DCO Application, currently in pre-examination phase. Indicative construction programme for onshore elements to commence January 2024, total construction duration 61 months.	Section A and B of the Scoping Boundary runs adjacent to the Hornsea Four onshore export cable order limtis from Immingham to Brigsley, overlapping near Wells Farm. At Brigsley, the Hornsea Four onshore export cable travels east away from the Scoping Boundary, towards the coast.
VPI Immingham Open Cycle Gas Turbine (OCGT). The Proposed Development comprises the construction and operation (including maintenance) of a gas-fired Open Cycle Gas Turbine (OCGT) power station with a gross electrical output of up to 299MW. Gas would be supplied to the Proposed Development by means of new and existing gas connection pipelines.	EN010097	DCO granted. Indicative construction period commences Q1 2021 with commissioning Q4 2022.	The order limits are located directly adjacent to Section A of the Scoping Boundary at Immingham.
ABLE Marine Energy Park - a new and substantial manufacturing base for the offshore marine energy sector.	TR030001	Construction is scheduled to begin in June 2022 and be completed by March 2025.	The order limits are adjacent to Section A of the Scoping Boundary at Immingham. Part of the order limits overlap with Section A of the Scoping

Development Name and Details	Reference	Development Status and Programme	Approx. Distance from the Project
		First quays are planned to be available in Q3 2023.	Boundary on Humber Road.
North Killingholme Power Project (C Gen). C.Gen has development consent to build a 470MW power station on the south bank of the Humber Estuary, near North Killingholme, North Lincolnshire.	EN010038	The project construction is likely to commence in 2022 and is expected to enter into commercial operation in 2024.	The order limits are located approximately 2.5km north of Section A of the Scoping Boundary at Immingham. Although outside the set ZOI, due to its size and scale, it has been included in this initial list.
South Humber Bank Energy Centre - The construction and operation of an energy from waste plant of up to 95 megawatts gross capacity and associated development including an electrical connection, landscaping and access.	EN010107	DCO granted. Indicative construction period commences Q2 2020 with commissioning Q4 2023.	The order limits are located approximately 4.2km east of Section A of the Scoping Boundary. Although outside the set ZOI, due to its size and scale, it has been included in this initial list.
North East Lincolnshire Council			
Change of use of land to caravan site for four number caravans with associated access and boundary treatments	DM/0996/15/ FUL	Approve – development to commence within three years of date of permission (19 January 2016).	Located within Section A of the Scoping Boundary to the west of B1210 Stallingborough Road, south of Immingham.
Change of Use of a Former Care Facility to Create 1no. Dwelling at Gatehouse Farm, Stallingborough Road, Immingham	DM/1004/18/ FUL	Approved – development to commence within three years of date of permission (12 February 2019).	Located within Section A of the Scoping Boundary to the west of B1210 Stallingborough Road, south of Immingham.
Grimsby Solar Farm, Aura Power	DM/0899/21/ FUL	Pending consideration – four months construction programme commencing spring 2022.	Directly adjacent to Section A of the Scoping Boundary, north of Aylesby.
Change of use of land for the siting of 74 timber lodges at	DM/1097/18/ FUL	Approved - development to	Approximately 117m east of Section B of the

Development Name and Details	Reference	Development Status and Programme	Approx. Distance from the Project
Laceby Manor Golf Course, Laceby Manor Resort Limited		commence within three years of date of permission (8 November 2019).	Scoping Boundary, south of Laceby.
Application for demolition of existing outbuilding and "Change of Use" of land to site 31No.Timber Holiday Lodges and 1No. Site Managers Lodge with adjacent Site Supply Shed / Shop, together with erection of a Residential Double Garage to the Existing House on Site.	DM/0076/20/FUL	Approved - development programme unknown.	Approximately 26m north of Section B of the Scoping Boundary, off Barton Street near Barnoldby le Beck.
New buried pumped foul sewer line, Laceby Manor Resort.	DC/765/12/WOL	Approved - development programme unknown.	Directly adjacent to the Scoping Boundary, south of Laceby.
North Lincolnshire Council			
Planning permission to erect 2 storage tanks to store FAME (Bio-diesel)	PA/2021/274	Not yet determined	Approximately 40m west of Section A of the Scoping Boundary, near the A1173 and Humber Road roundabout.
East Lindsey District Council			
Hybrid application consisting of outline erection of up to 300 dwellings with means of access to be considered and full planning permission for change of use of land from agricultural land to a recreation ground	N/085/00883/15	Approved - development programme unknown.	Approximately 2.9km north of Section C of the Scoping Boundary in Holton le Clay. Although outside the set ZOI, due to its size and scale, it has been included in this initial list.
Application for approval of reserved matters (appearance, landscaping, layout and scale) for 233no. dwellings on part phase A and phases B and C pursuant to Outline planning permission ref. no. N/085/01207/20	N/085/01215/21	Pending	Approximately 3km north of Section C of the Scoping Boundary in Holton le Clay. Although outside the set ZOI, due to its size and scale, it has been included in this initial list
Erection of 198no. dwellings with associated garages and construction of a vehicular and pedestrian access	N/133/01413/21	Pending	Approximately 170m east of Section C of the Scoping Boundary in the west of North Thoresby.

Development Name and Details	*Reference*	*Development Status and Programme*	*Approx. Distance from the Project*
Planning Permission - To construct a solar farm comprising construction and operation over a 25 year period of 790 solar PV panels (33,330 modules) with a maximum overall height of 2.23 metres together with support structures, temporary construction compound, access tracks, site substation, inverter cabins, 8 no security cameras each 3.0 metres in height, fencing and gates and associated electrical cabling for the generation of 8MW of renewable energy	N/218/00928/14	Approved – Appears to now be complete. This will be confirmed in the ES and included in baseline as appropriate.	Approximately 260m west of Section E of the Scoping Boundary adjacent to Little Beck Farm.
Environmental Impact Assessment (E.E.C Directive 85/337/E.E.C. as amended by Council Directive 97/11E.C) for a scoping opinion with respect to the erection of 2 no. wind turbines	N/063/01534/15	EIA Development - development programme unknown.	Approximately 75m north of Section E of the Scoping Boundary in Garton le Marsh Grange.
Erection of 1no. 225kW wind turbine with a hub height of 30.0 m high and a maximum height to blade tip of 45.0 m.	N/179/00803/14	Approved - programme is unknown	Within Section E of the Scoping Boundary adjacent to Neves Farm.
West Lindsey District Council – No developments currently identified			
Lincolnshire County Council			
Installation and operation of an underground gas pipeline up to 750 metres in length, connecting the existing Saltfleetby / Theddlethorpe underground gas pipeline to the National Grid National Transmission System, Theddlethorpe via the Uniper gas distribution terminal, together with temporary laydown areas, parking, security and welfare facilities.	PL/0060/20	Approved - programme is unknown	Partially within Section E of the Scoping Boundary adjacent to Theddlethorpe Gas terminal

19.3.7 Any feedback on this provisional 'long list of other existing development and/or approved developments' as part of the consultation undertaken in relation to the Scoping stage of the Project would be welcome.

19.4 Interaction with wider V Net Zero Transportation and System

19.4.1 As outlined in chapter 1, the V Net Zero Pipeline is one component of the over V Net Zero Transportation and Storage scheme. These other elements of the overall schemed are being consented separately.

19.4.2 However, to ensure that the potential impacts of the overall V Net Zero Transportation and Storage scheme are considered as a whole, a bridging document will be prepared which will present a summary of the key findings of the different ES's and also highlight any potential inter-Project cumulative impacts and assess their potential significance.

19.5 References

Ref 19-1 The Planning Inspectorate Advice Note 17. Cumulative Effects Assessment. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf

Ref 19-2 Infrastructure Planning, Projects Page. Available at: https://infrastructure.planninginspectorate.gov.uk/projects/Yorkshire%20and%20the%20Humber/. Last visited January 2022.

Ref 19-3 North East Lincolnshire Council Planning Portal. Available at: https://www.nelincs.gov.uk/planning-and-building-control/planning-applications/planning-portal/. Last visited January 2022.

Ref 19-4 North Lincolnshire Council Planning Applications, Decisions & Appeals. Available at: https://www.northlincs.gov.uk/planning-and-environment/planning-permission-applications-and-appeals/. Last visited January 2022.

Ref 19-5 West Lindsey District Council Planning Application Database. Available at: https://planning.west-lindsey.gov.uk/planning/. Last visited January 2022.

Ref 19-6 East Lindsey District Council Public Access. Available at: https://publicaccess.e-lindsey.gov.uk/online-applications/search.do%3bjsessionid=4A5119EA6DAA17CB3142825C17FC4978?action=simple&searchTye=Application. Last visited January 2022.

Ref 19-7 Lincolnshire County Council Planning Register. Available at: [redacted] Last visited January 2022.

20. Major Accidents and Disasters

20.1 Introduction

20.1.1 The topic was introduced into the UK EIA Regulations as a result of EU Directive 2014/52/EU (the EIA Directive relating to major accidents and disasters). It covers the assessment of potentially significant adverse effects of a development on the environment deriving from its vulnerability to risks of relevant major accidents and/or disasters.

20.1.2 In the context of EIA for major accidents and disasters, the following definitions have been applied:

- A **major accident** is 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 and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage;
- A **disaster** is 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.

20.1.3 Major accidents can be caused by disasters resulting from both man-made and natural hazards.

20.1.4 This chapter will:

- Identify the major accidents and disasters topics and events that would be scoped into the environmental assessment and thus included within the Environmental Statement (ES);
- Identify those major accidents and disasters topics and events scoped out of further assessment, with a justification provided; and
- Define the approach and methodology for identifying potential major accidents and disasters events and their assessment, in the context of the Project.

20.2 Baseline Environment and Study Area

Establishing the Baseline

20.2.1 The baseline relevant to major accidents and disasters primarily comprises:

- Features external to the Project that contribute a potential source of hazard to the Project itself;
- Sensitive environmental receptors at risk of significant effect; and
- Identified major accident and disaster risks which currently exist within the local area.

20.2.2 In line with regulations, the baseline environment would be established through existing sources of risk assessment or other relevant studies, rather than collecting survey data.

20.2.3 The baseline conditions described for major accidents and disaster events are derived from the following desk study sources:

- Technical chapters of this Scoping Report (Chapters 6 to 19);
- National Risk Register 2020 (Ref 20-1);
- British Geological Survey ‘Onshore GeoIndex’ (Ref 20-2);

- The Coal Authority Interactive Map (Ref 20-3);
- Health and Safety Executive's Planning Advice Web App (Ref 20-4);
- COMAH 2015 Public Information Search (Ref 20-5);
- Aerial Photography; and
- Google street view maps covering the Scoping Boundary.

20.2.4 The baseline would be further refined during the main environmental impact assessment (EIA) and outlined within the ES.

The Study Area

20.2.5 The Study Area for major accidents and disasters has been initially developed based on professional judgement as there is no regulatory guidance or standardised methodology.

20.2.6 The following factors and associated distances were taken into consideration for setting the initial Study Area, in order to capture the adverse consequences caused by other events, on the Project. The preliminary Study Area distances are based on professional judgement (as there is no specific regulatory guidance nor significant precedent or standardised methodology) and relate to the Scoping Boundary:

- Manmade features:
  - Airports and airfields within 10 km;
  - Control of Major Accident Hazard facilities within 5 km;
  - Major accident hazard pipelines within 1 km;
  - Petrol stations within 1 km;
  - Rail infrastructure within 1 km; and
  - Transmission (gas, electrical, oil/fuels) crossing the Scoping Boundary.
- *Natural features* with the potential to create risks within:
  - 5 km (hydrological and geological, such as dam failure and seismic activity)
  - 1 km (hydrological and geological, such as flood risk and unstable ground conditions)

Receptors

20.2.7 Receptors are features of the environment which may be affected and thus are subject to assessment under Section 5 (2) of the EIA Regs Infrastructure Planning (Environmental Impact Assessment) (EIA) Regulations 2017, namely biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape. Key receptors also include human populations.

20.2.8 These have been identified through a review of base mapping and aerial photography as well as consultation with the other EIA topics (Chapters 6-19). **Table 20-1** identifies the key major event receptors within the Study Area.

Table 20-1: Identified Key Receptors for Major Events

Major Event Receptor	Type	Description
Members of the public and local communities	Human health	The Scoping Boundary passes by a number of villages, including Stallingborough, Healing, Aylesby, Laceby, Irby upon Humber, Barnoldby le Beck, Brigsley, Ashby cum Fenby, Grainsby, North Thoresby, Ludborough, Covenham St Mary, Yarburgh, Alvingham, South Cockerington, Grimoldby, and Theddlethorpe.
Eastfield Industrial Estate and Immingham Docks	Land	A number of COMAH sites, industrial uses.
Railways (the Barton Line and Lincolnshire Wolds Heritage Railway)	Land	Crosses Scoping Boundary
River Humber / North Sea	Water	Pose a risk of tidal flooding
Main rivers, ordinary watercourses, canals	Water	A number cross the Scoping Boundary.
Lincolnshire Wolds AONB	Landscape	An area of outstanding natural beauty (AONB) is land protected by the Countryside and Rights of Way Act 2000 (CROW Act).
Designated Sites	Biodiversity	There are five European designated sites within 10 km of the Scoping Boundary, and 13 nationally designated sites within 10 km of the Scoping Boundary.
Protected Species	Biodiversity	Subject to survey, there are likely to be protected species within the Scoping Boundary.
Heritage assets and archaeology	Cultural Heritage	There are designated and non-designated heritage assets within the Scoping Boundary and the 1 km Study Area for this topic.

Accident and Disaster Categories

20.2.9 Within the Study Area, the potential major accidents and disaster groups and categories considered are listed in **Table 20-2**. Major accident and disaster events are then derived from each of the categories.

Table 20-2: Major Accidents and Disaster Groups and Categories

Groups	Categories
Natural	Geophysical
	Hydrological
	Climatological and meteorological
	Biological
Technological or Manmade hazards	Industrial and urban accidents
	Transport accidents
	Pollution accidents
	Utility failures
	Engineering accidents and failures
	Human error/management failure
	Design error
	Sabotage/arson
	Terrorism
	Explosion (chemical, nuclear or other)

20.3 Assessment Method

Guidance

20.3.1 The key applicable legislative framework covering the design, construction and operation of the Project include:

- Health and Safety at Work etc. Act 1974 (HASWA) (Ref 20-7);
- Pipeline Safety Regulations 1996 (SI 1996 No.825) (Ref 20-8); and
- Construction (Design and Management) Regulations 2015 (CDM) (Ref 20-9).

