

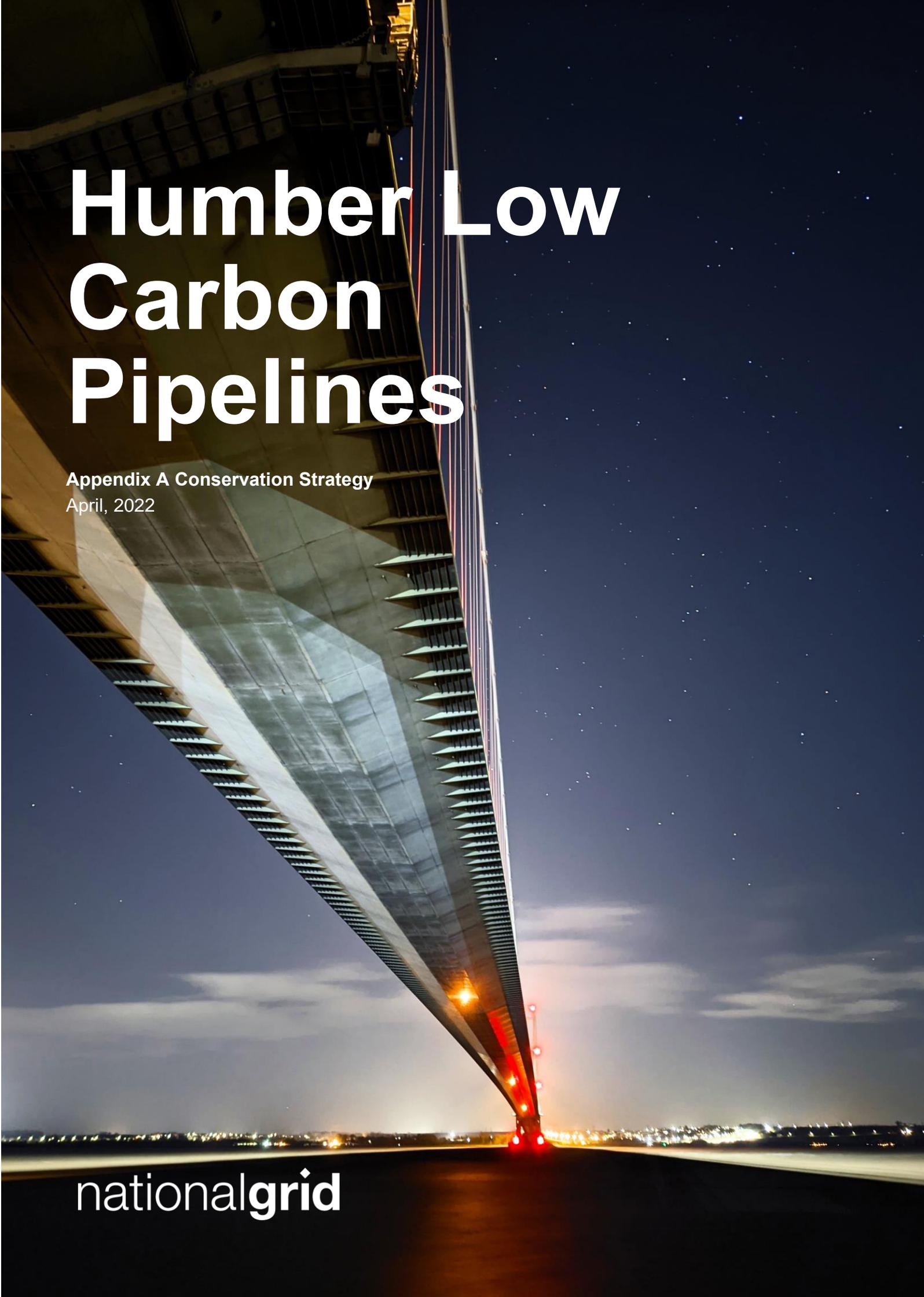
# Humber Low Carbon Pipelines

Volume III Appendices  
April, 2022

nationalgrid

# Volume III Appendices

Appendix	Title
A	Conservation Strategy
B	Statutory Designated Sites within the Zol
C	Non-statutory designated sites within the Zol
D	Ancient Woodland within the Zol
E	Scoping Assessment of Major Accidents and Disasters
F	Draft register of commitments
G	Hydrology and Land Drainage Assessment Criteria



# Humber Low Carbon Pipelines

Appendix A Conservation Strategy  
April, 2022

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## Document Properties

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<b>Title</b>	EIA Scoping Report Volume III, Appendix A: Humber Low Carbon Pipelines - Conservation Strategy

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## Version History

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April 2022	1	Final	For submission to PINs

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# FOREWORD

The Humber Low Carbon Pipelines (HLCP) project (the 'Project') is being developed by National Grid Carbon Limited ('the Applicant'). It comprises the construction of dual pipelines to transport carbon dioxide (to facilitate carbon capture, utilisation and storage) and hydrogen between Drax in North Yorkshire to a landfall point on the Holderness coast in East Riding of Yorkshire together with associated above ground installations (AGIs).

This Conservation Strategy is a live document which may be subject to change as the Project develops, a greater understanding of the range of ecological features (habitats, species and ecosystems, including ecosystem function and processes) associated with the Project is achieved through survey and assessment, and through consultation with stakeholders and strategic partners.

The aims of this Conservation Strategy are to:

- Set out the Applicant's approach to net gain (in terms of biodiversity and natural capital) as part of the Project and maximise opportunities for biodiversity enhancement delivered by the Project.
- Identify habitats and species across the Scoping Route Corridor that are of national, regional and local importance and outline a plan of action for their protection, management and enhancement in adherence to the mitigation hierarchy (i.e. firstly seeking to avoid effects etc.).
- Demonstrate how the Applicant will measure its commitments to nature conservation throughout construction and aftercare by providing a framework for maintenance and monitoring.

The Conservation Strategy is separated into three separate Parts as follows:

## **Part A – Biodiversity Enhancement Strategy**

The Applicant is committed to the delivery of Biodiversity Net Gain (BNG; calculated using Defra Biodiversity Metric) and the enhancement of Natural Capital Value. The Biodiversity Enhancement Strategy includes BNG calculations but also seeks to deliver biodiversity improvements beyond this mandatory commitment with focus on habitat and species-specific habitat enhancement and complementary habitat creation.

## **Part B – Ecology Surveys: Scope and Methodology**

This part sets out the proposed scope and methodology for undertaking ecological surveys of fauna and flora associated with the Project, providing a standard for methodologies to ensure a consistent approach in baseline ecological field surveys, facilitate a robust but proportionate Ecological Impact Assessment (EclA), and inform the Biodiversity Enhancement Strategy.

## **Part C – Biodiversity Enhancement and Management Plan**

The part details the mechanism to secure the protection, enhancement and provision of proposed biodiversity improvements, including maintenance and monitoring commitments. The Biodiversity Enhancement and Management Plan (BEMP) will include a Land Reinstatement Plan, which will record key changes to the habitats, biodiversity and key features impacted by delivery of the Project. A draft BEMP will be produced in support of an application for

development consent to the Planning Inspectorate; however, the final BEMP will be developed post development consent and in advance of construction. A Construction Environmental Management Plan (CEMP) will be developed as part of the Project and although the BEMP may include some overlap of information, the CEMP will focus on mitigation of impacts from and during construction.

# GLOSSARY

Term	Definition
Above Ground Installation (AGI)	Infrastructure sited above ground at or near emitter locations allowing safe and efficient operation and maintenance of the pipelines and/or for regional emitters to connect into the pipelines.
Baseline	The conditions that would pertain in the absence of the Project at the time that the Project would be constructed.
Biodiversity	The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.
Biodiversity Enhancement Management Plan (BEMP)	A document detailing the mechanism to secure the protection, enhancement and provision of proposed biodiversity improvements, including maintenance and monitoring commitments.
Biodiversity Enhancement Strategy (BES)	A document identifying strategic opportunities and targets to improve habitat quality, connectivity and ecosystem services, including the delivery of Net Gain.
Biodiversity Net Gain (BNG)	An approach to development and/or land management that aims to leave the natural environment in a measurably better state than it was beforehand.
BirdTrack	An online portal for individuals to store and manage observations of birds in the countryside.
Carrying capacity	The maximum number of organisms or amount of biomass that can be supported in a given area or by an ecosystem.
Compensation	Measures taken to offset the loss of, or permanent damage to, ecological features despite mitigation. Compensation addresses negative effects which are residual, after avoidance and mitigation have been considered. Depending on circumstances, compensation measures may be located within or outside of the Scoping Route Corridor.
Connectivity	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.
Conservation status	The state of a species or habitat including for example, extent, abundance, distribution and their trends.
Construction Environmental Management Plan (CEMP)	A document detailing how the Project will mitigate potential construction impacts on the environment.

Derogation licence	A legally binding permit for activities that would otherwise be permitted under the Conservation of Habitats and Species Regulations 2010 (as amended)
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIPs)
Discretionary Advice Service (DAS)	An advisory service offered by Natural England for complex development proposals that affect the environment. The DAS offers tailored advice aiming to reduce potential risk, delay and added cost.
Ecological feature	Habitats, species or ecosystems.
Ecological Impact Assessment (EclA)	The process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
Ecosystem services	The benefits provided by ecosystems that contribute to making human life possible and valuable. They include products or “goods” for example food, water and timber, and non-material benefits or “services” for example recreation and tourism
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the ecological feature in accordance with defined significance criteria.
EIA Directive	European Union Directive 2011/92/EU of 13 December 2011 (as amended in 2014 by Directive 2014/52/EU).
EIA regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Enhancement	Improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is ‘over and above’ that required to mitigate/compensate for an impact.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES)

Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
European Protected Species (EPS)	Plant or animal species receiving full protection under the Conservation of Habitats and Species Regulations 2010 (as amended).
Extended Phase 1 habitat survey	A standardised system for classifying and mapping habitats.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together
Habitats Regulations Assessment (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European sites, required under the Habitats Directive and Regulations. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI) and compensatory measures.
Impact	Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.
Impact Risk Zone (IRZ)	A GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.
Important Ecological Feature (IEFs)	Ecological features requiring specific assessment within EcIA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity)
Key Reptile Site	Sites meeting specified criteria characterising the importance of the reptile population/s present.
Keystone habitat	Habitat of high intrinsic ecological value and of principal importance for the conservation of biodiversity. Keystone habitats are central to the framework of the Conservation Strategy.
Macro-invertebrate	Invertebrate species large enough to see without a microscope and often with at least one aquatic life-stage.
Marine Conservation Zone (MCZ)	Offshore and coastal marine protected areas designated under the Marine and Coastal Access Act , 2009.
Mean Low Water Springs (MLWS)	Averaged lowest spring tidal level. Designates the boundary between the jurisdiction of the onshore and offshore projects.
Mitigation	Measures designed to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms.

Nationally Significant Infrastructure Project (NSIP)	Major developments relating to, for example, energy, transport, water or waste, as defined in the Planning Act 2008.
Natural Capital Value (NCV)	The value of that part of nature which directly or indirectly underpins benefits to people, including ecosystems, species, freshwater, soils, minerals, the air and oceans, as well as natural processes and functions.
Net Gain	Measures which are over and above those implemented to reduce the effects arising from development activities.
Non-native invasive species (NNIS)	Species which have been introduced into areas outside their natural range through human actions and are posing a threat to native wildlife
Orthophoto	A large, map-quality image with high detail and resolution made by combining many smaller images called orthophotos. These orthophotos are aerial photographs that have been corrected for lens distortion, camera tilt, perspective, and topographic relief.
Patch quality	An approach to ecological management focusing on the quality of discrete habitat patches which contributes to the maintenance of the structure, function and dynamics of the wider ecosystem.
Preliminary Ecological Appraisal (PEA)	<p>A rapid assessment of the ecological features present, or potentially present, within a site and its surrounding area in relation to a specific project (usually a proposed development). A PEA normally comprises a desk study and a walkover survey.</p> <p>The key objectives of a PEA are to identify the likely ecological constraints associated with a project, identify any mitigation measures likely to be required, following the 'Mitigation Hierarchy', identify any additional surveys that may be required to inform an EclA and identify the opportunities offered by a project to deliver ecological enhancement.</p>
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.
Priority Habitat	Habitats listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. In England, there are 55 Priority habitats, recognised as being of 'principal importance' for the conservation of biological diversity.
Ramsar site	A wetland site of international importance designated under the criteria of the Ramsar Convention on Wetlands for containing representative, rare or unique wetland types of for their importance in conserving biological diversity.
Refugia	Artificial objects, primarily of corrugated metal or roofing felt, used in reptile surveys to increase the likelihood of discovering reptiles because they absorb and trap heat

	offering reptiles an excellent means to gain warmth, while also providing protection from predation and disturbance
Significant Effect	An effect that either supports or undermines biodiversity conservation objectives for IEFs.
Special Area of Conservation (SAC)	Land designated under the Conservation of Habitats and of Species Regulations 2017 (as amended)
Special Protection Area (SPA)	Protected areas for birds in the UK designated under the Conservation of Habitats and Species Regulations 2017 (as amended)
Study area	Extent to which a particular survey or study applies. The study area is variable depending on which ecological feature is being studied.
Umbrella species	Species selected for making conservation-related decisions, usually because protecting these species indirectly protects and benefits the many other species that comprise the ecological community of its habitat (the umbrella effect)
Zone of Influence (Zoi)	The area over which ecological features may be affected by biophysical changes as a result of a proposed project and associated activities. The Zoi will vary for different ecological features depending on their sensitivity to an environmental change.

# ACRONYMS

Acronym	Definition
AGI	Above Ground Installation
BEMP	Biodiversity Enhancement Management Plan
BES	Biodiversity Enhancement Strategy
BNG	Biodiversity Net Gain
BTO	British Trust for Ornithology
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
DAS	Discretionary Advice Service
DCO	Development Consent Order
EclA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
GCN	Great Crested Newt
HRA	Habitats Regulations Assessment
IEFs	Important Ecological Features
IRZ	Impact Risk Zone
JNCC	Joint Nature Conservation Committee
LERC	Lincolnshire Environmental Records Centre
MAGIC	Multi-agency geographic information for the countryside
NCV	Natural Capital Value
NEYEDC	North East Yorkshire Ecological Data Centre
NNIS	Non-native invasive species
NSIP	Nationally Significant Infrastructure Project
NVC	National Vegetation Classification
PEA	Preliminary Ecological Appraisal
SAC	Special Area of Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
WeBS	Wetland Bird Survey
ZOI	Zone of Influence

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# **PART A – BIODIVERSITY ENHANCEMENT STRATEGY**

# 1. INTRODUCTION

## 1.1 Background

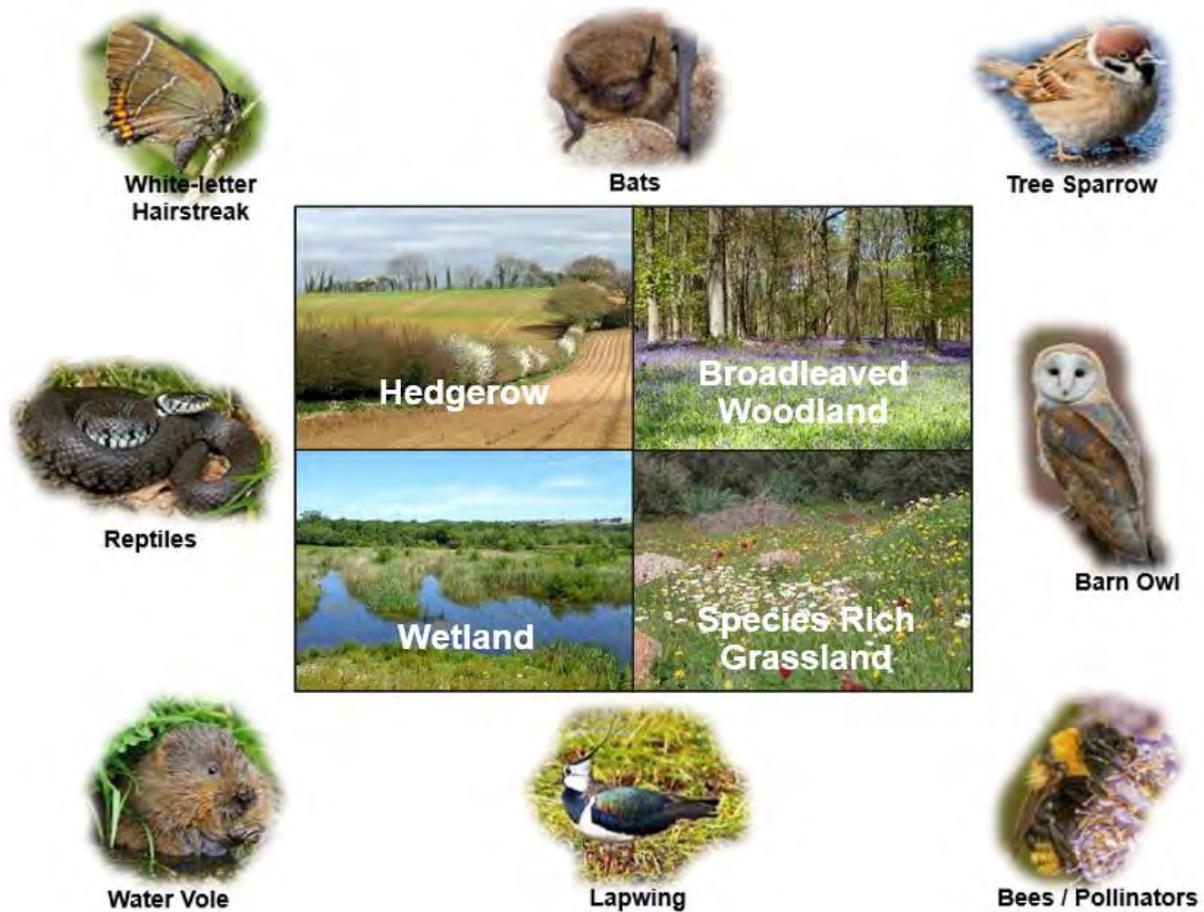
- 1.1.1 There are obligations on statutory undertakers and competent authorities with respect to Biodiversity Net Gain (BNG) and other habitat improvement drivers. The Applicant is committed to adopting a sustainable approach to development by pro-actively taking measures to ensure that the Humber Low Carbon Pipeline project (hereafter, ‘the Project’) leaves the environment in a better condition than it was before development, i.e. Net Gain.
- 1.1.2 Net Gain measures are those which are over and above the measures which have been implemented to reduce the effects arising from development activities. There are two tools used to assess Net Gain: the Defra Biodiversity Metric calculates biodiversity units; and the Natural Capital Tool calculates the value of ecosystem services. This Project will use both these tools to create a baseline and quantify environmental impacts before and after the proposed works, informing landscaping and enhancement actions required to achieve a Net Gain in environmental value.

## 1.2 Overview of approach

- 1.2.1 This Biodiversity Enhancement Strategy (BES) has been designed with consideration of the targets set out in the Environment Act (2021) which include halting decline in species abundance by 2030, ensuring that public authorities (such as NGV) consider what action they can take to “further the general biodiversity objective” i.e. conserve and enhance biodiversity, and to deliver biodiversity gain of at least 10%.
- 1.2.2 The above targets are not expected to be mandated in UK legislation until winter 2023. However, the Applicant is mindful of the opportunities the Project offers to improve biodiversity and the wider environment and is committed to ensure the Project delivers a net gain in biodiversity and that this is appropriately maintained post-construction. NGV is also seeking to deliver biodiversity improvements beyond this with focus on strategic habitat and species-specific habitat enhancement and complementary habitat creation.
- 1.2.3 The BES aims to identify and implement strategic opportunities to improve patch quality and habitat connectivity in line with [Making Space for Nature](#) (i.e. more, bigger, better and joined up), aligning with national nature recovery objectives and projects including: [Biodiversity 2020: A strategy for England’s wildlife and ecosystem services](#) (and the [2021 assessment](#)); the [UK Nature Recovery Network](#); the [National Pollinator Strategy](#), [Buglife’s B-lines project](#); and the [creation of a Northern Forest](#)).
- 1.2.4 Underpinning the BES are four ‘keystone’ habitats of conservation interest and an associated conservation target for the creation and/or enhancement of habitat; see Figure 1. In addition to these, eight species of conservation concern (also see Figure 1) have been chosen because they occur within one or more of the keystone habitats and because:
- The Project provides an opportunity to strategically enhance an extensive area of habitat associated with that species or species group (in line with national, region and/or local action plans), and,

- Conservation efforts for these species indirectly protect many other species that make up the ecological community of their habitat (i.e. they are good umbrella species for improving biodiversity).

**Figure.1-1 – Keystone habitats, associated actions and umbrella species included within the Biodiversity Enhancement Strategy**



- 1.2.5 The creation and enhancement of the keystone habitats will focus on the specific habitat requirements of associated umbrella species/species groups. However, each species and species group also have a series of conservation targets which are set out in Table 1 and will be developed further as a greater understanding of the local environment is achieved through survey and assessment.
- 1.2.6 The Applicant is committed to implementing improvements to wider ecosystem services through collaborative working both internally and with external stakeholders and utilising habitat data to inform decisions on improvement of Natural Capital Value. The latter will be demonstrated by the Natural Capital Tool.
- 1.2.7 Stakeholder engagement will be critical to the success of the overall Conservation Strategy; the Strategy will be developed in collaboration with a range of external stakeholders and strategic partners with the aim of driving tangible and sustainable environmental improvements.

