



Humber Low Carbon Pipelines

Preliminary Environmental Information Report
Volume III Appendix 7.2 Ecology and Biodiversity
October 2022

nationalgrid

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1. Introduction

1.1 Scope of the Document

1.1.1 This report is Appendix 7.2 of the Preliminary Environmental Information Report (PEIR) and has been prepared in support of the HLCP project (i.e. 'the Project', the boundary for which is hereafter referred to as 'Proposed Order Limits'). It provides a Preliminary Ecological Appraisal (PEA) and aims to:

- Identify and describe the habitats within the Proposed Order Limits;
- Assess the potential for, or presence of, any protected or notable species; and
- Determine ecological impacts.

1.2 Legislation and Policy

1.2.1 There is a comprehensive system of legislation, both domestic and international, which aims to protect biodiversity at the landscape, habitat and species level. Much of the legislation pertaining to biodiversity exists within, and also independently of, the planning process.

The Conservation of Habitats and Species Regulations 2010 (as amended) (Habitats Regulations)

1.2.2 These Regulations require authorities on behalf of the Secretary of State to maintain a list of sites that are important for either habitats or species (i.e. European sites including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and to provide protection for these sites through designation, planning and other controls.

1.2.3 The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licenses by the appropriate authorities (Natural England in England). Licenses may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the species concerned.

Wildlife and Countryside Act 1981 (WCA) (as amended)

1.2.4 This is the primary legislation covering endangered species in England and sets out the framework for the designation of Sites of Special Scientific Interest (SSSIs). It confers differing levels of protection on species themselves, their habitats, or both, depending on their conservation status. Species offered protection by the Act are listed in a series of schedules. These Schedules are subject to a rolling review on a five yearly basis. Protected species are listed under Section 1 (birds), Schedule 5 (animals other than birds) and Schedule 8 (plants).

Countryside and Rights of Way Act 2000

- 1.2.5 This Act affords a greater level of protection to SSSIs, provides enhanced management arrangements for Areas of Outstanding Natural Beauty (AONBs), and strengthens wildlife enforcement legislation. This Act has amended the Wildlife and Countryside Act by the addition of the term ‘recklessly’ to Section 1(5) and Section 9(4) which has resulted in additional obligations with respect to protected species. As such, it is now an offence to intentionally or recklessly disturb protected species listed on the relevant Schedules of the WCA.

Natural Environment and Rural Communities Act 2006

- 1.2.6 The Natural Environment and Rural Communities (NERC) Act 2006 is designed to help achieve a rich and diverse natural environment and thriving rural communities. Under Section 40 there is a Duty to conserve biodiversity; specifically, Subsection (1) states “Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.”
- 1.2.7 Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40.

The Protection of Badgers Act 1992

- 1.2.8 This Act brings together all the legislation that is specific to badger (*Meles meles*), with the exception of their inclusion on Schedule 6 of the Wildlife and Countryside Act 1981, (which prohibits certain methods of taking or capture). The Act makes it an offence to intentionally kill or ill-treat a badger, and destroy, disturb or obstruct a sett. Specifically, it imposes restrictions on works carried out within certain distances of badger setts. Any works that will directly impact on an existing sett are only permitted subject to approval through the issue of a licence from Natural England.

National Planning Policy Framework

- 1.2.9 The National Planning Policy Framework (NPPF) was updated in July 2021 and is a material consideration in all planning decisions. NPPF refers to the responsibilities of the local authorities to conserve the natural environment with respect to the use of the ‘Circular 6/2005: Biodiversity and Geological Conservation – Statutory Obligation and their Impact within the Planning System’ as guidance in this process. All public bodies including local planning authorities are required to consider Habitats and Species of Principal Importance listed in Section 41 of the NERC Act and Priority Species/Habitats within Biodiversity Action Plans (BAPs) when considering a planning application.

Non-Statutory Local Sites

- 1.2.10 Non-statutory local sites of relevance to the Proposed Order Limits are referred to as Local Wildlife Sites (LWS), Sites of Importance for Nature Conservation (SINC), Sites of Nature Conservation Importance (SNCI) and Nature Reserves managed by The Wildlife Trusts, within the region. These sites are of county importance for their wildlife value. They have no statutory protection but are recognised by Local Authorities and statutory agencies and their presence is fully considered when determining planning applications.

2. Methodology

2.1 Overview

2.1.1 The PEA comprises a desk study and Extended Phase 1 habitat survey to establish the ecological baseline of and key ecological constraints associated with the Project, and to form the basis for pre-construction Biodiversity Net Gain (BNG) calculations. The PEA 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.

2.2 Desk Study

2.2.1 The initial desk study (including the production of a preliminary Phase 1 habitat plan) was undertaken between December 2021 and March 2022 to identify specific features or species to target prior to the field survey.

2.2.2 The study area for the desk study comprised the Proposed Order Limits plus the following buffers, referred to as the Zone of Influence (Zol):

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

2.2.3 Table 2-1 summarises the various sources of information utilised for the desk study and the information to be obtained.

Table 2-1 Sources of information

Source	Information Obtained	Date received/ accessed
APEM aerial imagery (Ref 7.2.1)	<p>Digital surface model (DSM) tiles, Digital terrain model (DTM) tiles, Ortho-mosaic tiles and tree crown mapping were provided for the Proposed Order Limits. Imagery at a resolution of 3 cm Ground Sampling Distance was captured using fixed-wing aircraft on eight dates between 1 August and 18 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.</p>	November 2021 to January 2022
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) (Ref 7.2.2)	<p>The location of statutory designated sites for nature conservation, Priority Habitats, Ancient Woodland, granted EPS Licence applications, great crested newt (<i>Triturus cristatus</i>; GCN) survey licence returns, 2017-2019 GCN pond survey results, the Living England Habitat Map, Open Mosaic Habitat, 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

