



# Hornsea Project Four: Environmental Statement (ES)

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## Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report

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## Glossary

Term	Definition
Birds of Conservation Concern (BoCC) 'Red List'	The 'red list' includes birds of the highest conservation concern in the UK, Channel Islands and Isle of Man needing urgent action.
Commitment	A term used interchangeably with mitigation and enhancement measures. Commitments are Embedded Mitigation Measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more National Significant Infrastructure Projects (NSIP).
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
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
Export Cable Corridor (ECC)	The specific corridor of seabed (seaward of Mean High-Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.

Term	Definition
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The limits within which Hornsea Project Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Potential Roost Feature (PRF)	Potential bat roosts which can include visible cracks, holes, gaps or splits that allow access for roosting bats.

## Acronyms

Acronym	Definition
ACIEEM	Associate Member of Chartered Institute of Ecology and Environmental Management
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BoCC	Birds of Conservation Concern
CIEEM	Chartered Institute of Ecology and Environmental Management
DCO	Development Consent Order
EA	Environment Agency
EBI	Energy Balancing Infrastructure
EC	European Commission
ECC	Export Cable Corridor
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EP1HS	Extended Phase 1 Habitat Survey
ES	Environmental Statement
EU	European Union
FERA	Food and Environmental Research Agency
GCN	Great Crested Newt
HSI	Habitat Suitability Index
HVAC	High Voltage Direct Current
HVDC	High Voltage Alternating Current
IEMA	Institute of Environmental Assessment
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
MCIEEM	Member of Chartered Institute of Ecology and Environmental Management

MEECoW	Member of the Association of Environmental and Ecological Clerk of Works
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NE	Natural England
NERC	Natural Environmental and Rural Communities
NEYEDC	North and East Yorkshire Ecological Data Centre
NGET	National Grid Electricity Transmission
OEMP	Outline Ecological Management Plan
OnSS	Onshore Substation
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PMoW	Precautionary Method of Working
PRF	Potential Roost Feature
PRoW	Public Right of Way
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TN	Target Note
WCA	Wildlife and Countryside Act

## Units

Unit	Definition
°C	degrees Celsius
ha	hectare
km	kilometre
kV	kilovolt
m	metre
mph	miles per hour

## 1 Introduction

### 1.1 Project Background

- 1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.
- 1.1.1.2 Royal HaskoningDHV was commissioned to undertake an updated Extended Phase 1 Habitat survey (EP1HS) within and up to 50 m from the onshore Hornsea Four Order Limits (i.e. the landfall, onshore export cable corridor (ECC), OnSS and 400 kV National Grid Electricity Transmission (NGET) connection area).
- 1.1.1.3 To inform the Scoping stages of the project, an initial habitat assessment was conducted, comprising a desktop review of high-resolution aerial imagery obtained in July 2018, followed by a ground-truthing exercise. This is reported in the Hornsea Four Scoping Report (Orsted 2018).
- 1.1.1.4 This technical annex has been produced to update the habitat information following the scoping stage survey and to characterise the baseline environment and identify the requirement for Phase 2 species-specific surveys to inform and support the ecological impact assessment in [Volume A3, Chapter 3: Ecology and Nature Conservation](#) of the Hornsea Four Environmental Statement (ES).
- 1.1.1.5 Due to the amount of data collated during the Hornsea Four EP1HS, this technical report has been split into two parts:
- [Annex 3.1: Extended Phase 1 Habitat Survey Report \(this document\)](#) – outlines the methodology, survey results, conclusions and mitigation; and
  - [Annex 3.2: Extended Phase 1 Target Note Tables](#) – presents the target notes table.



## 1.2 Aims

1.2.1.1 The aim of the EP1HS consists of three components, which collectively enable a preliminary understanding of the ecological value of the habitats within and up to 50 m from the onshore Hornsea Four Order Limits (hereafter the ‘Hornsea Four EP1HS survey area’). These components include:

- A desktop review that summarises information on existing protected species records and statutory and non-statutory nature conservation designations;
- The recording of all habitats within the Hornsea Four EP1HS study area obtained from the field survey; and
- A data led assessment of the likelihood of the Hornsea Four EP1HS survey area supporting legally protected species or species of conservation concern.

1.2.1.2 As such, the purpose of this report is to:

- Present the results of the updated EP1HS undertaken in February and September 2019;
- Provide an overall understanding of the existing ecological value of the environment within the Hornsea Four EP1HS survey area; and
- Inform the requirements and scope of the Phase 2 species specific surveys.

1.2.1.3 This report has been prepared following the guidelines as set out in the Chartered Institute of Ecology and Environmental Management’s (CIEEM) Guidelines on Ecological Report Writing (CIEEM 2017).

## 2 Legislation and Policy

2.1.1.1 This section summarises the relevant information regarding the legal protection afforded to the habitats and species mentioned in this report. However, it should be noted that this is for information only and is not intended to be exhaustive or to replace specialised legal advice.

2.1.1.2 **Table 1** provides a summary of the key legislation and policy relevant to Hornsea Four.

**Table 1: Summary of key legislation and policy relevant to the onshore survey area.**

Legislation	Relevance
Wildlife and Countryside Act 1981 (as amended) (WCA 1981)	Codifies the European Union (EU) Directive 2009/147/EC (the Birds Directive) into UK law; provides legal protection for European designated sites (Special Protection Areas (SPA), Ramsar sites) and Sites of Special Scientific Interest (SSSI); outlines legal offences in relation to wild birds, animals, and invasive species; and provides lists of species which are protected under the Act.
The Conservation of Habitats and Species Regulations 2017 (as amended) (Conservation of Habitats and Species Regulations 2017)	Codifies the EU Directive 92/43/EEC (The Habitats Directive) into UK law, and provides legal protection for European designated sites (Special Area of Conservation (SAC)).

Legislation	Relevance
Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	Makes changes to the Conservation of Habitats and Species Regulations 2017 following the UK's exit from the European Union (EU).
Natural Environment and Rural Communities Act 2006 (NERC 2006)	Details a list of UK habitats and species of 'principle importance,' which require protection within the UK.
Protection of Badgers Act 1992 (Protection of Badgers Act 1992)	Outlines legal offences in relation to badgers, including taking, injuring or killing badgers, and interfering with badger setts.
The Hedgerow Regulations 1997 (Hedgerow Regulations 1997)	Outlines the definition of 'important' hedgerows and legal offences in relation to their disturbance or removal.
UK Post-2010 Biodiversity Framework (JNCC 2012)	Supersedes the UK Biodiversity Action Plan (UK BAP), which fulfilled a legal obligation under the Convention on Biological Diversity to identify and produce action plans for priority habitats and species.