**Table 1-1 Conservation status and proposed targets for umbrella species included within the Biodiversity Enhancement Strategy**

<p><b>White-letter Hairstreak</b></p>	<p>The white-letter hairstreak (<i>Satyrrium w-album</i>) is small and elusive butterfly that is intimately associated with elm trees. Wych Elm (<i>Ulmus glabra</i>) is preferred but English Elm (<i>U. procera</i>) and Small-leaved elm (<i>U. minor</i>) are used. The butterfly breeds where elms occur in sheltered hedgerows, mixed scrub, edges of woodland rides and large isolated elms. The devastation of the elm population by Dutch Elm disease in the 1970s has led to concern for this species.</p> <p>The conservation targets for this species seek to identify and safeguard existing elms within the Scoping Route Corridor and extensively improve opportunities for this species through widespread planting of elms (with a particular focus on Wych Elm) within all hedgerows created or enhanced by the Project.</p>
<p><b>Bats</b></p>	<p>UK bat populations have declined considerably in the last century due to roost loss, habitat fragmentation and reduction in prey availability. East Riding of Yorkshire and Lincolnshire are among the least wooded counties in England (2.6% and 4% respectively) and patchy distribution of only 6 species of bat were identified within them from biological record data.</p> <p>The conservation targets for this species group seek to improve the quality of hedgerows and plant broadleaved woodland for future use as a foraging and roosting resource. In addition to this, the Project proposes the creation of suitable artificial roosting sites through the installation of bat boxes and creating hollows and cracks in existing trees.</p>
<p><b>Tree Sparrow</b></p>	<p>The UK population of tree sparrow (<i>Passer montanus</i>) declined by 95 per cent between 1970 and 1998. This is thought to have been driven by a reduction in seed and insect food source availability within farmland habitats and a lack of suitable nest sites.</p> <p>The conservation targets for this species seek to improve insect food resource and suitable nest sites in strategic locations where seeds are already available within the landscape (such as areas that practice rotational set-aside, winter stubbles, root crops, etc.). Insect food resource will be improved through hedgerow enhancement and woodland planting which will also include the creation of a variety of habitat piles (created using arisings from construction vegetation clearance) with a focus of saprophytic species. Tree sparrows are gregarious, and it is proposed that closely associated groups of tree sparrow nest boxes are placed across the Scoping Route Corridor.</p>
<p><b>Barn Owl</b></p>	<p>Barn owl (<i>Tyto alba</i>) are widely distributed across the UK and although the species has suffered declines through the 20th century, numbers do appear to be steadily increasing in recent years.</p> <p>The conservation targets for this species seek to improve the quality of foraging habitat / availability of prey through the conservation targets of all of the keystone habitats. In addition to this, the Project will commit to the creation of suitable artificial roosting and nesting sites through the installation of nest boxes on trees or buildings.</p>
<p><b>Bee's / Pollinators</b></p>	<p>Establishing ecological networks to support the recovery of nature is a priority for UK government and also aligns with Buglife's B-Lines, which are a series of 'insect pathways' along which they are promoting the restoration and creation of a series of wildflower-rich habitat stepping stones. The B-Lines link existing wildlife areas together, creating a network that will weave across the British landscape with the aim of creating and restoring at least 150,000 hectares of flower-rich habitat across the UK.</p> <p>The conservation targets for Bee's / Pollinators seek to improve the quality and availability of ecological networks through the conservation targets of all of the keystone habitats. This will be achieved by:</p> <ul style="list-style-type: none"> <li>• Ensuring that replacement planting comprises entirely native species with the emphasis on species that provide nectar, fruit or seeds to maximise foraging opportunities for a range of species (including but not limited to pollinators).</li> <li>• Introducing the semi-parasitic Yellow Rattle (<i>Rhinanthus minor</i>) into ungrazed areas (such as fenced off field margins, access road verges, hedgerow bases, etc.) to</li> </ul>

	<p>reduce the quantity of grass growth and create space for other wild flowers to grow, directly increasing diversity.</p> <ul style="list-style-type: none"> <li>• Seeking opportunities to introduce areas of bare ground (through raking, scarification or scalping with machinery) throughout the Project to create a mosaic that will be beneficial for wildlife, especially invertebrates.</li> <li>• Arisings from construction vegetation clearance will be used to create a variety of habitat piles in a range of shaded and unshaded places. This will include bug hotels, buried deadwood beetle boxes, refuge piles and compost heaps. In addition to these, 100 bee hotels will be installed across the Project within suitable hedgerows, woodlands and patches of scrub.</li> <li>• The Scoping Route Corridor includes approximately 24 km of B-Lines and any suitable habitat creation/enhancement within a B-Line will be registered on Buglife's map to contribute towards this national pollinator recovery network.</li> </ul>
Lapwing	<p>The UK population of the lapwing (<i>Vanellus vanellus</i>) fell by at least 40% between 1970 and 1998 and the species is a UK priority and red listed species of conservation concern.</p> <p>The conservation targets for this species seek to identify lapwing distribution through survey and improve habitat quality and extent through the strategic creation/enhancement of wetland and species rich grassland keystone habitats. Habitat creation will also avoid planting new trees or hedgerows in areas used by nesting lapwings.</p> <p>Scrapes are shallow depressions with gently sloping edges, which seasonally hold water. They create obvious in-field wet features that provide important feeding areas for breeding wading birds such as lapwings. The proposed wetland commitment will include the creation of strategically located scrapes for lapwing.</p>
Water Vole	<p>The UK water vole (<i>Arvicola amphibius</i>) population has declined by 96% since 1950, which is largely thought to be due to predation by invasive non-native American mink (<i>Neovison vison</i>). This species is a UKBAP priority and also forms part of the local biodiversity action plans for Selby, East Riding and Lincolnshire.</p> <p>The conservation targets for this species seek to identify and increase water vole distribution through survey and the improvement of habitat quality and extent through the strategic creation/enhancement of wetland that is suitable for species. In addition to this the Project will fund a widescale mink control programme.</p>
Reptiles	<p>All UK reptiles have seen declines in their numbers and habitats, and based on available biological records, only three species (grass snake <i>Natrix helvetica</i>, adder <i>Vipera berus</i> and common lizard <i>Zootoca vivipara</i>) with vary patchy distribution are thought to be present within the Project.</p> <p>The conservation targets for this species group will include the widespread enhancement of habitats by implementing a variety of habitat piles across the Project which will include a mixture of grass snake egg-laying heaps, hibernacula (that include completely and partially buried logs), buried deadwood beetle boxes, refuge piles, compost heaps and deadwood/brush piles. It is envisaged that patch quality for this species group will also be improved by the creation/enhancement of hedgerow and species rich grassland habitat and ensuring that some of the proposed wetland creation (in areas of strategic importance) specifically includes habitat requirements for grass snake. Additional, species-specific targets may be identified following field survey.</p>

## 2. KEYSTONE HABITATS

The following section is to be developed following agreement with stakeholders and will include a section on each of the Keystone habitats that provides the conservation status and justification for inclusion within the Conservation Strategy, and an action plan for the delivery of the associated conservation target.

### **3. UMBRELLA SPECIES**

**The following section is to be developed following agreement with stakeholders and will include a section on each of the umbrella species that provides the conservation status, an action plan for the delivery of the associated conservation targets and how these targets will also benefit other species. This section will also include a summary of the commitments and the proposed schedule for their delivery.**

# **PART B – ECOLOGY SURVEYS: SCOPE AND METHODOLOGY**

# 1. INTRODUCTION

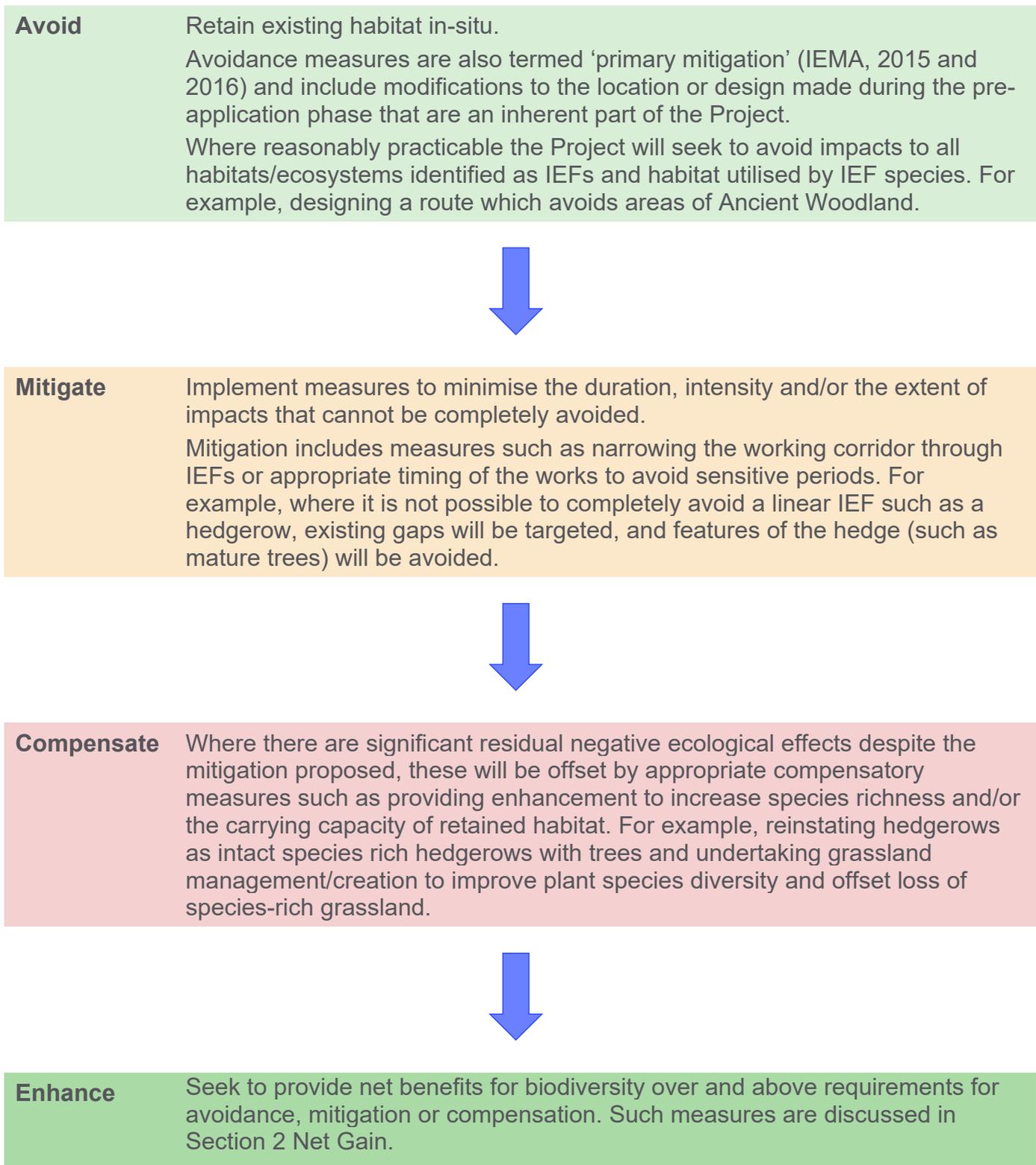
## 1.1 Background

- 1.1.1 The Humber Low Carbon Pipelines (HLCP) project ('the Project', is defined as a Nationally Significant Infrastructure Project (NSIP) as set out in the Planning Act 2008, Section 14 (1)(g) and Section 21. As such, to construct and operate the Project, a Development Consent Order (DCO) application will be made.
- 1.1.2 A suite of environmental studies will be required to support the DCO application, and this document details the framework for undertaking ecological survey and assessment for the range of ecological features (habitats, species and ecosystems, including ecosystem function and processes) associated with the Project. It provides a standard for methodologies and sets out the proposed survey programme.
- 1.1.3 The survey methodology and programme aims to be robust and proportionate. It will facilitate Ecological Impact Assessment (EclA), and the production of a Construction Environmental Management Plan (CEMP), Biodiversity Enhancement Strategy (BES; see Part A, above) and Biodiversity Enhancement and Management Plan (BEMP; see Part C, below).
- 1.1.4 The Project will encourage a symbiotic relationship between design and survey/assessment, whereby survey/assessment information will influence design (in line with the mitigation hierarchy) and effective design will avoid impacts, driving proportionate survey and reporting. Further, except for the Above Ground Installation (AGI) areas, all habitats affected during construction will be reinstated; thus, the vast majority of impacts would be temporary. For habitats identified as important ecological features (IEFs), reinstatement will be to a condition of ecological value equal to or above the baseline. It is proposed that this approach will remove the need for some ecological survey/assessment, or delay the need for this information until pre-construction (i.e. post DCO consent), allowing adherence to legislative and welfare requirements whilst ensuring that there is sufficient time to apply for any licences required and undertake mitigation.
- 1.1.5 IEFs are habitats, species and ecosystems that may be affected, with reference to a geographical context in which they are considered important. They can be important for a variety of reasons and require specific assessment within EclA (CIEEM, 2019). It is proposed that only ecological features considered to be of local importance for biodiversity or greater, and which could be affected by the Project, will be identified as IEFs. Effects on features of lower than local importance (site importance) for biodiversity will not be assessed within the biodiversity chapter of the ES; however, mitigation will be provided for such species that warrant it to ensure adherence to legislative requirements. This document sets out the IEFs of relevance to this Project; however, it is intended to be a 'live' document that is updated (as necessary) throughout Project evolution as a greater understanding of IEFs associated with the Project is achieved through survey/assessment and consultation with stakeholders and strategic partners.

## 1.2 Overview of approach

- 1.2.1 The need for ecological survey and assessment is primarily driven by EclA – a process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on habitats, species and ecosystems (CIEEM, 2019).
- 1.2.2 Application of the principles outlined in this document to the detailed design of ecological mitigation and compensation aims to ensure that adverse effects identified during EclA are addressed.
- 1.2.3 To ensure that all likely significant effects of the Project will be identified, where baseline information is incomplete a precautionary approach of assuming a 'reasonable worst-case' valuation is to be adopted. This approach will assign precautionary values to both known and potential IEFs based on the currently available information.
- 1.2.4 As part of the DCO, EclA will be applied during the production of the ecological component of the ES and for Habitats Regulations Assessment (HRA). Ecological survey and assessment will also be required pre-, during- and post-construction to:
- Ensure that the Project accords with DCO requirements, relevant planning policy and legislation;
  - Inform derogation licences; and
  - Demonstrate success of the BES and BEMP.
- 1.2.5 The survey and assessment programme is set out in Section 15. Following CIEEM (2019), the programme has been developed to be streamlined and proportionate, yet robust enough to support the consent application, thus minimising the collection of irrelevant/abortive information and the need for repeat surveys. Nevertheless, in the first instance, survey/assessment will be presumed to be required where:
- An IEF is confirmed, or it is thought there is a reasonable likelihood that an IEF may be present; and
  - Significant effects on the ecological integrity or conservation status of an IEF may arise from the construction or operation of the Project.
- 1.2.6 A full range of ecological features have been (and will continue to be) considered during the production of this document and several were discounted on the grounds that there was no likelihood of their occurrence on site (for example, due to geographical absence or an absence of suitable habitat) (see Section 14). Thus, only those considered relevant to the Project are identified below.
- 1.2.7 This Conservation Strategy seeks to ensure Project impacts will not result in significant adverse effects on the conservation status of IEFs and biodiversity in general. The Scoping Route Corridor is extensive and in the early stages of its evolution; it will be refined significantly as the route of the dual pipelines and locations of AGIs are finalised. With regards to IEFs, the mitigation hierarchy (as shown in Figure 1-1) will underpin this process.

**Figure 1-1: Mitigation hierarchy approach to the Project**



1.2.8 The commitment to biodiversity enhancement (as set out within the BES at Part A, above), along with the conservation targets for keystone habitats and umbrella species, aims to improve habitat quality and connectivity across the Project. This approach to strategic, landscape-scale habitat provision also has a direct bearing on the potential for

significant effects and the need for survey, and a justification for this is provided for each IEF identified within this document.

## **1.3 Qualifications, experience and licencing**

- 1.3.1 Where required, surveys will be led by surveyors holding appropriate licences. For example, where a survey/inspection has the potential to elicit disturbance to a European Protected Species (EPS), the lead surveyor will hold or be accredited under the appropriate Natural England survey licence. All other surveys will be led by surveyors approved under Arcadis' technical competency framework.

## **1.4 Biosecurity**

- 1.4.1 All field surveyors will take reasonable measures to ensure compliance with species specific best practice guidelines for preventing the spread of disease and of invasive species of flora and fauna.
- 1.4.2 This is particularly true of work in water. Current best practice biosecurity measures (ARG UK, 2017) will be implemented, with disinfection of footwear and equipment between surveys, where they are used on more than one watercourse or water body.

## 2. NET GAIN

### 2.1 Introduction

- 2.1.1 The main aim of the Project (from a biodiversity perspective) will be to leave the environment in a better condition than it was before development. 'Net Gain' refers to measures which are over and above those implemented to reduce the effects arising from development activities.
- 2.1.2 To demonstrate Net Gain, a BES (see Part A, above) will be produced which includes a post-construction commitment to Biodiversity Net Gain (BNG). The mechanism to secure the protection, enhancement and provision of proposed biodiversity improvements, including maintenance and monitoring commitments are detailed within a BEMP (Part C, below).
- 2.1.3 The Applicant are also seeking to deliver biodiversity improvements beyond this commitment, with a focus on habitat and species-specific enhancement and habitat creation.
- 2.1.4 A Net Gain in Natural Capital Value (NCV) will also be delivered. NCV is based upon the indicative financial value of 12 ecosystem services including food, water, timber, energy, pollination and biodiversity (National Grid, 2020).
- 2.1.5 To inform BNG and NCV, field surveys and subsequent data analysis are required. These aim to establish:
- The current baseline regarding habitat types and condition within the study area;
  - Opportunities for habitat and species-specific habitat enhancements;
  - The proposed habitat types and condition post-construction within the study area;
  - Change in biodiversity units pre- and post-construction, including percentage change; and
  - Change in Natural Capital Value pre- and post-construction.

### 2.2 Defining the study area

- 2.2.1 The measure of BNG and NCV will include all habitats within the Scoping Route Corridor.

### 2.3 Proposed methodology

- 2.3.1 Two tools will be used to assess Net Gain:
- Defra's [Biodiversity Metric 3.0](#) (Panks *et al.*, 2021) calculates biodiversity units for BNG; and,
  - National Grid's (2020) [Natural Capital Tool](#) calculates the value of ecosystem services for NCV.

- 2.3.2 Both tools use information collected from BNG habitat condition assessments (see Section 3) and collectively they create a baseline and quantify environmental impacts before and after proposed works. The units and values will be used to inform landscaping and enhancement measures required to achieve a Net Gain in environmental value.
- 2.3.3 This information will be used to inform the BEMP (Part C, below) which will be developed in draft to support the DCO application and finalised pre-construction.

## **2.4 Survey programme and effort**

- 2.4.1 Net Gain assessment will be undertaken once the Route Corridor boundary has been finalised.

# 3. PRELIMINARY ECOLOGICAL APPRAISAL

## 3.1 Introduction

3.1.1 A Preliminary Ecological Appraisal (PEA) will be undertaken, comprising a desk study and Extended Phase 1 habitat survey to establish the ecological baseline of and key ecological constraints associated with the Project and form the basis for pre-construction BNG calculations. The survey aims to establish:

- The current baseline regarding habitat types, quality, importance and distribution within the study area;
- The likely ecological constraints to the Project including the presence of designated sites and the presence, potential presence or likely absence of protected, notable and invasive species within the study area;
- The requirement for any further targeted ecological surveys; and
- Opportunities for ecological enhancement.

## 3.2 Defining the study area

3.2.1 The study area for the desk study will comprise the Scoping Route Corridor plus the following buffers:

- 2km for statutory designated sites, extending to 5km for statutory sites designated for bats and winter/passage birds;
- 2km for non-statutory designated sites; and
- 2km for priority habitats (including ancient woodland) and protected and notable species.

3.2.2 The Extended Phase 1 habitat survey area will include all land within the Scoping Route Corridor and a 50m buffer zone.

## 3.3 Proposed methodology

3.3.1 The PEA survey methodology will follow CIEEM (2017) guidelines and will be comprised of two elements – a desk study and a field survey.

### Desk Study

3.3.2 Table 3-1 summarises the various sources of information utilised for the desk study and the information to be obtained.

**Table 3-1 Sources of information**

Source	Information Obtained	Date received/ accessed
APEM (2021) aerial imagery	<p>Digital surface model (DSM) tiles, Digital terrain model (DTM) tiles, Ortho-mosaic tiles and tree crown mapping were provided for the Scoping Route Corridor.</p> <p>Imagery at a resolution of 3cm Ground Sampling Distance was captured using fixed-wing aircraft on eight dates between 1st August and 18th September 2021.</p> <p>Ground control data was also collected in July-August 2021 to achieve accurate outputs. Imagery was processed, colour-balanced and ortho-rectified using the ground control to produce the DSM, DTM and ortho-mosaics. The ortho-mosaics were then analysed, and individual tree crowns were digitised with the terrain models used to measure tree height. Further imagery will be obtained during 2022.</p>	Ongoing
Google Earth (2022)	<p>Review of freely available aerial photography will allow: habitats within the study area to be assessed in a wider (landscape-scale) context; assessment and identification of potential ephemeral ecological features that may not be evident on the ground during the field survey (e.g. ephemeral ponds); identification of potential wildlife corridors or barriers to animal movements (e.g. road networks, built development and major watercourses); and a review of changes to habitats over time so that an assessment of reliability/longevity can be made.</p>	Ongoing
Multi-agency geographic information for the countryside (MAGIC) (2022)	<p>The location of statutory designated sites for nature conservation, Priority Habitats, Ancient Woodland, granted EPS Licence applications, great crested newt (GCN) (<i>Triturus cristatus</i>) survey licence returns, 2017-2019 GCN pond survey results and the National Habitat Network Maps.</p> <p>As some ecological features are not always apparent on aerial photographs, relevant Ordnance Survey mapping was studied to identify ponds, issues and/or drains.</p>	Ongoing
Lincolnshire Environmental Records Centre (LERC) (Lincolnshire)	<p>The location of non-statutory designated sites for nature conservation and records of protected, notable and invasive species. NB: any records older than 20 years were omitted from the results unless specified for that species/species group.</p>	September 2021

Source	Information Obtained	Date received/ accessed
Wildlife Trust, 2021) and North & East Yorkshire Ecological Data Centre (NEYEDC) (2021)		
British Trust for Ornithology (BTO) (2021a and 2021b)	2007-2011 and 2017-2021 data collected from BTO BirdTrack and Breeding Bird Surveys, confirming species presence within a 1km, 2km, 10km, 20km or 50km grid square depending on species rarity and survey type. BTO also provided Wetland Bird Survey (WeBS) data for 2011/2012 low tide counts of the Humber Estuary and 2015 – 2020 core tide counts of all sites within 5km of the Scoping Route Corridor.	August 2021
National Infrastructure Planning (2022)	Information and documents relating to other NSIPs within/close to the Scoping Route Corridor e.g. Environmental Statement for Drax Re-Power.	Ongoing
GCN Risk Zone data (Natural England, 2021a & 2021b)	GCN risk zone modelling for Yorkshire and North Lincolnshire.	December 2021
National Water Vole Database and Mapping Project (The Wildlife Trusts 2022)	Location of water vole ( <i>Arvicola amphibius</i> ) and American mink ( <i>Neovison vison</i> ) records (2009 – 2018) and information on trends in water vole populations at a regional and national level.	February 2022
Environment Agency (2021)	Results of Environment Agency freshwater river macroinvertebrate surveys for locations within the study area.	February 2022
Selby District Council, East Riding of Yorkshire, North Lincolnshire Council and West Lindsey District Council.	Locations of trees with Tree Preservation Orders (TPOs).	February & March 2022

## Field Survey

- 3.3.3 Habitats will be mapped according to definitions outlined in the Joint Nature Conservation Committee (JNCC) Phase 1 Handbook (JNCC, 2010).
- 3.3.4 The Extended Phase 1 habitat survey will be undertaken in two phases:
- 3.3.5 Initially the habitats within the emerging route corridor will be mapped based on aerial imagery, with a classification of the habitats to Phase 1 Habitat Survey standard;
- 3.3.6 Following development of the preferred route and confirmation of AGI locations, a field survey will be undertaken to finalise the habitat classifications.
- 3.3.7 The survey will provide information on the habitats within the Scoping Route Corridor and identify actual or potential presence of legally protected and/or otherwise notable species/habitats. Dominant flora will be noted, and target notes will be included, highlighting the presence of any NNIS, habitats suitable to support protected flora/fauna, and areas where further surveys are recommended.