Source	Information Obtained	Date received/ accessed
Lincolnshire Environmental Records Centre (LERC) (Ref 7.2.3) and North & East Yorkshire Ecological Data Centre (NEYEDC) (Ref 7.2.4)	The location of non-statutory designated sites for nature conservation and records of protected, notable, and invasive species within 2 km of the Proposed Order Limits. NB: any records older than 20 years were omitted from the results unless specified for that species/species group.	September 2021 and July 2022 (following changes to the Proposed Order Limits)
British Trust for Ornithology (BTO) (Ref 7.2.5 and Ref 7.2.6)	2007-2011 and 2017-2021 data collected from BTO BirdTrack and Breeding Bird Surveys, confirming species presence within a 1 km, 2 km, 10 km, 20 km or 50 km 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 5 km of the Proposed Order Limits.	August 2021
National Infrastructure Planning (Ref 7.2.7)	Information and documents relating to other NSIPs within/close to the Scoping Route Corridor e.g. Environmental Statement for Drax Re-Power.	September 2022
National Water Vole Database and Mapping Project (Ref 7.2.8)	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 (Ref 7.2.9)	Results of Environment Agency freshwater river macroinvertebrate surveys for locations within the study area.	February 2022

Source	Information Obtained	Date received/ accessed
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
Woodland Trust (Ref 7.2.10)	Locations of ancient and veteran trees.	September 2022
East Yorkshire Barn Owl Conservation Group (Ref 7.2.11)	Locations of barn owl (<i>Tyto alba</i>) records within East Yorkshire.	June 2022

2.3 Field Survey

Phase 1 Habitat Survey

- 2.3.1 Habitats were mapped according to definitions outlined in the Joint Nature Conservation Committee (JNCC) Phase 1 Handbook (Ref 7.2.12).
- 2.3.2 The Extended Phase 1 habitat survey was undertaken in two phases:
- Initially the habitats within the study area were mapped based on aerial imagery, with a classification of the habitats to Phase 1 habitat survey standard.
 - A field survey was then undertaken to finalise the habitat classifications (where access allowed). Areas considered to have ecological value, but smaller than 10 m x 10 m, were target noted due to mapping scale.
- 2.3.3 The Extended Phase 1 habitat survey area included all land within the Proposed Order Limits and a 50 m buffer zone, hereafter referred to as the 'survey area'.
- 2.3.4 The survey provided information on the habitats within the survey area and identified actual or potential presence of legally protected and/or otherwise notable species/habitats. Dominant flora was noted, and target notes were included, highlighting the presence of any non-native invasive species (NNIS), habitats suitable to support protected flora/fauna, and areas where further surveys are recommended.
- 2.3.5 The Extended Phase 1 habitat survey was undertaken between May and July 2022.

Protected/Notable Species

- 2.3.6 The Conservation Strategy (Appendix 7.1 (Volume III)) details the methods used to assess the survey area for evidence and/or suitability for protected/notable species or habitats during the Extended Phase 1 habitat survey, including:
- Notable plants/habitats,
 - Invertebrates,
 - Reptiles,
 - Birds (wintering and breeding),
 - Badger,
 - Bats,
 - Otter (*Lutra lutra*),
 - Water vole, and
 - Any other protected/notable species detected within the survey area.
- 2.3.7 This report includes a summary of the bird surveys undertaken to date, including wintering and passage bird surveys undertaken in 2021/2022 and breeding bird surveys undertaken in 2022.

Survey Limitations

- 2.3.8 Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Therefore, the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, professional judgement allows for the likely presence of these species to be predicted with sufficient certainty so as to not significantly limit the validity of these findings.
- 2.3.9 It is also worth noting that any absence of records from the desk study does not confirm absence of a certain species due to under-recording of some taxa in certain areas.
- 2.3.10 Due to its scale, the entire survey area could not be surveyed thoroughly across all habitats for evidence of notable species, therefore it is possible that key features may have been missed during the walkover. Some areas of the site could also not be accessed due to restricted landowner access (Figure 7.5 (Volume IV)). These areas were assessed using binoculars where possible, and otherwise using aerial imagery (Ref 7.2.1 and Ref 7.2.13) to complete the Phase 1 habitat mapping and assessment of suitability for protected or notable species. For hedgerows where access and high-resolution imagery from APEM was not available, mapped presence of hedgerows was less certain, and those added to the map based on aerial imagery alone were assumed to be species rich.
- 2.3.11 It is proposed that previously inaccessible areas are accessed for detailed survey prior to the commencement of works.
- 2.3.12 Any grid references provided within this report are approximate (obtained through handheld GPS devices) and are to be used as a guide only.

3. Results

3.1 Designated Sites

Statutory Designated Sites

- 3.1.1 Details of all statutory designated sites within the Zol are listed in Table 3-1 and shown in Figure 7.1 (Volume IV).

Table 3-1 Statutory designated sites within the Zol

Designated site	Reason for designation	Approximate distance from Proposed Order Limits
Humber Estuary Ramsar	Estuarine habitats, breeding grey seal (<i>Halichoerus grypus</i>) colony, breeding natterjack toad (<i>Epidalea calamita</i>) population, internationally important waterfowl assemblage (non-breeding), internationally important spring/autumn passage bird populations, nationally important populations of breeding birds, and a migration route for river lamprey (<i>Lampetra fluviatilis</i>) and sea lamprey (<i>Petromyzon marinus</i>).	0 m – 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 (<i>Phoca vitulina</i>).	0 m – 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.	0 m – 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.	0 m – 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	0 m – the Project crosses through the Humber Estuary SSSI

Designated site	Reason for designation	Approximate distance from Proposed Order Limits
	nationally scarce species characteristic of coastal and wetland habitats) and invertebrates.	
Holderness Inshore MCZ	The seabed in this site comprises a mosaic of habitats that support a diverse range of algae, sponges and other encrusting fauna. The site also supports fish species such as European eel (<i>Anguilla anguilla</i>), dab (<i>Limanda limanda</i>) and wrasse (<i>Labrus</i> sp.) as well as commercially significant crustaceans such as edible and velvet swimming crabs (<i>Cancer pagurus</i> and <i>Necora puber</i>) and lobster (<i>Homarus gammarus</i>). The sandy beaches of intertidal and muddy sand and the strandline of seaweed and other debris provide important habitat for a range of fauna including bivalves, common cockle (<i>Cerastoderma edule</i>) and sea snails.	0 m – the Project extends into the Holderness Inshore MCZ
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.	170 m 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.	170 m north
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>).	270 m west