## 3 Methodology

3.1.1.1 This section presents the Hornsea Four EP1HS study area and methodology used to undertake the desk-based assessments and field survey components of the updated EP1HS, which inform the Phase 2 species specific surveys requirements.

### 3.2 Study area

#### 3.2.1 Desktop review Study Area

3.2.1.1 A desktop review of third-party data sources was undertaken for information on existing protected species records and statutory and non-statutory nature conservation designations within and up to 2 km of the Hornsea Four Order Limits. This buffer was extended to 5 km for bat and bird species to account for the greater mobility of these species. Both study areas are shown on [Figure 1](#).

3.2.1.2 This approach was agreed with relevant stakeholders (i.e. Natural England, Environment Agency (EA), Yorkshire Wildlife Trust (YWT) and East Riding of Yorkshire Council (ERYC)) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.18).

#### 3.2.2 Field Survey Study Area

3.2.2.1 The Hornsea Four EP1HS survey area includes all habitats within the onshore Hornsea Four Order Limits, plus an additional 50 m buffer. The EP1HS survey area is delineated by the red dashed line on [Figure 1](#).

3.2.2.2 [Table 2](#) summarises the study areas and survey area that have been utilised within this report.

**Table 2: Study areas relevant to the updated EP1HS.**

Study/survey area name	Description
Bat and bird study area	Search area for records of bat and bird species within and up to 5 km of the onshore Hornsea Four Order Limits
EP1HS study area	Search area for records of protected and notable species and habitats within and up to 2 km of the onshore Hornsea Four Order Limits
Great crested newt (GCN) <i>Triturus cristatus</i> study area	Search area for suitable water bodies and habitat for GCN within and up to 250 m of the onshore Hornsea Four Order Limits
EP1HS survey area	Area that was covered by the EP1HS field survey, covering habitats within and up to 50 m of the onshore Hornsea Four Order Limits

500000

520000

460000

460000

440000

440000






500000

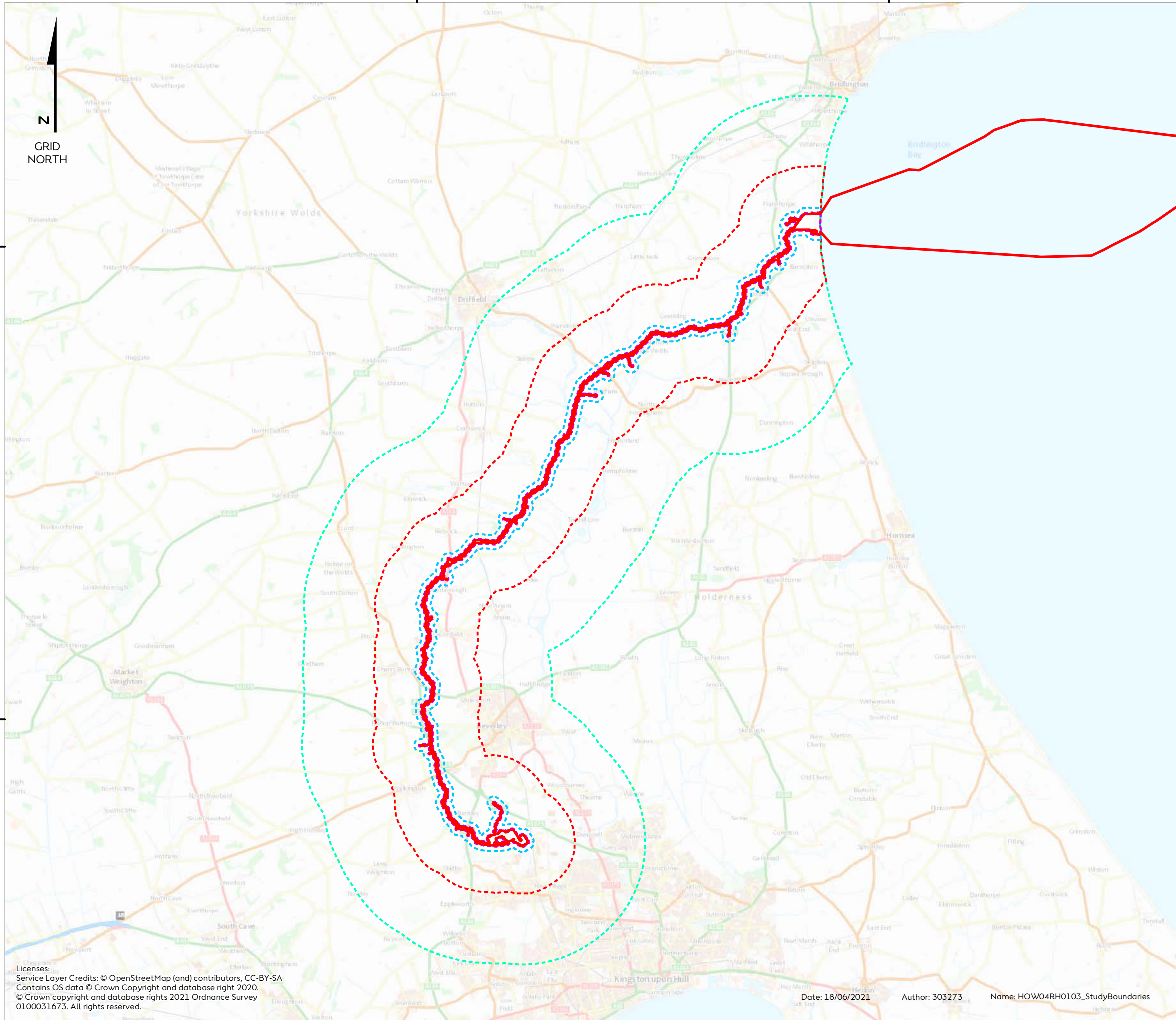
520000

# Hornsea Four

## Figure 1

### EP1HS Study Areas

-  Order Limits
-  EP1HS Survey Area (50m Buffer)
-  GCN Study Area (250m Buffer)
-  Data Search Study Area (2km Buffer)
-  Bat and Bird Study Area (5km Buffer)