20.3.2 The assessment method has been developed taking into account emerging EIA good practice, including published guidance by IEMA on major accidents and disasters in EIA (Ref 20-6), in addition to other useful documents which relate to the assessment of Risk:

- The International Standards Organization's ISO 31000: 2018 Risk Management – principles and guidelines (Ref 20-10); and
- Defra (2011) 'Guidelines for Environmental Risk Assessment and Management (Ref 20-11);

20.3.3 Additional guidance and data sources will be researched and included within the full assessment which will be included within the ES.

Initial Scoping Exercise

20.3.4 An initial scoping exercise has been undertaken to identify and review all accidents or disasters that could be relevant to the Scheme. This initial list was drawn from a number of sources, including the UK Government's Risk Register of Civil Emergencies (Ref. 20-12) and the National Risk Register 2020 (Ref 20-13). A copy of this review is included within

Appendix H of this Scoping Report. This initial scoping exercise shows the potential vulnerability of the Project to the risk of a major accident and/or disaster associated with a variety of different events. This table also provides further clarity on the topics and events which have been scoped into the EIA, and those which have been scoped out, with suitable justification provided.

20.3.5 This initial scoping review included consideration of the following key factors when it came to considering which events are of relevance to the Project:

- Events that could not realistically occur, due to the nature of the Scheme or its location in the UK;
- Events that could realistically occur, but for which the Project, and associated receptors, are either no more vulnerable than any other project or would not have an impact should the event occur; and
- Events that could occur, and to which the Project could be vulnerable, or which the Project itself has a particular capacity to exacerbate.

20.3.6 In general events falling into this last category would be considered for further assessment in the ES.

Assessment of topics scoped into the ES

20.3.7 For the Major Accidents and Disasters event types which have been scoped in for further assessment in the ES, the assessment would be conducted using a staged approach as outlined here:

- Identifying potential risk events related to the scoped in major event types (source / pathways and receptors);
- Screening these risk events, e.g. to remove unrealistic worst case scenarios;
- Defining the reasonable worst consequence if the event did occur;
- Identifying any cross-disciplinary impacts;
- Identifying any possible prevention, minimisation and / or mitigation measures;
- Assessing the likelihood; and then
- Determining whether the risk has been mitigated to As low as reasonably practicable (ALARP) and identification of any residual risks and their significance.

20.3.8 The ES would include a detailed methodology for the assessment of all major accidents and disasters considered, based on the guiding principles outlined above. Any limitations of the assessment of major accidents and disasters would also be clearly presented.

20.4 Summary

20.4.1 This chapter has identified the major accidents and disaster topics and events that would be scoped into the EIA and presented within the ES. The topics and events to be scoped out have also been identified, and justification provided. These are summarised in **Table 20-3**, with further information provided in Appendix H.

Table 20-3: Summary of elements scoped in and out of Major Accidents and Disasters

Element and Event	Scoped In	Scoped Out
Natural Hazards - Geophysical		
Earthquakes		✓
Volcanic Activity		✓
Landslides	✓	✓
Sinkholes	✓	
Tsunamis		✓
Natural Hazards – Hydrology		
Tidal Flooding	✓	
Fluvial Flooding	✓	
Pluvial Flooding		✓
Groundwater Flooding		✓
Avalanches		✓
Natural Hazards - Climatological and Meteorological		
Cyclones, hurricanes, typhoons, storms and gales		✓
Thunderstorms		✓
Wave surges	✓	
Extreme temperatures: Heatwaves Low (sub-zero) temperatures and heavy snow		✓
Droughts		✓
Severe Space Weather: Solar Flares		✓
Severe Space Weather: Solar Energetic Particles		✓
Severe Space Weather: Coronal Mass Ejections (CMEs)		✓
Fog		✓
Wildfires: Forest fire, Bush/brush, pasture		✓
Poor Air Quality		✓
Natural Hazards – Biological		
Disease epidemics		✓
Animal diseases		✓
Plants		✓
Technological or Manmade Hazards – Societal		
Extensive public demonstrations		✓
Widespread damage to societies and economies		✓
The need for largescale multi-faceted humanitarian assistance.		✓

Element and Event	Scoped In	Scoped Out
The hindrance or prevention of humanitarian assistance by political and military constraints		✓
Significant security risks for humanitarian relief workers in some areas.		✓
Famine		✓
Displaced population		✓
Technological or Manmade Hazards - Industrial and Urban Accidents		
Major Accident Hazard Chemical sites	✓	
Major Accident Hazard Pipelines	✓	
Nuclear		✓
Fuel storage		✓
Dam breaches		✓
Mines and storage caverns		✓
Fires		✓
Technological or Manmade Hazards - Transport accidents		
Road		✓
Rail		✓
Waterways	✓	
Aviation		✓
Technological or Manmade Hazards – Pollution accidents		
Air	✓	
Land		✓
Water		✓
Technological or Manmade Hazards - Utilities failures		
Electricity		✓
Gas	✓	
Water Supply		✓
Sewage system		✓
Technological or Manmade Hazards - Malicious Attacks		
Unexploded Ordnance	✓	
Chemical / Biological /Radiological / Nuclear		✓
Transport systems		✓
Crowded places		✓
Technological or Manmade Hazards - Engineering accidents and failures		
Cyber	✓	
Infrastructure	✓	

Element and Event	Scoped In	Scoped Out
Bridge failure		✓
Flood defence failure	✓	
Mast and tower collapse		✓
Property or bridge demolition accidents		✓
Tunnel failure/fire		✓

20.5 References

Ref 20-1 National Risk Register 2020. Available at: https://www.gov.uk/government/publications/national-risk-register-2020

Ref 20-2 British Geological Survey 'Onshore GeoIndex'. Available at: [redacted]

Ref 20-3 The Coal Authority Interactive map. Available at: [redacted]

Ref 20-4 Health and Safety Executive's Planning Advice Web App. Available at: https://www.hse.gov.uk/landuseplanning/planning-advice-web-app.htm

Ref 20-5 COMAH 2015 Public Information Search. Available at: https://notifications.hse.gov.uk/COMAH2015/Search.aspx

Ref 20-6 IEMA Major Accidents and Disasters in EIA: A Primer, September 2020. Available at: [redacted]

Ref 20-7 Health and Safety at Work etc. Act 1974. Available at: https://www.legislation.gov.uk/ukpga/1974/37/contents

Ref 20-8 Pipeline Safety Regulations 1991 (SI 1996 No.825). Available at: https://www.legislation.gov.uk/uksi/1996/825/made

Ref 20-9 Construction (Design and Management) Regulations 2015 (CDM). Available at: https://www.legislation.gov.uk/uksi/2015/51/contents/made

Ref 20-10 The International Standards Organization's ISO 31000: 2018 Risk Management – principles and guidelines

Ref 20-11 Defra (2011) 'Guidelines for Environmental Risk Assessment and Management Green Leaves III. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69450/pb13670-green-leaves-iii-1111071.pdf

Ref 20-12 Risk Register of Civil Emergencies (2017). Available at: https://www.gov.uk/government/publications/national-risk-register-of-civil-emergencies-2017-edition

Ref 20-13 National Risk Register 2020. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf

21. Summary and Next Steps

21.1 Summary

21.1.1 This Scoping Report represents notification under Regulation 8(1)(b) of the EIA Regulations that the Applicant will undertake an EIA in respect of the Scheme and produce an ES to report the findings of the EIA.

21.1.2 It also supports a formal application to PINS under Regulation 10(3) of the Infrastructure Planning (EIA) Regulations 2017 for a 'Scoping Opinion' as to information to be provided within the ES that will form part of the DCO application.

21.1.3 The Scoping Report sets out the environmental effects that are considered to have the potential to be significant and proposes the approach to be used in assessments that will be undertaken for the EIA to characterise and understand the significance of these effects. A summary of the disciplines and topics proposed to be included within the EIA have been included with each technical chapter of this document (Chapters 6 to 19), and a summary of the topics to be included are outlined in the proposed ES table of contents provided in **Table 21-1**.

21.1.4 This Scoping Report will inform consultation with prescribed consultees, statutory undertakers and section 43 consultees and enable key stakeholders to comment on the proposed structure, methodology, and content of the ES.

21.2 Proposed Structure of the Environmental Statement

21.2.1 The ES is expected to be structured into four volumes:

- ES Volume 1: Non-Technical Summary;
- ES Volume 2: Main ES Report;
- ES Volume 3: Figures; and
- ES Volume 4: Supporting technical appendices.

21.2.2 Further details are provided within **Table 21-1**. This will be confirmed following receipt of any scoping representations.

Table 21-1: Indicative Structure of ES

Proposed Structure of the Environmental Statement
ES Volume 1: ES Non-Technical Summary (NTS)
The ES NTS will be presented in a separate document and provides a concise description of the Project, the considered alternatives, baseline, assessment methodology, potential environmental effects and mitigation measures. The ES NTS will be designed to provide information on the Project in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the Project, including via a digital platform.
ES Volume 2: Main ES
This will form the main body of the ES, detailing the results of the environmental assessment, likely significant effects arising from the Project, and the proposed mitigation measures. The ES will also identify opportunities for social and economic benefits and environmental enhancement. The ES will be divided into a number of background and technical chapters, each being

Proposed Structure of the Environmental Statement	
supported with figures and tabular information. A proposed table of contents is as presented below	
Chapter 1:	Introduction
Chapter 2:	Design Evolution and Alternatives
Chapter 3:	The Project Description
Chapter 4:	Legislative and Policy Framework
Chapter 5:	Environmental Impact Assessment Methodology
Chapter 6:	Stakeholder Engagement and Consultation
Chapter 7:	Ecology & Biodiversity
Chapter 8:	Landscape & Visual
Chapter 9:	Historic Environment
Chapter 10:	Geology & Hydrogeology
Chapter 11:	Agriculture & Soils
Chapter 12:	Water Environment
Chapter 13:	Traffic & Transport
Chapter 14:	Noise & Vibration
Chapter 15:	Air Quality
Chapter 16:	Climate Change
Chapter 17:	Socio-Economics
Chapter 18:	Health & Wellbeing
Chapter 19:	Waste
Chapter 20:	Cumulative Effects
Chapter 21:	Major Accidents and Disasters
Chapter 22:	Outline Construction Environmental Management Plan
Chapter 23:	Summary of Environmental Effects
ES Volume 3: Supporting Figures	
A complete set of figures will be provided for reference which support the assessments in ES Volume 2.	
ES Volume 4: Technical Appendices	
A complete set of appendices will be provided for reference. These comprise of background data, technical reports, tables, figures and surveys which support the assessments in ES Volume 2.	

21.3 Next Steps

21.3.1 **Figure 21-1** provides a high level overview of the key steps the Project team will be undertaking to support this DCO application and the currently identified programme.

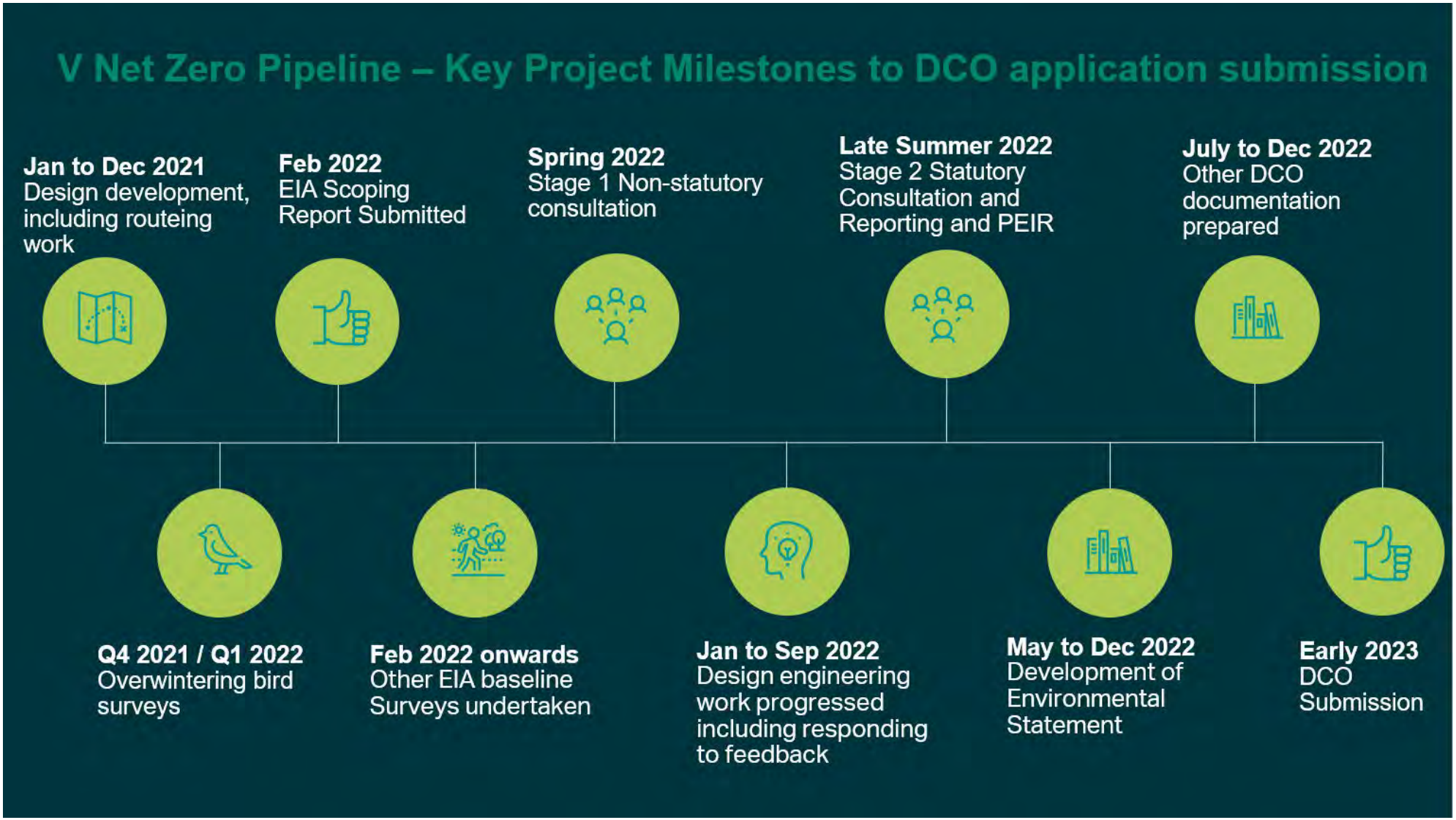
21.3.2 The Project is in the process of collecting data, engaging with landowners and undertaking necessary engineering and environmental surveys to help inform the development of the design of the Project and inform the EIA.