Designated site	Reason for designation	Approximate distance from Proposed Order Limits
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.	290 m west
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 (<i>Podiceps cristatus</i>), kingfisher (<i>Alcedo atthis</i>) and barn owl.	305 m west
North Killingholme Haven Pits SSSI	Large saline lagoons that provide roosting and feeding grounds for waterfowl.	350 m east
Manton and Twigmoor SSSI	Contains important areas of heathland, grassland, wetland and woodland.	360 m east/south
Ashbyville LNR	Supports a wide variety of birds (including four species of owl) and a range of mammals, butterflies and moths	850 m north-west
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 (<i>Numenius arquata</i>) and lapwing (<i>Vanellus vanellus</i>) breed in the meadows.	950 m west

Designated site	Reason for designation	Approximate distance from Proposed Order Limits
Thorne Moor SAC	Designated for the presence of degraded raised bogs still capable of natural regeneration.	1.25 km south
Thorne and Hatfield Moors SPA	The SPA is used regularly by nationally important numbers of breeding nightjar (<i>Caprimulgus europaeus</i>) and also supports hen harrier (<i>Circus cyaneus</i>), merlin (<i>Falco columbarius</i>), short-eared owl (<i>Asio flammeus</i>), hobby (<i>Falco subbuteo</i>) and nightingale (<i>Luscinia megarhynchos</i>).	1.25 km 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.	1.25 km south
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>).	1.3 km 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>).	1.3 km west

Designated site	Reason for designation	Approximate distance from Proposed Order Limits
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, lapwing, ringed plover (<i>Charadrius hiaticula</i>), great crested grebe, marsh harrier (<i>Circus aeruginosus</i>), whooper swan (<i>Cygnus cygnus</i>), pink-footed geese (<i>Anser brachyrhynchus</i>), hen harrier and short-eared owl.	1.5 km 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>).	1.5 km 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.	1.5 km west
The Lagoons SSSI	The SSSI comprises a variety of coastal habitats, including saline lagoons and pools (the only example of this nationally rare habitat in North Humberside). The lagoons support nationally scarce flora and invertebrates characteristic of coastal saline water habitats. The SSSI supports a variety of migratory and wintering birds and it noted for supporting breeding ringed plover and over 1% of the British breeding population of little tern (<i>Sternula albifrons</i>).	1.95 km south
Lower Derwent Valley Ramsar	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 (<i>Philomachus pugnax</i>) and whimbrel (<i>Numenius phaeopus</i>) in the spring and wintering waterfowl assemblages of	4.5 km north

Designated site	Reason for designation	Approximate distance from Proposed Order Limits
	international importance. Wigeon (<i>Anas penelope</i>) and teal (<i>Anas crecca</i>) also occur in populations of international importance over winter	
Lower Derwent Valley SPA	The SPA supports nationally important wintering populations of Bewick's swan (<i>Cygnus columbianus bewickii</i>), golden plover (<i>Pluvialis apricaria</i>) 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 overwinter waterfowl, including teal, wigeon, shoveler, pochard (<i>Aythya ferina</i>), whimbrel and ruff.	4.5 km north

Non-Statutory Designated Sites

- 3.1.3 There are 106 non-statutory designated sites within the ZoI (these are listed in Table 4-2 and shown in Figure 7.2 (Volume IV)), of which 21 are within the Proposed Order Limits. A number of historic non-statutory sites situated within the search radius have been deleted by the East Riding of Yorkshire LWS Panel. Deleted sites have not been included in this report.

3.2 Priority Habitats, Ancient Woodland and TPOs

Priority Habitats

- 3.2.1 According to the Priority Habitat Inventory (Ref 7.2.14 & Ref 7.2.15) the Proposed Order Limits contains 523 parcels of recognised areas of Priority Habitat, totalling 234 ha. These habitats are detailed in Table 3-2 and shown in Figure 7.3 (Volume IV).

Table 3-2 Priority habitats located within the Proposed Order Limits, in descending order of total area.

Habitat type	No. of parcels	No. of distinct areas	Total area (ha)
Deciduous woodland	78	37	62.46
Mudflats	29	6	47.27
Open Mosaic Habitat	1	1	44.67
Coastal and floodplain grazing marsh	17	9	40.87
Coastal saltmarsh	381	3	26.90
Lowland dry acid grassland	4	3	5.56
Maritime cliff and slope	3	1	3.35
Lowland fens	6	1	1.76
Good quality semi-improved grassland	3	1	1.33
Traditional orchard	1	1	0.02
Grand Total	523	-	234.19

3.2.2 In addition, the following recognised areas of Priority Habitat were also identified within the ZoI. Habitats marked with an asterisk are additional habitats which were not found within the Proposed Order Limits:

- Deciduous woodland (1,452 ha),
- Coastal and floodplain grazing marsh (445 ha),
- Mudflats (403 ha),
- Open Mosaic Habitat (260 ha),
- Lowland dry acid grassland (120 ha),
- Coastal saltmarsh (120 ha),
- Good quality semi-improved grassland (58 ha),
- Lowland heathland (58 ha)*,
- Lowland fens (43 ha),
- Lowland raised bog (33 ha)*,
- Maritime cliff and slope (22 ha),
- Traditional orchard (22 ha),
- Lowland meadows (20 ha)*,
- Saline lagoons (17 ha)*,
- Lowland calcareous grassland (14 ha)*,
- Purple moor grass and rush pastures (13 ha)*, and
- Reedbeds (10 ha)*.