Coordinate system: British National Grid

Scale@A3: 1:160,000

0 1.75 3.5 7 Kilometres

0 1 2 4 Miles

REV	REMARK	DATE
	First Issue for DCO	18/06/2021

Title: EP1HS Study Area  
 Document no: HOW04RH0103  
 Created by: AZ  
 Checked by: CC  
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Date: 18/06/2021

Author: 303273

Name: HOW04RH0103\_StudyBoundaries

### 3.3 Desktop review

- 3.3.1.1 The Multi-Agency Geographic Information for the Countryside (MAGIC) website (Defra 2013) was reviewed in January 2019 (and re-checked in April 2020) for information on statutory sites and notable habitats (e.g. ancient woodlands) of nature conservation value, within the Hornsea Four EP1HS study area (as shown on [Figure 2](#) to [Figure 11](#)).
- 3.3.1.2 A search for water bodies using 1:25,000 Ordnance Survey (OS) maps was also undertaken to identify the potential aquatic habitats used by Great crested newt (GCN) *Triturus cristatus*. A 250 m buffer is considered appropriate having considered the habitats within and around Hornsea Four. Although GCN can use suitable terrestrial habitat up to 500 m from a breeding pond (English Nature 2001), research suggests that newts are likely to travel no more than 250 m from ponds where suitable habitats for foraging and hibernation exist close to their breeding ponds (Cresswell and Whitworth 2004).
- 3.3.1.3 The use of a 250 m buffer from the Hornsea Four Order Limits was discussed and confirmed in consultation with Natural England, YWT, the Royal Society for the Protection of Birds (RSPB) and the EA during the third Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.6). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.15).
- 3.3.1.4 The water body information derived from the OS maps was then used to identify the potential presence of (and potential for impacts on) GCN and other aquatic and semi-aquatic protected species including otters *Lutra lutra* and water voles *Arvicola amphibius*. The Hornsea Four Phase 2 survey results for water voles, otters and GCN can be found in the following technical annexes:
- [Annex 3.5: Great Crested Newt Environmental DNA \(eDNA\) Survey Report](#);
  - [Annex 3.6: Water vole Survey Report](#); and
  - [Annex 3.7: Otter Survey Report \(confidential\)](#).
- 3.3.1.5 The UK Post-2010 Biodiversity Framework (2012) (which replaces the UK Biodiversity Action Plan (UK BAP)) and the East Riding BAP Strategy, were reviewed in February 2019 to identify habitats and species of conservation concern that may be present within the Hornsea Four EP1HS study area.
- 3.3.1.6 Biological data received from the North and East Yorkshire Ecological Data Centre (NEYEDC) initially obtained during the scoping stages of the project (NEYEDC 2018), and more recently updated in April 2020, was reviewed and used to supplement the findings of the EP1HS field survey effort. There is no specific date for determining that desk study records of a certain age are no longer valid, and therefore each record has been considered on its own merits. As the biological records data was updated in April 2020 it is therefore considered to remain valid. The findings from the desk study is presented within [Section 4.1](#) of this report.

## 3.4 Field Survey Methodology

- 3.4.1.1 The updated EP1HS was undertaken between 6<sup>th</sup> and 15<sup>th</sup> February 2019 and between the 4 and 13 September 2019 to record the habitats within the Hornsea Four EP1HS survey area and to identify the presence or likely presence of legally protected and notable species.
- 3.4.1.2 The updated EP1HS followed the 'Extended Phase 1' methodology as set out in Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment (IEMA 1995)). This method of survey enabled information on the habitats within the survey area to be provided and enabled an assessment of the potential for legally protected species to be present on or adjacent to the Hornsea Four EP1HS survey area. Habitats have been recorded within the Hornsea Four EP1HS survey area using the system set out within the Joint Nature Conservation Committee (JNCC) '*Handbook for Phase 1 habitat survey: A technique for environmental audit*' (JNCC 2010).
- 3.4.1.3 All of the habitats within the Hornsea Four EP1HS survey area that were accessible at the time of the survey have been mapped and Target Notes (TN) have been used to provide details of characteristic habitats, species composition and to highlight any features of ecological interest. Due to the size of the EP1HS survey area and the large number of TNs, the TNs are presented within a separate annex, [Annex 3.2 Extended Phase 1 Target Note Tables](#).
- 3.4.1.4 Ongoing consultation with landowners has been undertaken by The Applicant's land agents since 2019 and consequently access to the remaining 5 % unsurveyed in 2019 was granted in 2021. The findings from this survey are provided in [Appendix A](#) and [Appendix A of Annex 3.2: Extended Phase 1 Target Note Tables](#)) and have not been included in this document.
- 3.4.1.5 An assessment of hedgerows within the Hornsea Four EP1HS survey area was also undertaken. The methodology followed that outlined in the Hedgerow Survey Handbook (Defra 2007) and is in line with the Hedgerow Regulations (Hedgerow Regulations 1997). All hedgerows were recorded in line with the JNCC habitat classifications (JNCC 2010), as shown in [Table 3](#). In addition, a separate hedgerow survey was undertaken by a suitably qualified arboriculturalist, the results from this survey are contained within [Annex 3.14 Hedgerow and Arboricultural Survey Report](#).

**Table 3: Hedgerow classifications.**

Classification	Description	JNCC Classification	Notes
Intact hedgerow	Species-rich	J2.1.1	Hedgerow with no significant gaps that remains stock proof and contains five or more woody species per 30 m length.
	Species-poor	J2.1.2	Hedgerow with no significant gaps that remains stock proof and contains less than five woody species per 30 m length.
Defunct hedgerow	Species-rich	J2.2.1	Hedgerow with significant gaps that is not stock proof and contains five or more woody species per 30 m length.

Classification	Description	JNCC Classification	Notes
	Species-poor	J2.2.2	Hedgerow with significant gaps that is not stock proof and contains less than five woody species per 30 m length.
Hedgerow with trees	Species-rich	J2.3.1	Hedgerow that is made of a mix of tree and shrub species, with five or more woody species per 30 m length.
	Species-poor	J2.3.2	Hedgerow that is made of a mix of tree and shrub species, with less than five woody species per 30 m length

3.4.1.6 Following the Guidelines for Baseline Ecological Assessment (CIEEM 2017), the 2019 habitat survey was 'extended' to make preliminary investigations in respect to the following legally protected and/or notable species. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8).