21.3.3 The Applicant will formally engage in a non-statutory public consultation event in Spring 2022 to introduce the Project, its components and emerging preferred location and route alignment. To ensure the public can engage safely in these events, and in line with government Covid-19 guidelines, these events will be hosted both at a publicly accessible location as well as being created in a virtual setting on a dedicated website.

21.3.4 Statutory consultation events will also be held early autumn 2022. These events provide an opportunity for the Applicant to present the proposed Project to key stakeholders and local community ahead of submission, in particular highlighting how and where their concerns have been addressed. It also provides an opportunity to understand what concerns remain and may need to be considered post-submission. The PEIR will be prepared to support the Statutory consultation.

21.3.5 Environmental and engineering surveys and assessment will continue through 2022, working towards a proposed submission of the ES in early 2023.

Figure 21-1: Indicative Timeline for the V Net Zero Pipeline



V Net Zero Pipeline Project

Environmental Impact Assessment Scoping Report

Appendices

March 2022

Document Reference: 60668955_Doc_005b

PINS Reference: EN070008

Applicant: Chrysaor Production (U.K.) Limited, a Harbour Energy Company

Quality information

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Revision History

Revision	Revision date	Details
Rev 1	31/01/22	1st Full Draft
Rev 2	18/02/22	2nd Draft addressing client comments
Rev 3	25/03/22	Final Version

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Appendix A – Glossary

Term	Definition
Above Ground Installation (AGI)	All permanent above ground facilities which are required for the Project. It covers all facilities such as: Offtake, Block Valve Station, Terminal, Offshore Pipeline Tie-in and Outlst Facility and Pigging Station.
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
Above-Ground Heritage Asset	An above ground 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.
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	The organisation Chrysaor Production (U.K.) Limited (a Harbour Energy Company) applying for the DCO.
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.
As Low As Reasonably Practicable (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.
Authorised Development	The development that is described in Schedule 1 of the draft Development Consent Order (dDCO).
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.

Term	Definition
Below-Ground Heritage Asset	Below-ground heritage assets include both known and hitherto unknown buried archaeological remains.
Best and Most Versatile Agricultural Land (BMV)	Defined as Grades 1, 2 and 3a in the Agricultural Land Classification by the revised National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG). This is the land which is determined to be most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals. Grades 3b, 4, and 5 are used to classify land that is of moderate quality to very poor quality.
Best Available Techniques (BAT)	The available techniques which are the best for preventing or minimising emissions and impacts on the environment.
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	Biodiversity Net Gain is an approach to development that leaves biodiversity in a better state than before.
Block Valve	An intermediate valve which can rapidly stem the flow of the carbon dioxide stream, designed and located to minimise the inventory loss to a level that avoids harm to humans in the event of a breach of the pipeline.
Block Valve Station (BVS)	An area containing a Block Valve and Electrical and Instrumentation (E&I) Kiosk and includes perimeter security fencing
Book of Reference	A list of all of the land directly affected by the Project, as well as the owners and occupiers of the affected land and those with an interest in it.
Best Available Technique Reference Documents (BREF) Notes	The European Commission (EC) produces Best Available Technique reference documents or BREF notes. They contain Best Available Techniques (BAT) for installations.
Carbon Capture	The capture of CO_2 from industrial sources that would otherwise be emitted into the atmosphere.
Carbon Capture and Storage	The combined processes of Carbon Capture, transportation (by pipeline or otherwise), and Carbon Dioxide Storage
Carbon Dioxide Storage	The locations for or act of providing the long-term sub-sea geological storage of carbon dioxide
Cathodic Protection (CP)	Cathodic protection (CP) is a technique used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell.
Climate Change	Large scale, long term shift in the Earth's weather patterns or average temperature.

Term	Definition
CO_2 Stream	A fluid consisting overwhelmingly of carbon dioxide that has been captured from industrial sources, which also contains incidental associated substances derived from the source materials and the capture process (impurities), and any substances added to the stream to enable or improve the injection process.
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.
Competent Authority	The relevant Secretary of State is the Competent Authority for the purposes of the Habitats Directive and the Habitats Regulation in relation to applications for Nationally Significant Infrastructure Projects (NSIPs).
Compressor Plant	A compressor is a mechanical device that increases the pressure of a gas by reducing its volume.
Construction Environmental Management Plan (CEMP)	Document containing the REAC 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 PA2008. They included “plans and maps showing the nature and location of the Project” as stated in subsection (4) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.
Construction Compound	A secure area from which Site work is managed and resourced, including but not limited to temporary offices, workshops, parking and storage areas.
Consultation Zone	The Health & Safety Executive (HSE) sets a Consultation Distance around major hazard sites and major accident hazard pipelines after assessing the risks and likely effects of major accidents at the major hazard site/pipeline. The area enclosed within the CD is referred to as the consultation zone. The Local Planning Authority is notified of this CD and has a statutory duty to consult HSE on certain Projects within the zone the CD forms.
Contaminated Land	Where substances are causing or have a significant possibility to cause significant harm to people, property or protected species; or, where significant pollution is being caused or has a significant possibility of being caused to controlled waters.
Cumulative Effects	The effects of the Project in cumulation with other existing development and/or approved development.

Term	Definition
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.
Development Consent Order (DCO)	A Development Consent Order (DCO) is a Statutory Instrument (SI) made by the Secretary of State (SoS) pursuant to the Planning Act 2008 (as amended) (PA2008).
Direct Effect	An effect that is directly attributable to the Project.
Direct Employment	An increase in local employment arising from further economic activity (jobs, expenditure or income) associated with additional local income and local supplier purchases as a result of the Project.
Disaster	In the context of the Project, a naturally occurring phenomenon such as an extreme weather event (e.g. storm, flood, temperature) or ground-related hazard events (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation that meets the definition of a Major Accident.
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.
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Emission Rate	The quantity of a pollutant released from a source over a given period of time.
Enhancement	Measures to improve the environment, such as landscape resource and the Visual Amenity of the Project and its wider setting, over and above its Baseline condition.
Environmental Impact Assessment (EIA)	A systematic means of assessing the significance of effects from the Project, undertaken in accordance with The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations).
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended).
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
European Designated Site	An area of land subject to protection through European legislation, including Special Area of Conservation (SAC) and Special Protection Area (SPA).

Term	Definition
Examining Authority (ExA)	Planning Inspector(s) responsible for conducting the examination and recommending a decision on a DCO application to the Secretary of State (SoS).
Exceedance	A period of time where the concentrations of a pollutant is greater than the appropriate air quality standard.
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, COMAH site major accident) it would increase the risk of serious damage to an environmental receptor associated with the Project.
Flood Map for Planning	Defines Flood Zones based on annual probability of flooding from Fluvial and tidal sources to inform development planning and flood risk assessment. Nationally consistent delineation of 'high', 'medium' and 'low' flood risk updated by the Environment Agency as deemed appropriate, typically on a quarterly basis
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.
Fluvial	Processes associated with rivers and streams and the deposits and landforms created by them.
Future Baseline	The likely evolution of the baseline without implementation of the Project.
Geographic Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
Geophysical Survey	Making and interpreting measurements of physical properties of the earth to determine subsurface conditions.
Geotechnical Survey	An investigation to determine the nature and engineering properties of the soil and other materials and to determine soil profiles and property assignments for the purpose of design and construction.
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' (CO2e) according to their relative global warming potential. For this reason, the shorthand 'carbon' may be used to refer to GHGs.

Term	Definition
Ground Investigations	The physical investigation stage of the Geotechnical Survey of which Geophysical Surveys may be one element. Comprised of targeted investigations including both intrusive and non-intrusive techniques to prove ground conditions, determine soil / rock parameters and identify hazards associated with the ground conditions to inform a Project.
Groundwater	Groundwater is the store of water present beneath Earth's surface in rock and soil pore spaces and in the fractures of rock formations
Groundwater Source Protection Zone (SPZ)	Also, Source Protection Zone (SPZ), defined for 2,000 groundwater sources such as wells, boreholes and springs used for public drinking water supply, show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The SPZ maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which the Environment Agency occasionally apply to a groundwater source.
Habitat	The environment in which populations or individual species live or grow.
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna.
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 (as amended) which covers the terrestrial environment.
Habitats Regulations Assessment (HRA)	A Habitats Regulations Assessment (HRA) refers to the stages of assessment carried out by the competent authority in accordance with Habitats Regulations and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) to determine if a project may affect the protected features of a European site and European offshore marine site, before deciding whether to undertake, permit or authorise it.
Haul Road	Haul roads are temporary roads provided within a contractor's site area to allow for the movement of construction materials, construction machinery and/or construction labour around the site.
Hazard	Anything with the potential to cause harm, including ill-health and injury, damage to property or the environment; or a combination of these.
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.

Term	Definition
Horizontal Directional Drilling (HDD)	Horizontal directional drilling (HDD) is a Trenchless construction method used to install pipes underground without disturbing the ground surface above. The drill is launched from one HDD Compound and retrieved from the HDD compound at the other end, and except for the launch and retrieving spaces above ground, the entire process takes place underground.
HDD Compound	Temporary compound within which the Horizontal Directional Drilling (HDD) operations takes place.
Hydrology	The movement, distribution and quality of water throughout the earth.
Hydromorphology	The physical characteristics of the shape, boundaries and content of a water body.
Impact	A physical or measurable change to the environment attributable to the Project.
Index of Multiple Deprivation	The indices of deprivation measure relative deprivation in local authorities across England. The index of multiple deprivation is the most widely used of these indices.
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.
Indirect Employment	Employment growth arising locally through manufacturing services and suppliers to the construction process (indirect or supply linkage multipliers) as a result of the Project.
Induced Employment	Employment associated with local expenditure as a result of those who derive incomes from the direct and supply linkage impacts 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.
LAeq	Equivalent Continuous Level. When a noise varies over time, the LAeq is the equivalent continuous sound which would contain the same sound energy as the time varying sound.
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.
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.

Term	Definition
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, the character of which is a 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.
LAfmax	LAfmax is the maximum A - weighted sound pressure level recorded over the period stated. LAfmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall LAeq,T noise level but will still affect the noise environment.
Lead Local Flood Authority (LLFA)	Local authority responsible to taking the lead on local flood risk management as defined within the Flood and Water Management Act 2010.
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. This is expected to be approximately 100 metres wide, but will be confirmed within the ES
Limit of Land to be Acquired or Used	The limits of land to be acquired or used, as shown on the Land Plans.
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 of importance for wildlife, geology, education or public enjoyment. Some are also nationally important Site of Special Scientific Interest (SSSI). Local Nature Reserves must be controlled by the local authority through ownership, lease or agreement with the owner.
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.

Term	Definition
Lower Layer Super Output Area	A geographic area with an average population of 1500 residents, identified for the purpose of reporting census data by the Office for National Statistics (ONS).
Lowest Observed Adverse Effect Level (LOAEL)	The level above which adverse effects on health and quality of life can be detected as a result of noise or vibration.
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.
Major Accident	In the context of the Project, an event that threatens immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Applicant or its contractors to respond to the event. Serious damage includes the loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor that cannot be restored through minor clean-up and restoration efforts. The significance of this effect will take into account the extent, severity and duration of harm and the sensitivity of the receptor.
Magnitude	A combination of the scale, extent and duration of an impact.
Mean Low Water Springs	MLWS is the average throughout a year of the heights of two successive low waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is greatest
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)	Established to protect sensitive features and to provide ‘outdoor laboratories’ for research.
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 in February 2019.
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).

Term	Definition
Nationally Designated Site	Areas of land subject to project through UK legislation, including Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR)
Noise Action Plan Priority Area (NAPPA)	Areas where people's homes are exposed to a day-evening-night noise level exceeding 73 dB, or where people live alongside concrete trunk roads.
Noise Important Area (NIA)	Noise 'hotspots' as defined by the Noise Action Plan produced by DEFRA. Important Areas are defined as the areas where the 1% of the population that are affected by the highest noise levels are located according to the results of the strategic noise mapping undertaken by DEFRA.
Noise Sensitive Receptor	Any identified Receptor likely to be affected by noise. These are generally human Receptors, and may include residential dwellings, work places, schools, hospitals, community facilities, places of worship, recreational spaces and ecological Receptors.
Nomis	Nomis is a service hosted by the Office for National Statistics (ONS) which provides access to the most detailed and up-to-date UK labour market statistics from official sources.
No Observed Effect Level (NOEL)	The level below which no effect from noise or vibration can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
Non-Statutory Consultation	The informal process of holding consultation events with interested parties to give them an opportunity to review the Project details and provide feedback which can help influence a projects design.
Non-Statutory Consultees	Consultees who – whilst not designated in law – are likely to have an interest in a Project and will therefore be consulted on the Project.
Open Cut	Open Cut is a method of installing a length of pipeline by clearing the ground along the Carbon Dioxide Pipeline Route, excavating a trench and installing a length of pipe. Following satisfactory testing of the pipe, the trench is backfilled, and the ground returned to its previous condition.
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 Plan provided as part of examination.
Ordinary Watercourse	Any river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which

Term	Definition
	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.
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 inspecting internal maintenance, cleaning and monitoring of a pipeline.
Pigging	Use of a PIG.
Pipeline Construction Activities	Construction Activities specific to the Carbon Dioxide Pipeline and the work required to install them. This will also include installation activities such as Open Cut and trenchless methods.
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).
Planning Practice Guidance (PPG)	The Planning Practice Guidance (PPG) provides context and guidance to the National Planning Policy Framework (NPPF). The PPG has been updated to reflect changes to the revised NPPF.
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 Projects 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 (PEI)	Information which has been compiled by the Applicant and is reasonably required for the consultation bodies to develop an informed view of the Likely Significant Environmental Effects of the development (and of any associated development).
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.

Term	Definition
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 (PHI)	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 V Net Zero
Project	The development for which a Development Consent Order (DCO) is ought. In this instance, this includes the V Net Zero Pipeline and inlet and outlet facilities.
Ramsar Site	Wetlands of international importance designated under the Ramsar Convention 1971.
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.
Register of Environmental Actions and Commitments (REAC)	The Register of Environmental Actions and Commitments (REAC) 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.
Residual Effects	Effects arising from the Project that cannot be mitigated following implementation of Mitigation Measures.
Resilience (Climate change)	The vulnerability of the Project to climate change.
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.