Ancient Woodland

3.2.3 No parcels of Ancient Woodland (Ref 7.2.16) were identified within the Proposed Order Limits. Within the ZoI, nine parcels were identified within the following areas (Figure 7.3 (Volume IV)):

- Alder Carr Wood LWS
- Alder Wood;
- Far Wood (two parcels);
- Gadbury and Lundimore Woods (two parcels);
- Low Wood, Barnetby le Wold LWS; and
- Thomas Wood LWS (two parcels).

Arboriculture

3.2.4 The Proposed Order Limits contains six TPOs, as detailed in Table 3-3 and shown in Figure 7.3 (Volume IV).

3.2.5 The Woodland Trust Ancient Tree Inventory provided locations of two ancient, veteran or notable trees within the survey area. These are both located within a woodland parcel

at TA 1153 1290 and comprise one 'notable' hybrid black poplar (*Populus x canadensis*) and one veteran wych elm (*Ulmus glabra*) (Ref 7.2.10).

Table 3-3 TPOs located within the Proposed Order Limits

Location	TPO area or point	Number of areas/points	Further information
Railway Embankment, Long Drax	Linear area	1	Species include oak (<i>Quercus</i> spp.), sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>), hawthorn (<i>Crataegus monogyna</i>) and willow (<i>Salix</i> spp.)
Railway Embankment, Long Drax	Points	3	2 x ash trees and 1 x sycamore tree
Sweeting Thorns LWS	Area	1	Woodlands consisting mainly of oak, silver birch (<i>Betula pendula</i>) and sycamore
North of Main Road, Thorngumbald	Linear area	1	Various species

3.3 Phase 1 Habitat Survey

Habitat Areas

3.3.1 The Phase 1 habitat map is presented in Figure 7.4 (Volume IV). The survey area contained mainly arable habitat, making up approximately 80% of the total survey area. Other main habitat types identified within the survey area were as follows (with percentage of total survey area):

- Running water, including River Humber and North Sea (5%),
- Semi-improved and poor semi-improved neutral grassland (4%),
- Built areas and hardstanding (3%),
- Improved grassland (3%), and
- Woodland, various types (2%).

The remaining habitats were:

- Dense/continuous scrub,
- Recently felled broadleaved woodland,
- Unimproved & semi-improved acid grassland,

- Unimproved neutral grassland,
- Semi-improved calcareous grassland,
- Marsh/marshy grassland,
- Bracken,
- Tall ruderal,
- Swamp,
- Marginal vegetation,
- Inundation vegetation,
- Standing water,
- Intertidal – mud/sand, shingle/cobbles & boulders/rocks,
- Saltmarsh and saltmarsh/dune interface,
- Maritime cliff & slope – soft cliff,
- Artificial habitats – quarry, spoil & refuse tip,
- Ephemeral/short perennial, and
- Bare ground.

Linear Habitats

- 3.3.2 Much of the arable landscape within the survey area is bisected by hedgerows, ditches and/or drains. Within the survey area there was 310 km of hedgerows, of which 53% are species-rich¹.

3.4 Notable Plants

- 3.4.1 The desk study returned 16 notable/protected species of plant, two of which were protected under the WCA; namely Bluebell (*Hyacinthoides non-scripta*; of which 10 records were located within the Proposed Order Limits) and Greater Yellow-Rattle (*Rhinanthus angustifolius*). The remaining 14 species were S41 species and include Shepherd's-Needle (*Scandix pecten-veneris*) and Burnt-Tip Orchid.
- 3.4.2 During the field survey, bluebell was noted in four locations: Broom Plantation LWS, Black Hoe Plantation LWS, Low Wood and Top Hedge, and woodland south of Redhouse Lane, Drax. Several unidentified species of orchid were noted within Keadby Ash Tip.

3.5 Non-Native Invasive Species

- 3.5.1 The desk study returned 14 non-native invasive species (NNIS), as listed on Schedule 9 of the WCA. These included terrestrial plants such as Japanese Knotweed (*Reynoutria japonica*), giant hogweed (*Heracleum mantegazzianum*) and Rhododendron

¹ In accordance with the Hedgerows Regulations 1997, species-rich hedgerows in this part of England must contain 4 or more woody species within a 30 m section of hedgerow.

(*Rhododendron ponticum*), and aquatic plants including New Zealand Pigmyweed (*Crassula helmsii*) and Nuttall's Waterweed (*Elodea nuttallii*).

- 3.5.2 During the field survey, NNIS were noted in ten locations throughout the survey area: one record of Japanese Knotweed, eight Indian [Himalayan] Balsam (*Impatiens glandulifera*) and one Japanese Rose (*Rosa rugosa*).

3.6 Invertebrates

- 3.6.1 The desk study returned records of 87 terrestrial invertebrate species within the Zol. This included records of one species listed on Schedule 5 (part 9.5) of the WCA, namely the mire pill beetle (*Curimopsis nigrita*) located within Thorne Moor. Records of 59 priority species were also returned, including small heath butterfly (*Coenonympha pamphilus*), sea aster bee (*Colletes halophilus*) and mottled rustic moth (*Caradrina morpheus*).
- 3.6.2 The desk study also returned records of 20 aquatic invertebrate species within the Zol. These included single records of priority species such as mud pond snail (*Omphiscola glabra*) and shining ram's-horn (*Segmentina nitida*).
- 3.6.3 Within the Proposed Order Limits, 44 species of invertebrate were found, of which 28 are S41 species (within the moth, butterfly and hymenoptera taxons).
- 3.6.4 A single record for white-clawed crayfish (*Austropotamobius pallipes*) was returned from 2021, located approximately 1.7 km west (upstream) of the Proposed Order Limits.
- 3.6.5 During the field survey, 13 locations within the survey area were identified as having good potential to support notable invertebrates, or where invertebrates such as butterflies, dragonflies and damselflies were noted. These habitats included wetlands, mosaic habitats, ponds and woodlands. Larger areas with perceived valuable invertebrate habitat included Keadby Ash Tip, Three Rivers LWS, Broom Plantation LWS, and Mosaic habitats at East Halton.
- 3.6.6 During the field survey, the following invertebrates of note were recorded:
- Swallowtail butterfly (*Papilio machaon*) – observed within a narrow grassed roadside verge approximately 45 m outside of the survey area at Frodingham Lane, East Riding of Yorkshire. This species is protected under the WCA Schedule 5 against killing, injury and being taken, and against disturbance, damage or obstruction to a resting place.
 - Sea aster bees – observed within Paull Holme Strays Nature Reserve. This species is believed to be rare (and a S41 species) and confined mainly to the south-east of England. The records of this species found within the desk study were located on the opposite side of the Humber River (East Halton Skitter and Halton Marshes).