## Phase 2 Botanical Survey

- 3.3.8 The need for Phase 2 botanical survey will be confirmed following Preliminary Ecological Appraisal. Specific botanical surveys may (for example) be to assess habitat quality in detail, and may include, but not be limited to: National Vegetation Classification (NVC) survey, hedgerow survey, veteran tree assessment and habitat condition assessment.
- 3.3.9 Phase 2 botanical surveys are likely to be required where the PEA has identified a perceived/potential impact from the Project on the following:
- Statutory and non-statutory designated wildlife sites where botanical features (habitats or plants) are designated features;
  - Priority Habitats recognised on the Priority Habitat Inventory (Natural England, 2020) or identified during the PEA;
  - Extensive wetland areas; and/or
  - Other habitats considered to be particularly high quality/value examples of their type or likely to contain uncommon plant species.
- 3.3.10 Phase 2 botanical survey methodologies will follow published good practice guidance, including but not limited to Rodwell (2006) for NVC survey and Defra (2007) for hedgerow survey.

## 3.4 Survey programme and effort

- 3.4.1 The desk study (including the production of the initial Phase 1 habitat plan) will be undertaken between December 2021 and March 2022 to identify specific features or species to target prior to the field survey. It is proposed that the field surveys are undertaken between April-September 2022.

## 4. INTERTIDAL AND MARINE ECOLOGY

### 4.1 Introduction

- 4.1.1 The landfall route of the Project bisects a long, sandy, inter-tidal beach that comprises part of the Holderness Inshore Marine Conservation Zone (MCZ), and the Greater Wash Special Area of Conservation (SPA), which are designated for intertidal (and subtidal) habitats, and marine seabirds and divers, respectively.
- 4.1.2 The beach is made up of littoral sand that consists of sand or muddy sand sediments with shells and stones occasionally present on the surface. The communities present within the Scoping Route Corridor will depend on the stability of the habitat and the degree of drying at low tide, with species including amphipods, polychaetes and bivalves.
- 4.1.3 No surveys for subtidal marine ecology are anticipated as the current Project extends only to the mean low water springs (MLWS), which is considered the ecological boundary between intertidal and subtidal<sup>1</sup> (marine) ecology. The offshore pipeline and associated works below MLWS forms part of a separate consent for which bp is the project proponent.

### 4.2 Defining the survey area

- 4.2.1 Requirements for intertidal surveys will be influenced by the availability and quality of intertidal data from publicly available sources. However, it is likely that a survey will be required at the intertidal area at the Easington landfall.
- 4.2.2 The survey area will be determined by the positioning and location of the route within the landfall site at Easington.
- 4.2.3 The intertidal walkover survey area will include all of the intertidal area within the Scoping Route Corridor and a 50 m buffer zone.

### 4.3 Proposed methodology

- 4.3.1 An initial review of existing information regarding the intertidal habitats will be undertaken for the Easington landfall. Existing information already available in the public domain, including any available monitoring data by Natural England for the area, which will be used to compile the initial intertidal environmental description. The most up to date information for the citations of the Greater Wash SPA and any available documentation on the Holderness Inshore MCZ will also be used.
- 4.3.2 An intertidal walkover survey will be undertaken to determine the principal biotopes within the Scoping Route Corridor. This will provide a broad-scale characterisation of the key biotopes of the landfall, based on visual observations only, as well as other key

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<sup>1</sup> For information, the subtidal areas are a mosaic of seabed habitats of rock, sand, mud, and coarse and mixed sediments, supporting a diverse array of organisms.

features of interest: substrate type, conspicuous fauna and flora, evidence of NNIS or any existing anthropogenic impact(s).

4.3.3 Survey methods will align with those used in the Marine Intertidal Phase 1 Methodology, in the Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey (Wyn et al., 2006). The walkover survey will aid in the production of habitat mapping in the intertidal area of interest.

4.3.4 In addition, intertidal sediment samples may be collected as part of the survey, to be analysed to identify the macrofaunal community, and physical and chemical characteristics of the sediment.

## **4.4 Survey programme and effort**

4.4.1 The initial review of existing information will be undertaken in April 2022.

4.4.2 It is proposed that the intertidal walkover surveys are undertaken between April-July 2022. These will be conducted over a spring low tide to maximise the extent of the intertidal area that can be surveyed.

# 5. INVERTEBRATES

## 5.1 Introduction

- 5.1.1 The Project extends through a largely agricultural landscape of structurally poor arable and grazed pasture fields. Subsequently, large populations, or presence of protected invertebrates and/or notable invertebrate assemblages are considered to be restricted to distinct areas/habitats that will be identified during the PEA and that the Project will seek to avoid. Further, due to the largely temporary nature of the Project (see Section 1.1.4), adverse effects to most invertebrate populations are expected to be temporary and minor.
- 5.1.2 The general approach to EclA for invertebrates is to ensure that the Project results in an increase in area of better-quality habitat (patch quality) than that affected by the Project and ensures that these habitats are well connected to the wider landscape. This will be achieved by avoiding permanent impacts (from AGI's) to habitats of perceived value, reinstating habitats affected in areas of temporary habitat loss to equal or better condition than existing, and (in line with the BES; see Part A, above) improving the quality and availability of ecological networks across the Project (through the conservation targets for keystone habitats and invertebrate umbrella species (white letter hairstreak (*Satyrrium w-album*) and bees/pollinators). By following this approach, it is proposed that the need for invertebrate surveys can largely be avoided.

## 5.2 Screening for survey and defining the survey area

- 5.2.1 The requirement for invertebrate surveys (terrestrial or aquatic) will be based on the results of the PEA, focusing on suitable habitat within the land required for construction.
- 5.2.2 In accordance with Drake *et al.* (2007), there are several reasons for undertaking invertebrate survey and to inform the DCO this could include areas:
- Where the presence of legally protected invertebrates has been identified;
  - Within or adjacent to a statutory or non-statutory designated site where invertebrates are a notable feature;
  - Identified as particularly botanically diverse and/or sensitive, or a habitat type restricted in the UK/Region; or
  - Where there is a perceived and proportionate risk of invertebrate presence.
- 5.2.3 For watercourses, Environment Agency (2021) data will be reviewed to identify locations where an assemblage of aquatic macro-invertebrates indicative of good water quality<sup>2</sup> occurs within the same catchment as the Project.
- 5.2.4 Surveys may also be undertaken to inform the BES and/or BEMP as part of a strategic plan for species recovery/action, to inform the management of certain habitats and/or to form the baseline of a monitoring programme. The need for such surveys will be

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<sup>2</sup> Evidenced by a Biological Monitoring Working Party score of 71 or more (Bourne Stream Partnership, 2012) occurring on a regular basis within the last 5-10 years.

identified following the production of the PEA and as these sections of the Conservation Strategy are developed.

- 5.2.5 Where surveys are required, the survey boundary will include an adequate and habitat/species specific Zone of Influence (ZOI).

## 5.3 Proposed methodology

- 5.3.1 Many invertebrate taxa are poorly understood in terms of their ecology and distribution. Although records of the presence of such species are a valuable addition to distributional knowledge, it is often not possible to accurately assess the value of a species record in a taxon which does not have a good database of distributional information. Even the first record of a species in a poorly known group does not necessarily confer significance to the site from which it was recorded without suitable contextual information.

- 5.3.2 It is therefore proposed that habitat surveys will use the recommended taxa for each habitat within Drake *et al.* (2007), where the aim is to assess the value of an area of land for invertebrate conservation rather than focusing on individual species presence. Accordingly, where the need for survey has been identified, a two staged approach will be implemented:

- Stage 1 - a habitat-based classification of invertebrate assemblage or suitability assessment for specific species; and,
- Stage 2 - species surveys carried out to identify assemblage types and their species richness, and the presence, distribution and population size of noteworthy species.

- 5.3.3 Where it is considered that detailed invertebrate surveys are required (terrestrial or aquatic), then the appropriate methods (including timing and number of survey visits) relevant to the taxa and/or habitats under consideration will be adopted, following guidance published by Drake *et al.* (2007). For terrestrial surveys, these methods could for example, include sweep netting, pitfall trapping, suction sampling and hand searches.

## 5.4 Survey programme and effort

- 5.4.1 The survey programme and effort will be determined following the PEA and based on the targeted species or species groups and the context of the local habitat. It is proposed that surveys are undertaken after DCO submission in the appropriate survey season prior to site enabling works and site establishment works.

# 6. FISH

## 6.1 Introduction

6.1.1 The requirements for fish survey are to be assessed following a review of existing data and an initial habitat assessment. Following the review of existing data, the most appropriate scope and method of survey will be agreed with the local Environment Agency team on a location-by-location basis for assessing the potential for significant impacts on fish.

## 6.2 Screening for survey and defining the survey area

6.2.1 Requirements for fish surveys will be influenced by the availability and quality of fisheries data from the Environment Agency. Where insufficient data exist to assess likely effects, surveys are more likely to be required for waterbodies meeting one or more of the following criteria:

- Bodies of water designated as a Special Area of Conservation (SAC) or Site of Special Scientific Interest (SSSI) for fish species or their water habitat; and/or
- Bodies of water likely to host protected fish species/fish species of conservation concern.

6.2.2 Bodies of water affected by the Project will be categorised for fish habitat quality and the potential for utilisation by fish. Surveys may be necessary for moderate and good habitats that could be directly or indirectly affected by the Project where no existing recent data are held by the Environment Agency. Further surveys are unlikely to be required for poor habitats.

6.2.3 Typical descriptors for good, moderate and poor quality habitats are as follows:

- **Good:** For running waters the habitats include varying flow types to include riffles pools, runs and glides. Substrate diversity is complex and there is good cover to provide refuge for juvenile and adult fish (both in-stream/waterbody and in marginal vegetation). Substrate is present for spawning salmonids. No evidence of pollution or other habitat degradation. No obvious barriers to migration (where applicable to species concerned);
- **Moderate:** For running waters the habitats include a number of flow types throughout the survey reach. Limited substrate diversity. Sparse cover for both juvenile and adult fish. Lower in-stream/waterbody and marginal vegetation diversity. Limited substrate present for spawning salmonids. No evidence of pollution; other habitat degradation (e.g. poaching) may be present. Potential barriers to upstream migration present (where applicable to species concerned); and
- **Poor:** Habitats with minimal variation. Substrate diversity limited. No bankside/marginal cover for fish. In-stream and marginal vegetation (where present) typically limited to single dominating species. No substrate available for spawning salmonids. Water body may receive diffuse, land-based pollution (run-off) and exhibit a high degree of other degradation such as poaching. Barriers to upstream

migration (e.g. debris/man-made dams) present (where applicable to species concerned).

- 6.2.4 The survey area will be determined on a site-by-site basis depending on habitat quality, upstream and downstream characteristics and likely effects on fish. Where access and seasonal constraints dictate, it may be necessary for fish habitat assessments to be undertaken in parallel with detailed survey work.

## **6.3 Proposed methodology**

- 6.3.1 Detailed survey methods used will be dependent on the watercourse characteristics and will be agreed with the local Environment Agency team.

## **6.4 Survey programme and effort**

- 6.4.1 Survey programme and effort are to be confirmed following discussion with local Environment Agency teams.
- 6.4.2 Where required, surveys are generally recommended to be undertaken from June to September depending on target species (JNCC, 2015) Where present, specific surveys may be required during spawning periods for salmonids (mid-November to the end of January) and Bullhead (*Cottus gobio*) (February to June).

# 7. REPTILES

## 7.1 Introduction

7.1.1 Widespread presence and large populations of reptiles are thought to be unlikely due to the unsuitable nature of the majority of the habitats (predominately structurally poor agricultural fields) within the Scoping Route Corridor.

7.1.2 Nevertheless, it is anticipated that a range of habitats within the land required for the construction of the Project will provide suitable habitat to support more widespread reptile species, namely adder (*Vipera berus*), slow worm (*Anguis fragilis*), grass snake (*Natrix helvetica*) and common lizard (*Zootoca vivipara*) and it is assumed that some (or all) of these species will be present within the footprint of the development.

## 7.2 Screening for survey and defining the study area

7.2.1 Aerial imagery (APEM, 2021) will be reviewed to identify and map areas potentially suitable to support reptiles within or adjacent to the Project. The results of the PEA will also be reviewed to refine potential survey areas and identify any additional areas of potentially suitable habitat.

7.2.2 An appropriately experienced ecologist will visit these selected survey areas to appraise the suitability of the habitats present on the ground. The habitat assessment will be based on consideration of the following characters (taken from Natural England, 2011):

- Location in relation to species range;
- Vegetation structure;
- Insolation (sun exposure);
- Aspect;
- Topography;
- Surface geology;
- Connectivity to nearby good quality habitat;
- Prey suitability/abundance;
- Refuge opportunity;
- Hibernation habitat potential;
- Disturbance; and
- Egg-laying site potential (grass snake only).

7.2.3 For each survey area the habitat assessment for reptiles will be graded as follows:

- **Poor** – habitat which is unfavourable for reptiles based on the majority of the habitat assessment characters listed above, or is limited in size and highly isolated from other areas of suitable habitat.

- **Good** – habitat which is favourable or sub-optimal for many of the habitat assessment characters listed above; or is sub-optimal for some of the characters and has good connectivity with areas of more suitable habitat.
- **Exceptional** – habitat which is favourable for reptiles based on the majority of habitat assessment characters listed above.

7.2.4 Grading will also note which species the survey area is considered potentially suitable for, and this will be combined with the results of the desk study and professional judgement to rank the likelihood of presence as follows:

- **Negligible** – while presence cannot be absolutely discounted, habitats are very limited in size or of poor quality for reptile species and/or assemblages. There may be no desk study records and the surrounding habitats are considered unlikely to support wider populations. The Project may also be outside or peripheral to the known natural range of reptiles.
- **Low** – habitats are of poor to good quality for reptiles. There are few or no desk study records but presence cannot be discounted based on national distribution, the nature of surrounding habitats, habitat fragmentation or recent disturbance etc.
- **Medium** – habitats are of good quality and desk study records reveal local occurrence, or the area is within the national distribution and with suitable surrounding habitat. Factors limiting the likelihood of occurrence may include small habitat area, habitat isolation, and/or disturbance.
- **High** – habitats are of exceptional quality for reptiles. Desk study provides evidence of local occurrence. The area is within/peripheral to a national or regional stronghold and/or has good quality surrounding habitat and good connectivity.
- **Confirmed Presence** – presence confirmed from survey or by recent, confirmed records.

7.2.5 Accordingly, an isolated area of exceptional quality habitat could be considered to have negligible likelihood of reptile presence and an area of poor quality habitat could have a high likelihood of reptile presence, if situated adjacent to better quality habitat with confirmed presence.

7.2.6 With the exception of any access constrained areas (e.g. due to health and safety concerns such as roadside verges), the survey area/s to be targeted for further presence/likely absence surveys (see Section 7.3) will comprise land required for the construction of the Project that is assessed as having ‘good’ or ‘exceptional’ habitat suitability and medium or above likelihood of reptile presence.

## 7.3 Proposed methodology

### Presence/Likely Absence Survey

7.3.1 Reptile presence/likely absence surveys will be conducted according to the below methodology which draws heavily upon Herpetofauna Groups of Britain and Ireland (HGBI) (1998), Froglife (1999 & 2015) and Natural England (2011).

7.3.2 In each survey area, refugia (comprising a 50:50 ratio of corrugated metal/onduline and roofing felt measuring a minimum 0.5m x 0.75m in size) will be numbered and placed in suitable habitat.

- 7.3.3 In non-linear habitats, refugia will be placed at a density of at least 100/ha (for very small sites this density may be increased appropriately with a justification provided). In linear habitats of less than 10m in width (e.g. hedgerows) refugia will be placed at a frequency of at least one every 10m of suitable habitat. Where varying from the refugia ratio and densities, a justification will be provided, based on the habitat type and target species concerned. Once placed, artificial refugia will be left to settle for at least 14 days prior to conducting the first survey (Natural England, 2011).
- 7.3.4 Each survey area will be checked for reptiles on the required number of occasions (see Section 7.4.2), with binoculars used where appropriate to check for reptiles on and between refugia, as well as careful checks beneath each refugia. Each refugia check will be conducted during appropriate weather conditions (i.e. air temperature 10°C-20°C, still to moderate winds and no or very light rain).
- 7.3.5 During each check the surveyor will record details of all reptiles encountered during the survey including refugia number/location, species, number, life stage (adult, subadult, juvenile) and where possible, sex.

### **Estimating Population Size Class**

- 7.3.6 Population size class for each survey area will be assessed utilising the peak adult count for each species across all visits and population density will be calculated by dividing these figures by the survey area in hectares. Population densities will then be compared with the criteria outlined by HGBI (1998) and also Froglife (1999) to determine if any of the survey areas qualify as “Key Reptile Sites” which would trigger the requirement for further visits to provide a robust assessment to be considered.

## **7.4 Survey programme and effort**

- 7.4.1 It is proposed that surveys are undertaken after DCO submission in the appropriate survey season prior to site enabling works and site establishment works.

### **Presence/likely absence survey**

- 7.4.2 Seven visits (during suitable weather conditions (see Section 7.3.4)) will be conducted to determine presence/likely absence with at least four of these visits conducted during the ‘optimum’ survey months of April, May, June and/or September. As a consequence, at sites where surveys commence during July or August, if no reptiles are found during the first three visits, then the remaining visits would be delayed until September.
- 7.4.3 Where access allows, surveys will be programmed to maximise the number of visits conducted during April, May, June and September. However, visits during July and August are not precluded assuming they are conducted according to the weather requirements specified in Section 7.3.4.
- 7.4.4 For survey areas with confirmed presence of adder, survey visits may also be carried out during October/November when adders use areas in close proximity to potential hibernation habitats. Note that where a requirement for additional spring emergence visits is identified, these will be completed in April.
- 7.4.5 Surveys will also be planned to ensure that there is at least 30 days between the first and last survey visits and a minimum of two days between each visit.

## Population size class estimate

- 7.4.6 Where presence/likely absence survey confirms presence of one or more reptile species and all survey visits have been conducted during 'optimum' survey months (under suitable conditions) (see Section 7.4.2) then (unless the surveyor considers it necessary) no further visits will be required.
- 7.4.7 Where any presence/likely absence survey visits have been conducted during the sub-optimal months of July or August, additional visits will be required until at least seven visits (under suitable conditions) have been conducted during optimum months.

## Approach to impact assessment

- 7.4.8 Should reptile presence or likely presence be identified, it will be necessary to mitigate for the risk of death or injury during the construction period and it is proposed that a combination of capture and exclusion methods (i.e. use of reptile proof fencing) and displacement by habitat manipulation will be used. A Reptile Method Statement document will be prepared (post DCO submission but before construction) to detail the location where these methods are used and of receptor sites.
- 7.4.9 The Reptile Method Statement will be informed by the survey and assessment described above and will also develop a mitigation solution that ensures an increase in area of better-quality habitat than that affected by the Project and that these habitats are well connected to the wider landscape. This will be based on the habitat suitability assessment (described within Section 7.2) and measured as part of the BES, as reptiles are an 'umbrella' species (see Section 1.2).
- 7.4.10 In summary, the proposed mitigation involves:
- The identification, preparation, and management of a receptor site/s to receive translocated reptiles (if required). Note that the Project will largely require the temporary loss of sections of suitable habitat. Further, these habitats will be reinstated in equal or better quality for reptiles. It is proposed that the Reptile Method Statement targets retained (but enhanced) sections of these habitats and that reinstatement is used to deliver better quality habitat for reptiles.
  - The capture/exclusion and/or manipulation of reptiles from the construction footprint (i.e., donor sites) to avoid incidental mortality.
  - Pre-, during- and post-construction monitoring of reptile populations. During- and post- construction monitoring will be detailed within the Reptile Method Statement.

# 8. BREEDING BIRDS

## 8.1 Introduction

- 8.1.1 It is anticipated that a range of habitats within the land required for the construction of the Project will provide suitable habitat to support nesting birds and particularly those associated with farmland habitat.
- 8.1.2 The general approach to EclA for breeding birds is to ensure that the Project results in an increase in area of better-quality habitat (patch quality) than that affected by the Project and ensure that these habitats are well connected to the wider landscape. This will be achieved by avoiding permanent impacts (from AGIs) to habitats of perceived value, reinstating habitats affected in areas of temporary habitat loss to equal or better condition than existing, and (in line with the BES; see Part A, above) improving the quality and availability of ecological networks across the Project (through the conservation targets for keystone habitats and bird umbrella species (tree sparrow (*Passer montanus*), barn owl (*Tyto alba*) and lapwing (*Vanellus vanellus*)). By following this approach, it is proposed that the need for breeding bird surveys can largely be avoided.

## 8.2 Screening for survey and defining the survey area

- 8.2.1 The requirement for breeding bird surveys will be based on the results of the PEA, focusing on suitable habitat within the land required for construction. The extent of survey will be defined by the outcome of a two staged screening exercise as defined below.

### Stage 1 – Sites of known importance for breeding birds

- 8.2.2 The desk study (undertaken during the PEA) will be used to identify sites of known importance for birds where there is the potential for adverse effects because of the Project. Any such sites will be included for survey.

### Stage 2 – Other areas identified as being of potential importance for breeding birds

- 8.2.3 A review of the following information sources will be undertaken to identify the locations of sites of potential importance for breeding birds (i.e. areas which are considered to have potential to support notable species such as those listed on Annex 1 of the Birds Directive, Schedule 1 of the Wildlife and Countryside Act, or red or amber listed species on the Birds of Conservation Concern list; or which may support notable assemblages of common birds) within the Scoping Route Corridor and that are potentially subject to adverse effects:
- Aerial photography and Ordnance Survey mapping;
  - Phase 1 habitat survey results;
  - Feedback from wintering bird surveys conducted during 2021/2022; and,
  - Discussions with local consultees.