Term	Definition
Scoping	An exercise undertaken pursuant to the EIA Regulations, to determine the topics to be addressed within the Environmental Statement (ES).
Scoping Boundary	The boundary considered to be the limits of the Project, as studied as part of the Scoping Report. Where additional areas may be required, but are not yet identified (e.g. location of construction compounds) this is made clear.
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.
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.
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).
Significance	A measure of the importance or gravity of the effect defined by significance criteria specific to the environmental topic
Significant Observed Adverse Effect Level (SOAEL)	The level above which significant adverse effects on health and quality of life occur as a result of noise or vibration. (see also: Significance).
Site	The land within the Order Limits that will be shown on the Works Plans.
Sites 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

Term	Definition
	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 Protection Zone 1 (SPZ 1)	Also referred to as 'inner zone'. In relation to contamination risks to groundwater sources, defined by the Environment Agency as the 50- day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.
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)	Areas of protected habitats and species as defined in the Habitats Directive.
Special Protection Area (SPA)	Sites classified in accordance with Article 4 of the EC Birds Directive (79/409/EEC) which came into force in April 1979. They are classified for rare and vulnerable birds (as listed on Annex 1 of the Directive), and for regularly occurring migratory Species.
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.
Stringing	Placing joints of pipe end to end along a pipeline right of way in preparation for laying, i.e., screwing or welding the joints together to form the pipeline.
Study Area	The area identified by each technical specialist for which impacts could occur and therefore within which specialist assessment is undertaken and baseline data and information is gathered.
Survey Area	The area within which environmental surveys are undertaken.
Statutory Consultation	The Planning Act 2008 (as amended) (PA 2008) 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.

Term	Definition
Statement of Community Consultation (SoCC)	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). A Statement of Community Consultation (SoCC) must be prepared, setting out how the Applicant proposes to consult people living in the vicinity of the Project.
Survey Buffer	An area additional to the core Survey Area within which surveys may be required.
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
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.
Town and Country Planning Act	The Town and Country Planning Act 1990 (as amended) gives Local Planning Authorities in England and Wales the power to regulate and grant permission for local development. It is used to permit development for the Project which does not fall under the Planning Act 2008.
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.
Transect	Survey technique for surveying birds, wintering birds and breeding birds, with surveyors walking pre-defined routes.
Trenchless	Trenchless technology is the science and engineering of installing underground pipes using techniques which minimise the amount of excavation and associated environmental disturbance associated with Open Cut techniques
Visual Amenity	Overall enjoyment of a particular area, surroundings, or views in terms of people's activities - living, recreating, 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.
Vulnerability	In the context of the 2014 EU Directive, the term refers to the 'exposure and resilience' of the Project to the risk of a major accident and/or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact.

Term	Definition
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)	The principal piece of UK legislation relating to the protection of wildlife.
Working Width	The temporary boundary within which Pipeline Construction Activities are expected to take place. This will be defined within the ES.
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.

Appendix B – Additional Supporting Figures

Revision: 2 Drawn: ER Checked: AG Approved: MW Date: 2022-03-23

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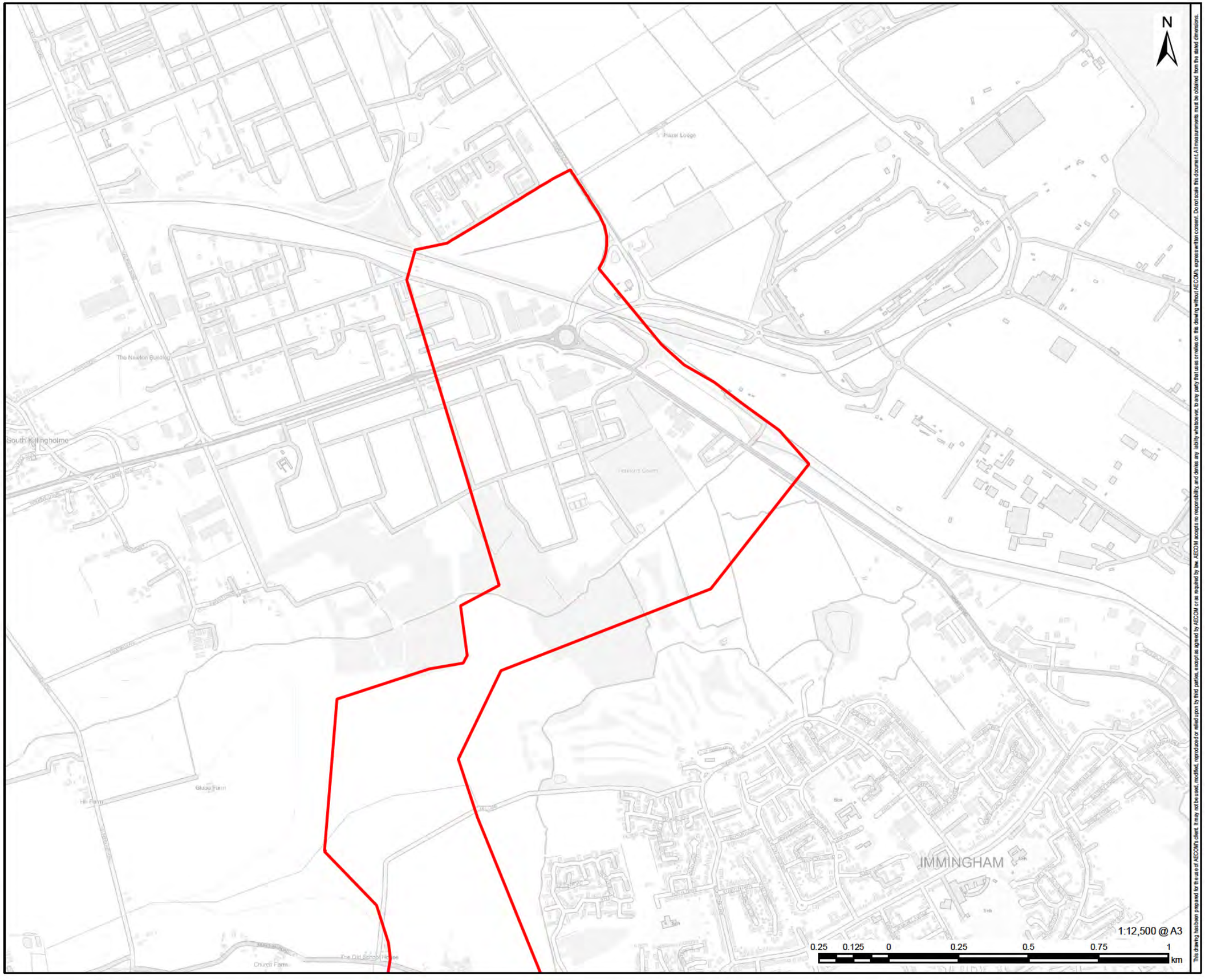

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V Net Zero Pipeline

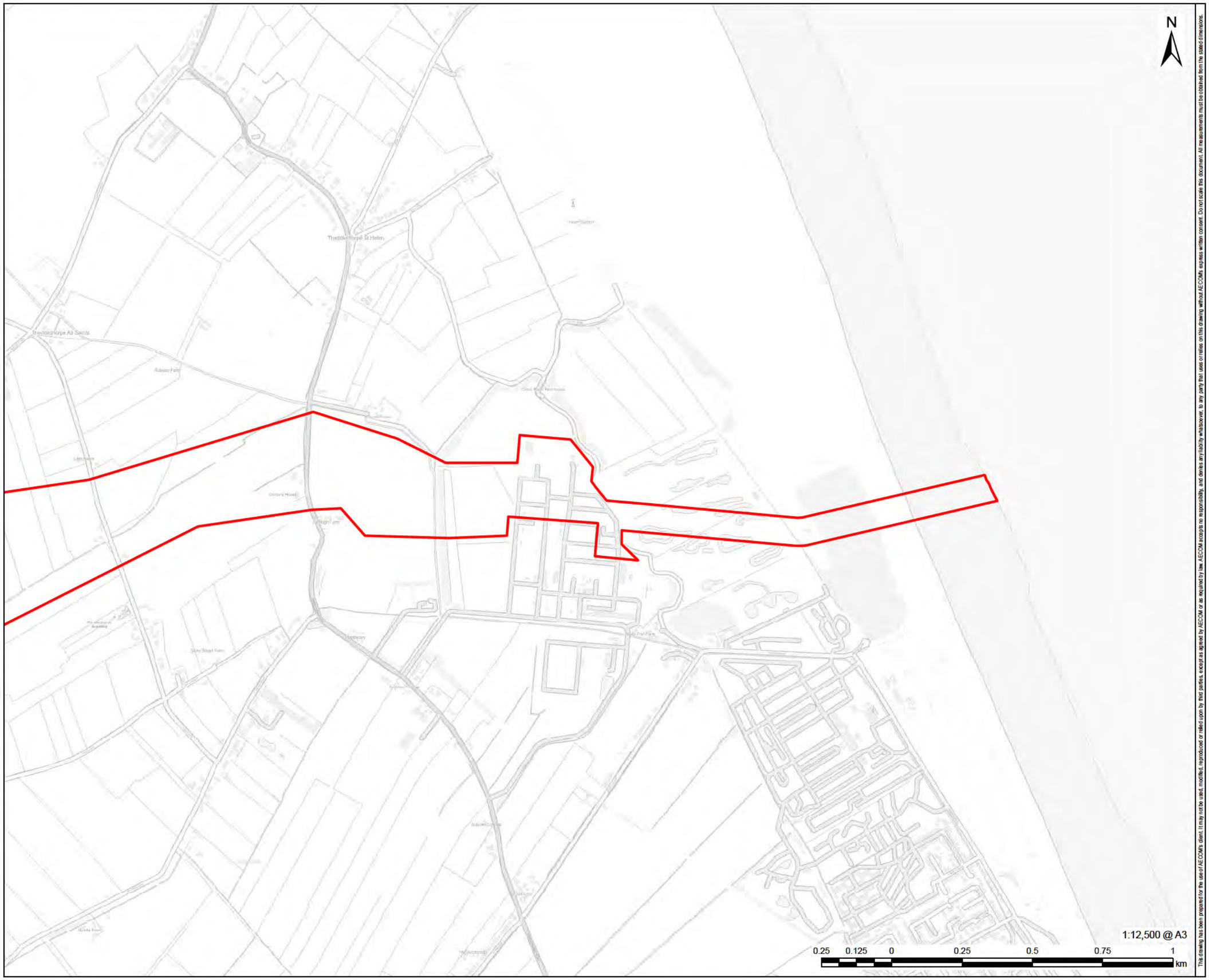
LEGEND
Scoping Boundary

FIGURE TITLE
Appendix B - Figure 1
Scoping Boundary at the Pipeline Offtake Facility

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220323_SR_A_B-1

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\600_CAD_GIS\620_GIS\02_Maps\Scoping Report\Appendix\VNZ_SR_A_B-2_Scoping_Boundary_at_Pipeline_tien_and_Outlet_v2_20220328_AG.mxd Revision: 2 Drawn: ER Checked: AG Approved: MW Date: 2022-03-28



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PROJECT
V Net Zero Pipeline

LEGEND
Scoping Boundary

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FIGURE TITLE
Appendix B - Figure 2
Scoping Boundary at the pipeline tie-in and outlet at the former TGT site and it's surrounds

ISSUE PURPOSE
SCOPING REPORT

PROJECT NUMBER / REFERENCE
60668955 / VNZ_20220328_SR_A_B-2

Appendix C – Transboundary Effects Screening Matrix

Regulation 32 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires the consideration of any likely significant effects on the environment of another European Economic Association (EEA) State.

Guidance upon the consideration of transboundary effects is provided in PINS Advice Note 12: Development with significant transboundary impacts consultation.

The following screening matrix provides the consideration of transboundary effects for the Project, taking guidance from Advice Note 12 (Annex).

Table A1: Screening Matrix for Possible Substantial Effects on the Environment of Another EEA State

Screening Criteria:	Commentary and Location of Relevant Information in this Scoping Report
Characteristics of the Development	Key considerations include: • Size of the development; • Use of natural resources; • Production of waste; • Pollution and nuisances; • Risk of accidents; and • Use of technologies This information is presented in Chapter 2 Project Description. Risk of accidents is considered in Chapter 20: Major Accidents and Disasters and has been considered during the development of this Screening Matrix
Location of Development (including existing use) and Geographical area	Key considerations include: • What is the existing use? • What is the distance to EEA states? • What is the extent of the area of a likely impact under the jurisdiction of an EEA state? The Project would not require any physical works in any area under the jurisdiction of any other EEA State. The Project is located in the north-east of England, specifically within the jurisdictions of: • Lincolnshire County Council; • North Lincolnshire Council; • North East Lincolnshire Council; • East Lindsey District Council; and • West Lindsey District Council. The nearest EEA state is the Netherlands, which is

Screening Criteria:	Commentary and Location of Relevant Information in this Scoping Report
	approximately 300km east of the Project. Further details about the Project context and land uses are provided in Chapter 2 of this Scoping Report.
Environmental Importance	Key considerations include: • Are particular environmental values (eg protected areas – name them) likely to be affected? • Capacity of the natural environment. • Wetlands, coastal zones, mountain and forest areas, nature reserves and parks, Natura 2000 sites, areas where environmental quality standards already exceeded, densely populated areas, landscapes of historical, cultural or archaeological significance. Information regarding environmental constraints and designations is provided in the baseline environment and study area of each technical chapter (Chapters 5-19) of this Scoping Report, and constraints are provided on Figure 2-3. There are European designated sites within proximity to the Project which include: • Humber Estuary SAC, SPA and Ramsar site Other national environmental designations either directly impacted or within close proximity to the Project include: • Humber Estuary SSSI; and • Lincolnshire Wolds AONB.
Potential impacts and Carrier	Key consideration includes: • By what means could impacts be spread (i.e. what pathways)? The proposed construction associated with the Project is onshore and has a limited likelihood of transboundary effects. Routine noise and air emissions associated with the onshore pipeline and infrastructure installation, and any subsequent operation, would not be detectable nor would have the ability to significantly affect adjacent state waters or air quality.
Extent, Magnitude, Probability, Duration, Frequency, Reversibility	Key considerations include: • What is the likely extent of the impact (geographical area and size of the affected population)? • What will the likely magnitude of the change in relevant variables relative to the status quo, taking into account the sensitivity of the variable? • What is the degree of probability of the impact? • Is the impact likely to occur as a consequence of normal conditions or exceptional situations, such as accidents? • Is the impact likely to be temporary, short-term or long-term?