3.7 Fish

- 3.7.1 The desk study returned records of eight fish species within the Zol. These records included single records of river lamprey (*Lampetra fluviatilis*) and Atlantic salmon (*Salmo salar*), which are fully protected under the WCA, and records of seven priority species including European eel (*Anguilla anguilla*), brown trout (*Salmo trutta*) and spined loach (*Cobitis taenia*).

- 3.7.2 The closest record was of European eel at the Barmby on the Marsh tidal barrage between the River Derwent and River Ouse, approximately 215 m east of the Proposed Order Limits.

3.8 Amphibians

- 3.8.1 The desk study returned 277 records of GCN within the Zol, as well as records for common toad (*Bufo bufo*), common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*).
- 3.8.2 Of the GCN records, 22 were located within the Proposed Order Limits, mainly around Ulceby and East Halton, North Lincolnshire. Records for the other three species of amphibian were also found within the Proposed Order Limits.
- 3.8.3 Natterjack toad is a designated feature of Humber Estuary Ramsar, which is located within the Proposed Order Limits. However, no records of this species were returned from the desk study, and the nearest known colony is located approximately 30 km south of the Proposed Order Limits, within the dune slacks at Saltfleetby-Theddlethorpe (Ref 7.2.14). Therefore, there are no perceived impact pathways for this species and natterjack toad is not considered further in this report.
- 3.8.4 Within the survey area, 85 waterbodies were identified (either by desk study data or field surveys). These are spread throughout the survey area, however areas lacking waterbodies can be found between Swinefleet, East Riding of Yorkshire and Crowle, North Lincolnshire; and between Halsham and Patrington, East Riding of Yorkshire.
- 3.8.5 The majority of the habitat within the survey area was suboptimal for amphibians, comprising intensively-farmed arable land. However, the Proposed Order Limits contained multiple patches/corridors of semi-natural habitat providing breeding and resting opportunities for amphibians (see Appendix 7.3 (Volume III): Reptiles for a list of sites identified as being suitable for reptiles that are also suitable for amphibians).

3.9 Reptiles

- 3.9.1 See the Reptile Technical Appendix (Appendix 7.3 (Volume III)) for further information.

3.10 Birds

- 3.10.1 The desk study returned records of 133 bird species within 2 km of the Zol. These included records of 72 species protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) such as barn owl, hen harrier and bittern (*Botaurus stellaris*). The desk study also returned records of 45 Red-listed bird species (Ref 7.2.17) including cuckoo (*Cuculus canorus*) and corn bunting (*Emberiza calandra*), and 34 Amber-listed bird species including song thrush (*Turdus philomelos*), nightjar (*Caprimulgus europaeus*) and avocet (*Recurvirostra avosetta*).
- 3.10.2 Wintering and passage bird surveys undertaken in 2021/2022 recorded 165 bird species including 34 Red-listed species such as fieldfare (*Turdus pilaris*), redwing (*Turdus iliacus*) and whimbrel (*Numenius phaeopus*) and 35 Amber-listed species such as common gull, greylag goose (*Anser anser*) and knot (*Calidris canutus*). Numerous species that form the qualifying wintering bird assemblage of the Humber Estuary SPA and Ramsar site were also commonly recorded in high numbers including golden plover (*Pluvus apricaria*), lapwing (*Vanellus vanellus*), dunlin (*Calidris alpina*), teal (*Anas*

crecca), wigeon (*Mareca penelope*), and curlew (*Numenius arquata*). Substantial numbers of other species that over wintering within our Zol were also recorded including pink-footed goose, black-headed gull (*Chroicocephalus ridibundus*), common gull, linnet (*Linaria cannabina*) and starling (*Sturnus vulgaris*).

- 3.10.3 Regionally notable species such as crane (*Grus grus*), whooper swan, hen harrier, green sandpiper (*Tringa ochropus*) and snow bunting (*Plectrophenax nivalis*) were also recorded during the wintering and passage bird surveys.
- 3.10.4 Breeding bird surveys undertaken in 2022 recorded 119 bird species including eight Schedule 1 listed birds such as barn owl, marsh harrier, avocet and black-tailed godwit (*Limosa limosa*), 25 Red-listed species including skylark (*Alauda arvensis*), lapwing, linnet, yellowhammer (*Emberiza cirinella*), curlew, grey partridge (*Perdix perdix*), yellow wagtail (*Motacilla flava*) and tree sparrow (*Passer montanus*) and 38 Amber-listed species such as kestrel (*Falco tinnunculus*) meadow pipit (*Anthus pratensis*), whitethroat (*Sylvia communis*), reed bunting (*Emberiza schoeniclus*) and willow warbler (*Phylloscopus trochilus*).
- 3.10.5 Regionally notable species such as golden oriole (*Oriolus oriolus*), nightingale (*Luscinia megarhynchos*), woodlark (*Lullula arborea*) and willow tit (*Poecile montanus*) were also recorded during the breeding bird surveys.
- 3.10.6 The habitats within the Proposed Order Limits provide opportunities for breeding farmland birds and barn owl, and for over-wintering wildfowl, among others.