## 8.3 Proposed methodology

### Common Bird Census style survey

- 8.3.1 Survey will comprise six survey visits during the breeding season (broadly mid-March to early July). Survey visits will be undertaken on dry days with no more than moderate wind. Survey during dawn mist is acceptable but survey during dense fog would be avoided. Site visits would commence no later than one hour after sunrise. The starting position of each survey would be varied between visits in order to reduce survey bias.
- 8.3.2 For survey areas comprising a large expanse of open grassland or arable field, the boundaries will be walked and all birds within the field recorded. In other habitat where access and views allow, efforts will be made to record all bird activity within 50m of the survey route. Where no access is available, Public Rights of Way (PRoW) and local roads (where it is deemed safe to do so) will be utilised.
- 8.3.3 In all cases all birds seen or heard will be identified and recorded on a suitable scale map of the site to allow the information to be clearly recorded using standard British Trust for Ornithology (BTO) species and activity codes.
- 8.3.4 Large wetland areas will also be covered by a slightly modified Common Bird Census style survey to include recording the activity of individual birds and counts of birds on the water from the lake edge.

### Species specific surveys

- 8.3.5 Species specific surveys would be conducted as appropriate, and where considered to be required (as described above).
- 8.3.6 As a minimum this would include consideration of potential nesting locations for Schedule 1 species such as barn owl. Survey for Schedule 1 species would follow established best practice survey methodologies as follows:
- Barn owl – Shawyer (2011); and
  - Red kite (*Milvus milvus*) / hobby (*Falco subbuteo*) / peregrine (*Falco peregrinus*) / black redstart (*Phoenicurus ochruros*) / nightjar (*Caprimulgus europaeus*) / kingfisher (*Alcedo atthis*) – Gilbert *et al.* (1998).
- 8.3.7 Where crepuscular or nocturnal species such as nightjar are suspected then evening survey visits (in addition to those forming part of the Common Bird Census survey) would be undertaken. At each appropriate site at least two evening visits including the hour after sunset should be conducted.

## 8.4 Survey programme and effort

### Schedule 1 breeding birds

- 8.4.1 The survey season and number of survey visits will be based upon the target Schedule 1 species/taxa.

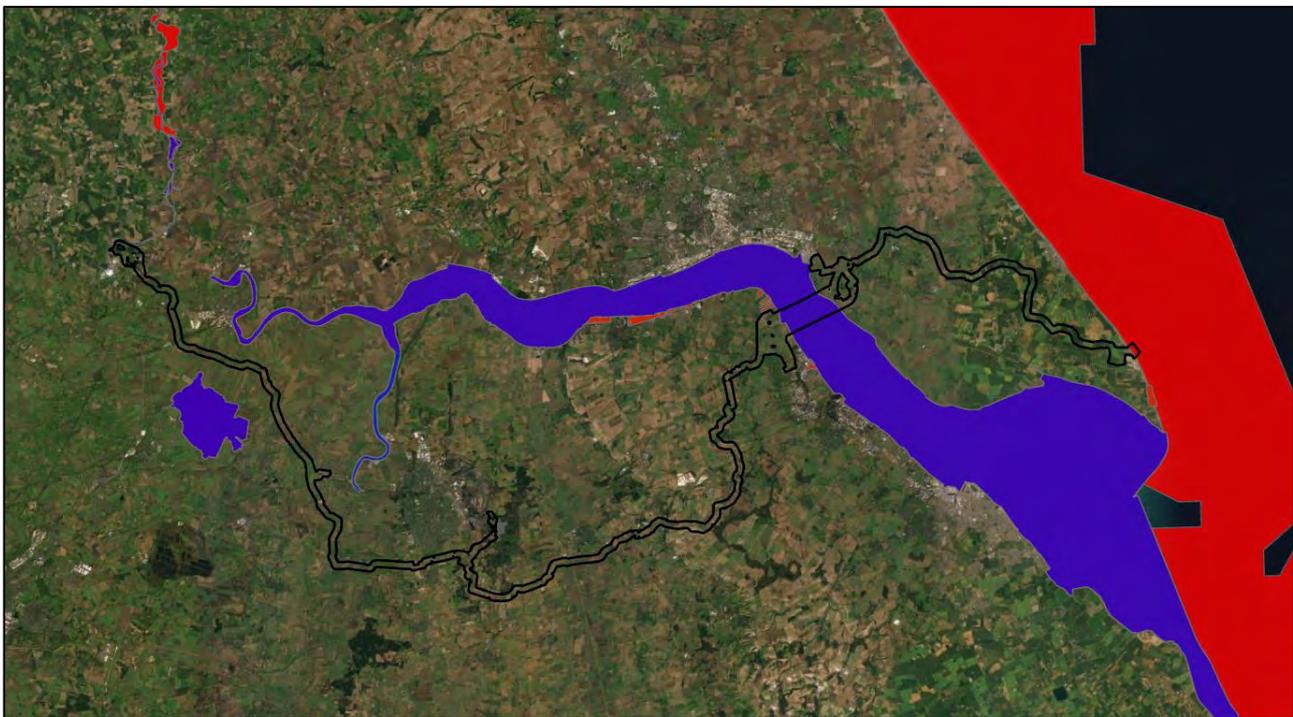
# 9. WINTERING/PASSAGE BIRDS

## 9.1 Introduction

9.1.1 The Project will cross beneath the Humber Estuary which is designated as a Special Protection Area (SPA), SAC and Ramsar site. The Greater Wash SPA is located along the east of the Project at the Holderness coast. The Scoping Route Corridor in relation to European sites is illustrated on

9.1.2 Figure 9-1.

**Figure 9-1: Scoping Route Corridor (black) in relation to European sites (blue: SAC, red: SPA)**



9.1.3 The text below outlines respective qualifying ornithological features for the Humber Estuary SPA and Ramsar site, and the Greater Wash SPA. Breeding populations are also referenced where relevant to the designation. It should be noted that habitat suitability for these breeding populations is included as part of the assessment detailed below.

9.1.4 A detailed assessment of impacts to passage and overwintering birds will be carried out through a HRA screening report, informed by passage/wintering bird surveys being undertaken in 2021/2022. The surveys aim to establish:

- The current baseline regarding how passage and wintering bird communities utilise the study area;

- A list of bird species encountered and an estimate of the numbers of each bird species utilising the study and surrounding areas; and
- A comparison of results with desktop data to identify any significant changes to the Site status.

## 9.2 Screening for survey and defining the survey area

### Humber Estuary SPA

9.2.1 The site qualifies under Article 4.1 of the Directive (79/409/EEC) by regularly supporting populations of European importance of the following species listed on Annex I of the directive (% of the population in Great Britain):

- Over winter: bittern (*Botaurus stellaris*) (4%), hen harrier (*Circus cyaneus*) (1.1%), bar-tailed godwit (*Limosa lapponica*) (4.4%), golden plover (*Pluvialis apricaria*) (12.3%), avocet (*Recurvirostra avosetta*) (1.7%).
- On passage: ruff (*Philomachus pugnax*) (1.4%).
- Breeding: bittern (10.5%), marsh harrier (*Circus aeruginosus*) (6.3%), avocet (8.6%), little tern (*Sternula albifrons*) (2.1%).

9.2.2 The site also qualifies under Article 4.2 of the Directive by supporting populations of European importance of the following migratory species (% of the population in Great Britain):

- Over winter: dunlin (*Calidris alpina*) (1.7%), knot (*Calidris canutus*) (6.3%), black-tailed godwit (*Limosa limosa*) (3.2%), shelduck (*Tadorna tadorna*) (1.5%), redshank (*Tringa totanus*) (3.6%).
- On passage: dunlin (1.5%), knot (4.1%), black-tailed godwit (2.6%), redshank (5.7%).

9.2.3 The site also regularly supports a non-breeding assemblage of 153,934 waterbirds.

### Humber Estuary Ramsar

9.2.4 Criterion 5: Regularly supporting a bird assemblage of international importance comprising 153,934 waterfowl during the non-breeding season.

9.2.5 Criterion 6: Supporting internationally important spring/autumn passage populations of golden plover, knot, dunlin, black-tailed godwit and redshank, and during the winter, populations of shelduck, golden plover, knot, dunlin, black-tailed godwit and bar-tailed godwit.

9.2.6 Breeding bird species occurring at national levels of importance (% of the GB population): bittern (10.5%), marsh harrier (6.3%), avocet (8.6%), little tern (2.1%).

### Greater Wash SPA

9.2.7 The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the Annex I species (% of the population in Great Britain):

- Over winter: red-throated diver (*Gavia stellata*) (3%), little gull (*Hydrocoloeus minutus*) (1,255 individuals).

- On passage: Common scoter (*Melanitta nigra*) (0.6%).
- Breeding: Sandwich tern (*Sterna sandvicensis*) (35%), Common tern (*Sterna hirundo*) (5.1%), Little tern (42%).

## Survey Scope

- 9.2.8 During the preparation of this Scope and Methodology Report, consultation with Natural England was undertaken through the Discretionary Advice Service (DAS) and comments were provided via email on the 21st, 26th and 27th July 2021; a meeting was held on the 27th July 2021. The results of these consultations were used to form the survey method as outlined below.
- 9.2.9 The proposed survey effort aims to screen and discount areas from survey where it is likely that the habitats support only low numbers of common birds whose conservation status would not be significantly affected by the Project. As proposed by Natural England, a study/survey area has been established which is defined as the area that meets the following criteria:
- Within the route corridor;
  - Within 3km Impact Risk Zone (IRZ) of Humber Estuary (with the exception of the land to the south of Alkborough Flats as described above); and
  - Suitable habitat for wintering SPA/Ramsar birds i.e. open agricultural land identified through aerial photos etc.
- 9.2.10 The survey areas are shown in
- 9.2.11 Figure 9-2. This shows the areas that are being surveyed for passage and wintering birds using a combination of habitat assessments (supported by desk-study data), transects and vantage point (VP) surveys (described in the sections below). Option selection and route corridor refinement continued throughout 2021 and into early 2022. This led to a reduction in the number of survey areas that met the criteria detailed above compared to the original scope.

**Figure 9-2: Survey areas (red) in relation to Scoping Route Corridor (black).**



## 9.3 Proposed methodology

### Desk study and habitat assessments

- 9.3.1 WeBS data has been obtained for all sectors/compartments within 5km of the Scoping Route Corridor (see Section 3.3); the location of all sectors is illustrated on
- 9.3.2 Figure 9-3. This data provides extensive information on the wintering bird species and numbers within the Humber Estuary and surrounding areas.

**Figure 9-3: WeBS sectors (yellow) for which data has been obtained, in relation to Scoping Route Corridor (black)**



- 9.3.3 Prior to the first VP and transect surveys, the survey area will be walked to determine the most suitable vantage point and transect route locations. During this survey, the habitats will be assessed for their suitability to support passage and wintering birds. Where habitats within the study area are considered unsuitable, they will be discounted, and a justification provided within the survey report. In addition, any areas considered to be of particular interest, will be recorded and surveyed accordingly. For example, large areas of reedbed which could support roosting harriers may require additional survey (see Section 9.3.8). This habitat assessment will be supported by a desk-based assessment of aerial imagery.

### Vantage Point survey

- 9.3.4 VP survey methodology has been adapted from Scottish Natural Heritage (SNH) guidance (SNH, 2017). This guidance pertains to the assessment of effects of wind farms on birds; however, for this Project it is being used to support the transect surveys and focus on bird movements between the Humber Estuary (and River Trent) crossing locations, the Scoping Route Corridor and surrounding habitats (i.e. terrestrial habitats will also be surveyed along with the estuary/river). VPs are also proposed on the

Holderness Coast at Aldbrough to generate data on bird presence and behaviour within this area.

A total of four VP positions are proposed for survey, as shown in

9.3.5 **Figure 9-4.** The locations of these have been selected from an assessment of aerial imagery and will be further assessed for suitability during the habitat assessments. Accordingly, VPs may be moved, dropped, or additional vantage point locations added.

**Figure 9-4: Location of vantage points (VP) in relation to Scoping Route Corridor (black)**



9.3.6 Bird movements will be mapped during the VP surveys using BTO activity codes, which distinguish between birds coming into land, overhead flights and birds taking off. The recorded information with each referenced flight will comprise; time, species, estimated number of birds and flight behaviour, as a minimum.

9.3.7 It is acknowledged that SNH guidance (SNH, 2017) outlines 36 hours of monitoring per season, with more regular surveying through the passage period when bird turnover is high; however, this methodology is designed to collate data on bird flight behaviour for windfarm collision risk. This Project is for two new buried pipelines, which would not cause a collision threat and (with the exception of the permanent AGI sites) habitats will be reinstated on completion of the work. Therefore, 36 hours of monitoring per season is not considered proportionate for this Project. Instead, 2 visits per month (spaced approximately 2 weeks apart) will be undertaken with surveys carried out from 2 hours before high tide to 2 hours after high tide. Each survey will therefore be 4 hours in length and will aim to ensure a range of weather conditions are covered.

9.3.8 Vantage points may also be used to monitor harrier roosts, if suitable habitat is considered present with the survey area during the habitat assessment surveys. Suitable vantage point(s) will be selected, where deemed necessary, which give full coverage over the potential habitat.

## Transect survey

- 9.3.9 Surveys will follow an adaption to the BTO WeBS methodology which is based on a 'look-see' approach (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998). Transects will be walked across all suitable wintering bird habitat within the survey area. Aerial imagery suggests much of the survey area is arable, which is likely to provide foraging habitat to a range of species, particularly lapwing, golden plover, curlew (*Numenius arquata*) and geese. Any unsuitable areas identified through the initial habitat assessment will be discounted from the transect route.
- 9.3.10 During the transects, fields will be scanned using binoculars and scopes (where necessary). Details recorded will include time, species, number of birds, location, behaviour and information regarding flights in or out of the survey area. BTO activity codes will be used during the survey.

## 9.4 Survey programme and effort

### Vantage Point survey

- 9.4.1 As per recommended guidance (Clarke & Watson, 1990, Gilbert *et al.*, 1998), surveys at vantage points will be conducted once a month between October 2021 and March 2022 inclusive, from 1.5 hours prior to sunset to 0.5 hours after sunset (or until it becomes too dark to see). Surveys will only be undertaken in good visibility.

### Transect survey

- 9.4.2 As per WeBS methodology and incorporating Natural England advice (see Section 9.2.8 and 9.3.9), each transect will be completed twice per month between August and April (inclusive) and completed in a period 2 to 3 hours either side of high tide (NB: as surveys were not commenced until September 2021, surveys may extend into August 2022; subject to further discussion with Natural England).

# 10. BADGER

## 10.1 Introduction

- 10.1.1 Based on the suitability of habitats and rural location of most of the Project, it is envisaged that badgers (*Meles meles*) are widespread throughout. Potential impacts on badgers are likely to be loss of setts within the land required for the construction of the Project and potential for disturbance of setts in close proximity to the land required. Survey for badgers will therefore need to identify sett locations only. Due to the temporary nature of the works, it is not considered necessary for surveys to identify the potential for severance/fragmentation of territories.
- 10.1.2 The badger is not a species of conservation concern nationally, and accordingly, is not considered a priority species for conservation in England. In an urban context and on the edges of its range, the species may be of local conservation concern, but in this context the species.
- 10.1.3 It is proposed that badger surveys are undertaken pre-construction to ensure adherence to legislation and animal welfare. Pre-construction surveys and sett classifications will follow Harris *et al.* (1989) and are outlined below.
- 10.1.4 In compliance with the Protection of Badgers Act 1992, all information related to badgers (including survey methodology, baseline information, mitigation and residual effects and cumulative effects), will be presented in a Confidential Appendix. Release of the Confidential Appendix would only be to the Planning Inspectorate (the Inspectorate), and on request from suitably qualified professionals.

## 10.2 Screening for survey and defining the survey area

- 10.2.1 Utilising results from the Phase 1 habitat survey, desk study records and analysis of aerial photographs, areas will be identified within the land required for the construction of the Project, or within a 50m surrounding buffer that are likely to be used by badgers and where there is the potential for significant effects to occur. These areas will then be subject to badger survey.

## 10.3 Proposed methodology

- 10.3.1 The badger survey will comprise a systematic walkover to obtain records of the following field signs:
- Setts.
  - Badger hair.
  - Mammal/badger pathways.
  - Foraging signs.
  - Latrines.
  - Footprints.

- Bedding material.
- Evidence of rabbit (*Oryctolagus cuniculus*) and fox (*Vulpes vulpes*).

10.3.2 Identified setts will be mapped on a GPS and categorised following Harris *et al.* (1989) as 'main', 'annex', 'subsidiary', or 'outlier'. These will be classified as 'active', 'partially active', or 'disused'. The number of sett entrances will be noted alongside the direction of each entrance hole. Where necessary, further badger surveys will be undertaken to confirm if there are additional setts within the territory.

## 10.4 Survey programme and effort

10.4.1 Badger surveys can be undertaken at any time of the year but, where possible, will be undertaken in winter or early spring (due to improved visibility).

# 11. BATS

## 11.1 Introduction

- 11.1.1 In the instance the loss of a tree(s) with potential to support roosting bats cannot be avoided, then these will be inspected/surveyed in accordance with the Bat Conservation Trust guidelines (Collins, 2016), described below.
- 11.1.2 Negative impacts to foraging/commuting bats from construction activities are expected to be temporary and minor, as the number and length of hedgerows being severed will be minimised (i.e. gaps of less than 20m), and impacts to woodland will be avoided. There are no European sites identified within 25km of the proposed pipeline route which are designated for bats. The works are unlikely to devoid bats of locally important linear features and the Conservation Strategy will ensure all hedgerows are reinstated post-construction, with native species-rich planting incorporated. This means that post-construction there will be new and enhanced commuting corridors and foraging habitat for bats.

## 11.2 Screening for survey and defining the survey area

- 11.2.1 During the Phase 1 habitat survey trees, woodland blocks and structures with potential roosting features will be highlighted. Those with potential roosting features which cannot be avoided by the Project will subsequently receive further bat roost surveys including preliminary roost assessment (PRA), inspection and/or emergence/re-entry surveys.

## 11.3 Proposed methodology

### Preliminary roost assessment

- 11.3.1 Trees identified for PRA will be highlighted in the Phase 1 habitat survey. Where potential roosting features (PRFs) are present on or within a tree, these will be assessed to determine suitability for roosting bats alongside professional judgement. Trees will be classified as confirmed, high, moderate, low, or negligible roosting suitability. All trees with potential to support roosting bats will be recorded on a GPS to provide accurate referencing. Trees will be classified as high on a precautionary basis when PRA can only take place in full foliage and from the ground.
- 11.3.2 Trees assessed as high or moderate roost suitability will be inspected (see 0). Trees classified as low or negligible roost suitability will be soft-felled/pruned under supervision of a bat licenced ecologist.

### Tree inspections

- 11.3.3 Trees with high or moderate roost suitability will be inspected further, where possible. Where a cherry picker or endoscope cannot be used to inspect PRFs, trees will be climbed by a licenced bat ecologist with tree climbing qualifications.
- 11.3.4 Where evidence of bats is found (such as droppings) and bats are not present, or neither inspection method is safe nor suitable, emergence/re-entry surveys will be

undertaken. Trees that are down-graded to low or negligible roost suitability following inspection will be soft-felled/pruned under supervision of a licenced bat ecologist.

### **Emergence/re-entry**

- 11.3.5 For trees with moderate roost suitability, two separate surveys are required and consist of one emergence and one re-entry survey spaced at least 14 days apart between May and September. For trees with confirmed roost or high roost suitability, three surveys are required under the same conditions.
- 11.3.6 Emergence surveys are to be undertaken from 15 minutes before sunset until two hours after sunset, and re-entry surveys undertaken from two hours before sunrise until 15 minutes after sunrise. All surveys will be undertaken in appropriate weather conditions. Surveyors will use echolocation detectors that will record bat activity across surveys. Recorded data will subsequently be analysed using appropriate software to identify species and inform mitigation requirements where necessary.

### **Survey programme and effort**

- PRAs will aim to take place before or after trees are in full foliage, i.e. between October and March.
- Inspections of trees with high or moderate roost suitability will take place during the bat 'active' period of May to September (unless a PRF has been identified as having hibernation roost suitability).
- Emergence/re-entry surveys will be undertaken between May and September, in line with Collins (2016).

# 12. OTTER

## 12.1 Introduction

- 12.1.1 Adverse effects on otter (*Lutra lutra*) from construction activities could occur near to watercourses where underground (holts) or above-ground (couches) resting sites may be located, or along watercourses that otter use as corridors.
- 12.1.2 The Scoping Route Corridor extends across multiple watercourses of various size and desk study information suggests that otter are widespread throughout the local area (occurring on several watercourses within the Scoping Route Corridor).
- 12.1.3 Construction activities will seek to avoid impacts to watercourses and time works to avoid disturbance to resting sites whilst occupied. Nevertheless, temporary impacts to habitats utilised by otter are anticipated during construction.
- 12.1.4 Otter surveys will be undertaken in accordance with Chanin, 2013 and taking account of best practice guidance (Chanin, 2003; Liles, 2003; and Chanin, 2005) and CIEEM competencies for undertaking otter surveys (CIEEM, 2003).

## 12.2 Screening for survey and defining the survey area

- 12.2.1 Desk based information, including local environmental records centre data and PEA results, will be reviewed to highlight watercourses and waterbodies suitable for otter or where presence has been historically recorded. Watercourses crossed by the Project will be assessed during the desk-based screening exercise.
- 12.2.2 A walkover of each site selected for survey will be conducted, and a decision taken on the need for subsequent detailed otter survey. This assessment should include consideration of each site against the following criteria:
- Proximity to the land required for construction of the Project;
  - Presence of significant barriers to dispersal and movement through the territory;
  - Habitats present and suitability for use by otter (including terrestrial habitats);
  - Adjoining land use;
  - Level of disturbance;
  - Features of watercourse/water body (estimated depth, level of flow, width of channel);
  - Connectivity with other areas of suitable or sub-optimal habitat; and
  - Pollution.

## 12.3 Proposed methodology

### Aquatic/riparian habitats

12.3.1 Watercourse and waterbody banks which have been identified as having the potential to support otter will be surveyed for evidence, within a 200m buffer of construction, in line with guidelines in Chanin (2003). This will also include riparian habitats such as reedbeds. Otter evidence includes footprints, spraints, anal jelly, feeding remains, slides, resting sites and breeding holts. Otter surveys can be undertaken at any time of year. Evidence of water vole and American mink will additionally be recorded.