Screening Criteria:	Commentary and Location of Relevant Information in this Scoping Report
	• Is the impact likely to relate to the construction, operation or decommissioning phase of the activity? • What is likely to be the temporal pattern of the impact? • Is the impact likely to be reversible or irreversible? Based on the information collated to date as part of the scoping exercise, no significant effects are identified that could impact on another EEA Member State. This position would be clarified as the environmental topic assessments proceed, and clarification included within the ES.
Cumulative impacts	Key consideration includes: • Are other major developments close by? There are a number of other projects being developed near the Project and these are identified in Chapter 19: Cumulative Effects Potential cumulative impacts would be assessed within the ES. However, due to the distances involved between the Project location and the nearest EEA member state, along with the design and control measure which will be in place for each project, no significant transboundary impacts are expected.

Appendix D – Approach to Habitat Regulations Assessment

Introduction

As part of the assessment of a proposed scheme it is necessary to consider whether the scheme is likely to have a significant effect on areas that have been internationally designated for nature conservation purposes (known as European sites: Special Areas of Conservation, Special Protection Areas and, as a matter of government policy, Ramsar sites). European sites are protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended). The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 ("the Withdrawal Act"). However, the most recent amendments to the Habitats Regulations –the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 –make it clear that the need for HRA continues to apply.

There is no formal HRA Scoping stage. However, this HRA Scoping is undertaken as an initial step to help identify the European sites within the wider area of the scheme, the impact pathways likely associated with the proposals as understood at this time and whether a realistic connection between the impact pathways and ecological receptors is likely to exist. Ultimately, the objective of the Scoping Report is to inform the Likely Significant Effects (LSEs) screening assessment (the first stage of the HRA process). The LSE screening stage will identify which aspects of the scheme can be screened out from Appropriate Assessment (the second stage of the HRA process) because they are unlikely to result in adverse effects on European sites based on best available evidence.

Specific details on the construction process and specifications of the scheme are not yet available and a formal HRA screening (likely significant effects) exercise is not possible currently. Therefore, this Scoping Report also outlines the additional information to be collected concerning project delivery and highlights data collection to fill any gaps in the ecological evidence base needed for the subsequent LSEs screening and Appropriate Assessment stages of the HRA.

Once the HRA is progressed to Stage 1 (Test of Likely Significant Effects), it will be carried out with reference to the general EC guidance on HRA (European Commission, 2001), and general guidance on HRA published by the UK government in July 2019 (Department for Levelling Up, Housing and Communities, 2019). Furthermore, due regard will be given to all relevant case law relating to the 2017 Regulations, the Habitats Directive and Birds Directive. This includes the ruling by the Court of Justice of the European Union (CJEU) in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17). This case held that; "*it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site*" (paragraph 40). This establishes that bespoke mitigation measures cannot be taken into account at the LSEs stage and instead must be considered in an Appropriate Assessment. Additional case law is relevant, including the Holohan ruling[1] which was also handed down by the European Court of Justice in

[1] Case C-461/17

2018. Among other provisions, the ruling underlined the need to consider effects on functionally-linked habitat (i.e. habitat outside the boundaries of a European site but which is essential for achieving the conservation objectives of that European site). This is relevant for European designated for highly mobile species.

Furthermore, any uncertainties regarding the delivery of the scheme will be accounted for by using the Rochdale Envelope. This has arisen from two cases: R. v Rochdale MBC ex parte Milne (No.1) and R. v Rochdale MBC ex parte Tew [1999], which are cases that dealt with outline planning applications for a proposed business park in Rochdale. The HRA will be undertaken in compliance with government guidance on HRA (Habitats regulations assessments: protecting a European site - GOV.UK (www.gov.uk)) and in particular with Planning Inspector Advice Note 10 (Habitats Regulations Assessment).

European Designated Sites

The indicative alignment of the preferred pipeline corridor (excluding the existing LOGGS pipeline) does not pass directly through any European sites. Several European sites lie outside the development footprint but may nonetheless be impacted by the indicative alignment. For example, this could be because these sites harbour mobile bird for which European sites are designated and which potentially frequent the scheme area, or due to impact pathways extending some distance beyond the indicative alignment.

This is presented in Table D1 below, which also provides an overview of the most likely impact pathways associated with the construction and operation of the pipeline. Note that due to the early development stage of the project, the likely importance of many of these impact pathways is subject to change. The impact pathways were identified using prior ecological knowledge, appraising the sensitivity of European sites, and considering Scoping Reports for other schemes.

Appendix Table D1 Summary of the European Sites and impact pathways within 10 km of the indicative alignment

European Site	Approx. distance from the indicative alignment	Qualifying Species / Habitats	Threats and Pressures to Site Integrity	Impact Pathways with potential to affect European site.
Humber Estuary SAC (including marine component*)	0.66 km east	Annex I habitats that are a primary reason for selection of this site: • Estuaries and mudflats and sandflats not covered by seawater at low tide*. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Sandbanks which are slightly covered by seawater all the time*, • Coastal lagoons, Salicornia and other annuals colonizing mud and sand*, • Atlantic salt meadows*, • Embryonic shifting dunes, shifting dunes along the shoreline with Ammophila arenaria, • Fixed coastal dunes with herbaceous vegetation and • Dunes with *Hippophae rhamnoides*. Annex II species present as a qualifying feature, but not a primary reason for site selection: • Sea lamprey *Petromyzon marinus**, • River lamprey *Lampetra fluviatilis** and • Grey seal *Halichoerus grypus**.	• Water pollution • Coastal squeeze • Changes in species distributions • Under-grazing • Invasive species • Natural changes to site conditions • Public access and disturbance • Fisheries: fish stocking • Fisheries: commercial marine and estuarine • Direct land take from development • Air pollution • Shooting/scaring • Direct impact from third party	Damage through pollution depending on hydrological connectivity to the preferred alignment, damage to qualifying feature, supporting habitats or notable species. Potential disruption of SAC fish movements depending on the nature of river crossings.

European Site	Approx. distance from the indicative alignment	Qualifying Species / Habitats	Threats and Pressures to Site Integrity	Impact Pathways with potential to affect European site.
			• Inappropriate scrub control	
Humber Estuary SPA (including marine component**)	0.66 km east	The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season**: • Avocet *Recurvirostra avosetta* (wintering and breeding) • Bittern *Botaurus stellaris* (wintering/breeding), • Hen harrier *Circus cyaneus* (wintering), • Golden plover *Pluvialis apricaria* (wintering), • Bar-tailed godwit *Limosa lapponica* (wintering), • Ruff *Philomachus pugnax* (passage), • Marsh harrier *Circus aeruginosus* (breeding), • Little tern *Sternula albifrons* (breeding), • Shelduck *Tadorna tadorna* (wintering), • Knot *Calidris canutus* (wintering/passage), • Dunlin *Calidris alpina* (wintering/passage), • Black-tailed godwit *Limosa limosa* (wintering/passage), • Redshank *Tringa totanus* (wintering/passage). The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds**.	As Above	Damage through pollution depending on hydrological connectivity to the preferred alignment, damage to qualifying feature, supporting habitats or notable species Disturbance to qualifying features through noise, light and visual pathways Disturbance to qualifying features and damage to supporting habitats through temporary removal of functionally linked land.
Humber Estuary Ramsar (including marine component***)	0.66 km east	• Designated for habitats including dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. • The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook***. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the	As above	Damage through pollution depending on hydrological connectivity to the preferred alignment, damage to qualifying feature, supporting habitats or notable species

European Site	Approx. distance from the indicative alignment	Qualifying Species / Habitats	Threats and Pressures to Site Integrity	Impact Pathways with potential to affect European site.
		most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. • The estuary supports a waterfowl assemblage of international importance (153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)***. • The following bird species / populations occur at levels of international importance: golden plover, red knot, dunlin, black-tailed godwit, common redshank, common shelduck and bar-tailed godwit. (JNCC, 2008)***, • It holds an assemblage of threatened coastal and wetland invertebrates***.		Disturbance to qualifying features through noise, light and visual pathways Disturbance to qualifying features and damage to supporting habitats through temporary removal of functionally linked land.
Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC	0.65 km east	Annex I habitats that are a primary reason for selection of this site: • Shifting dunes along the shoreline with *Ammophila arenaria*, • Fixed coastal dunes with herbaceous vegetation, • Dunes with *Hippophae rhamnoides*, and • Humid dune slacks. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Embryonic shifting dunes.	• Inappropriate coastal management • Change to site conditions • Change in land management • Air pollution	None identified
Greater Wash SPA (Marine Site)	1.18 km east	The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the following Annex I species: • Red-throated diver *Gavia stellata (wintering)*, • Little gull *Hydrocoloeus minutus*, • Sandwich tern *Thalasseus sandvicensis (breeding)*, • Common tern *Sterna hirundo (breeding)*,	No additional conservation advice available	Damage to designated sites through pollution depending on hydrological connectivity to the preferred alignment, damage to qualifying feature, supporting habitats or notable species

European Site	Approx. distance from the indicative alignment	Qualifying Species / Habitats	Threats and Pressures to Site Integrity	Impact Pathways with potential to affect European site.
		• Little tern *Sternula albifrons (breeding)*, and • Common scoter *Melanitta nigra*. This site protects important foraging areas for the largest breeding populations of little tern in the UK marine SPA network (798 pairs), and important areas used by the second largest non-breeding populations of red-throated diver (1,407 individuals) and little gull (1,255 individuals) within the UK SPA network.		

HRA Scoping Summary

At this stage it is impossible to conclude that no Likely Significant Effects for any European sites would occur, though it is worth also noting that no impact pathways have been identified at this stage linking the Scheme to Saltfleetby-Theddlethorpe Dunes SAC.

This HRA Scoping is undertaken as an initial step to help identify the European sites within the wider area of the scheme, the impact pathways likely associated with the proposals as understood at this time and whether a realistic connection between the impact pathways and ecological receptors is likely to exist. Ultimately, the objective of the Scoping Report is to inform the LSEs screening assessment. Consequently, a HRA will be undertaken for the Project and appended to the ES and the details summarised within the ES.

Information to inform an Appropriate Assessment

The environmental assessment will include sufficient information to develop a detailed pipeline laying methodology for each habitat found along the pipeline route and include a consideration of potential pipeline protection outside of designated sites. Where required to investigate impacts on European sites, information will be obtained regarding functionally linked land, construction noise, operational noise, construction working methods and potential for effects on sediment processes. Best practice should also be adopted for the wider area to minimise the potential for adverse effects on integrity.

Appendix E – Baseline Air Quality Pollutant Concentrations

Appendix Table E-1 Annual mean concentrations of NO_2 within 10 km of the Study Area

LPA	ID	Type	X	Y	Annual mean concentration of NO_2 ($\mu g/m^3$)				
					2016	2017	2018	2019	2020
NLC	CM6	Other	514880	416133	17	17	18	15	13
NLC	DT13	Roadside	514573	415901	31	20	17	17	-
NLC	DT14	Roadside	514782	415971	31	27	28	29	-
NLC	DT15	Urban Background	515452	416107	21	19	20	18	-
NLC	DT16	Roadside	515279	416085	26	25	26	25	-
NLC	DT22	Roadside	514141	417483	-	-	21	21	-
NELC	AURN	Urban Background	518277	415116	17	14	14	11	12
NELC	Cleeth Rd	Roadside	527761	410425	42	36	-	32	26
NELC	Peaks Parkway	Kerbside	527540	408080	-	-	-	-	20
NELC	NEL1	Kerbside	526838	409261	30	32	30	29	26
NELC	NEL2	Roadside	527095	409367	40	37	34	33	30
NELC	NEL3	Roadside	527100	409400	38	34	32	30	26
NELC	NEL4	Roadside	526583	408047	28	27	25	26	23
NELC	NEL5	Roadside	524350	407765	-	-	-	22	20
NELC	NEL6	Roadside	527748	404396	-	-	-	17	12
NELC	NEL7	Roadside	527540	408080	-	-	-		20
NELC	NEL8	Kerbside	527403	408666	32	31	29	29	24
NELC	NEL9	Kerbside	527665	410164	22	21	21	21	16
NELC	NEL10	Roadside	523284	409883	-	-	21	20	16
NELC	NEL11	Roadside	527761	410425	45	47	38	38	33
NELC	NEL14	Kerbside	527754	410445	37	35	33	32	28

LPA	ID	Type	X	Y	Annual mean concentration of NO_2 ($\mu g/m^3$)				
					2016	2017	2018	2019	2020
NELC	NEL15	Kerbside	527789	410438	36	37	33	31	28
NELC	NEL16	Kerbside	527693	410413	33	35	31	29	28
NELC	NEL17	Roadside	528725	410102	30	33	31	30	26
NELC	NEL18	Kerbside	725171	410338	30	36	34	32	31
NELC	NEL19	Kerbside	527165	409995	34	35	30	30	27
NELC	NEL20	Kerbside	527182	410092	37	37	33	33	30
NELC	NEL21	Roadside	526077	410124	33	31	27	25	23
NELC	NEL22	Roadside	524666	408814	29	27	24	24	19
NELC	NEL23	Roadside	519193	415279	33	29	27	25	21
NELC	NEL24	Kerbside	517543	414312	-	-	-	17	13
NELC	NEL25	Kerbside	518108	414533	-	-	-	19	16
NELC	NEL26	Roadside	528891	408078	24	23	21	21	15
NELC	NEL27	Roadside	529532	406835	22	23	20	23	22
NELC	NEL28	Kerbside	527716	404516	28	30	25	24	21
NELC	NEL29	Roadside	526564	406334	25	24	23	22	19
NELC	NEL30	Roadside	527181	409513	-	-	29	27	23
NELC	NEL31	Kerbside	527183	409647	28	30	30	27	21
NELC	NEL32	Kerbside	527189	409621	30	29	29	27	22

Appendix Table C-2 Annual mean concentrations of PM10 closest to the Study Area

LPA	Monitor ID	Type	X	Y	Annual mean concentration of PM_{10} ($\mu g/m^3$)				
					2016	2017	2018	2019	2020
NLC	CM6	Other	514880	416133	18	19	19	15	11