3.11 Badger

- 3.11.1 The desk study returned 432 records of badger within the Zol. Numerous records were located within the Proposed Order Limits including records of setts and latrines. This is supported by observations during ecology field surveys; 51 badger setts and 41 records of other badger (or likely badger) activity have been recorded which comprised latrines, tracks/pathways, footprints, snuffle holes and live individuals within the survey area.
- 3.11.2 The badger setts and other evidence of activity are spread throughout the Proposed Order Limits.
- 3.11.3 The habitats within the survey area are largely suitable for badger and sett creation, particularly in hedgerows, scrub, dry ditches and woodland, and in the arable fields adjacent to these habitats.

3.12 Bats

- 3.12.1 The desk study returned records of 136 bat roosts within the Zol. This comprised roosts from six bat species: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), noctule (*Nyctalus noctula*), Natterer's bat (*Myotis nattereri*), whiskered bat (*M. mystacinus*) and brown long-eared (*Plecotus auritus*). Several bat roost records were potentially located within the Proposed Order Limits; however, all roost records were restricted to the 1 km square grid resolution, thus precise locations are not known.
- 3.12.2 To date, 229 trees, 11 structures, 23 hedgerows and 51 areas (woodland/scrub) within the Proposed Order Limits have been identified as containing Potential Roost Features (PRFs) suitable for roosting bats. Of these, the following features had:
 - High roost suitability – 59 trees, 4 structures, 14 hedgerows and 17 areas;

- Moderate roost suitability – 102 trees, 1 structure, 6 hedgerows, 27 areas; and
- Low roost suitability – 68 trees, 6 structures, 3 hedgerows and 7 areas.

3.12.3 The desk study returned 392 records of bat activity (field observations, feeding areas, monitoring and emergence survey results) for the same bat species noted above and an additional two species: Daubenton's bat (*Myotis daubentonii*) and Nathusius' pipistrelle (*Pipistrellus nathusii*).

3.13 Otter

3.13.1 The desk study returned 100 records of otter within the Zol. The closest record was of a dead individual on the A18 near Keadby, located within/directly adjacent to the Proposed Order Limits.

3.13.2 During the field survey, there were three locations where evidence of otter was identified. These were:

- East of Crowle (footprints in mud, adjacent to arable fields and drains),
- South of M180, between Beltoft and River Trent (otter spraint), and
- Three Rivers LWS (otter spraint).

3.13.3 Much of the survey area has suitability for commuting otter, via rural networks of ditches, drains and other watercourses. Although no holts or other resting places were noted during the Extended Phase 1 habitat survey, the survey area contains larger watercourses with adjacent scrub and riparian habitat which had suitability for otter holt creation.

3.14 Water Vole

3.14.1 The desk study returned 982 records of water vole within the Zol. Numerous records were located within the Proposed Order Limits, with a high concentration of records between Eastoft and West Butterwick, North Lincolnshire; Messingham, North Lincolnshire; and within land on both sides of River Humber.

3.14.2 Data from The Wildlife Trusts (Ref 7.2.8) show that although water vole are widespread in the area, so too are American mink (a water vole predator), except from around East Halton. The desk study also returned mink records from areas including New River Ancholme; near to Three Rivers LWS; and Messingham Sand Quarry SSSI.

3.14.3 During field surveys, 660 watercourses were assessed for their water vole suitability. Of these, 1% had confirmed presence of water vole (e.g. latrines, feeding remains or individuals seen); 39% had high water vole suitability, 28% had moderate suitability, 28% were low and 3% had negligible suitability. Therefore, significant areas of the survey area are considered to have moderate or high suitability for water vole, due to the rural networks of ditches and drains.

3.14.4 Hotspots identified for high water vole suitability are around Rawcliffe, East Riding of Yorkshire; Crowle/Keadby, North Lincolnshire; Althorpe to Beltoft, North Lincolnshire; near Broom Plantation LWS; and Burstwick, East Riding of Yorkshire.

3.15 Pine Marten and Polecat

- 3.15.1 A single pine marten (*Martes martes*) record dated 2003 was returned from the data search, located within Messingham Sand Quarry SSSI, approximately 1.3 km west of the Proposed Order Limits. Although the SSSI will not be directly impacted by the works, the record of pine marten is an indication the species could be present in the wider area.
- 3.15.2 Two records of polecat (*Mustela putorius*) were returned from the data search, dated 2015 and 2020, located within the Proposed Order Limits (north of Messingham), and 1.5 km north of the Proposed Order Limits (west of Scawby), respectively.

3.16 Other Notable Mammals

- 3.16.1 The Proposed Order Limits is situated outside the natural range of dormouse (*Muscardinus avellanarius*) and there is no publicly available information that indicates that there are any nearby release sites. Absence is assumed.
- 3.16.2 Brown hare (*Lepus europaeus*) and hedgehog (*Erinaceus europaeus*) records are widespread across the Proposed Order Limits. In addition, 74 brown hare records were taken within the survey area during Project ecology field surveys.
- 3.16.3 Five harvest mouse (*Micromys minutus*) records were returned from the data search. The records were spread across the Proposed Order Limits, with the majority located within or adjacent to statutory or non-statutory designated sites.
- 3.16.4 Breeding grey seal is a designated feature of Humber Estuary Ramsar/SAC/SSSI and harbour seal is present within the Humber Estuary SAC (though with a non-significant presence). These designated sites are located within the Proposed Order Limits. One record of grey seal was returned in the desk study, located within the River Humber south of Hull. No harbour seal records were returned. The nearest known breeding colony for grey seal is at Donna Nook, located approximately 20 km south of the Proposed Order Limits (Ref 7.2.14). Therefore, there are no perceived impact pathways for these species and they are not considered further in this report.

4. Discussion

4.1 Designated Sites

Statutory Sites

- 4.1.1 A total of 25 statutory designated sites are present within the Zol of which six contain land within the Proposed Order Limits: Humber Estuary SSSI, Ramsar, SAC and SPA (including marine components), Greater Wash SPA (marine) and Holderness Inshore MCZ.
- 4.1.2 The remaining 19 sites have been assessed for their potential for impact pathways (Table 4-1).