### Terrestrial habitats

12.3.2 Woodland, scrub, and derelict man-made features within 200m of construction, 100m of a watercourse or waterbody (which has been identified as having the potential to support otter – see Section 12.3.1) and identified as suitable for otter, will be surveyed for potential otter breeding holts. A holt will be classified as active where any of the following signs are present:

- Spraints or footprint within tunnel or immediate ground outside.
- Scratch marks and/or body rubbing against tunnel wall.
- Otter hair within tunnel or immediate ground outside.

12.3.3 If a resting site or breeding holt is recorded, the location will be recorded on a GPS and suitably sized buffer zones will be identified to ensure no works that could otherwise elicit disturbance take place. Disturbance buffer zones will be classed as 30m for an active otter resting place and, depending on the magnitude of works and local topography, 100-200m for an active breeding holt.

12.3.4 In the unlikely event that any otter resting places are unavoidable, the temporary loss will be mitigated for under licence from Natural England.

## 12.4 Survey programme and effort

12.4.1 Where access restrictions allow, a total of four survey visits should be conducted at approximately three-monthly intervals. However, where no habitat suitable for the creation of holts or couches is present within the land required for the construction of the Project then survey may be curtailed once the presence of otter has been confirmed.

12.4.2 Survey should not be conducted during or following periods of heavy rainfall, as field signs will have been washed away. In general where possible survey visits should be timed to avoid survey when water levels are high.

# 13. WATER VOLE

## 13.1 Introduction

- 13.1.1 Based on desk study information, water voles are known to be widespread throughout the Scoping Route Corridor with particular (known) 'hot spots' to the west and south west of Scunthorpe and around the Humber at Goxhill and Paull.
- 13.1.2 The Project extends through a largely rural landscape, crossing multiple watercourses of various size. Construction activities will seek to avoid impacts to watercourses but temporary impacts to sections of field drains/ditches are anticipated and therefore temporary and minor impacts to water vole and their burrows are expected during construction.
- 13.1.3 The general approach to EclA for water voles is to ensure that the Project results in an increase in area of better-quality habitat (patch quality) than that affected by the Project. This will be largely achieved by avoiding permanent impacts (from AGI's) to habitats of perceived value and reinstating habitats affected in areas of temporary habitat loss to equal or better condition than existing.
- 13.1.4 Water voles are also identified as an umbrella species within the BES (see Part A, above). The conservation targets for this species seek to identify and increase water vole distribution through the strategic creation and/or enhancement of wetland that is suitable for species and a mink control programme.
- 13.1.5 By following this approach, it is proposed that detailed water vole survey information is not required for EclA and providing surveys are undertaken with sufficient time to apply for any licences required and undertake mitigation, they can be delayed until pre-construction (i.e. post DCO consent). Survey methodology will follow the Water Vole Mitigation Handbook (Dean *et al.*, 2016).

## 13.2 Screening for survey and defining the survey area

- 13.2.1 Desk based information, including local environmental records centre data, PEA results and other incidental water vole evidence, will be reviewed to highlight habitats which may be suitable for water vole. Habitats include ditches, streams, rivers, ponds and lakes.
- 13.2.2 Where potentially suitable habitat is identified and cannot be avoided by the Project, a habitat walkover survey will be undertaken in order to appraise the potential suitability of the habitat present for water vole in more detail and determine the scope of detailed survey.
- 13.2.3 The habitat assessment will be based on consideration of the following factors:
- Bank profile, channel profile and characteristics, and water levels;
  - Availability of food sources;
  - Vegetation structure (in particular the extent of suitable marginal vegetation);
  - Level of shading;

- Disturbance levels;
- Bordering land use; and
- Connectivity with other areas of suitable or sub-optimal habitat.

13.2.4 Based on the above factors and any others which the surveyor considers to be important in the local context, habitat areas requiring detailed survey are to be determined, as well as areas that can be discounted from further investigation.

### 13.3 Proposed methodology

13.3.1 Two survey visits will be undertaken at each selected site to collect evidence of water vole presence, including latrines, burrows, runs, footprints, feeding remains and stashes, droppings, and sightings. Additional information on the habitat will be collected during the first water vole survey, including water flow direction, bank substrate, existing disturbance, bank vegetation type and structure, and adjoining land use.

13.3.2 Where there is uncertainty over droppings and additional field signs are inconclusive, dropping samples will be collected and sent away for DNA analysis. Once survey data has been obtained, the relative population size in each stretch of watercourse or surveyed habitat will be calculated using the methods in (Dean *et al.*, 2016).

13.3.3 Survey results will be used to inform a licence application to Natural England (where appropriate), with a method statement outlining the steps that would be taken to minimise impacts during construction and to improve the conservation status of water vole in the locality upon project completion.

### 13.4 Survey programme and effort

13.4.1 Two survey visits will be undertaken at each selected site spaced at least two months apart, with one survey between mid-April and the end of June, and the other between July and September. Surveys will avoid heavy rainfall or periods immediately thereafter.

# 14. ECOLOGICAL FEATURES NOT REQUIRING FURTHER SURVEY

## 14.1 White-Clawed Crayfish

- 14.1.1 The Project and its Zol are perceived to be outside the current natural range for white-clawed crayfish (*Austropotamobius pallipes*). There is a recent record of a single individual approximately 1.7km west (upstream) of the Project although this is currently considered an anomaly (Environment Agency, personal communication). Absence is therefore currently assumed and no surveys are proposed at present; however, it is acknowledged that the Environment Agency are planning to further investigate presence along that stretch of watercourse and the situation may change in the future.

## 14.2 Great Crested Newt and Other Amphibians

- 14.2.1 Great crested newts (*Triturus cristatus*; GCN) are widespread throughout the region (Natural England, 2021a) and therefore licensing and mitigation will be required to minimise impacts to this species.
- 14.2.2 [District level licensing](#) (DLL) is a type of strategic mitigation licence for GCN granted in certain areas at a Local Authority or wider scale with the aim of improved conservation outcomes for GCN. Where a DLL scheme is in place, developers can make a financial contribution to strategic, off-site habitat compensation instead of applying for a separate licence or carrying out individual detailed surveys.
- 14.2.3 DLL is currently available in North Lincolnshire and Yorkshire (excluding Calderdale, City of Bradford and Kirklees). It is currently unavailable in Lincolnshire but consultation with Natural England has been undertaken and given the proximity of the Project to DLL schemes in this area, it is proposed that the DLL approach to GCN conservation can be taken forward for the Project in its entirety.
- 14.2.4 Once the proposed route has been finalised, an application will be made to Natural England under the DLL scheme which will include the results of the desk study undertaken during the PEA.
- 14.2.5 By demonstrating that a DLL scheme for GCN will be used, GCN can be scoped out of detailed assessment in the EclA. This is because, the DLL approach includes strategic area assessment, the identification of risk zones and strategic opportunity area maps, and a mechanism to ensure adequate compensation is provided.
- 14.2.6 The outcome of this assessment is documented within the Impact Assessment and Conservation Payment Certificate (IACPC) which will be appended to the EclA to identify what the impacts associated with the Project equate too (in terms of compensatory ponds that will be created by Natural England within strategic locations) and confirm that, as a minimum, the impact to GCN associated with the Project is unlikely to be significant.
- 14.2.7 It is also proposed that the DLL approach, coupled with the temporary nature of the Project and the commitment to habitat improvements is also satisfactory to scope out other amphibians from consideration within the EclA.

## 14.3 Other Notable Mammals

- The Project is situated outside the natural range of the dormouse (*Muscardinus avellanarius*) and there is no publicly available information that indicates that there are any nearby release sites. Absence is assumed and no dormouse surveys are proposed.
- Brown hare (*Lepus europaeus*) and hedgehog (*Erinaceus europaeus*) are widespread across the Scoping Route Corridor. Nevertheless, impacts are temporary and as habitats will be reinstated (to equal or better condition than existing), no significant impacts are envisaged. Typical best practice development measures (to minimise disturbance and entrapment within excavations for example) will be included within the CEMP but it is not proposed that these species are specifically identified as an IEF within the EclA.
- A single pine marten (*Martes martes*) record was returned from 2003, located within Messingham Sand Quarry SSSI; two records of polecat (*Mustela putorius*) were returned, one of which within Alkborough Grassland Local Wildlife Site; and four harvest mouse (*Micromys minutus*) records were also returned. The records were spread across the Project, with the majority located within or adjacent to statutory or non-statutory designated sites. Impacts to designated sites will be minimised and, where they cannot be avoided, will be temporary. As habitats will be reinstated (to equal or better condition than existing), no significant impacts to these species are envisaged. As described above, typical best practice development measures will be included within the CEMP but it is not proposed that these species are specifically identified as an IEF within the EclA.

# 15. SURVEY AND ASSESSMENT SUMMARY AND PROGRAMME

**Table 15-1 Summary of survey and assessment requirements for DCO**

<b>Species</b>	<b>Survey and/or assessment required (yes/no/unknown)</b>
Net Gain	Yes – Net Gain assessment (including BNG and Natural Capital commitments)
Preliminary Ecological Appraisal	Yes
Phase 2 Botanical Surveys	Unknown – it is envisaged that the need for survey will be largely avoided but this will be confirmed following Preliminary Ecological Appraisal.
Invertebrates	Unknown – it is proposed that the need for survey will be avoided but this will be confirmed following Preliminary Ecological Appraisal.
Fish	Unknown – it is envisaged that the need for survey will be largely avoided but this will be confirmed following Preliminary Ecological Appraisal.
Reptiles	Unknown – it is proposed that the need for survey will be avoided but this will be confirmed following Preliminary Ecological Appraisal.
Great Crested Newts and common amphibians	No – district level licencing approach being taken forward for great crested newts.
Birds	Passage and wintering: Yes – surveys are ongoing (methodology agreed with Natural England in November 2021). Breeding: Unknown – it is proposed that the need for survey will be avoided but this will be confirmed following Preliminary Ecological Appraisal.
Badger	No – no specific survey is proposed to inform the DCO application. Ad hoc findings will be recorded and assessed with desk study information and patch quality. Detailed survey only planned to be undertaken to inform construction activities.

Species	Survey and/or assessment required (yes/no/unknown)
Bats	<p>Roosts: Yes – further surveys to establish the presence of roosting bats (climbed inspections and/or dusk/dawn emergence/re-entry surveys) will be undertaken as necessary.</p> <p>Activity: No - it is not proposed that any surveys for commuting/foraging bats (i.e. activity transect surveys and static detector survey are undertaken.</p>
Otter	<p>No – no specific survey is proposed to inform the DCO application. Ad hoc findings will be recorded and assessed with desk study information and patch quality. Detailed survey only planned to be undertaken to inform construction activities.</p>
Water Vole	<p>No – no specific survey is proposed to inform the DCO application. Ad hoc findings will be recorded and assessed with desk study information and patch quality. Detailed survey only planned to be undertaken to inform construction activities.</p>

**Table 15-2: Recommended months to undertake each survey/ assessment**

Survey type and anticipated survey dates	Recommended survey/assessment period <sup>3</sup>											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Desk study and habitat assessment <b>Sep 2021 – Mar 2022</b>												
Phase 1 habitat survey & condition assessment <b>Apr – Jun 2022</b>												
Phase 2 botanical survey (if required) (timing species/ habitat dependent) <b>Jun – Sep 2022</b>												
Intertidal and marine surveys <b>Dates Apr – July 2022</b>												
Invertebrate survey (if required) (timing is species/taxon dependent) <b>Jun – Sep 2022</b>												
Fish surveys (if required) (survey timing is species dependent) <b>Jun – Sep 2022</b>												
Reptile survey (if required) <b>May, Jun, Sep 2022</b>												
Breeding birds: Common birds census style survey <b>mid-March – early July 2022</b>												

<sup>3</sup> Dark colour months are within the optimum period, paler colour months are sub-optimum and white coloured months are not recommended for survey/assessment.

Survey type and anticipated survey dates	Recommended survey/assessment period <sup>3</sup>											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding birds: Schedule 1 bird species surveys (if required) (timing is species dependent) <b>Jun – Sep 2022</b>												
Wintering/passage birds: Vantage Point surveys (2 visits per month to each of the 5 VPs). <b>Sep 2021 – Apr 2022 (may also include Aug 2022)</b>												
Wintering/passage birds: Transect surveys (2 visits per month to each transect). <b>Sep 2021 – Apr 2022 (may also include Aug 2022)</b>												
Fish surveys (if required) (survey timing is species dependent)												
Badger survey <b>Pre-construction</b>												
Bats: Preliminary Roost Assessment <b>Apr – Jun 2022</b>												
Bats: Roost inspection and/or survey (where required) <b>Jul – Sep 2022</b>												
Bats: Foraging and commuting activity survey (if required) <b>May – Sep 2022</b>												
Otter survey (if required) <b>Jun 2022 – May 2023</b>												
Reptile survey (if required)												
Water vole survey <b>Jun and Sep 2022</b>												

Survey type and anticipated survey dates	Recommended survey/assessment period <sup>3</sup>											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Invertebrate survey (if required) (survey timing is species/taxon dependent)												

# **PART C – BIODIVERSITY ENHANCEMENT AND MANAGEMENT PLAN**

**Draft to be completed in advance of DCO application**

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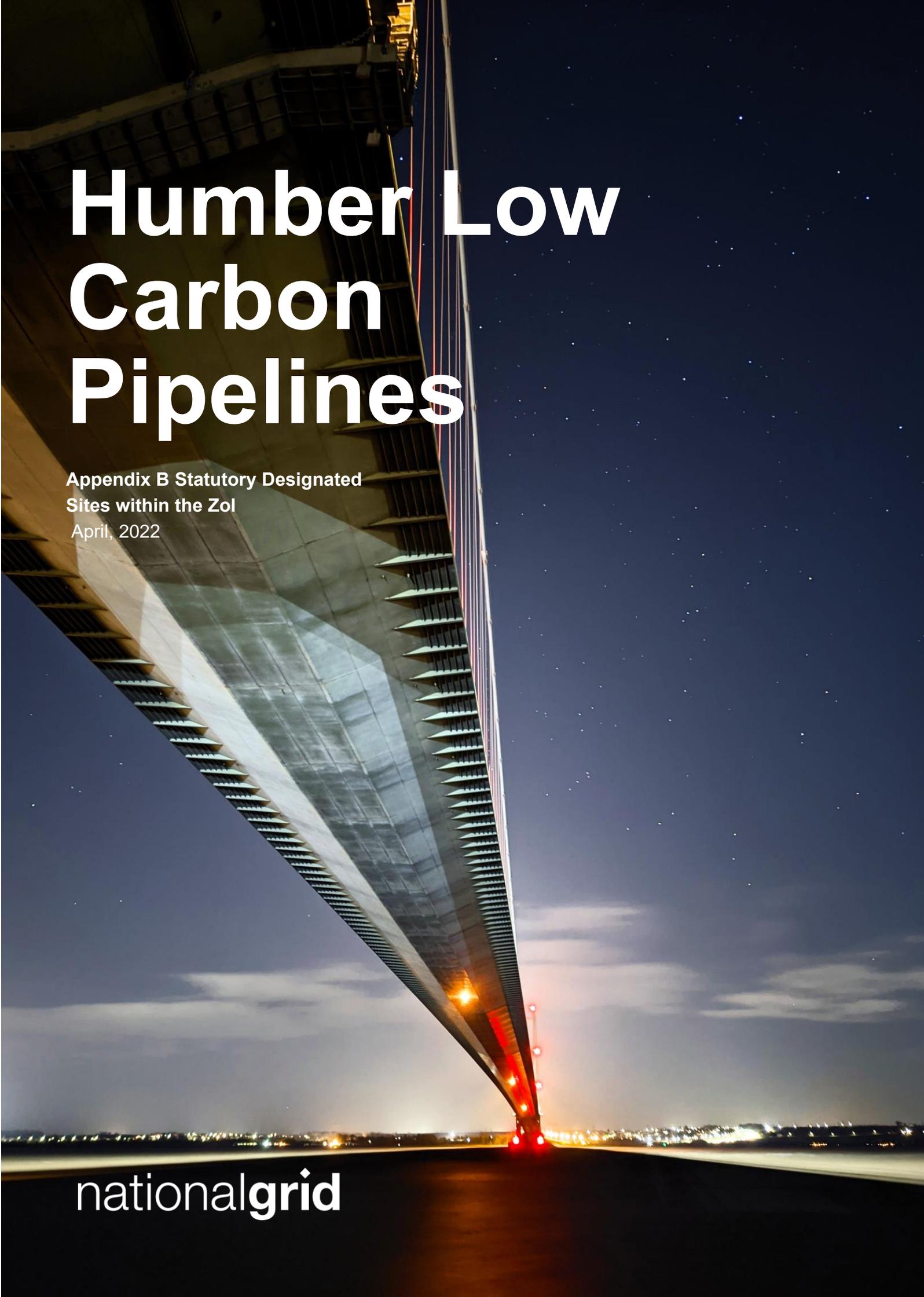
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# Humber Low Carbon Pipelines

Appendix B Statutory Designated  
Sites within the Zol  
April, 2022

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## Appendix B – Statutory designated sites within the Zol

Designated site	Reason for designation	Approximate distance from Scoping Route Corridor
Humber Estuary Ramsar site	Estuarine habitats, breeding grey seal colony, breeding natterjack toad ( <i>Epidalea calamita</i> ) population, internationally important waterfowl assemblage (non-breeding), internationally important spring/autumn passage bird populations, migration route for river lamprey and sea lamprey ( <i>Petromyzon marinus</i> ), nationally important populations of breeding birds.	0m – the Project crosses through the Humber Estuary Ramsar
Humber Estuary SAC (including marine components)	Designated for the presence of estuaries, mudflats and sandflats. Other habitats and species present include coastal lagoons, sea lamprey, river lamprey, allis shad ( <i>Alosa alosa</i> ), twaite shad ( <i>Alosa fallax</i> ) and harbour seal.	0m – the Project crosses through the Humber Estuary SAC
Humber Estuary SPA (including marine components)	Designated for regularly supporting bird populations of European importance over winter (including migratory species), on passage and during the breeding season.	0m – the Project crosses through the Humber Estuary SPA
Greater Wash SPA (marine)	Designated for regularly supporting bird populations of national importance over winter, on passage and during the breeding season.	0m – the Project is within the Greater Wash SPA at the landfall location
Humber Estuary SSSI	Comprises a large macro-tidal coastal plain estuary with intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Species groups that utilise the SSSI include nationally important numbers of breeding birds of lowland open waters and their margins, 22 species of wintering waterfowl in nationally important numbers, passage waterfowl, river and sea lamprey, grey seal, vascular plants (including at least ten nationally scarce species characteristic of coastal and wetland habitats) and invertebrates.	0m – the Project crosses through the Humber Estuary SSSI
Holderness Inshore MCZ	Designated for a mosaic of seabed habitats, with the protected feature of relevance to the Project the intertidal sand and muddy sand. The long sandy intertidal beach is littoral sand, covering the shore area and may be sand or	0m – the Project is within the Holderness Inshore

Designated site	Reason for designation	Approximate distance from Scoping Route Corridor
	muddy sand sediments with shells and stones occasionally be present on the surface; the communities present depend on the stability of the habitat and the degree of drying at low tide, with species present including amphipods, polychaetes and bivalves.	MCZ at the Easington landfall location
Eastoft Meadow SSSI	A herb-rich hay meadow. Of particular note is the occurrence of Green-winged Orchid ( <i>Orchis morio</i> ), Burnt-tip Orchid ( <i>O. ustulata</i> ) and Adder's-tongue fern ( <i>Ophioglossum vulgatum</i> ).	120m west
River Derwent SAC	Designated for the presence of river lamprey. The SAC also supports sea lamprey, bullhead ( <i>Cottus gobio</i> ), otter and water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	170m north
River Derwent SSSI	Supports diverse communities of aquatic flora and fauna, including an exceptionally rich assemblage of invertebrates. Eleven species of dragonfly have been recorded, including the banded agrion ( <i>Agrion splendens</i> ) at its most north-easterly site in the country. The river is also noted for its diversity of fish species, an excellent breeding bird community and otter.	170m north
Messingham Sand Quarry SSSI	The site is predominantly open water and associated fringing stands of reed ( <i>Phragmites australis</i> ) and reedmace ( <i>Typha latifolia</i> ). Wetland plants include pillwort ( <i>Pilularia globulifera</i> ); broadleaved and coniferous woodland has been planted; and in more open areas, grassland and heathland communities are developing. Thirteen species of dragonfly have been confirmed breeding and over 140 species of birds have been recorded on the site, of which about 60 are known to breed regularly.	185m west
Manton and Twigmoor SSSI	Contains important areas of heathland, grassland, wetland and woodland.	360m east/south
North Killingholme Haven Pits SSSI	Large saline lagoons that provide roosting and feeding grounds for waterfowl.	730m east
Ashbyville LNR	Supports a wide variety of birds (including four species of owl) and a range of mammals, butterflies and moths	850m north-west