Appendix F – Health & Wellbeing Planning Policy

Policy Reference	Policy Context
National Policy	
National Planning Policy Framework	There are some direct references to health throughout the NPPF. The following are of relevance: • Para 8; There are three overarching objectives in achieving sustainable development, one of which is…"*a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being*"; and • Para 91; "*Planning policies and decisions should aim to achieve healthy, inclusive and safe places which promote social interaction, are safe and accessible and that enable and support health lifestyles*". The basis of the NPPF is a presumption in favour of sustainable development. It should be noted that potential impacts to Human Health are factors in determining what is sustainable development.
NHS Long Term Plan 2019	The NHS Long Term Plan 2019 sets out a ten-year programme of phased improvements to the NHS. The plan outlines how the NHS will attempt to reduce health inequalities through wider preventative action in deprived areas and improved integrated community-based care systems. This includes funding support to programmes which help to reduce smoking, obesity and air pollution in vulnerable communities.
Spatial Planning for Health: An evidence resource for planning and designing healthier	In 2017, Public Health England published '*Spatial Planning for Health: An evidence resource for designing healthier places*'. The review provided public health planners and local communities with evidence informed principles for designing healthy places. The review addresses the relationship which exists between public health and the built environment. It identifies five aspects of the built and natural environment which can be influenced by local planning policy: • Neighbourhood design; • Housing; • Healthier food;

Policy Reference	Policy Context
places (2017)	• Natural and sustainable environment; and • Transport. For each aspect identified above, the review provides the evidence base underpinning why they are important determinants of public health. It also sets out principles which public health professionals and planners should follow to ensure that places become healthier. The two aspects deemed most relevant to the V Net Zero Pipeline Project are 'neighbourhood design' and 'natural and sustainable environment'. For 'neighbourhood design', the review states that *"Neighbourhoods are places where people live, work, and play and have a sense of belonging. The design of a neighbourhood can contribute to the health and well-being of the people living there. Several aspects of neighbourhood design (walkability and mixed land use) can also maximise opportunities for social engagement and active travel. Neighbourhood design can impact on our day-to-day decisions and therefore have a significant role in shaping our health behaviours" (PHE,* Spatial Planning for Health 2017, pg. 11. For the 'natural and sustainable environment', the review states "*there is a very significant and strong body of evidence linking contact and exposure to the natural environment with improved health and wellbeing. For the purpose of this review, the natural and sustainable environment is comprised of neighbourhood ecosystems and the resulting co-benefits between the environment and health. Protecting the natural environment is essential to sustaining human civilization" (PHE,* Spatial Planning for Health 2017, pg. 38.
Public Health England: Strategy 2020 to 2025	In 2020, Public Health England published the 'Public Health England Strategy 2020 to 2025' which states their objectives over the next five years. The document also states the importance of planning in healthy communities and references the Spatial Planning and Health document described above in providing an evidence base for this.
Local Planning Context	
North Lincolnshire Council	North Lincolnshire Council is currently preparing a new single Local Plan for North Lincolnshire. This is currently at Stage 4, and the consultation stage is now closed. The draft Local Plan, as of October 2021, details the following key health policies:

Policy Reference	Policy Context

	• **Policy CSC1: Health and Wellbeing**
	  • Make the potential for achieving positive mental and physical health outcomes a priority when considering all development proposals;
	  • Promote improvements and enhancing accessibility to the historic environment, nature, accessible natural greenspaces and green infrastructure corridors and blue and green infrastructure;
	  • Recognise the vital role heritage and nature plays in people's lives by safeguarding and enhancing the quality of our surroundings to ensure positive impacts on individuals and communities;
	  • Use the ten principles of Active Design to support development in North Lincolnshire;
	  • Support the integration of community facilities and services i.e. health, education, cultural and leisure in multi-purpose community buildings;
	  • Development schemes safeguarding and, where appropriate, enhancing the role of allotments, gardens and food markets in designated public and private spaces accessible from the home, school or workplace providing access to healthy, fresh and locally produced food;
	  • Ensure development does not have an adverse impact on the environment or residential amenity through air, noise, vibration and water pollution;
	  • Make provision for the needs of an ageing population by promoting a range of development which supports independent living and avoiding the need for residential care;
	  • Work with relevant stakeholders to reduce geographical inequalities in health through maximising the provision of affordable housing and regenerating poorer neighbourhoods within the area; and
	  • To require in the case of development of 50 or more homes or 1000sqm commercial floorspace, the submission of a Health Impact Assessment (HIA); as part of the planning application to explain how health impacts have been identified and how they will be addressed and mitigated and how they have informed the design. This must include a statement setting out how the active design principles and the principles of this policy have been incorporated into the new design.

Policy Reference	Policy Context
	Policy CSC2: Health Care Provision • The council will support the implementation of health care provision in North Lincolnshire, in order to modernise and improve the primary health care facilities, and to improve the health of residents through safeguarding and enhancing open space, facilities for sports and recreation and improving walking and cycling routes; • Where appropriate, developers should consult with health care commissioners at an early stage in order to understand the need for new or enhanced health care infrastructure and improved access to primary and mental health care facilities; • That the healthcare infrastructure implications of any relevant Project have been considered and addressed; • Proposals for new health care facilities should provide high standards of accessibility to all sectors of the community and should connect well to public transport services, walking and cycling routes and be easily accessible to all sectors of the community. Proposals which utilise opportunities for the multi-use and co-location of health facilities with other services and facilities, and thus co-ordinate local care and provide convenience for the community, will be particularly supported; • The loss of health care facilities or land allocated for such purposes will be resisted, unless there is no longer a need for the land or building in any form of health care use, or there is an acceptable alternative means of meeting such need to the same or higher standard in terms of community benefit; and • On proposals of 11 dwellings or more in areas with the greatest health care impact including Scunthorpe, Barton Upon Humber, Brigg, Kirton in Lindsey, Winterton, Crowle and Barrow upon Humber developers will be expected to make a payment towards health care provision.
North East Lincolnshire Council	North East Lincolnshire Council's 2013 Local Plan sets out the key strategic objectives that relate directly to the spatial vision: • **SO5 Social and health inequality** – North East Lincolnshire Council aims to Narrow the gap in terms of social and health inequality by addressing issues of housing choice, providing accessible employment and training opportunities, promoting healthier lifestyles, providing healthcare and community facilities, improving educational attainment and cultural facilities; and establishing protecting and maintaining a network of accessible good quality open space, sport and recreation facilities. Critical success factors for this objective are as follows: 1. Reduced deprivation, narrowing the gap in terms of social and health inequality; and, 2. Safeguarded and developed, open space and sport and recreation facilities to maintain or exceed local accessibility standards, promoting healthy lifestyles.

Policy Reference	Policy Context
West Lindsey District Council	City of Lincoln, North Kesteven Council and West Lindsey District Council formed the Central Lincolnshire Joint Strategic Planning Committee (CLJSPC) which was established in October 2009 and the Central Lincolnshire Local Plan Team was established in May 2010. The Central Lincolnshire Local Plan adopted in April 2017 makes reference to health in the following policies: • **Policy LP9: Health and Wellbeing:** this states that the potential for achieving positive and physical health outcomes will be taken into account when considering all development proposals; • **Policy LP13: Accessibility and Transport**: this states that development proposals should contribute towards an efficient and safe transport network, where the use of sustainable transport modes are maximised; • **Policy LP15: Community Facilities:** this states that all development proposals should recognise the community facilities as an integral component in achieving and maintaining sustainable, well integrated and inclusive development; • **Policy LP18. Climate Change and Low Carbon Living:** this states that development proposals will be considered more favourably if the scheme would make a positive and significant contribution towards one or more of the following: reducing demand; resource efficiency; energy production; and carbon off-setting; • **Policy LP19: Renewable Energy Proposals:** this states that proposals for non-wind renewable technology will be assessed on their merits, with the impacts considered against the benefits of the Scheme; and • **Policy LP21: Green Infrastructure Network**: this states that the Central Lincolnshire Authorities will aim to maintain and improve the green infrastructure network by enhancing, creating and managing multifunctional green space within and around settlements that are well connected to each other and the wider countryside.
East Lindsey District Council	East Lindsey District Council formally adopted their Local Plan in 2018. A key objective for the local authority by 2031 is to be a district with *"A network of thriving, safer and healthy sustainable communities, where people can enjoy a high quality of life and an increased sense of well-being and where new development simultaneously addresses the needs of the economy, communities and the environment."* The Council's key objectives relating to health are as follows: **Objective 9. Support inclusive, safe and vibrant communities** – Including helping to improve the availability and accessibility of key local services and facilities, including health, education and leisure.

Policy Reference	Policy Context
	Objective 12. Encourage and provide the facilities and infrastructure for healthy lifestyles – Ensuring that • Adequate health facilities and infrastructure is available for present and future generations • Health facilities are accessible to all sectors of the community • Health inequalities are reduced across the district • Healthy and active lifestyles are promoted • The Council maintains, enhances and creates green infrastructure assets (e.g. green space, recreation and sports facilities, semi -wild/rural places) across the district to ensure they are accessible to the whole community.
Lincolnshire County Council	Lincolnshire County Council is a unitary local authority that East Lindsey Council area and West Lindsey Council are both part of. Lincolnshire County Council adopted their 'Joint Health and Wellbeing Strategy for Lincolnshire' in 2018, with key themes including: • Embed prevention across all health and care services; • Develop joined up intelligence and research opportunities to improve health and wellbeing; • Support people working in Lincolnshire through workplace wellbeing and support them to recognise opportunities to work with others to support and improve their health and wellbeing; • Harness digital technology to provide people with tools that will support prevention and self-care; and • Ensure safeguarding is embedded throughout the Joint Health and Wellbeing Strategy. In particular, these themes are to be implemented across seven focused priority groups identified by Lincolnshire County council, which are as follows: • Mental health & emotional wellbeing in children & young people; • Mental health in adults; • Carers; • Physical activity; • Housing and health;

Policy Reference	Policy Context
	• Obesity; and • Dementia These priority groups each have developed a delivery plan for their respective areas. The plans detail the actions, outcomes, timescales, and responsibilities for delivering the objectives. They also highlight where specific objectives and actions support the themes for the Joint Health and Wellbeing Strategy.

Appendix G – Materials and Waste Planning Policy

Policy Reference	Policy Context
National Policy	
Overarching National Policy Statement for Energy (EN-1)	
Paragraph 5.4.6 of Section 5.14: Waste Management	The applicant should set out the arrangements that are proposed for managing any waste produced and prepare a Site Waste Management Plan. The arrangements described and Management Plan should include information on the proposed waste recovery and disposal system for all waste generated by the development, and an assessment of the impact of the waste arising from development on the capacity of waste management facilities to deal with other waste arising in the area for at least five years of operation. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that this is the best overall environmental outcome.
National Policy Statement for Electricity Networks Infrastructure (EN-5)	
N/A	No waste specific measures
NPPF	
	The NPPF does not contain specific waste policies as these are detailed within the revised Waste Management Plan for England (2021) and the National Planning Policy for Waste, however the following overarching policies are relevant to waste and resources: a. The environmental objective set out at paragraph 8 of the NPPF is "to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy." b. The environmental objective set out in paragraph 210 of the NPPF is to "so far as practicable, take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously."
National Planning Policy Guidance (PPG) for Minerals and Waste	
	Published to provide more in-depth guidance to the NPPF. The PPG aims to make planning guidance more accessible and ensures that the guidance is kept up to date.
National Planning Policy for Waste	

Policy Reference	Policy Context
	The National Planning Policy for Waste sets out detailed waste planning policies to be applied in conjunction with the NPPF. It states: *"when determining planning applications for non-waste development, local planning authorities should, to the extent appropriate to their responsibilities, ensure that:* *The likely impact of proposed, non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities;* *New, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development, and;* *The handling of waste arising from the construction and operation of development maximises reuse/recovery opportunities, and minimises off-site disposal".*
Waste Management Plan for England	
	Provides an overview of waste management in England and reiterates the requirement for all waste producers and waste management providers to implement the waste hierarchy. It also highlights the need for waste to be managed using the proximity principle and confirms England's commitment to recovering at least 70% by weight of non-hazardous construction and demolition waste by 2020 (excluding soils and stones). Recovery is assumed in the context of this policy to include reuse, recycling and incineration with energy recovery.
A Green Future: Our 25 Year Plan to Improve the Environment	
	Plan to Improve the Environment' published in 2018, "sets out goals for improving the environment within a generation and leaving it in a better state than we found it". It details how the government will work with communities and businesses to do this. The following policies are relevant: *Make sure that resources are used more efficiently and kept in use for longer to minimise waste and reduce its environmental impacts by promoting reuse, remanufacturing and recycling.* *Work towards eliminating all avoidable waste by 2050 and all avoidable plastic waste by end of 2042.* *Reducing food supply chain emissions and waste.* *Reducing litter and littering.* *Improving management of residual waste.*
Resources and Waste Strategy for England	
	The strategy published in 2018 will help the government to meet the commitments outlined in the 25 Year Plan and *"sets out how we will preserve our stock of material resources by minimising waste, promoting resource*

Policy Reference	Policy Context
	efficiency and moving towards a circular economy. At the same time we will minimise the damage caused to our natural environment by reducing and managing waste safely and carefully, and by tackling waste crime." The strategy combines actions to be taken now and commitments for the coming years. Key targets and milestones and targets, which could be relevant to the Project, include: *Roll out of a deposit return scheme (subject to consultation) – 2023;* *Legislation for mandatory separate food waste collections (subject to consultation) – 2023;* *75% recycling rate for packaging (subject to consultation) – 2023;* *65% recycling rate for municipal solid waste – 2035; and* *Municipal waste to landfill 10% or less – 2035.*
Local Policies	
Lincolnshire Minerals and Waste Local Plan – Core Strategy and Development Management Policies (adopted 2016)	The first part of the Lincolnshire Minerals and Waste Local Plan is the Core Strategy and Development Management Policies document. This document sets out the key principles to guide the future winning and working of minerals and the form of waste management development in the County up to 2031. The plan also sets out the development management policies against which planning applications for minerals and waste development will be considered. Relevant policies include: Policy M10 – Underground Gas Storage Policy M11 – Safeguarding of Mineral Resources Policy M12 – Safeguarding of Existing Mineral Sites and Associated Minerals Infrastructure Policy W8 – Safeguarding Waste Management Sites Policy DM1 – Presumption in favour of sustainable development Lincolnshire Minerals and Waste Local Plan Figure 1: Lincolnshire Minerals Safeguarding Areas Map shows the extent of Limestone, sand and gravel and wind blown sand MSAs. The Preferred Route Corridor boundary does not pass through any Lincolnshire County Council MSAs. Figure 3: Lincolnshire Site Specific Minerals Safeguarding Area Map shows the extent of site specific MSAs. The Preferred Route Corridor boundary does not pass through any of these site specific MSAs. Figure 4: Key Diagram shows the extent of sand and gravel areas of search. The Preferred Route Corridor boundary does not pass through any of these areas of search.