Table 4-1 Potential for impact pathways for statutory designated sites

Designated Site	Important Ecological Feature(s)	Potential Impact Pathway*
Humber Estuary Ramsar / SAC / SPA / SSSI	Habitats; Vascular plants; Invertebrates; Fish; Passage, breeding & non-breeding birds.	Yes
Greater Wash SPA (marine)	Wintering, passage and breeding birds.	Yes
Holderness Inshore MCZ	Habitats; Invertebrates (crustaceans, molluscs); Fish.	Yes
River Derwent SAC / SSSI	Aquatic plants; Invertebrates; Fish; Breeding birds; Otter.	Yes
Eastoft Meadow SSSI	Habitats; Vascular plants.	Yes
Messingham Sand Quarry SSSI	Habitats; Invertebrates; Breeding birds.	Yes
Sugar Mills Ponds LNR	Reptiles; Breeding birds; Water vole.	No
North Killingholme Haven Pits SSSI	Habitats; Birds.	Yes (hydrology)

Designated Site	Important Ecological Feature(s)	Potential Impact Pathway*
Manton and Twigmoor SSSI	Habitats	No
Ashbyville LNR	Invertebrates (Lepidoptera); Birds.	Yes (air quality)
Eskamhorn Meadows SSSI	Habitats; Vascular plants; Breeding birds.	No
Thorne Moor SAC	Habitats	No
Thorne and Hatfield Moors SPA	Birds	No
Thorne, Crowle and Goole Moors SSSI	Habitats; Invertebrates, Wintering and breeding birds.	No
Cleatham Quarry SSSI	Habitats; Vascular plants; Invertebrates.	No
Crowle Borrow Pits SSSI	Habitats; Vascular plants.	No
Humberhead Peatlands NNR	Habitats; Vascular plants; Invertebrates; Reptiles; Birds; Water vole.	No
Messingham Heath SSSI	Habitats; Invertebrates.	No
Hatfield Chase Ditches SSSI	Habitats; Vascular plants; Invertebrates (Carabidae); Water vole.	No
The Lagoons SSSI	Habitats; Vascular plants; Invertebrates; Breeding, passage and wintering birds.	No
Lower Derwent Valley Ramsar / SPA	Habitats; Invertebrates; Breeding, passage and wintering birds.	Yes
<p>* Potential impact pathways considered included:</p> <ul style="list-style-type: none"> • Direct disturbance of land. • Hydrological connectivity up to 2 km from the Proposed Order Limits. 		

Designated Site	Important Ecological Feature(s)	Potential Impact Pathway*
	<ul style="list-style-type: none"> Potential for functionally linked land for bats and winter/passage birds within 5 km of the Proposed Order Limits. Other pollution impacts (such as dust and plant/vehicle emissions, noise, vibration and visual) up to 300 m from the Proposed Order Limits and 250 m from the affected road network (see Section 6.4 of the PEIR for affected road network criteria). 	

Non-Statutory Designated Sites

- 4.1.3 A total of 106 non-statutory designated sites have been identified within the Zol.
- 4.1.4 An assessment of impact pathways, including hydrological connectivity and air quality (Table 4-2), shows that 49 of the non-statutory sites outside of the Proposed Order Limits have the potential to be impacted by the Project.

Table 4-2 Non-statutory designated sites within the Zol and their potential for impacts.

Ecological feature	Designated site
Non-statutory designated sites situated within the Proposed Order Limits	Barnetby Road Verges LWS; Black Hoe Plantation LWS; Brick Hills LWS; Broom Plantation LWS; Candley Beck, Westrum LWS; Chase Hill Wood LWS; Grasby Bottoms Green Lane LWS; Hatfield Waste Drain LWS; Hedon – Winestead Disused Railway Line LWS; Hodgson's Fields Nature Reserve; Keadby Boundary Drain LWS; New River Ancholme LWS; Oak Hill LWS; Old River Ancholme LWS; Paull Holme Strays Nature Reserve; Pauper's Drain LWS; Stainforth and Keadby Canal Corridor LWS; Sweeting Thorns LWS; Three Rivers LWS; Warping Drain, Derrythorpe LWS; and West Common North Road LWS.
Non-statutory designated sites situated outside the Proposed Order Limits but with hydrological connectivity and/or other potential impact pathway	Abbot's Lodge Grassland LWS; Alder Wood LWS; Ashbyville Lake LWS; Asselby Island LWS; Beaulah Wood LWS; Beckingham Shaw LWS; Black Walk Nook LWS; Brockholes SINC; Brocklesby Park LWS; Burkinshaw's Covert LWS; Butterwick Hale and Common LWS; Dawson City Claypits (Nature Reserve); Donkey Park South LWS; East Marsh LWS; Faraway and Thirty Foot Drains LWS; First Wood North Field LWS; First Wood North LWS; First Wood South LWS; Folly Drain North LWS; Fort Paull Humber Grassland Candidate LWS; Frodingham – Winestead Lane LWS; Greetwell North LWS; Greetwell South LWS; Halton Marsh Clay Pits LWS; Hollym Carrs LWS; Holme Hall Golf Course LWS; Holme Lane Verge LWS; Howsham Barff Wood LWS; Keadby Warping Drain LWS; Keadby Wet Grassland LWS; Keadby Wetland LWS; Kelsey Hill Gravel Pits Historic LWS; Killingholme Haven Pits (Nature Reserve); Low Wood, Barnetby le Wold LWS; Melton Ross Quarry LWS; Messingham Lakes LWS; Messingham Northwest LWS; Messingham Sand Quarry (Nature Reserve); Newland Ings, Newland SINC; Newstead Drain LWS; North Engine Drain, Belton LWS; Out Newton – Skeffling LWS; River Torne LWS; South Cloister