#### Birds

3.4.1.7 It should be noted that specific bird surveys (over-wintering and breeding birds) have been undertaken and the findings are reported separately in the following technical annexes:

- [Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report.](#); and
- [Annex 3.4: Breeding Bird Survey Report.](#)

3.4.1.8 As part of the updated EP1HS, a search for all habitats with suitability to support breeding and over-wintering birds was undertaken, with a focus on those habitats with the suitability to support birds listed on Schedule 1 of the Wildlife and Countryside Act (WCA 1981) and International Union for Conservation of Nature (IUCN) 'Red' and 'Amber' List species (IUCN 2019). Such habitats include trees, hedgerows, water bodies, grazing marsh or fen, lowland heath and agricultural land.

#### Badgers

3.4.1.9 A search for signs of badgers *Meles meles* activity within the Hornsea Four EP1HS survey area was undertaken in 2019 and 2021. Signs such as setts, tracks, hairs, bedding and spoil heaps, snuffle holes and latrines, were checked for. These results are reported separately in the confidential technical annex: [Annex 3.15: Badger Survey Report \(Confidential\)](#).

3.4.1.10 Where active setts were found, they were classified using the following categories:

- **Main sett** - Several holes with large spoil heaps and obvious paths leading from and between sett entrances;
- **Annexe sett** - Normally less than 150 m from main setts, comprising several holes. May not be in use all the time, even if main sett is very active;
- **Subsidiary sett** - Usually at least 50 m from main sett with no obvious paths connecting to other setts. May only be used intermittently; and
- **Outlier sett** - Little spoil outside holes, with no obvious paths connecting to other setts. Only used sporadically and may be used by foxes and rabbits.

## Bats

3.4.1.11 All trees, buildings and structures (e.g. bridges and farm buildings) were assessed for their potential to support roosting bats from the ground and using binoculars. Each feature was assigned a classification of either negligible, low, moderate or high suitability for supporting roosting bats following the guidelines set out in Table 4.1 of the Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (BCT 2016).

3.4.1.12 All trees, water bodies and hedgerows were also assessed for their potential to provide commuting and foraging habitat for bats, in accordance with BCT guidelines (BCT 2016).

3.4.1.13 Full survey results for bat species are contained within the following annexes:

- [Annex 3.8: Bat Static Detector Survey Report Part A](#);
- [Annex 3.9: Bat Static Detector Survey Report Part B](#);
- [Annex 3.10: Bat Activity Transect Survey Report Part A](#);
- [Annex 3.11: Bat Activity Transect Survey Report Part B](#);
- [Annex 3.12: Bat Emergence and Re-entry Survey Report Part A](#); and
- [Annex 3.13: Bat Emergence and Re-entry Survey Report Part B](#).

## Water voles and otters

3.4.1.14 All standing and running water bodies within the Hornsea Four EP1HS survey area were recorded. Assessments of a water body's suitability for water voles and otters was made in line with the Mammal Society guidance (Dean et al. 2016) and standing advice from Natural England (Natural England 2015).

3.4.1.15 Full survey results for water vole and otter are provided in the following annexes:

- [Annex 3.6: Water Vole Survey Report](#); and
- [Annex 3.7: Otter Survey Report \(confidential\)](#).

## Great crested newts

3.4.1.16 All standing water bodies within the Hornsea Four GCN study area have been mapped and were subject to a Habitat Suitability Index (HSI) assessment (following Oldham et al. 2000) and an Environmental DNA (eDNA) survey within the appropriate survey window (between mid-April and the end of June) during 2019 and 2021 (see [Section 5.2](#)). Further details on the survey methodology and results are provided in [Annex 3.5: Great Crested Newt Environmental DNA \(eDNA\) Survey Report](#).

## Reptiles

3.4.1.17 Areas of potential reptile habitat were identified during the updated EP1HS. Habitat mosaics were noted, such as where a collection of suitable habitats for reptile hibernation, basking, and foraging occur together. These habitats include habitat transitions (ecotones), rank grassland, lowland heath, piles of debris (hibernacula), or bare ground (Edgar et al. 2010).



Invasive non-native species

3.4.1.18 Where present, the location and extent of invasive non-native species was recorded. Due to the large number of invasive non-native species present in the UK, the updated EP1HS focussed on the species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (WCA 1981).

### 3.4.2 Surveyors

3.4.2.1 The updated EP1HS was conducted by two Royal HaskoningDHV ecologists. The survey was led by Charlotte Clements, BSc. (Hons), Associate Member of CIEEM (ACIEEM) and assisted by Maria Walentek BSc. MSc (ACIEEM). Charlotte and Maria both have over 6 years of experience in Extended Phase 1 Habitat surveying. On occasion, Charlotte was also assisted by Paul Hiscocks, a Member of CIEEM (MCIEEM) and a Member of the Association of Environmental and Ecological Clerk of Works (MEECoW). Paul has 15 years' experience of undertaking ecological surveys.

### 3.4.3 Weather conditions

3.4.3.1 **Table 4** summarises the weather conditions encountered during the updated EP1HS.

**Table 4: Weather conditions during the updated EP1HS.**

Survey Date (2019)	Weather conditions
6th February	Dry, fine, moderate breeze, approximately 7°C.
7th February	Rain, wind, approximately 4°C.
8th February	Showers, strong wind (40mph gusts), approximately 5°C.
12th February	Dry, fine, approximately 6°C.
13th February	Dry, fine, approximately 7°C.
14th February	Dry, fine, approximately 8°C.
15th February	Dry, fine, moderate breeze, approximately 4°C.
4th September	Dry, fine, strong winds (25mph gusts), approximately 18°C.
5th September	Dry, fine, strong winds (25mph gusts), approximately 18°C.
6th September	Dry, fine, strong winds (30mph gusts), approximately 19°C.
9th September	Light rain, moderate breeze, approximately 15°C.
10th September	Dry, fine, moderate breeze, approximately 18°C.
11th September	Dry, fine, strong winds (30mph gusts), approximately 21°C.
12th September	Dry, fine, strong winds (30mph gusts), approximately 23°C.
13th September	Dry, fine, moderate breeze, approximately 19°C.