Policy Reference	Policy Context
	Figure 6: Existing Minerals and Waste Sites West Lindsey District shows existing sites. The Preferred Route Corridor boundary does not pass through any of these sites. Figure 7: Existing Minerals and Waste Sites East Lindsey District shows existing sites. The Preferred Route Corridor boundary does not pass through any of these sites.
Lincolnshire Minerals and Waste Local Plan – Site Locations (2017)	The second part of the Lincolnshire Minerals and Waste Local Plan is the Site Locations document which includes specific proposals and policies for the provision of land for mineral and waste development. Relevant policies include: Policy SL1 – Mineral Site Allocations Policy SL2 – Safeguarding Mineral Allocations Policy SL4 – Waste Site and Area Allocations Figure 1: Site Locations Policies Map show the extent of allocated mineral sites, allocated waste sites and allocated waste areas. The Preferred Route Corridor boundary does not pass through any of these sites.
The North Lincolnshire Local Development Framework (adopted 2011)	Replaced the North Lincolnshire Local Plan and includes the Core Strategy which contains chapters regarding Sustainable waste management (Chapter 12) and Minerals (Chapter 13). Relevant policies include: CS20 – Sustainable Waste Management CS21 – Minerals The development of a separate Minerals and Waste DPD document is mentioned in the Cores Strategy however the document is not available on the North Lincolnshire website. North Lincolnshire is preparing a new single Local Plan for North Lincolnshire. Once agreed (formally adopted), it will replace the current North Lincolnshire Core Strategy and the Housing and Employment Land Allocations Development Plan Documents (DPDs). The North Lincolnshire Local Plan Publication Draft (October 2021) contains chapters regarding planning for a sustainable supply of minerals (Chapter 12) and sustainable waste management (Chapter 13). Relevant policies include: Policy MIN4 – Recycle and Secondary Aggregates Policy WAS1 – Waste Management Principles Policy WAS4 – Safeguarding Existing Waste Sites and Infrastructure

Policy Reference	Policy Context
	Policy WAS6 – Waste Management in Development Policy WAS7 – Restoration and Aftercare The associated policy map shows the extent of waste sites and infrastructure, MSAs, and mineral sites and infrastructure. The Preferred Route Corridor boundary does not pass through any of these sites or areas.
North East Lincolnshire Local Plan 2013 to 2032 (adopted 2018)	Sets out the Council's approach to accommodating future requirements in relation to the demands on the Borough's mineral resource and waste needs. Relevant policies include: Policy 44 – Safeguarding minerals and related infrastructure Policy 45 – Future mineral extraction and Secondary Aggregates Policy 47 – Future requirements for waste facilities Policy 48 – Safeguarding waste facilities and related infrastructure Policy 49 – Restoration and aftercare (waste) The Policy Map (shows the extent of MSAs for sand and gravel and blown sand and existing waste management facilities. The Preferred Route Corridor boundary passes through the MSA for sand and gravel. The Preferred Route Corridor boundary does not pass through any waste sites although one site is recorded as being adjacent (Policy 48).
East Lindsey Local Plan Core Strategy (adopted 2018)	East Lindsey is one of the seven districts covered by the Lincolnshire Minerals and Waste Local Plan – Core Strategy and Development Management Policies (2016). The East Lindsey Local Plan Core Strategy includes a MSAs Policies Map (Annex 4). The Preferred Route Corridor boundary does not pass through any MSAs.
Central Lincolnshire Local Plan (replaced the West Lindsey Local Plan in 2017)	West Lindsey is one of the seven districts covered by the Lincolnshire Minerals and Waste Local Plan – Core Strategy and Development Management Policies (2016). Relevant policies in the Central Lincolnshire Local Plan include: Policy LP18 – Climate Change and Low Carbon Living *"Resource efficiency: development should (a) take opportunities to use sustainable materials in* *the construction process, avoiding products with a high embodied energy content and (b) minimize construction waste".* Policy LP26 - Design and Amenity *"Adequate storage, sorting and collection of household and commercial waste, including provision for increasing recyclable waste".*

Appendix H – Major Accidents and Disasters - Summary

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Geophysical	Earthquakes	Earthquakes in the UK are moderately frequent but are unlikely to be powerful enough to inflict severe damage. The BGS acknowledges although the UK is distant from the nearest plate boundary, the Mid-Atlantic Ridge, earthquakes in the UK occur as crustal stresses within the tectonic plates are relieved by movement occurring on pre-existing fault planes. One of the driving forces is regional compression caused by motion of the Earth's tectonic plates and uplift resulting from the melting of the ice sheets that covered many parts of Britain thousands of years ago.	N
Natural Hazards	Geophysical	Volcanic Activity	According to the National Risk Register – 2020, there are a number of volcanoes across Europe that could affect the UK, especially volcanoes in Iceland (such as Bárðarbunga and Eyjafjallajökull) which are of most concern because of their proximity to the UK and frequent eruptions and - due to prevailing winds – have potential to blow ash and gas towards the UK. It is highly unlikely that an ash cloud could significantly impact on any aspect of the Project.	N
Natural Hazards	Geophysical	Landslides	The BGS is the definitive source of landslide information in Great Britain. The National Landslide Database shows there has been one landslide recorded within the Scoping Boundary and three within 4km of it.	Y

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
			The Project's topography is relatively flat with gently undulating land. The Project does not involve the formation of deep cuts/high embankments. In designing the Project to applicable standards, resources and receptors would not be put at a greater risk as a consequence of the Project. Despite no significant concerns being identified at the scoping stage, landslides will be considered further within the ES to ensure that these are fully evaluated.	
Natural Hazards	Geophysical	Sinkholes	The superficial geology underlying the Project include the following; Glacial Till, Tidal Flat Deposits, Glaciofluvial Deposits, Alluvium, Lacustrine Deposits. The bedrock geology that underlies the Project includes various chalk formations. Some sinkholes result from the removal of a soluble rock, such as chalk, which can be triggered by construction works and development. This will therefore be considered further in the ES.	Y
Natural Hazards	Geophysical	Tsunamis	The Project is not located in a tsunamis risk zone.	N
Natural Hazards	Hydrology	Tidal Flooding	A review of the Environment Agency Flood Map for Planning (Rivers and Sea) (Environment Agency, 2020) indicates that Sections A and E of the Scoping Boundary are at risk of tidal flooding. There is a risk of tidal flooding which would be considered as part of the Flood Risk Assessment. As the Project predominantly consists of a buried asset, tidal flooding is not considered to be a major consideration related to accidents, but the ES will include further work to confirm this.	Y

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Hydrology	Fluvial Flooding	A review of the Environment Agency Flood Map for Planning (Rivers and Sea) (Environment Agency, 2020) indicates that the Project crosses Flood Zone 2 at 12 locations and Flood Zone 3 at 11 locations. Flood Zone 2 is land assessed as having between 0.1% and 1 % chance of flooding any given year from rivers, or between 0.1% and 0.5% chance of flooding any given year from the sea. Flood Zone 3 is land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. There are fluvial flood defences running along the edge of the Great Eau, the Long Eau, the Great Fleet Drain, the Louth Canal, Tetney Drain. There is a risk of fluvial flooding which would be considered as part of the Flood Risk Assessment. As the Project predominantly consists of a buried asset, tidal flooding is not considered to be a major consideration related to accidents, but the ES will include further work to confirm this	Y
Natural Hazards	Hydrology	Pluvial Flooding	A review of the Environment Agency's Flood Risk from Surface Water Map (Environment Agency, 2020) shows isolated areas within the area of the Project to be at very low to high risk of flooding from surface water. Surface water flooding is likely to be associated with localised depressions where water will pond during or after prolonged rainfall events. There is a risk of pluvial flooding which would be considered as part of the Flood Risk Assessment, but this is not expected to lead to any increase risk of a major accident or disaster.	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Hydrology	Groundwater Flooding	Groundwater is relatively shallow throughout the Scoping Boundary ranging from 0.30m to 25m below ground level according the borehole records found on BGS GeoIndex. There is a risk of groundwater flooding during excavations during construction phase which would be considered as part of the Flood Risk Assessment, but this is not expected to lead to any increase risk of a major accident or disaster.	N
Natural Hazards	Hydrology	Avalanches	Avalanches are not considered relevant given the location of the Project.	N
Natural Hazards	Climatological and Meteorological	Cyclones, hurricanes, typhoons, storms and gales	Cyclones, hurricanes, typhoons do not typically occur in the UK. Storms and gales could result in damage to the above ground installations (AGIs). However, all AGIs will be designed in line with UK standards which take into account environmental conditions including exposure to UK weather conditions. The risk is not significantly different to other similar infrastructure in the locality.	N
Natural Hazards	Climatological and Meteorological	Thunderstorms	This type of event could result in lightning strikes to temporary elevated structures during construction (e.g. tower cranes); however, the risk is no different to other construction projects in the locality. Specific measures are therefore not considered to be required as part of the Project.	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Climatological and Meteorological	Wave surges	The Project is located in an area at risk of tidal flooding. The floodplains of the Humber Estuary and North Sea are at risk of tidal flooding. The pipeline is below ground and therefore would not be subject to the direct hydraulic forces of a wave surge. The AGI's proposed would largely be sited inland enough not to be subject to wave surges. However a review of the Emergency Shutdown Valve on the existing LOGGS Pipeline will be reviewed further and an assessment made.	Y
Natural Hazards	Climatological and Meteorological	Extreme temperatures: Heatwaves, Low (sub-zero) temperatures and heavy snow	This type of event could expose site infrastructure to greater heat intensity and exposure to sunlight. Heavy snow could cause disruption to workers and delivery vehicles and drivers. In August 2003, a UK heatwave lasted 10 days and resulted in over 2,000 deaths. Temperatures reached what was then a record 38.5°C in Faversham, England and 33°C in Anglesey, Wales. High temperature records are now being broken across the UK with increasing frequency, most recently in 2019 when a temperature of 38.7°C was recorded in Cambridge. In late February and early March 2018, the UK experienced a spell of severe winter weather with very low temperatures and significant snowfall. This event became known as 'The Beast from the East' in the media and led to widespread impacts across the UK. Climate change is set to lead to more extreme events over the coming years. The risk is not significantly different to other similar infrastructure in the locality.	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Natural Hazards	Climatological and Meteorological	Droughts	Over the past 40 years or so, England has experienced five long-duration droughts (lasting over 6 months) and two shorter periods of drought. Drought in the other UK nations is rare. During the 2010–12 drought, parts of south-east and eastern England recorded their lowest 18-month rainfall total in over 100 years. Temporary hosepipe bans were applied to 20 million customers, and the environment and agricultural sectors were disrupted. Drought has the longest advance warning times of the severe weather types. The Project should not be vulnerable to drought as water is not an essential service during its use or maintenance phases. The design of the pipeline will be resilient to ground shrinkage.	N
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Solar Flares	The energy from solar flares reach Earth within a few minutes and can cause radio blackouts. The Project is no more vulnerable than other similar infrastructure in the locality.	N
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Solar Energetic Particles	Solar energetic particles arrive at Earth around 15 minutes to a few hours after they occur, and cause solar radiation storms which can potentially harm astronauts and impact electronics. The Project is no more vulnerable than other similar infrastructure in the locality.	N
Natural Hazards	Climatological and Meteorological	Severe Space Weather: Coronal Mass	CMEs travel slowly and can take between 14 hours and up to four days to reach Earth, and cause geomagnetic storms with many impacts including localised disruptions to power grids.	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
		Ejections (CMEs)	The Project is no more vulnerable than other similar infrastructure in the locality.	
Natural Hazards	Climatological and Meteorological	Fog	Fog is one of the most common weather conditions in the UK, particularly throughout autumn and winter. Severe disruption to transport occurs when the visibility falls below 50m over a wide area. Should fog become an issue during the construction phase due to visibility, work would cease until conditions improve.	N
Natural Hazards	Climatological and Meteorological	Wildfires: Forest fire, Bush/brush, pasture	In 2018, fire and rescue services dealt with a number of wildfires across the country. The vast majority of these were considered business as usual, although some larger incidents (including the Saddleworth Moor and Winter Hill fires) involved mutual aid from other services and the use of specialist capabilities such as high-volume pumps. Scotland also experiences large, rural wildfires, most recently seen in Dumfries and Galloway in 2020. The Project is not located in wooded or highly vegetated areas. Should weather conditions during construction become hot and dry for a long period of time, further consideration would be given to hot work activity locations.	N
Natural Hazards	Climatological and Meteorological	Poor Air Quality	Between 27 June and 7 July 2006, and between 13 and 23 July of the same year, the UK experienced two periods of extended hot weather with associated elevated ozone and harmful airborne particles. In the first episode, the combination of heatwave conditions, poor air quality and worsening of people's pre-existing conditions led to up to 540 deaths and up to 700 hospital admissions. The same factors led to up	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
			to 630 deaths and up to 830 hospital admissions in the second episode. Periods of elevated pollution over a widespread area, and lasting more than two days, can occur around 5 to 10 times a year dependent on seasonal weather conditions. During the construction, changes in air quality effects could arise from vehicles emissions, plant emissions and dust associated with the construction work. These would be temporary, and should the air quality assessment deem them significant, appropriate mitigation measures would be put in place to reduce their effect. During operation of the Project there is unlikely to be any effect on Air Quality as maintenance vehicles would be very few and there are no emissions associated with the operation of the project itself.	
Natural Hazards	Biological	Disease epidemics: - Viral - Bacterial - Parasitic - Fungal - Prion	There were four influenza pandemics in the 20th century. The most recent flu pandemic was the H1N1 strain (swine flu) pandemic in 2009 which caused at least 18,500 deaths worldwide. In 1918, another variant of the same H1N1 strain (Spanish flu) killed over 50 million people globally. Over the past 30 years, more than 30 new, or newly recognised, diseases have been identified. Most of these have been zoonoses – diseases that are naturally transmissible, directly or indirectly, from animals to humans. Examples of new infections that have emerged in the human population include COVID-19 (which has led to more than 150,000 deaths in the UK since the start of the pandemic), HIV and	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
			HCIDs, such as Ebola, SARS, Middle East Respiratory syndrome (MERS), and Zika virus. The construction and operation of the Project would not give rise to any disease epidemics. The development itself would be constructed following all necessary guidance and restrictions in place at the time of its construction relating to the control of COVID-19.	
Natural Hazards	Biological	Animal Diseases: - zoonotic: • avian influenza • West Nile virus • Rabies - non-zoonotic: • foot and mouth • swine fever	Both low and highly pathogenic avian influenza has been recorded in poultry in the UK several times in the last 10 years, although with no human cases reported. The most recent outbreaks of avian influenza occurred in November 2020 years, most recently in the winter of 2016/17, although with no human cases reported. Bats infected with Lyssavirus (rabies) have been found every year for the last seven years and there have been a number of cases of equine notifiable disease in the UK in 2019 and 2020. Classical swine fever has been recorded in the UK but African swine fever has not. Bluetongue was first recorded in the UK in 2007. It was eradicated in 2008 through vaccination but UK animals are vulnerable to new incursions. There was a devastating foot and mouth disease outbreak in 2001 which cost the UK around £8 billion, however, greatly improved response arrangements ensured that an outbreak in 2007 caused much less damage (£150 million).	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
			The Project would not be a source of any disease epidemics and spread would be controlled through containment of infected animals including prohibition of transportation. Strict biosecurity protocols would be put in place when working between livestock farms and these measures would form part of the draft CEMP.	
Natural Hazards	Biological	Plants	Standard control measures would be implemented by the appointed contractor during construction to handle and dispose of any diseased, invasive plants to prevent their spread. Measures, such as an invasive plant management plan would be a commitment within the draft CEMP.	N
Technological or Manmade Hazards	Societal	Extensive public demonstrations which could lead to violence and loss of life	In recent decades, serious widespread disorder in the UK has been rare. On 6 August 2011, a protest in Tottenham following the shooting of Mark Duggan by the police escalated into widespread public disorder. The G20 summits in 2009 and 2017 resulted in varying degrees of violent disorder, while the tuition fees protest in 2010 saw incidents of criminal damage and use of improvised missiles against police. The Project is located in a largely rural area of the UK, and despite the isolated cases listed above, the UK is considered to be a politically stable country. The Project is not considered particularly controversial and should not lead to high profile public demonstrations, widespread damage to societies and economies and is unlikely to require largescale multi-faceted humanitarian assistance.	N
Technological or Manmade Hazards	Societal	Widespread damage to societies and economies.		
Technological or Manmade Hazards	Societal	The need for largescale multi-faceted humanitarian assistance.		