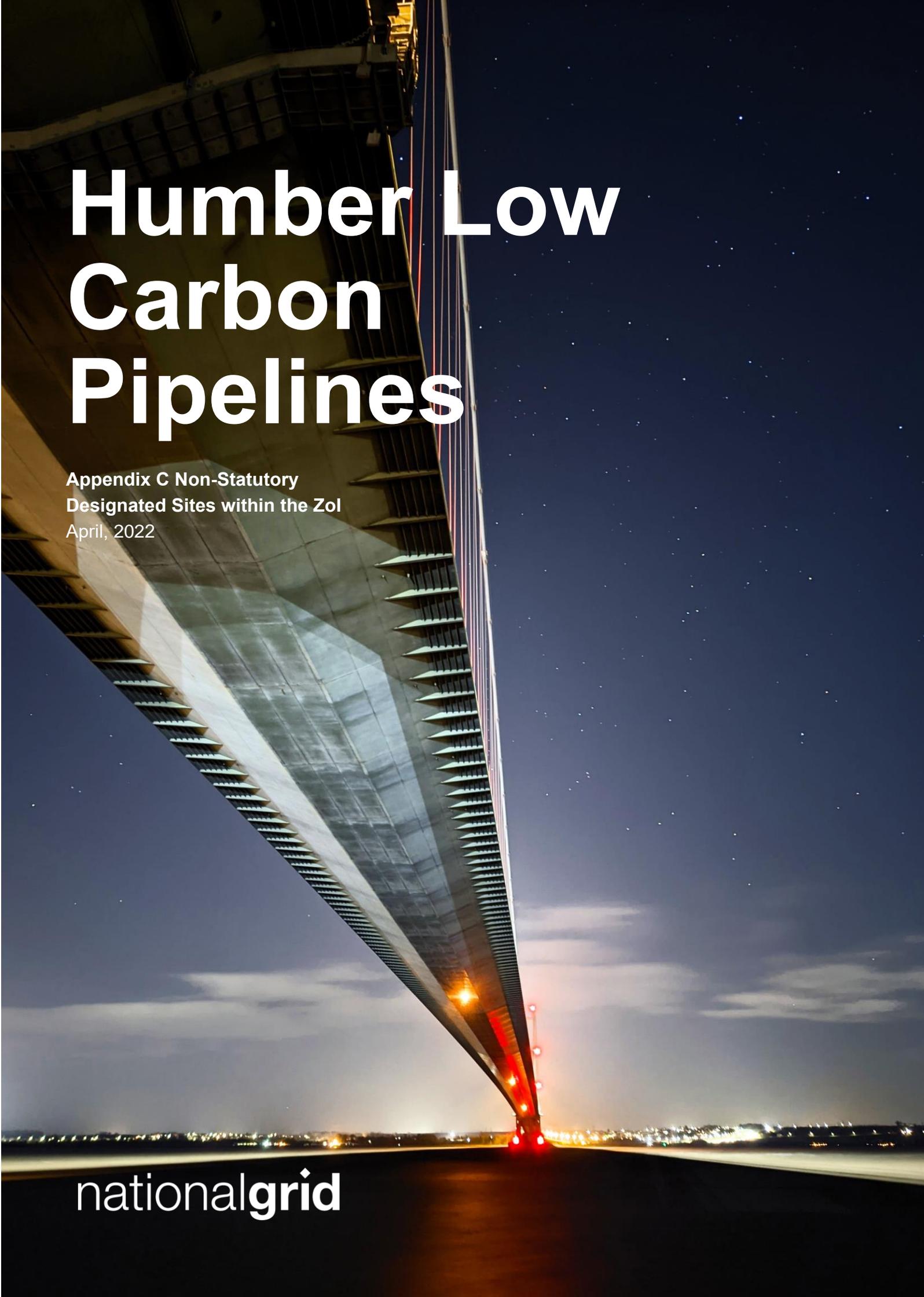
Designated site	Reason for designation	Approximate distance from Scoping Route Corridor
Thorne Moor SAC	Designated for the presence of degraded raised bogs still capable of natural regeneration.	1.1km south
Thorne and Hatfield Moors SPA	The SPA is used regularly by nationally important numbers of Nightjar and also supports Hen Harrier ( <i>Circus cyaneus</i> ), Merlin ( <i>Falco columbarius</i> ) and Short-eared Owl ( <i>Asio flammeus</i> ), Hobby ( <i>Falco subbuteo</i> ) and Nightingale ( <i>Luscinia megarhynchos</i> ).	1.1km south
Thorne, Crowle and Goole Moors SSSI	The SSSI forms the largest extent of lowland raised mire in England. The extensive series of canals linking the wet peat cuttings contain a wide range of plant species. The moors are highly regarded for their invertebrate fauna, especially insects, including several nationally rare species associated with peat bog and fen habitats such as the bog bush cricket ( <i>Metrioptera brachiptera</i> ). There is also a strong population of large heath butterfly ( <i>Coenonympha tullia</i> ). This site is important for wintering birds and breeding bird populations including nightjar, nightingale and woodcock ( <i>Scolopax rusticola</i> ) which are associated with dry scrub and heathland, wet heath and fen habitats.	1.1km south
Sugar Mills Ponds LNR	Former brickworks and sugar refinery next to the Aire and Calder Navigation canal with two small lakes supporting water vole and grass snake ( <i>Natrix helvetica</i> ) and approximately 70 species of resident birds including great crested grebe, kingfisher and barn owl.	1.2km west
Cleatham Quarry SSSI	Disused quarry supporting limestone flora including species-rich limestone grassland. A number of uncommon plant species occur at the site including tall broomrape ( <i>Orobanche elatior</i> ), bee orchid ( <i>Ophrys apifera</i> ), blue fleabane ( <i>Erigeron acer</i> ) and pyramidal orchid ( <i>Anacamptis pyramidalis</i> ). The invertebrate fauna is particularly rich including lepidoptera such as ringlet ( <i>Aphantopus hyperantus</i> ), large skipper ( <i>Ochlodes sylvanus</i> ), common blue ( <i>Polyommatus icarus</i> ) and wall ( <i>Lasiommata megera</i> ) and the rare chalk carpet moth ( <i>Scotopteryx bipunctaria</i> ).	1.2km south
Crowle Borrow Pits SSSI	Comprises a variety of habitats including alder carr, scrub, open water and fen containing the nationally rare Marsh fern ( <i>Thelypteris thelypteroides</i> ).	1.3km west

Designated site	Reason for designation	Approximate distance from Scoping Route Corridor
Humberhead Peatlands NNR	The largest area of raised bog wilderness in lowland Britain. More than 5000 species of plants and animals have been recorded on the reserve of which more than 4000 are insects. There are also sizable populations of adder ( <i>Vipera berus</i> ) and water vole. More than 200 bird species have been recorded included woodlark, oystercatcher ( <i>Haematopus ostralegus</i> ), lapwing, ringed plover ( <i>Charadrius hiaticula</i> ), great crested grebe ( <i>Podiceps cristatus</i> ), marsh harrier, whooper swan ( <i>Cygnus cygnus</i> ), pink-footed geese, hen harrier and short-eared owl.	1.4km south
Messingham Heath SSSI	The SSSI is an important example of coversand heathland, noted for the occurrence of the grayling butterfly ( <i>Hipparchia semele</i> ).	1.4km south
Eskamhorn Meadows SSSI	Five floristically diverse fields supporting unimproved neutral grassland. Of particular note is the occurrence of meadow thistle ( <i>Cirsium dissectum</i> ) which is uncommon in the lowlands of Yorkshire. Small numbers of curlew and lapwing breed in the meadows.	1.5km south
Hatfield Chase Ditches SSSI	A large area of former marsh and wetland containing a rich assemblage of aquatic and emergent plants. including ivy-leaved duckweed ( <i>Lemna trisulca</i> ) and various-leaved pondweed ( <i>Potamogeton gramineus</i> ). Four reed beetles have been recorded including two nationally scarce species - <i>Donacia clavipes</i> and <i>D. simplex</i> . The ditches also support a population of water vole.	1.7km west
Lower Derwent Valley Ramsar site	Traditionally managed species-rich alluvial flood meadow, wetland invertebrates (including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and the only know site in Great Britain for a leafhopper ( <i>Cicadula ornata</i> )), nationally important numbers of passage ruff and whimbrel ( <i>Numenius phaeopus</i> ) in the spring and wintering waterfowl assemblages of international importance. Wigeon ( <i>Anas penelope</i> ) and teal ( <i>Anas crecca</i> ) also occur in populations of international importance over winter	4.5 km north
Lower Derwent Valley SPA	The SPA supports nationally important wintering populations of Bewick's swan ( <i>Cygnus columbianus bewickii</i> ), golden plover and ruff. The SPA also supports important numbers of ruff during spring migration and shoveler ( <i>Anas clypeata</i> ) during the breeding season. The SPA is on international importance for	4.5km north

Designated site	Reason for designation	Approximate distance from Scoping Route Corridor
	overwinter waterfowl, including teal, wigeon, shoveler, pochard ( <i>Aythya ferina</i> ), whimbrel and ruff.	

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# Humber Low Carbon Pipelines

Appendix C Non-Statutory  
Designated Sites within the ZOI  
April, 2022

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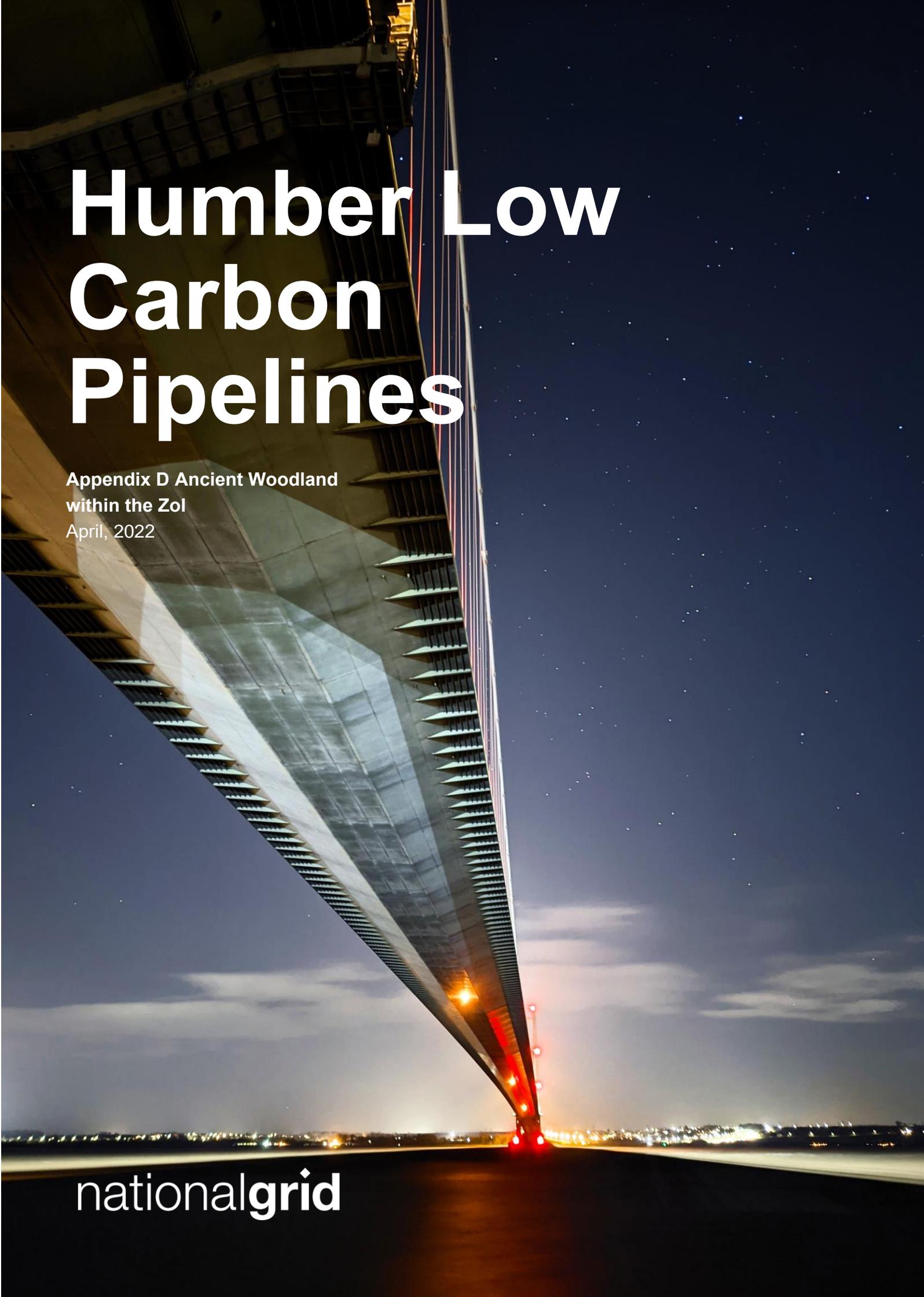
## Appendix C – Non-statutory designated sites within the Zol

Ecological feature	Designated site
<p>Non-statutory designated sites situated within the Scoping Route Corridor and/or with hydrological connectivity to AGI locations (scoped in for further assessment)</p>	<p>Sites within the Scoping Route Corridor and hydrologically connected to AGI locations: Barnetby Road Verges LWS; Black Hoe Plantation LWS; Broom Plantation LWS; Hodgson’s Fields Yorkshire Wildlife Trust Reserve; Keadby Boundary Drain LWS; Stainforth and Keadby Canal Corridor LWS; Sweeting Thorns LWS; New River Ancholme LWS; Old River Ancholme LWS; and Paull Holme Strays Yorkshire Wildlife Trust Reserve.</p> <p>Sites outside the Scoping Route Corridor but hydrologically connected to AGI locations: Holme Hall Golf Course LWS; Greetwell North LWS; Keadby Wet Grassland LWS; Keadby Wetland LWS; Newstead Drain LWS; South Soak Drain, Keaby LWS; Butterwick Hale and Common LWS; Keadby Warping Drain LWS; and Out Newton – Skeffling LWS.</p>
<p>Non-statutory designated sites situated within or with hydrological connectivity to the Scoping Route Corridor (excluding AGI locations) (scoped in for further assessment)</p>	<p>Sites within the Scoping Route Corridor: Brick Hills LWS; Grasby Bottoms Green Lane LWS; Pauper’s Drain LWS; Three Rivers LWS; South Engine Drain, Belton LWS; Candley Beck, Westrum LWS; Hedon – Winestead Disused Railway Line LWS; Oak Hill LWS; Warping Drain, Derrythorpe LWS; and West Common North Road LWS.</p> <p>Sites with hydrological connectivity to the Scoping Route Corridor (excluding AGI locations): Folly Drain North LWS; Halton Marsh Clay Pits LWS; Holme Lane Verge LWS; Greetwell South LWS; Howsham Barff Wood LWS; Messingham Lakes LWS; Messingham Northwest LWS; South Cloister Covert LWS; Black Walk Nook LWS; Donkey Park South LWS; Asselby Island LWS; Messingham Sand Quarry Lincolnshire Wildlife Trust Reserve; Dawson City Claypits Lincolnshire Wildlife Trust Reserve; Enholmes Plantations Historic LWS; Hollym Carrs LWS; Kelsey Hill Gravel Pits Historic LWS; Fort Paull Humber Grassland Candidate LWS; East Marsh LWS; Frodingham – Winestead Lane LWS and Newland Ings, Newland SINC.</p>
<p>Non-statutory designated sites located outside of the Scoping Route Corridor and without hydrological connectivity or other</p>	<p>First Wood North LWS; First Wood South LWS; Goxhill Meadows LWS; Halliday Hill LWS; First Wood North Field LWS; Beaulah Wood LWS; Mausoleum Woods LWS; Beckingham Shaw LWS; River Eau and Messingham Ings LWS; River Torne LWS; Top Farm Fields LWS; Gainsthorpe Medieval Village LWS; Crowle Moor Lincolnshire Wildlife Trust Reserve; Killingholme Haven Pits Lincolnshire Wildlife Trust Reserve; Ashbyville Lake LWS; Broughton West Wood LWS; Hatfield Waste Drain LWS; North Engine Drain, Belton LWS; Heron Holt LWS; Manby Wood LWS; Melton Ross Quarry LWS; New Barnetby Road Verges, South LWS; Santon Wood East LWS; Hendale Wood LWS; Weldon’s</p>

Ecological feature	Designated site
potential impact pathway (scoped out of further assessment)	Plantation LWS; Staniwells Road Verges LWS; Abbot's Lodge Grassland LWS; Faraway and Thirty Foot Drains LWS; Scawby Park LWS; Cottagers Dale Wood LWS; Greetwell Road, East Verge LWS; Greetwell Road, West Verge LWS; Broughton Far Wood LWS; Gadbury and Lundimore Woods LWS; Swinster Lane Field LWS; Chase Hill Wood LWS; Cleatham Pits East LWS; Cliff Farm Pit LWS; Scrub Lane East Field LWS; Wold Road, Wootton Grange LWS; East View Meadow LWS; Meadow Area 4 Historic LWS; Brockholes SINC; Withernsea Millennium Green LWS; Yaddlethorpe Fish Ponds LWS; Messingham Grassland LWS; Burkinshaw's Covert LWS; Searby Wold Lane Verges LWS; Brocklesby Park LWS; Low Wood, Barnetby le Wold LWS; Barton Road, Wootton Hall LWS; Somerby Top Road Verge LWS; and South Moor Covert and Fishpond Plantation LWS.

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# Humber Low Carbon Pipelines

Appendix D Ancient Woodland  
within the ZOI  
April, 2022

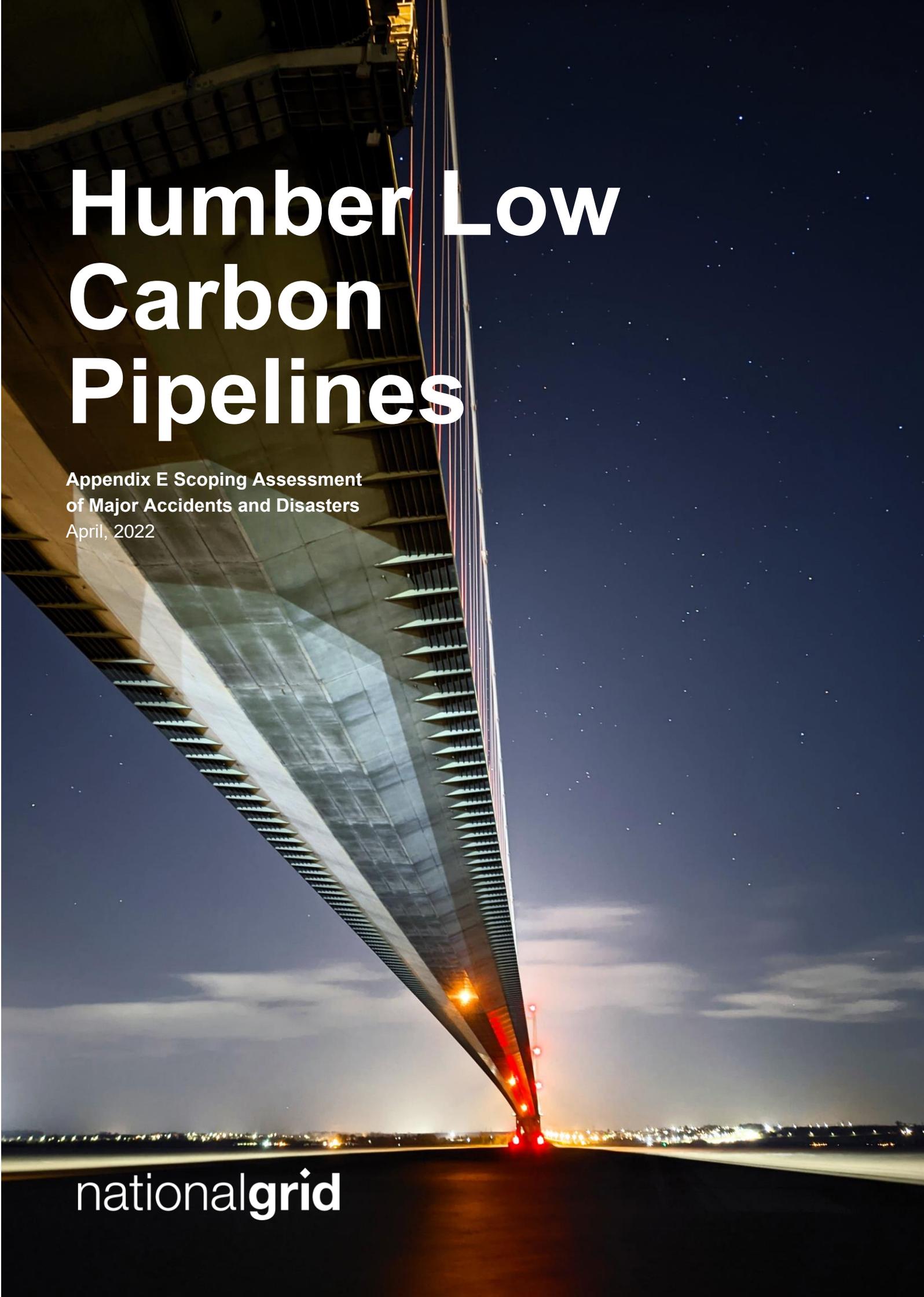
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## Appendix D – Ancient Woodland within the Zol

Designated site	Description
Ancient woodland within the Scoping Route Corridor	None
Ancient woodland outside the Scoping Route Corridor	Gadbury and Lundimore Woods, Alder Wood, Far Wood (2 parcels); and four un-named parcels

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# Humber Low Carbon Pipelines

Appendix E Scoping Assessment  
of Major Accidents and Disasters  
April, 2022

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## Appendix E: Scoping Assessment of Major Accidents and Disasters