Ecological feature	Designated site
	Covert LWS; South Engine Drain, Belton LWS; South Soak Drain, Keaby LWS; Station Road Field LWS; Swinster Lane Field LWS; and Thomas Wood LWS.
Non-statutory designated sites located outside of the Proposed Order Limits and with no perceived impact pathway to the Project	Alder Carr Wood LWS; Barton Road, Wootton Hall LWS; Broughton Far Wood LWS; Broughton West Wood LWS; Cleatham Pits East LWS; Cliff Farm Pit LWS; Cottagers Dale Wood LWS; Crowle Moor (Nature Reserve); Dawson City Claypits South-West LWS; East View Meadow LWS; Eastfield Road Railway Embankment LWS; Gadbury and Lundimore Woods LWS; Gainsthorpe Medieval Village LWS; Goxhill Meadows LWS; Greetwell Road, East Verge LWS; Greetwell Road, West Verge LWS; Halliday Hill LWS; Hendale Wood LWS; Heron Holt LWS; Manby Wood LWS; Mausoleum Woods LWS; Meadow Area 4 Historic LWS; Messingham Grassland LWS; New Barnetby Road Verges, South LWS; River Eau and Messingham Ings LWS; Santon Wood East LWS; Scawby Park LWS; Scrub Lane East Field LWS; Searby Wold Lane Verges LWS; Somerby Top Road Verge LWS; South Moor Covert and Fishpond Plantation LWS; Staniwells Road Verges LWS; Top Farm Fields LWS; Weldon's Plantation LWS; Withernsea Millennium Green LWS; and Yaddletorpe Fish Ponds LWS.

4.2 Priority Habitats, Ancient Woodland and TPOs

- 4.2.1 The Proposed Order Limits contains 523 parcels of recognised Priority Habitat, totalling 234 ha. The majority of this habitat is Deciduous woodland, followed by Mudflats, Open mosaic habitat and Coastal and floodplain grazing marsh, and six other habitat types.
- 4.2.2 Within the Zol there was an additional 1,452 ha of Deciduous woodland plus a range of other recognised Priority Habitat types, including seven types that were not found within the Proposed Order Limits. Of the additional seven recognised Priority Habitats, potential pollution pathways exist between the Project and all but one; Purple moor grass and rush pastures.
- 4.2.3 Thus, potential impact pathways exist between the Project and the following recognised Priority Habitats:
- Coastal and floodplain grazing marsh
 - Coastal saltmarsh
 - Deciduous woodland
 - Good quality semi-improved grassland
 - Lowland calcareous grassland
 - Lowland dry acid grassland
 - Lowland fens
 - Lowland heathland

- Lowland meadows
- Lowland raised bog
- Maritime cliff and slope
- Mudflats
- Open Mosaic Habitat
- Reedbeds
- Saline lagoons
- Traditional orchard.

4.2.4 Nine parcels of Ancient Woodland were identified within the Zol. None fall within the Proposed Order Limit but Ancient Woodland is located within 250 m of the affected road network at Low Wood and Thomas Wood. Six TPOs and two ancient/notable trees were also identified within the Zol.

4.3 Phase 1 Habitat Survey

4.3.1 The survey area contained mainly arable habitat, comprising 80% of the total survey area, bisected by a combination of species-poor and species-rich hedgerows, ditches and drains. A further 15% of the survey area comprised improved, semi-improved and poor semi-improved neutral grassland, built-up areas or hardstanding and running water (including the River Humber and North Sea).

4.4 Protected/Notable Species

4.4.1 The Conservation Strategy (Appendix 7.1 (Volume III)) outlines the approach to survey for protected/notable species, and includes methods for avoidance, mitigation and enhancement. For the majority of these, it is proposed that a series of Technical Appendices are produced for a more detailed discussion of the desk study and field survey results. Table 4-3- provides a summary of the findings for protected/notable species, or species groups, from the Extended Phase 1 habitat survey.

Table 4-3 Summary of findings for protected/notable species or species groups.

Species/Group	Summary
Notable plants	Bluebell was recorded within areas of woodland within the Proposed Order Limits during ecology surveys. Other protected or notable plant species may be located within the Proposed Order Limits; however, these are most likely to be found within designated sites or other Priority Habitat (which are summarised in Section 4.2).

Species/Group	Summary
Non-Native Invasive Species	Occasional stands of NNIS are present throughout the Proposed Order Limits. Additional species may be identified during further surveys and a method statement will be produced prior to works commencing in areas where NNIS have been identified.
Invertebrates	<p>Notable terrestrial and aquatic invertebrates are located within the Zol of the Proposed Order Limits, and 13 areas within the survey area were noted as having potential to support good invertebrate populations.</p> <p>The Proposed Order Limits and its Zol are perceived to be outside the current natural range for white-clawed crayfish (Ref 7.2.9 & Ref 7.2.4). The single record returned in the desk study is currently considered an anomaly (refer to PEIR Table 7.2).</p>
Fish	The desk study found protected and notable records of fish species in the Zol, but none located within the Proposed Order Limits. The Proposed Order Limits are bisected by watercourses of varying sizes within a predominantly rural area, which are likely to support fish.
Amphibians	The habitats on site are broadly unsuitable for amphibians due to being intensively-managed arable land. Localised patches containing ponds and wetlands may have breeding suitability for GCN and other amphibians.
Reptiles	See the Reptile Technical Appendix (Appendix 7.3 (Volume III)) for further information.
Birds	Much of the habitat on site has the potential to support passage, breeding and non-breeding birds.
Badger	The ecology surveys to date have identified 51 badger setts within the survey area.

Species/Group	Summary
Bats	Several features have been identified which may provide suitable habitat for roosting, foraging and commuting bats. Desk study data suggests that mainly common and widespread bat species are found in the local area.
Otter	There are habitats suitable for commuting otter within the survey area, and some evidence of their presence has been noted during field surveys. However, no holts or other resting places have been identified during the Extended Phase 1 habitat survey.
Water vole	Water vole presence has been confirmed within the survey area. Significant portions of the survey area are also considered to have at least moderate suitability for water vole, due to the networks of ditches and drains within the arable landscape.
Pine marten and Polecat	There is some evidence of low numbers of pine marten and polecat being present within the Zol.
Other notable mammals	Other relevant notable mammals include brown hare and hedgehog, with low numbers of harvest mouse.

5. References

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