## 3.4.4 Survey limitations

- 3.4.4.1 The updated EP1HS covered approximately 95% of the onshore Hornsea Four Order Limits. The remaining 5 % equates to a small section that is currently unsurveyed due to no landowner access being granted (denoted in grey on [Figure 35](#)) at the time of the 2019 survey. This area was reviewed using aerial imagery and where possible ground-truthed from adjacent land parcels where landowner access had been granted. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Agreement was subsequently obtained from Natural England via the Hornsea Four onshore ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.18).
- 3.4.4.2 Some areas of habitats could not be fully accessed during the updated EP1HS due to the presence of physical barriers, such as dense scrub, which in turn prevented safe entry for the surveyors. However, these areas were small and discrete (such as dense bramble covering ditches) and were encountered infrequently. In the few locations where they were encountered, they were recorded as potentially providing field signs which could not be picked up during the field survey.
- 3.4.4.3 The updated EP1HS was undertaken in February and September 2019. Although these periods are at the start and end of the optimal survey period for identifying ground flora species and habitat communities, sufficient evidence of key indicator species was found enabling the successful identification of habitat communities. Additionally, the majority of habitats encountered during the updated EP1HS is consistent with those expected of agricultural landscapes and colonised by identifiable species, for example scrub dominated by bramble and hawthorn. Therefore, it is considered that the survey (and its results) are robust in being used to characterise the existing site conditions and in turn be used to inform and support the ecological impact assessment set out in [Volume A3, Chapter 3: Ecology and Nature Conservation](#) of the Hornsea Four ES. This conclusion was agreed by Natural England via the Hornsea Four onshore ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.18).
- 3.4.4.4 Additionally, although the survey team made the utmost effort to cover every habitat and pick up all field signs present during the updated EP1HS, on occasion some field signs can be missed. Despite this, the data presented in this report is considered to provide an accurate description of the habitats within the Hornsea Four EP1HS survey area.

## 4 Results

### 4.1 Desktop review results

#### 4.1.1 Statutory and Non-statutory designated sites

- 4.1.1.1 Designated sites identified during the desk-based review are listed in [Table 5](#) below and shown on [Figure 2](#) to [Figure 6](#). The designated sites are listed in order from the landfill through to the OnSS.

**Table 5: Statutory and non-statutory designated sites within the Hornsea Four EP1HS study area.**

Designated site (ordered from landfall to OnSS)	Present within EP1HS survey area (Yes / No)
<i>Statutory designated sites</i>	
Greater Wash Special Protection Area (SPA)	No
River Hull Headwaters Site of Special Scientific Interest (SSSI)	Yes
Bryan Mills Field (SSSI)	No
Burton Bushes (SSSI)	No
<i>Non-statutory designated sites</i>	
Gembling Common Local Wildlife Site (LWS)	No
Foston Fox Covert Heronry (LWS)	No
Copper Hall Wood (candidate LWS)	No
Gravel Pit, North Frodingham (candidate LWS)	No
Emmotland Soak Drain (LWS)	No
Cranswick Common (candidate LWS)	No
Corpslanding Road (LWS)	No
Sheepman Lane (LWS)	No
Watton Carr (LWS)	No
Barff Hill Causeway (LWS)	No
Mill Dam Beswick (LWS)	No
Lockington (candidate LWS)	No
Bryan Mills Beck (LWS)	Yes
Lake's Wood (LWS)	No
Bealey's Beck, Lockington (candidate LWS)	Yes
Scorborough Lane (LWS)	No
Old Lane, Leconsfield (LWS)	No
Bealey's Lane (LWS)	No
Leman Road Corner – Moorbeck Road a (LWS)	No
Leman Road Corner – Moorbeck Road b (LWS)	No
Leman Wood (LWS)	No
Bygot Wood Lane, Leconfield (LWS)	No
Raventhorpe Embankment (LWS)	Yes
Driffield Road (LWS)	No
Burton Bushes Veteran Trees (candidate LWS)	No
Newbald Road (LWS)	Yes
Newbald Road, Beverley (LWS)	No

Designated site (ordered from landfall to OnSS)	Present within EP1HS survey area (Yes / No)
Shorthill Hag (candidate LWS)	No
Beverley Limekilns (LWS)	No
Moor Lane (LWS)	Yes
Risby Park (LWS)	No
Fishpond Wood, Risby Estate (LWS)	No
Birkhill Wood (LWS)	No
Jillywood Lane (LWS)	Yes
Drove Road (candidate LWS)	No
Woodhill Path, Cottingham (LWS)	No
Mill Beck and Fields (candidate LWS)	No
Bentley Moor Wood (LWS)	No
Beverley Westwood Waxcaps (LWS)	No

## 4.1.2 UK Habitats of Principal Importance

4.1.2.1 The following UK Habitats of Principal Importance are present within the Hornsea Four EP1HS survey area, and are shown on [Figure 7](#) to [Figure 11](#):

- Coastal and Floodplain Grazing Marsh;
- Maritime Cliff and Slope; and
- Reedbeds.






4.1.2.2 [Figure 7](#) to [Figure 11](#) also include the habitat data collated from the National Forestry Commission dataset. The two key woodland habitat types that are present within the Hornsea Four EP1HS survey area are:

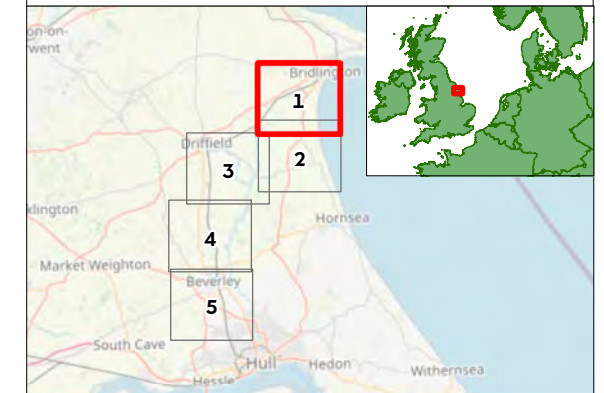
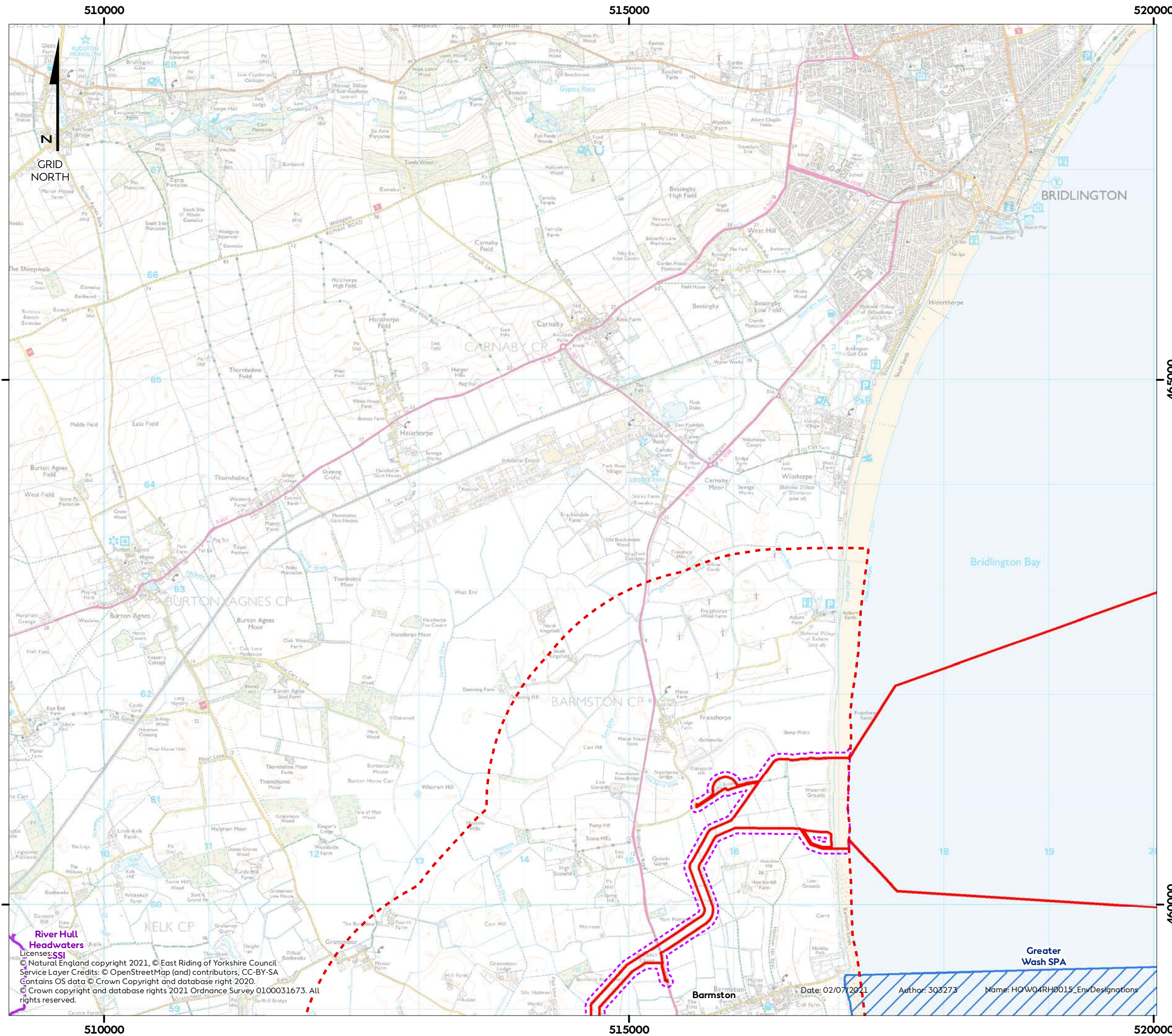
- Assumed Woodland; and
- Broadleaved.

# Hornsea Four

## Figure 2

Statutory and Non Statutory Environmental Designations (Landfall 1) - Sheet 1 of 5

-  Order Limits
-  Data search study area
-  EP1HS Survey Area
- Statutory Designations**
-  Sites of Special Scientific Interest (SSI)
-  Special Protection Areas (SPA)



Coordinate system: British National Grid  
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 0 500 1,000 2,000 Yards

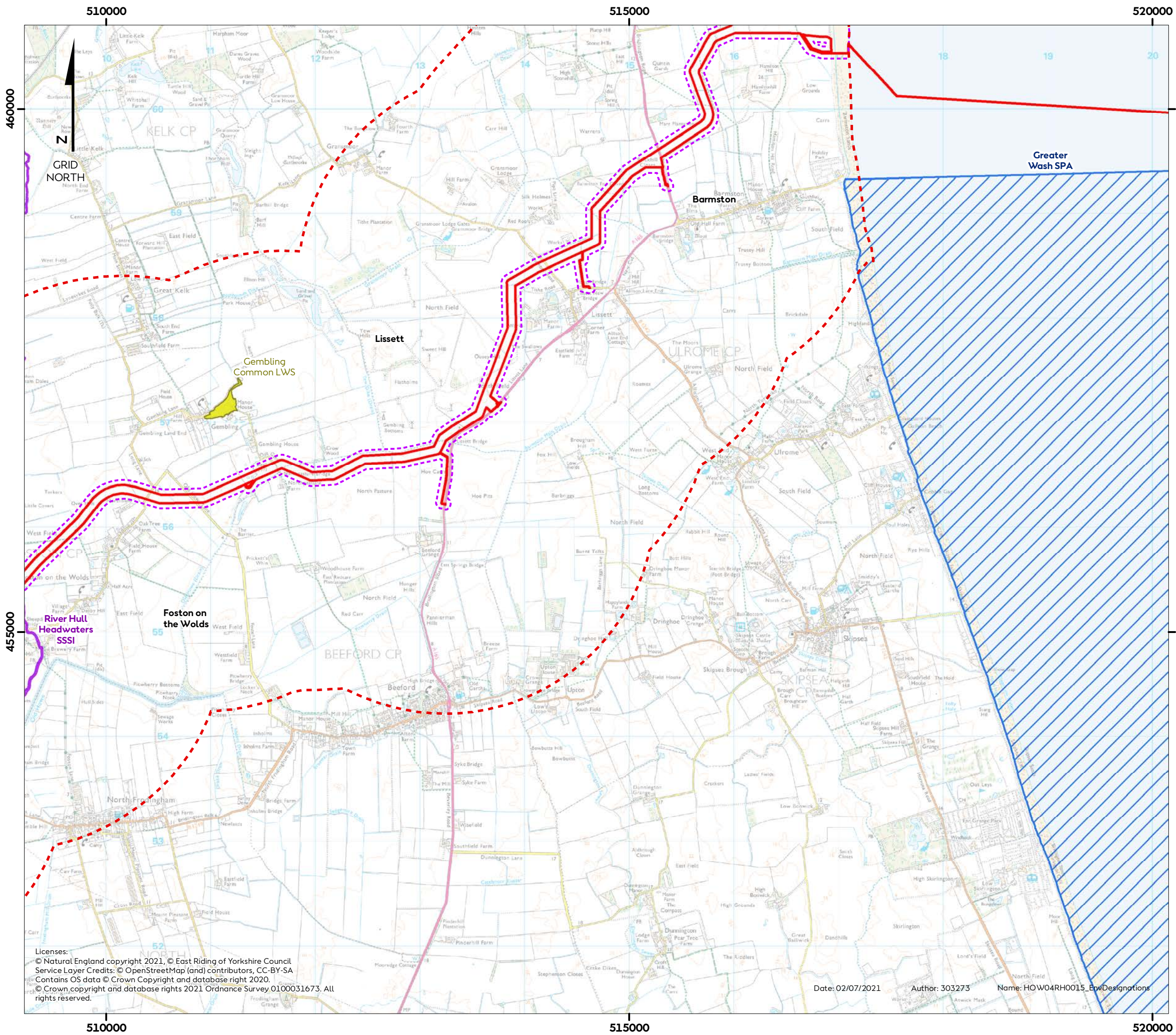
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	First Issue	11/07/2019
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Title: Statutory and Non Statutory Environmental Designations  
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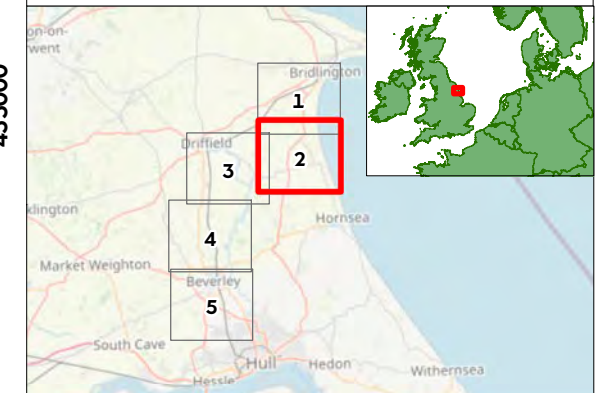
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**Hornsea Four**  
**Figure 3**  
 Statutory and Non Statutory  
 Environmental Designations (Landfall 2)  
 - Sheet 2 of 5