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
<b>Internal Major Accidents</b>				
Accidents during commissioning	Construction	✓		<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>Following the construction of the pipelines, there will be a period of initial testing called pre-commissioning. This period is used to confirm that the pipelines have been correctly installed and has not been damaged during the construction phase prior to flammable or toxic fluids being introduced. There is the potential for a major accident to occur during commissioning such as a pipe failure which could harm members of the Project workforce.</p>
Construction phase accidents including dropped objects, heavy plant, temporary works, rock falls from tunnel boring and problems with machinery	Construction		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The potential for accidents to occur during the construction process will be identified and dealt with through appropriate risk assessment and mitigation (applying the hierarchy of controls) as required to comply with UK health and safety legislation and environmental legislation. The CEMP will require risk assessment of construction activities (including any necessary earthworks or demolition activities) and this assessment would identify and mitigate, where necessary, the potential impact of all major accidents or disasters, including those affecting non-human receptors. These risk assessments shall count for adverse weather and prevailing environmental conditions.</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				There may be potential for accidents during tunnel boring (for example, encountering unexpected ground conditions leading to instability etc.). This will be mitigated via geological investigations prior to the construction phase.
Construction phase activities impact on UXO	Construction		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>Encountering Unexploded Ordnance (UXO) during intrusive construction works is scoped out. Based on The UXO Risk Map (Ref. F.1), the hazard across the preliminary 1km Study Area is low. There are well developed construction industry practices which allow safe construction of thousands of Projects each year in low hazard areas.</p>
Construction traffic accidents	Construction		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The Project will require road transport movements for the construction workforce and construction materials. However, the numbers of vehicle movements will not be significant compared to the background rate across the widespread area covered by the Project. A full assessment of the impact on traffic will be in Chapter 14: Traffic and Transport. It is therefore not considered further in the assessment of Major Accidents and Disasters.</p>
Damage to existing utilities	Construction		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>There is potential for utilities and services to be present along the Scoping Report Corridor. There is potential to damage these utilities which could harm the Project workforce or lead to contamination of the ground/groundwater.</p> <p>Service searches will be undertaken to confirm the presence of utilities and services and discussions will be conducted with landowners to confirm the presence of utilities and services. Furthermore, The Applicant will work with the utility owners and construct the Project around those utilities identified. Utilities and services will be marked during construction and mitigated as required.</p>
Fires	Construction and Operation	✓		<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>There will be construction compounds including temporary welfare facilities and vehicle fuelling facilities established in order to facilitate construction. There is the potential for a fire in the construction compounds which could cause serious harm to the Project workforce. Suitable risk assessments will be conducted and appropriate mitigation measures included.</p> <p>There will be electrical equipment and other consumables in the AGIs once operational, with a low potential risk of fire during the operational phase which will be assessed at the Preliminary</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				Environmental Information Report (PEIR)/Environmental Statement (ES) stages.
Impacts on Aviation	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>There is one airport which lies within 10km of the Scoping Route Corridor - more specifically, Humberside Airport which at its closest point is approximately 250m northwest of the Scoping Route Corridor.</p> <p>The Airport Operators Association have published 5 Advice Notes (AN) on safety in the proximity to airports. Advice Note 4 (Ref. F.2) states that good practice in line with BS 7121 requires the Project to consult with the aerodrome/airfield manager for any crane exceeding 10m in height within 6km of the aerodrome. As outlined earlier, a section of the proposed route corridor lies within 6km of the airport. It is not yet known whether any cranes will be required in these locations but, if they are, it is unlikely they will exceed 10m in height. If a crane was to exceed 10m, the aerodrome/airfield manager would be consulted.</p>
Impacts on mines and storage caverns	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>Available Coal Authority records show two sections of the Study Area fall within Coal Mining Reporting Areas (Ref. F.3), this includes the initial stretch of the Scoping Route Corridor prior to Scunthorpe and then a stretch of the Scoping Route Corridor crossing the Humber.</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				A full assessment of the impact on mines and storage will be in Chapter 8: Geology and Hydrology. It is therefore not considered further in the assessment of Major Accidents and Disasters.
Impacts on transport networks and network impacts on the pipelines	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The pipelines would be required to cross transport networks including major road infrastructure. It is anticipated that these will likely be crossed using trenchless techniques to minimise the potential impact on these networks. At a crossing points the pipelines will be designed in accordance with the appropriate approved codes and standards with regards sufficient depth, wall thickness and, if necessary, impact protection, which are well established and understood by the pipeline industry such that it would be protected from any road accidents. It is noted that there are a very large number of natural gas pipelines which are buried in public highways and experience gained over many decades ensures that the risk of damage by traffic collisions on the road surface is negligible.</p> <p>Road crossings are well understood by the pipeline industry and will be addressed through the design of the pipelines. Industry good practice design will be adopted for the whole pipeline system. In addition, pipeline crossings of railways and major roads are subject to approval by the relevant network authority.</p> <p>On this basis, it is proposed to scope out the impact on transport networks and the potential for transport networks to cause a Major Accident at the Project.</p>
Impact on watercourse	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>The pipelines will need to cross various watercourses including the River Humber, River Aire, River Trent and the Sheffield and South Yorkshire Canal. It is anticipated that major rivers and canals would likely be crossed using trenchless techniques to minimise the potential impact on these networks, i.e., closing waterbodies to facilitate construction. Smaller watercourse crossings including ditches and streams would generally be crossed using an open cut technique.</p> <p>The pipelines will be buried beneath the watercourse and therefore not located within the surface water body. The design of the pipelines in such locations will be in accordance with the appropriate approved codes and standards to ensure that it is protected from foreseeable forces including to sedimentation, scour or dredging. These are well understood by the pipeline industry and will be addressed through the design of the pipelines. Industry good practice design will be adopted for the whole pipeline system.</p> <p>On this basis, it is proposed to scope out the impact on watercourses and the potential for watercourses to cause a Major Accident at the Project.</p>
Impact on intertidal areas	Construction and Operation		✓	<p>The pipelines will need to cross two intertidal areas, namely: the River Humber and the Holderness Coast.</p> <p>There is not expected to be an effect on the River Humber during construction because it will be crossed utilising trenchless techniques.</p> <p>Furthermore, during operation the pipelines will be buried beneath the River Humber and therefore not located within the surface water body. The design of the pipelines in such locations will be in accordance with the appropriate approved codes and standards to ensure that it is protected from foreseeable forces including to sedimentation, scour or dredging. These are well understood by the pipeline industry and will be addressed through the design of the</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>pipelines. Industry good practice design will be adopted for the whole pipeline system. On this basis, it is proposed to scope out the impact on the River Humber.</p> <p>Chapter 6: Biodiversity and Chapter 16: Hydrology and Land Drainage will assess the potential for impacts to the Holderness Coast during the construction and operation phases; it is therefore not considered further in the assessment of Major Accidents and Disasters.</p>
Leaks and spills – pollution to water or ground	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>There will be small amounts of chemicals and fuels used and stored within the construction compounds. These will be stored in line with industry good practice and the quantities will be minimised.</p> <p>Chapter 8: Geology and Hydrogeology will assess the potential for ground/groundwater contamination during the construction and operation phases; it is therefore not considered further in the assessment of Major Accidents and Disasters.</p> <p>Chapter 16: Hydrology and Land Drainage will assess the potential for water contamination during the construction and operation phases; it is therefore not considered further in the assessment of Major Accidents and Disasters.</p>
Accidents during maintenance	Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The AGIs and pipelines are normally unoccupied but personnel will visit for inspection and maintenance activities and to carry out any repairs which may be required. Maintenance accidents are work-related accidents that could affect only one or two workers carrying</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>out the task, the effects of which, do not extend to receptors within the wider environment. Under UK Health and Safety legislation, employers are required to manage the risk to their employees and others who could be affected by their activities and ensure that the risk is reduced to As Low As Reasonable Possible (ALARP). The ALARP principle requires compliance with good practice as a minimum.</p> <p>The AGIs will be designed with consideration of the potential occupational health and safety hazards such as electrocution, falls from height and trip hazards. These will be mitigated through the application of the hierarchy of controls: i.e., hazards will be designed out or minimised where practicable, and appropriate measures to prevent and mitigate residual risks implemented. All staff who undertake maintenance on the system will be suitably qualified and experienced professionals.</p>
Unplanned release of hydrogen from pipeline or AGI during operation	Operation	✓		<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>There is potential for a release of hydrogen from a pipeline or AGI during operation, for example as a result of external interference with the pipeline either accidentally or deliberately and from operational errors.</p> <p>The release of flammable gases has the potential to lead to fire/explosion hazards which could lead to serious harm to receptors in the vicinity.</p>
Unplanned release of carbon dioxide from pipeline or AGI during operation	Operation	✓		<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>There is potential for a release of carbon dioxide from a pipeline or AGI during operation, for example as a result of external interference with the pipeline either accidentally or deliberately and from operational errors.</p> <p>The release of carbon dioxide has the potential to cause asphyxiation and/or have toxic contamination effects, both of which could lead to serious harm to receptors in the vicinity.</p>
Structural collapse of assets	Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The design of the AGIs will be undertaken by suitably qualified and experienced personnel including civil and structural engineers. The design will account for the expected ground conditions and design loads, e.g., due to wind, accounting for the effects of climate change, and will be ensured through compliance with appropriate codes and standards, and the application of good practice in structural design.</p> <p>This will ensure appropriate design of the Project and a reduction of the risk of structural hazards during operation such as building collapse to low levels, which are considered to be ALARP.</p>
Decommissioning activities	Decommissioning		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The potential for MA&amp;Ds to occur during decommissioning activities will be identified and dealt with through appropriate risk assessment and mitigation measures as required to comply with UK health and safety and environmental legislation. The Decommissioning Environmental Management Plan (DEMP) will require a risk assessment of decommissioning activities and this assessment shall identify and mitigate, where necessary, the potential impact of all</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				major accidents or disasters, including those affecting non-human receptors. These risk assessments shall count for adverse weather and prevailing environmental conditions. The decommissioning of the Project will also be covered by additional consents.
<b>External Major Accidents</b>				
Aircraft	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>The risk of an aircraft crash impacting the Project is considered to be extremely low. The Project represents a small construction workforce population which at its closest point will be located 250m from any airport.</p> <p>The Project will include predominantly buried infrastructure, which is unlikely to have any material impact on aviation.</p> <p>Given the narrow, buried and linear nature of the Pipelines as well as there not being AGI locations within 10km of Humberside Airport, the risk of a plane crash impacting the Project is extremely small.</p> <p>As the Project will not materially alter the risk of an aircraft crash, it will not have a significant effect and is therefore scoped out of the EIA.</p>
Rail	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The proposed pipeline route alignments would require crossing of the rail network in England.</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>Trenchless crossing techniques will 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.</p> <p>The pipelines are a sealed, below-ground feature and therefore where they pass underneath embankments there is potential impacts on rail lines from subsidence over time and potentially vibration from trains passing over at high speed on the pipelines which will need to be considered in the design.</p> <p>It is considered that there will not be a significant risk to underground pipeline integrity from an impact resulting from a rail accident as the pipelines will be buried and constructed to good engineering practice. The AGIs and Block Valve Stations are located within a fenced compound a significant distance away from the railway line and are unlikely to be impacted during a rail accident.</p>
External chemical major accidents	Construction and operation	✓		<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>There are a large number of Control of Major Accident Hazard (COMAH) Establishments and potentially further sites holding Hazardous Substance Consents within the preliminary 1km Study Area (Ref. F.4), including some sites which are associated with the Project as users or suppliers of hydrogen and/or carbon dioxide.</p> <p>A major accident at one of these sites could impact the construction workforce or could potentially initiate a major release through damage to the pipelines.</p>
External nuclear major accidents	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				Nuclear sites are designed, built and operated so that the chance of accidental releases of radiological material in the UK is extremely low. The last historical major accident in the UK was Windscale in 1957. There are no nuclear sites within a 10km corridor along the Project.
Loss of utilities	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>During the construction and operation of the Project, there will be a reliance on utility systems to provide services to the Project. For example, electricity will be required for lighting, and powering control systems for operation of the AGIs, it may also be used to provide heating and welfare facilities during construction. However, the loss of utility systems including water, power or telecommunications will only lead to construction phase/operational inconvenience, but it will not lead to Major Accident level consequences, as all items will be designed to ‘fail-safe’ in the event of loss of utilities.</p>
<b>External Major Accidents – Malicious Attacks</b>				
Terrorism	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>Terrorism is the act of inflicting violence as a means of inflicting terror for political reasons. At the time of writing (February 2022), MI5 rates the current UK-wide threat level as SUBSTANTIAL, which means an attack in the UK is considered ‘likely’ (Ref. F.5). The National Risk Register (Ref. F.6) for the UK lists various types of terrorist attack as potential major accidents including attacks on publicly accessible</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>locations, transport systems, infrastructure, as well as Chemical, Biological, Radiological or Nuclear (CBRN) or Cyber-attacks.</p> <p>The Project is not a publicly accessible location or transport system, it also does not represent a potential target or vector for a CBRN attack.</p> <p>Cyber-attacks are considered separately below.</p> <p>The Centre for the Protection of National Infrastructure (CPNI) sets the definition of Critical National Infrastructure (CNI) (Ref. F.7). Security provisions have already been allowed for within the design of the Project and consideration will be given to the appropriate additional measures if the Project is designated as CNI.</p> <p>Additionally, it is worth noting that the Project is infrastructure which is dispersed over significant distances and will be buried. This will make it extremely difficult to ‘damage’ in the conventional sense as it is protected by its disparate nature, unlike a power station or water treatment facility, which presents a more consolidated target.</p> <p>The potential effects on the Project of terrorism are not considered significant.</p>
Widespread public disorder	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The National Risk Register (Ref. F.6) states that public disorder ‘<i>may be caused by a combination of long-standing grievances and a spontaneous response to a single incident.</i>’</p> <p>The UK is a developed economy with a stable democratic political regime, such that prolonged civil unrest is considered extremely unlikely. Periodically, political protests may turn violent but these are rarely widespread and are usually in response to a ‘precipitating event’.</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				As the Project represents a significant step forward in the UKs drive to a Net Zero Carbon economy, it is not considered that the Project is likely to be either a target or a precipitating event for widespread public disorder.
Cyber Attack	Operation	✓		<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>The National Risk Register (Ref. F.6) includes cyber attacks as one of the types of terrorism which may affect the UK. In recent years, other countries have seen successful cyber attacks against power stations or grid infrastructure and the UK NHS has also been a victim of a ransomware attack. The Project has associated cyber infrastructure which could be attacked. If this were to happen, impacts could be as follows:</p> <ul style="list-style-type: none"> <li>• An unplanned shut down leading to a major event;</li> <li>• Overpressure of the pipelines; and</li> <li>• A carbon dioxide and/or hydrogen shut down that could affect the Connected Projects' ability to generate power.</li> </ul> <p>Any one of these impacts has the potential to lead to a High magnitude of change to human and non-human receptors. The project will be conducting appropriate risk assessments and the systems supporting the Project will include suitable protective measures.</p>
<b>Disasters</b>				
Biological threats, e.g., disease epidemics, animal diseases etc.	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>The Project will not materially alter the health of those who may be exposed to biological threats, nor will it increase or decrease their likelihood, as the construction population will be small. The Project will not therefore materially alter the background risk of biological threats.</p> <p>Any impacts that these threats may have on the Project such as temporary cessation of construction or requirements for social distancing measures as were required for the Coronavirus pandemic are not considered to be Major Accidents.</p> <p>Therefore, the assessment of biological threats is scoped out.</p>
Dam/Reservoir breaches	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>A Flood Risk Assessment will be undertaken as part of the Hydrology and Land Drainage assessment. To avoid duplication, flood risk is therefore scoped out of the Major Accidents and Disasters assessment.</p>
Extreme weather conditions (temperature, wind, precipitation, drought)	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The design of the Project, including any temporary structures, will be undertaken by suitably qualified and experienced personnel including civil and structural engineers. The design will account for the expected ground conditions and design loads over the appropriate</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>return period, e.g., due to wind and will be ensured through compliance with good practice in structural/process design, including compliance with the Eurocodes and any relevant British Standards Institution (BSI) published documents.</p> <p>The design of the Project will include allowances for the anticipated changes in climate over the lifecycle of the Project and will incorporate measures to allow adaption where required. This is described and assessed within Chapter 7: Climate.</p> <p>To avoid duplication, extreme weather conditions is therefore scoped out of the Major Accidents and Disasters assessment.</p>
Flood risk including pluvial, fluvial and coastal flooding	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p> <p>A Flood Risk Assessment will be undertaken as part of the Hydrology and Land Drainage assessment. To avoid duplication, flood risk is therefore scoped out of the Major Accidents and Disasters assessment.</p>
Lightning	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>The majority of the pipeline infrastructure will be buried and therefore at negligible risk of a lightning strike.</p> <p>The potential consequences of a lightning strike on any AGI are likely to be restricted to damage to the AGI building and potential injury to</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				any workers who may be present. The Project will be provided with adequate lightning protection compliant with BS EN 62305-3 (Ref. F.8) to ensure the risk from lightning is reduced further and is considered to be reduced to ALARP. Adequate lightning protection for temporary structures or plant during construction will be required by any CEMP.
Seismic	Construction and operation		✓	<p><b>Likelihood:</b> Low</p> <p><b>Consequence:</b> Low</p> <p>Seismic activity does not occur in Britain in a sufficient intensity owing to the motion of the Earth's tectonic plates causing regional compression. The British Geological Survey (BGS) (Ref. F.9) acknowledges that on average, a Richter magnitude 4 earthquake happens in Britain roughly every two years and a magnitude 5 earthquake occurs around every 10 to 20 years.</p> <p>As such the Cabinet Office National Risk Register (Ref. F.6) states that <i>"Earthquakes in the UK are moderately frequent but rarely result in large amounts of damage. An earthquake of sufficient intensity (determined on the basis of the earthquake's local effect on people and the environment) to inflict severe damage is unlikely"</i>.</p> <p>The Project is not in or close to an active area. Furthermore, the design of the Project will account for any foreseeable loads, e.g., due to seismic activity in line with British Standards. It is therefore considered there are no significant effects arising from seismic hazards.</p> <p>Details on the fault lines within the Study Area are provided in Chapter 8: Geology and Hydrogeology.</p>

Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
Space Weather	Construction and operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> Low</p> <p>Severe space weather is divided into three categories in the National Risk Register (Ref. F.6): Solar flares, solar energetic particles and coronal mass ejections. These have the capacity to cause a loss of power or interference with satellite or radio based communication technologies. While these events affecting the UK are extremely rare, they are known to have occurred in 1921, 1960, 1989, 1991 and 2003.</p> <p>The only foreseeable impact to the Project is a temporary loss of power (which could also affect pipeline Cathodic Protection (CP) systems for a short period) or telemetry systems. Good engineering design practices will ensure that in the event of loss of services (power or communications), the Project will be maintained in a safe condition.</p> <p>It is noted that the Project is no more vulnerable than other similar infrastructure such as the natural gas systems across the UK, and much less vulnerable than other industries which have a more onerous reliance on satellites such as aviation.</p> <p>As space weather does not have the capacity to cause a major accident which may impact the Project it is therefore not considered further.</p>
Coastal erosion and landslides	Construction and Operation		✓	<p><b>Likelihood:</b> Low <b>Consequence:</b> High</p>

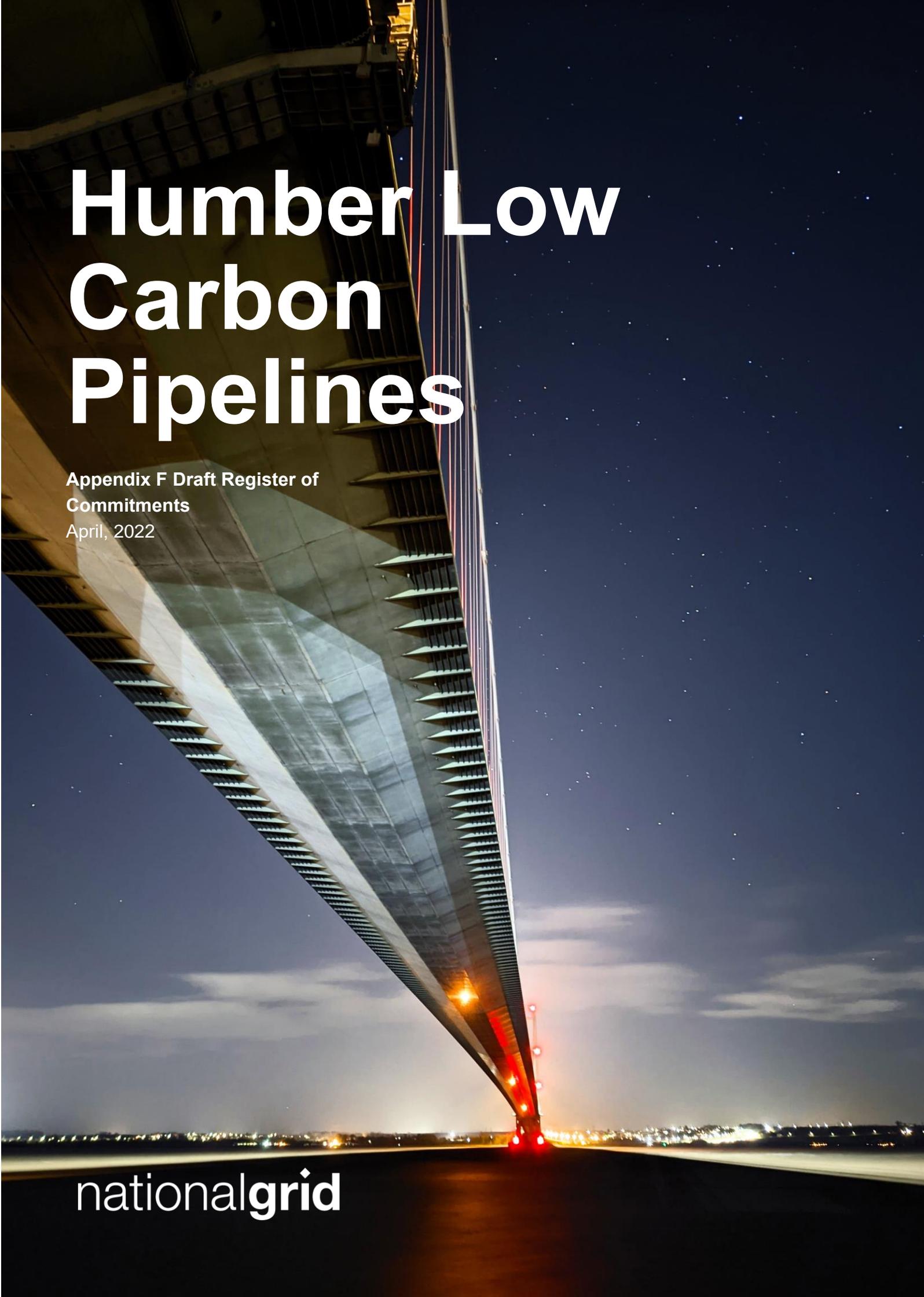
Potential Major Accident/ Disaster	Phase	Scoped in	Scoped out	Justification
				<p>The landfall site is located on the Holderness coast in vicinity of Easington. There are existing coastal defences at this location that will be maintained up to 2045. However, the long-term future of these defences is uncertain.</p> <p>This part of the coastline is rapidly eroding and there is evidence of landslides in the area.</p> <p>Coastal erosion has the potential to expose the carbon dioxide pipeline in the intertidal zone leading to potential damage to the pipeline. Additionally, the Pumping Facility could be impacted by the erosion of the cliff although the site options being considered are set back from the current cliff line in order to minimise this risk.</p> <p>Assessment of coastal processes in the intertidal zone will be undertaken as part of the Hydrology and Land Drainage assessment. To avoid duplication, coastal processes are therefore scoped out of the Major Accidents and Disasters assessment.</p>

## References

- Ref. F.1 Zetica (2021). UXO Risk Maps. [online] Available at: <https://zeticauxo.com/downloadsand-resources/risk-maps/> (Accessed 16<sup>th</sup> February 2022).
- Ref. F.2 Airport Operators Association (2016) *Safeguarding of Aerodromes - Advice Note 4: Cranes and Other Construction Issues*. [online] Available at: <<https://www.aoa.org.uk/wp-content/uploads/2016/09/Advice-Note-4-Cranes-2016.pdf>> (Accessed 23 February 2022).
- Ref F.3 Interactive Map Viewer (2022) *Coal Authority*. [online] Available at: <<https://mapapps2.bgs.ac.uk/coalauthority/home.html>> [Accessed 26 February 2022].
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- Ref F.6 HM Government (2020) National Risk Register. [online]. Available at: <https://www.gov.uk/government/publications/national-risk-register-2020> (Accessed 16 February 2022).
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- Ref F.8 British Standard (2011) *BS EN 62305-3 - Protection Against Lightning*. [online] Available at: [http://www-public.tnb.com/eel/docs/furse/BS\\_EN\\_IEC\\_62305\\_standard\\_series.pdf](http://www-public.tnb.com/eel/docs/furse/BS_EN_IEC_62305_standard_series.pdf). (Accessed 25 February 2022).
- Ref F.9 British Geological Society (2022) Where do earthquakes occur? [online]. Available at: <https://www.bgs.ac.uk/discovering-geology/earth-hazards/earthquakes/where-do-earthquakes-occur/#:~:text=A%20magnitude%204%20earthquake%20happens,UK%20is%20around%20magnitude%206.5.> (Accessed 19 February 2022).