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Technological or Manmade Hazards	Societal	The hindrance or prevention of humanitarian assistance by political and military constraints		
Technological or Manmade Hazards	Societal	Significant security risks for humanitarian relief workers in some areas.		
Technological or Manmade Hazards	Societal	Famine	The Project is located in a developed country that produces its own crops and imports food. It is politically stable and not subject to hyperinflation and therefore food is available, whether produced within the UK or imported. Famine is also not relevant to the use of the Project.	N
Technological or Manmade Hazards	Societal	Displaced population	The Project is located in a developed country which is politically stable. There will be no significant displacement of populations as part of the Project.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Major Accident Hazard Chemical sites	There are approximately 17 establishments within the Immingham Docks area, within proximity of Section A of the Scoping Boundary near the Pipeline Inlet Facility, which are covered by the Control of Major Accident Hazard (COMAH) Regulations 2015. The inter-relationship	Y

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
			with our Project and the potential for events to occur which could lead to potential incidents will be explored further and included within the ES.	
Technological or Manmade Hazards	Industrial and Urban Accidents	Major Accident Hazard Pipelines	There are Major Accident Hazard (MAH) pipelines within the Scoping Boundary. However, detailed information on these would not be sought until pipeline routing is more developed. Consultation would commence with the asset owners and crossing design would be such that physical damage does not occur. The inter-relationship with our Project and the potential for events to occur which could lead to potential incidents will be explored further and included within the ES.	Y
Technological or Manmade Hazards	Industrial and Urban Accidents	Nuclear	Nuclear sites are designed, built and operated so that the likelihood of releases of radiological material in the UK is extremely low. Historical accidents include Windscale (UK) in 1957. The Theddlethorpe Gas Terminal is being considered by the Radioactive Waste Management (RWM) authority as a site for the storage of nuclear waste. However, at this stage, no formal decision has been made and so we do not intend to include any further assessment on it.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Fuel storage	There are fuel storage sites within the Scoping Boundary. However, detailed information on these would not be sought until pipeline routing is more developed. Consultation would commence with the asset owners and the Project would be designed to ensure that physical damage does not occur.	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
Technological or Manmade Hazards	Industrial and Urban Accidents	Dam breaches	Dam breaches in the UK are rare. The last major breach was at the Cwm Eigiau dam in 1925, which caused 17 fatalities and widespread flooding. The Malpasset dam in southern France was breached on 2 December 1959, resulting in over 400 fatalities and widespread damage. English reservoirs are regulated under the Reservoirs Act (1975). A UK dam breach is highly unlikely. However, if a breach occurs, the emergency services will issue a warning and may decide that evacuation is necessary. The Environment Agency Flood Risk from Reservoirs map indicates that the pipeline crosses one area at risk of reservoir flooding. This is associated with the Covenham Reservoir. However, as the pipeline would be located below ground it is unlikely to be affected by flooding as a result of a dam breach.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Mines and storage caverns	The Project is not within a Coal Mining Reporting Area.	N
Technological or Manmade Hazards	Industrial and Urban Accidents	Fires	Fires could be initiated by construction related activities however standard control measures would be implemented by the appointed contractor to manage the risk of fire and these would be included in the draft CEMP.	N
Technological or Manmade Hazards	Transport accidents	Road	Transport accidents occur across the UK on a daily basis. The Project would include approximately 40 road crossing, including one trunk road crossings at the A180. Further 'A' road crossing would be	N

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			required as the A1173, A1173, A18 (in two places), A46, A16 and the A1031. 'B' road network crossing would include the B1210, B1203 and B1200. The remaining 29 crossings would take place at unclassified roads. During construction there will be an increase in heavy construction plant and equipment on the local road network which would form the entry and exit points for construction traffic and therefore may increase the risk of road traffic accidents. Careful consideration of the micro-siting of these temporary access points will be a key feature in terms of reducing the risk of adverse effects, with access points needing to incorporate appropriate visibility splays, turning radii and speed limit reductions where necessary/appropriate. Outside of those design measures, the main mitigation for traffic and transport effects would be described within a draft CEMP which would be submitted with the ES. The operation of the Project would not result in increased traffic flow or changes to traffic composition which could have an adverse impact on highway safety. It is considered that there would not be a significant risk to underground pipeline integrity as a result of a road traffic accident as the pipeline will be buried and constructed to good engineering practice. The block valves would be located away from trunk/'A' roads and would be within a fenced compound and therefore are unlikely to be impacted during a road traffic accident.	

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Technological or Manmade Hazards	Transport accidents	Rail	The Project may require crossing of the rail network including the Barton Railway Line and the Lincolnshire Wolds Heritage Railway Line. Trenchless crossing techniques are likely to be employed during the construction phase so as not to impact ongoing use of the railway. There will be close liaison and agreement with the railway operator before works commence near and under the railway. The Project includes a buried pipeline which would pass underneath embankments. There is the potential for railways to subside over time and the vibration from trains passing over at high speed could pose risks to the pipeline, however these are taken into consideration during the design. There is unlikely to be a significant risk to the integrity of the pipeline as a result of a rail accident as it would also be considered during design. The AGI's would be located within a fenced compound a significant distance away from the railway line and are unlikely to be impacted during a rail accident.	N
Technological or Manmade Hazards	Transport accidents	Waterways	The Project would require crossing the Louth Canal as well as numerous other waterways crossings. Trenchless crossing techniques would be used to install the pipeline so as not to impact ongoing use of the canal. There will be close liaison and agreement with the canal operator before works commence near and under the canal. The exact nature of other crossings is yet to be determined and this on this basis waterways will initially be screen in for further assessment in the ES	Y

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Technological or Manmade Hazards	Transport accidents	Aviation	There have been no major air accidents in the UK since the Kegworth incident in 1989. There are no airports or airfields within the Scoping Boundary. The nearest airport is Humberside International Airport which is approximately 7.5km west of Section A of the Scoping Boundary at its nearest point. As the Project includes a buried pipeline it would be protected from any above ground aviation incidents and is unlikely to cause an aviation incident. There would be no AGI's sited within close proximity of this airport.	N
Technological or Manmade Hazards	Pollution accidents	Air	Construction activities may cause an increase in the exposure to dust and emissions from vehicles and construction plant. This would be temporary in nature and emissions associated with construction plant and vehicles are managed under specific air quality legislation. Effects of the Project on Air Quality will be considered as part of the EIA. If there was a significant loss of containment event involving the pipeline it would result in a large-scale release of CO_2 to the environment, which could potentially cause a significant adverse impact on local air quality and human health. CO_2 is not currently defined as a dangerous substance under the Control of Major Accident Hazards Regulations 1999 (COMAH) or as a dangerous fluid under the Pipelines Safety Regulations 1996, thus there is no requirement to produce a formal Safety Case Report.	Y

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			However, safety is of paramount importance to the applicant and further work will be undertaken relating to the safety of the project. In addition, detailed standards and codes of practice written specifically for the design and operation of dense phase or supercritical CO_2 plant and pipelines are currently being developed.	
Technological or Manmade Hazards	Pollution accidents	Land	During the construction phase there may be an increase in the risk of leaks and spillages of hazardous materials associated with the construction activities. This risk would be controlled through standard control measures which would form commitments within the draft CEMP.	N
Technological or Manmade Hazards	Pollution accidents	Water	The superficial underlying aquifers comprise Tidal Flat Deposits, Glacial Till, Glaciofluvial Deposits, Alluvium and Lacustrine Deposits. The bedrock aquifers comprise Welton Chalk Formation and Burnham Chalk Formation. The Groundwater Source Protection Zone mapping (DEFRA, 2020) shows that the Scoping Boundary contains various Source Protection Zones. These are a mixture of Zone I Inner Protection Zone and Zone II Outer Protection Zone. During construction there is a risk of contaminating groundwater, however mitigation measures would be incorporated into the draft CEMP. During operation of the Project, it is unlikely to have significant effects on groundwater.	N

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Technological or Manmade Hazards	Utilities failures	Electricity	Above-ground electrical transmission lines are present within the Scoping Boundary which are National Grid owned and transmitted 400kv. During construction, any work required near electric overhead power lines would be adequately controlled and consulted on with the operator, and appropriate site-specific risk assessments completed which would consider such aspects as: - The voltage and height; - Size and reach of any machinery or equipment; - Safe clearance distances required; - Site conditions such as undulating terrain; and - Competence, supervision, training and briefing to staff.	N
Technological or Manmade Hazards	Utilities failures	Gas	Underground gas transmission pipelines are present in the Scoping Boundary. Detailed information on these would be sought once pipeline routing is more developed, and consequently this has been scoped in for further assessment. Consultation would commence with the asset owners and crossing design would be such that physical damage does not occur.	Y
Technological or Manmade Hazards	Utilities failures	Water Supply	During the construction phase, the Project would require water for welfare use and during hydrostatic testing and would be relatively low. Should water supply fall below the required need volumes, supplies would be tinkered in.	N

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			Anglian water mains and supply are present in the Scoping Boundary. However, detailed information on these would not be sought until pipeline routing is more developed. Consultation would commence with the asset owners and crossing design would be such that physical damage does not occur.	
Technological or Manmade Hazards	Utilities failures	Sewage system	No use of the sewage system is associated with the Project. During the construction phase, temporary portable systems will be in place covered by H&S welfare requirements.	N
Technological or Manmade Hazards	Malicious Attacks	Unexploded Ordnance	Part of the Scoping Boundary contains a UXO moderate risk area. Measures would be undertaken during the construction phase to raise awareness of this issue to construction site staff and operatives, and to define the appropriate response strategies should any be discovered during the works. Further assessment of UXO would be included within the ES and how they can link to major incidents.	Y
Technological or Manmade Hazards	Malicious Attacks	Chemical Biological Radiological Nuclear	Historical attacks have been within closed densely occupied structures (underground, buildings) or targeted at specific individuals. The Project is unlikely to be a target for such an event.	N
Technological or Manmade Hazards	Malicious Attacks	Transport systems	The main transportation methods used in the construction phase of the Project would include road, for staff transit and material delivery / waste removal. The Project is unlikely to be a target for this type of event due to the low number of exposed targets.	N

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Technological or Manmade Hazards	Malicious Attacks	Crowded places	The routing of the pipeline associated with the Project and the siting of the AGI's would specifically seek to avoid crowded or highly populated areas in a bid to reduce construction impacts. The Project is also unlikely to be a target for this type of event due to the low number of exposed targets.	N
Technological or Manmade Hazards	Engineering accidents and failures	Cyber	According to the National Risk Register 2020, cyber-attacks occur almost constantly on key national and commercial electronic information, control systems and digital industries. The reliance on telemetry for remote monitoring and to allow the remote operation of valves could render the Project more vulnerable to a cyber-attack. The Applicant is accountable to the Secretary of State (SoS) for Business, Energy and Industrial Strategy for ensuring the resilience of their strategic power generator stations and network to national security risks, including from terrorism, cyber-attack, natural hazards and other risks. Consequently this will be assessed further within the ES.	Y
Technological or Manmade Hazards	Engineering accidents and failures	Infrastructure	The Project will be developed following the most up to date regulations and standards in place at the time of its development. These requirements have been developed to reduce the risk of accidents of failures of pipeline projects and draw upon experiences from around the world. Although no infrastructure related accidents are anticipated, this will be investigated further within the ES.	Y
Technological or Manmade Hazards	Engineering accidents and failures	Bridge failure	Bridge works are not proposed as part of the Project.	N

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Technological or Manmade Hazards	Engineering accidents and failures	Flood defence failure	There are watercourses within the Scoping Boundary that benefit from flood defences. The design of the Project will be developed to include allowances for future climate change predicted effects on flooding. The potential risk of breech events will be considered in the EIA, specifically the Flood Risk Assessment which would accompany the ES. This will be explored as part of the FRA to see if there could be any major incidents which would need to be considered within the MADS assessment.	Y
Technological or Manmade Hazards	Engineering accidents and failures	Mast and tower collapse	There are electric overhead line power lines and pylons within the Scoping Boundary. During construction, any work required near electric overhead power lines would be adequately controlled and consulted on with the operator, and appropriate site-specific risk assessments completed which would consider such aspects as: - The voltage and height; - Size and reach of any machinery or equipment; - Safe clearance distances required; - Site conditions such as undulating terrain; and - Competence, supervision, training and briefing to staff.	N
Technological or Manmade Hazards	Engineering accidents and failures	Property or bridge	The Project does not involve demolition works in order for it to be constructed.	N

Major Event Group	Major Event Category	Major Event Type	Basis of Decision to Scope In/Out	Scope In?
		demolition accidents		
Technological or Manmade Hazards	Engineering accidents and failures	Tunnel failure/fire	There are no tunnel structures proposed as part of the Project or within the Study Area.	N