-  Order Limits
-  Data search study area
-  EP1HS Survey Area
- Non Statutory Designations**
-  Local Wildlife Sites (LWS)
- Statutory Designations**
-  Sites of Special Scientific Interest (SSSI)
-  Special Protection Areas (SPA)



Coordinate system: British National Grid  
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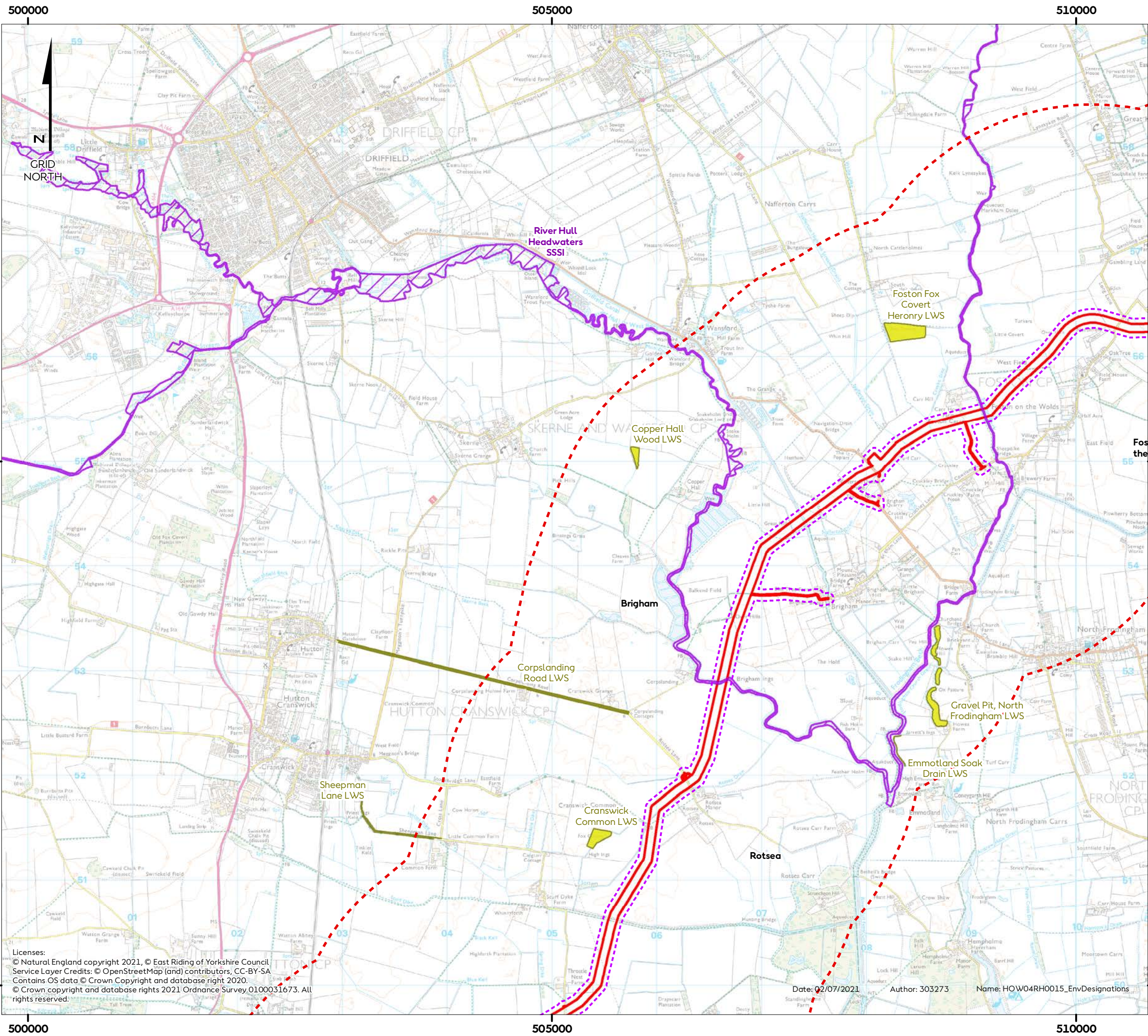
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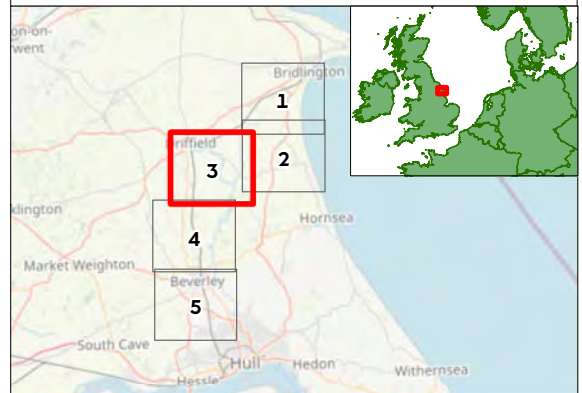
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**Hornsea Four**  
**Figure 4**  
 Statutory and Non Statutory  
 Environmental Designations (ECC 1)  
 - Sheet 3 of 5