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# Humber Low Carbon Pipelines

Appendix F Draft Register of  
Commitments

April, 2022

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# Humber Low Carbon Pipelines

## Document control

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### Document Properties

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<b>Organisation</b>	Arcadis
<b>Author</b>	Catherine Sugden (and various authors)
<b>Approved by</b>	Chris Taylor
<b>Title</b>	EIA Scoping Report Volume III, Appendix F: Draft register of commitments

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### Version History

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<b>Document</b>	<b>Version</b>	<b>Status</b>	<b>Description / Changes</b>
April 2022	1	Final	For submission to PINs

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# Appendix F: Draft Register of Commitments

**Table 1: Draft Register of Commitments for the Project**

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
1	Various	<p>The implementation of a Construction Environmental Management Plan (CEMP). The CEMP will set out a series of measures, based on best practice guidance from a range of environmental disciplines to control the environmental effects of the construction of the Project.</p> <ul style="list-style-type: none"> <li>• Measures within the CEMP will include (but not be limited to):</li> <li>• Site inspections for visual dust.</li> <li>• Covering stockpiles.</li> <li>• No idling of vehicles.</li> <li>• Dust suppression techniques.</li> <li>• Wheel washing.</li> <li>• Construction traffic to be restricted to operating at designated areas.</li> <li>• Topsoil and subsoil movements will only be undertaken in suitable conditions, for example, when not waterlogged, and using appropriate</li> </ul>	<p>A draft CEMP will be submitted with the DCO application.</p> <p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	Construction

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
		<p>techniques to avoid long-term damage to the soil structure from compaction.</p> <ul style="list-style-type: none"> <li>• Topsoil storage bunds will be restricted to a maximum height of 4m to minimise risk of compaction and development of adverse conditions within the topsoil heap that may affect structure and fertility.</li> <li>• Topsoil stripping will be restricted to the width of the permanent and temporary elements of the Project, thereby minimising disturbance to the integrity of the soil and its structure.</li> <li>• Soils will not be stockpiled within 8m of surface water features or other sensitive receptors. Where soils are stockpiled for the short term (i.e. less than three months), they will be covered to reduce the risk of wind and water erosion. Soil stockpiles that are in place for longer periods will generally be seeded to stabilise the surface and reduce the risk of wind and water erosion. Appropriate measures, for example silt fences/barriers, will be placed around the stockpiles to prevent sediment-laden runoff reaching surface water features until the vegetation is established. Stockpiles will be managed to avoid the establishment of weeds either through removal or treatment.</li> <li>• All concrete pours would be contained within shuttering or dry excavations and pre-cast concrete would be used where possible.</li> </ul>		

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
		<ul style="list-style-type: none"> <li>• Appropriate induction to be given to ensure contractors act considerately in relation to local residents.</li> <li>• Appropriate fencing, signage and safety precautions.</li> <li>• Measures associated with the design of construction compounds. Where practical, construction compounds would be located to avoid or minimise environmental and community impacts, provide the best access for personnel and deliveries in relation to major structures and worksites, and meet other construction requirements for the Project.</li> <li>• Fuels and oils at the construction compounds, on site and at work areas will be managed in accordance with the Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010. Fuels, oils, chemicals and any other potentially hazardous materials will be stored responsibly and all refuelling, oiling and greasing of construction plant and equipment will take place above drip trays and also away from watercourses and drains as far as is reasonably practicable. Appropriate spill kits will be made easily accessible for these activities.</li> <li>• Where required, a watching brief will be maintained during construction works to confirm the absence of potential sources of contamination such as ‘made ground’, visual or</li> </ul>		

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
		<p>olfactory evidence of hydrocarbons. These areas of potentially contaminated ground and/or water will be sampled and undergo appropriate sampling and laboratory analysis.</p> <ul style="list-style-type: none"> <li>• Fuel to be stored within secure bunded fuel tanks with an impermeable bund capacity of 110% of the tank volume.</li> <li>• The potential for an impact on the integrity of existing flood defences due to ground movement at the landfall, and/or at watercourse crossings would be reduced by adopting best practice techniques.</li> <li>• Storage of excavation arisings in Flood Zone 3 resulting from pipeline trenching will be managed appropriately during the construction phase so that it does not form a continuous barrier to floodplain flow conveyance or pose a risk of causing sedimentation of watercourses. Excavation arisings would be stored outside of Flood Zone 3b, and where possible avoid Flood Zone 3a.</li> </ul>		
2	Various	<p>The implementation of a decommissioning management plan (DEMP). The DEMP will set out a series of measures, based on environmental best practice guidance from a range of environmental disciplines, to control the environmental effects of the decommissioning of the Project.</p>	<p>The DEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the DEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	Decommissioning

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
3	Ground Conditions (Soil Management)  Waste Management	<p>A Site Waste Management Plan (SWMP) will be produced as part of the CEMP (commitment number 1).</p> <p>The SWMP sets the framework for the management of wastes generated during the construction of the Project. It documents the decisions taken during the planning and design stages to minimise construction waste and sets objectives and targets for the main waste types.</p> <p>In addition, any soil stabilising methods for stockpiles will be undertaken in accordance with a SWMP to reduce the risk of erosion, the creation of leachate and potential water quality issues.</p>	<p>A draft CEMP will be submitted with the DCO application.</p> <p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	Construction
4	Ground Conditions (Pollution Control)	<p>A Surface Water Management Plan will be produced as part of the CEMP (commitment number 1).</p> <p>A Surface Water Management Plan would be developed for the construction activities at the tunnel head locations, as well as at other areas where significant dewatering is required (TBC). This would specify measures to manage discharges from dewatering required during tunnel construction, and from the associated works adjacent to the tunnel heads (slurry and concrete batching) and shafts.</p>	<p>A draft CEMP will be submitted with the DCO application.</p> <p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	Construction
5	Ground Conditions (Pollution Control)	<p>Environmental Emergency and Contingency Procedures (a Pollution Incident Control Plan) will be produced as part of the CEMP (commitment number 1).</p>	<p>A draft CEMP will be submitted with the DCO application.</p>	Construction

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
			<p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	
6	Cultural Heritage	The Project will seek to avoid any physical impact to any listed buildings located within the Scoping Route Corridor.	<p>Project design and construction methodology, which will be a measure in the CEMP.</p> <p>A draft CEMP will be submitted with the DCO application.</p> <p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	Pre-application and Construction
7	Cultural Heritage	An Outline Heritage Mitigation Strategy (OHMS) will be produced as part of the CEMP (commitment number 1). This will include measures such as:	A draft CEMP will be submitted with the DCO application.	Construction

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
		<p>Excavation and recording of archaeological assets that would experience a significant effect due to physical impact of construction works;</p> <p>Standard working practices that limit dust and noise during construction works, limiting change to setting of heritage assets; and</p> <p>Reinstatement of construction working areas to prior condition, reversing change to setting of heritage assets along the Scoping Route Corridor.</p>	<p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	
8	Landscape	<p>Reinstatement of landscape features, such as grassland, to areas affected by the pipelines. Trees and hedgerows to be reinstated where lost to appropriate locations at a safe distance from the pipelines. This will be instructed on site where appropriate to ensure integration with existing nearby features from a landscape and biodiversity perspective whilst also allowing maintenance access and reducing likely damage from roots</p>	<p>Secured through a requirement in the draft DCO.</p>	Operation
9	Landscape	<p>Reinstatement of landscape features, such as grassland, to areas affected by the Above Ground Installations (AGIs). Trees and hedgerows to be reinstated where lost to appropriate locations at a safe distance from the AGIs. This will be instructed on site where appropriate to ensure integration with existing nearby features from a landscape and biodiversity perspective whilst also allowing maintenance access and reducing likely damage from roots.</p>	<p>Secured through a requirement in the draft DCO.</p>	Decommissioning

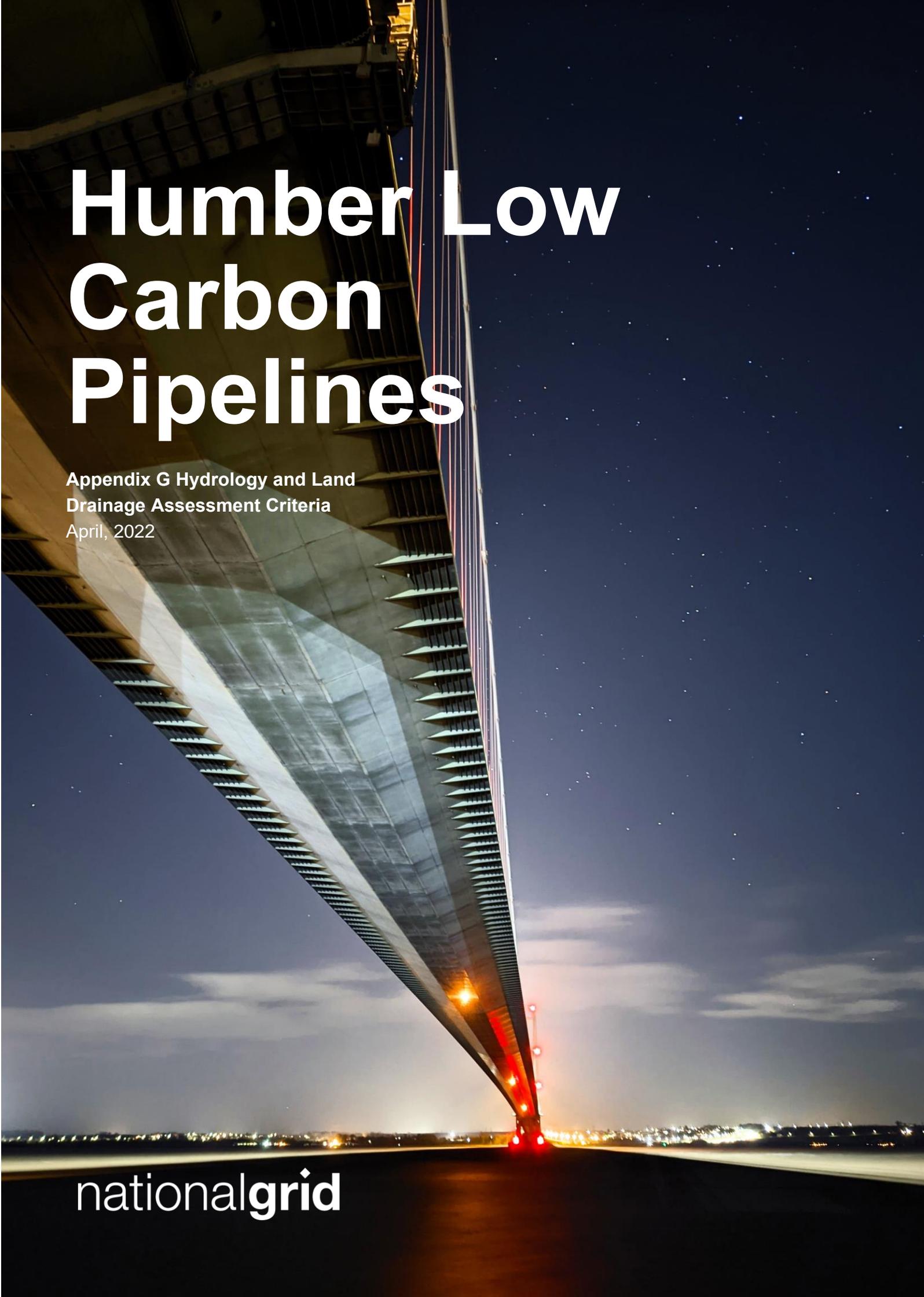
Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
10	Socio-economic (Recreation and Tourism)  Human Health and Wellbeing	Where PRoW or cycle routes may be disrupted by construction of the Project, temporary diversions will be put in place together with appropriate signage as necessary. If this is not possible discussions will occur with stakeholders to agree the most appropriate approach.	Secured through the draft DCO.	Construction
11	Traffic and Transport	A Construction Transport Management Plan (CTMP) would be implemented by the Main Works Contractor to ensure that all traffic associated with the Project's construction works operate in a safe and compliant manner. The CTMP would be approved by the Main Works Contractor and the highway authorities. This agreement would include for the repair of any damage caused to highway infrastructure by the construction traffic under Section 56 of the Road Act 1984.	The CTMP will be a working document that will be updated throughout the EIA process and into the construction phase. A Draft CTMP will be provided with the DCO application.  The CTMP will be secured through a requirement in the draft DCO.  The implementation of the CTMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).	Construction

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
12	Traffic and Transport	<p>An access route inspection and Swept Path Analysis (SPA) for the largest equipment/construction material delivery vehicles and transporters, including Abnormal Indivisible Loads (AILs).</p> <p>Swept path drawings to be prepared as part of the Project design package, identifying any required modifications to the existing highway. Visual inspection report to include photographs and videos taken of all access routes before, during and after the construction works, to ensure that there is a record of road conditions throughout the Project.</p> <p>If required, any modifications will be submitted to, and agreed with the relevant local authority.</p>	Secured through a requirement in the draft DCO.	Construction
13	Traffic and Transport	<p>A Staff Travel Plan will be prepared by the Main Works Contractor with the aim of proactively managing trips to and from the Project, to minimise local impacts by reducing the number of single occupancy vehicle trips and encouraging the uptake of sustainable modes of travel. The workforce is the primary target audience. However, visitors will also be encouraged to travel to and from the Project in a sustainable / responsible manner.</p>	<p>The Staff Travel Plan will be secured through a requirement in the draft DCO.</p> <p>The preparation and implementation of the Staff Travel Plan will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	Construction
14	Waste Management	<p>A Materials Management Plan (MMP) will be produced in accordance with the CL:AIRE Definition of Waste: Code of Practice (DoW:CoP) and included in the CEMP. Measures will include:</p>	A draft CEMP will be submitted with the DCO application.	Construction

Commitment Number	Environmental Topic	Mitigation	Delivery Mechanism	Phase
		<p>Implementation of the waste hierarchy.</p> <p>Working to a proximity principle, ensuring arisings generated are handled, stored, managed and reused or recycled as close as possible to the point of origin.</p> <p>Principles of circular economy, reuse and recycling of waste arisings on site.</p> <p>Embedded design – e.g., reuse of excavated materials within construction (trench backfill).</p> <p>Designing out waste.</p>	<p>The CEMP will be secured through a requirement in the draft DCO.</p> <p>Implementation of the CEMP will be the responsibility of the Main Works Contractor (or the lead contractor for the element of the work).</p>	
15	Hydrology and land drainage (watercourse crossings)	<p>All works within main rivers or ordinary watercourses will be in accordance with a method approved under relevant environmental permits.</p> <p>For open cut watercourse crossings and installation of vehicle crossing points, good practice measures will include, but not be limited to, reducing the working width whilst still providing safe working and re-instating riparian vegetation and natural channel bed materials on completion of the works.</p>	<p>Permits issued under the Environmental Permitting Regulations</p> <p>or</p> <p>Protective provisions of the DCO for the benefit of the Environment Agency and the Lead Local Flood Authorities (LLFAs)/Internal Drainage Boards (IDBs).</p>	Construction and Operation
16	Hydrology and Land Drainage (Managing Construction in the Intertidal Zone)	<p>Construction activities in the inter tidal zone would be undertaken within a dry working area and in accordance with any conditions to be agreed with the Marine Management Organisation (MMO) in order to reduce the potential for the transmission of underwater noise and vibration and generation of suspended sediments.</p>	<p>Methods of work would be included in the CEMP and secured via a Deemed Marine Licence.</p>	Construction and operation

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# Humber Low Carbon Pipelines

Appendix G Hydrology and Land  
Drainage Assessment Criteria  
April, 2022

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## Appendix G - Hydrology and Land Drainage Assessment Criteria

**Table 1.1: Estimating the importance of water environment attribute**

Importance/ sensitivity of resource or receptor	Criteria	Typical examples	
Very high	Nationally significant attribute of high importance	Surface water quality	<ul style="list-style-type: none"> <li>Site protected/designated under European Commission (EC) or UK legislation (Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest, Ramsar site, salmonid water)</li> <li>Watercourse having a Water Framework Directive (WFD) classification shown in a River Basin Management Plan (RBMP) and a Q95<sup>1</sup> ≥1.0m<sup>3</sup>/s</li> </ul>
		Flood risk	Essential infrastructure or highly vulnerable development
High	Locally significant attribute of high importance	Surface water quality	Watercourse having a WFD classification shown in an RBMP and a Q95 <1.0m <sup>3</sup> /s
		Flood risk	More vulnerable development
Medium	Of moderate quality and rarity	Surface water quality	Watercourses not having a WFD classification shown in an RBMP and Q95 >0.001m <sup>3</sup> /s
		Flood risk	Less vulnerable development

<sup>1</sup> Q95 = The flow equalled or exceeded in a watercourse 95% of the time.

Importance/ sensitivity of resource or receptor	Criteria	Typical examples	
Low	Lower quality	Surface water quality	Watercourses not having a WFD classification shown in an RBMP and Q95 $\leq 0.001\text{m}^3/\text{s}$
		Flood risk	Water compatible development

**Table 1.2: Estimating the magnitude of an impact on an attribute**

Magnitude of impact	Criteria	Typical example	
Major adverse	Results in loss of attribute and/or quality and integrity of the attribute	Surface water quality	<ul style="list-style-type: none"> <li>• Loss or extensive change to a fishery</li> <li>• Loss or extensive change to a designated nature conservation site</li> <li>• Reduction in water body WFD classification</li> </ul>
		Flood risk	Increase in peak flood level (1% Annual Exceedance Probability (AEP)) >100mm
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	Surface water quality	<ul style="list-style-type: none"> <li>• Partial loss in productivity of a fishery</li> <li>• Pollution of a non-potable source of abstraction</li> <li>• Degradation of regionally important public water supply or loss of major commercial/ industrial/agricultural supply</li> <li>• Contribution to reduction in water body WFD classification</li> </ul>
		Flood risk	Increase in peak flood level (1% AEP) >50mm

Magnitude of impact	Criteria	Typical example	
Minor adverse	Results in some measurable change in attribute quality or vulnerability	Surface water quality	<ul style="list-style-type: none"> <li>• Low risk of pollution</li> <li>• Minor effects on water supplies</li> </ul>
		Flood risk	Increase in peak flood level (>10mm)
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	The proposed project is unlikely to affect the integrity of the water environment.	
		Surface water	Negligible risk of pollution from runoff or accidental spillage pollution incidents.
		Flood risk	Negligible change in peak flood level ( $\leq \pm 10\text{mm}$ ).
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	Surface water	Some improvement/reduction of an existing polluting discharge.
		Flood risk	Creation of flood storage and reduction in peak flood level (1% AEP) >10mm
Moderate beneficial	Results in moderate improvement of attribute quality	Surface water	Contribution to improvement in water body WFD classification
		Flood risk	Creation of flood storage and reduction in peak flood level (1% AEP) >50mm
Major beneficial	Results in major improvement of attribute quality	Surface water	<ul style="list-style-type: none"> <li>• Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse.</li> <li>• Improvement in water body WFD classification</li> </ul>
		Flood risk	Creation of flood storage and reduction in peak flood level (1% AEP) >100mm
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.		

LA 113 does not provide a prescriptive assessment methodology, therefore the assessment was undertaken using professional experience and with reference to published literature, namely the 'Guidebook of Applied Fluvial Geomorphology' (Sear et al, 2003) and the 'River Hydromorphology Assessment Technique Training Manual' (Northern Ireland Environment Agency, 2014).

Existing watercourse importance has been classified in line with the criteria set out in Table 1.1, which was derived from information presented in the River Hydromorphology Assessment Technique Training Manual (Northern Ireland Environment Agency, 2014).

**Table 1- 3 Hydromorphology importance criteria**

Importance	Criteria
Very high	<p>Varied morphological features with no sign of channel modification, displaying natural flow regime and fluvial processes.</p> <p>Sediment regime that is in equilibrium and provides a diverse mosaic of habitat types suitable for species sensitive to changes in turbidity</p>
High	<p>Predominantly natural water feature with a range of morphological features (e.g. varied, natural bank profiles, pools, riffles, bars). Limited signs of artificial modifications.</p> <p>Sediment regime that provides suitable habitat for species sensitive to changes in turbidity e.g. migratory salmon, freshwater pearl mussel</p>
Medium	<p>Water feature with channel cross-section partially modified in places but exhibiting some morphological features (e.g. pools, riffles, depositional bars). Varied flow types but with an obviously impacted natural flow regime.</p> <p>Sediment regime that provides some physical habitat for species sensitive to changes in turbidity</p>
Low	<p>Water feature that has been extensively modified (e.g. by culverting, impoundment, addition of bank protection, or to perform a flood defence or drainage function). Exhibits limited to no morphological diversity, with uniform flow, bed and bank profiles and low energy.</p> <p>Sediment regime that provides for very limited physical habitat for species sensitive to changes in turbidity</p>

Similarly, to defining watercourse importance, there is little guidance on the classification of the potential magnitude of hydromorphological impacts. Criteria for assessing the magnitude of impacts are presented in Table 1.2. These were developed with reference to published literature (Sear et al, 2003), (Northern Ireland Environment Agency, 2014).

**Table 1-4 Hydromorphology impact magnitude criteria**

Magnitude	Criteria
Major adverse	Significant impacts on the bed, banks and vegetated riparian corridor, resulting in changes to sediment transport, load and turbidity Significant alterations to channel planform and/or cross-section Significant shift away from baseline conditions at the water body scale
Moderate adverse	Some changes to bed, banks and vegetated riparian corridor, resulting in some changes to sediment transport, load and turbidity at the multi-reach scale Some alterations to channel planform and/or cross-section A shift away from baseline conditions with impacts at the multi-reach scale
Minor adverse	Limited impacts on bed, banks and vegetated riparian corridor resulting in limited changes to sediment characteristics. Small changes to channel planform and/or cross-section and a minimal shift from baseline conditions; localised impacts up to the reach scale
Negligible	Minimal or no measurable change from baseline conditions. Any impacts highly localized; no impacts at the reach scale

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