-  Order Limits
-  Data search study area
-  EP1HS Survey Area
- Non Statutory Designations**
-  Local Wildlife Sites (LWS)
- Statutory Designations**
-  Sites of Special Scientific Interest (SSSI)



Coordinate system: British National Grid  
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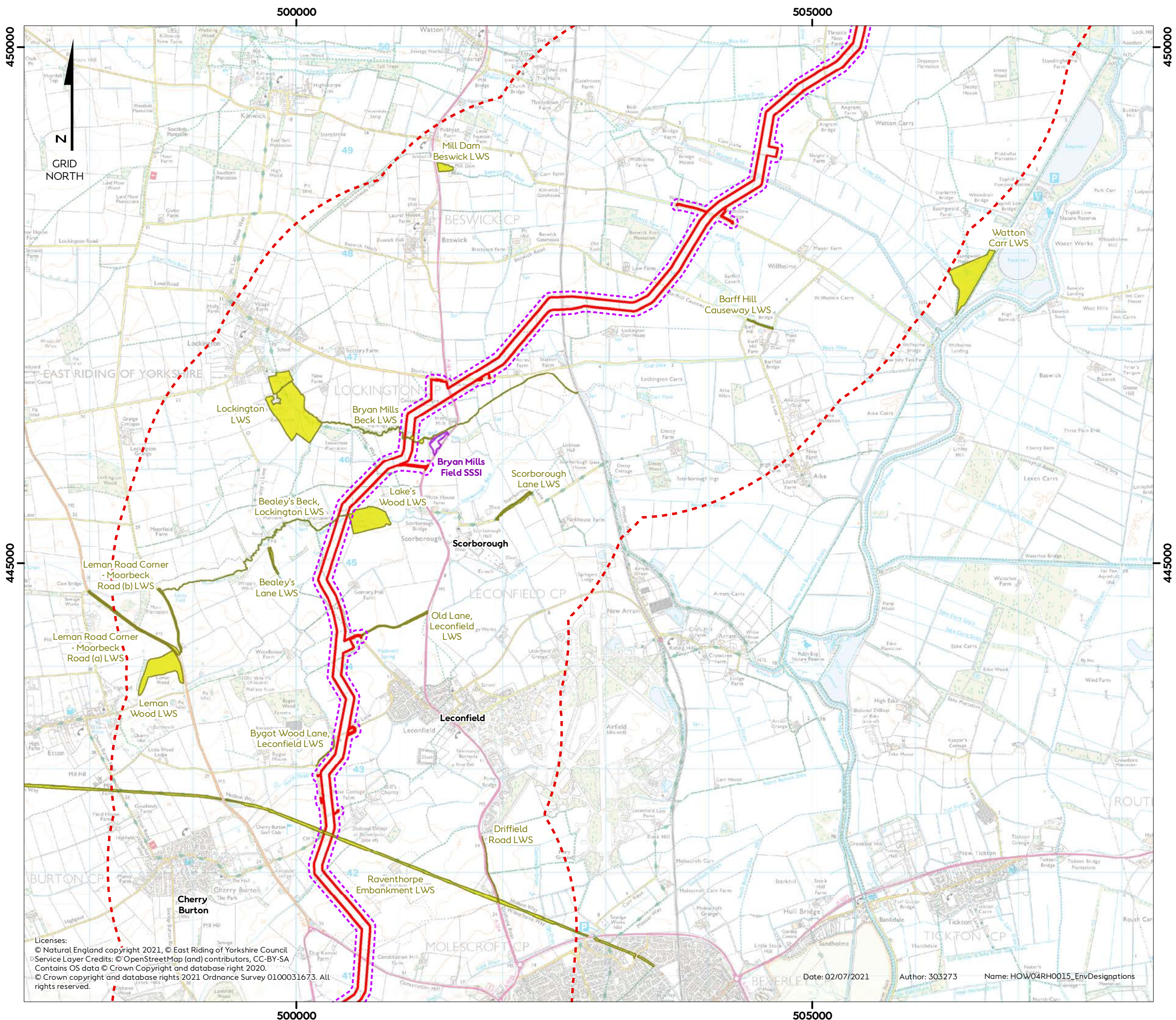
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 Document no: HOW04RH0015  
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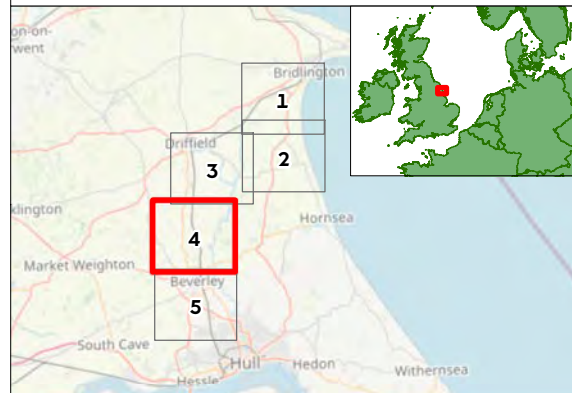
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# Hornsea Four

Figure 5  
Statutory and Non Statutory  
Environmental Designations (ECC 2)  
- Sheet 4 of 5

-  Order Limits
-  Data search study area
-  EP1HS Survey Area
- Non Statutory Designations**
-  Local Wildlife Sites (LWS)
- Statutory Designations**
-  Sites of Special Scientific Interest (SSSI)



Coordinate system: British National Grid  
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0 500 1,000 2,000 Yards

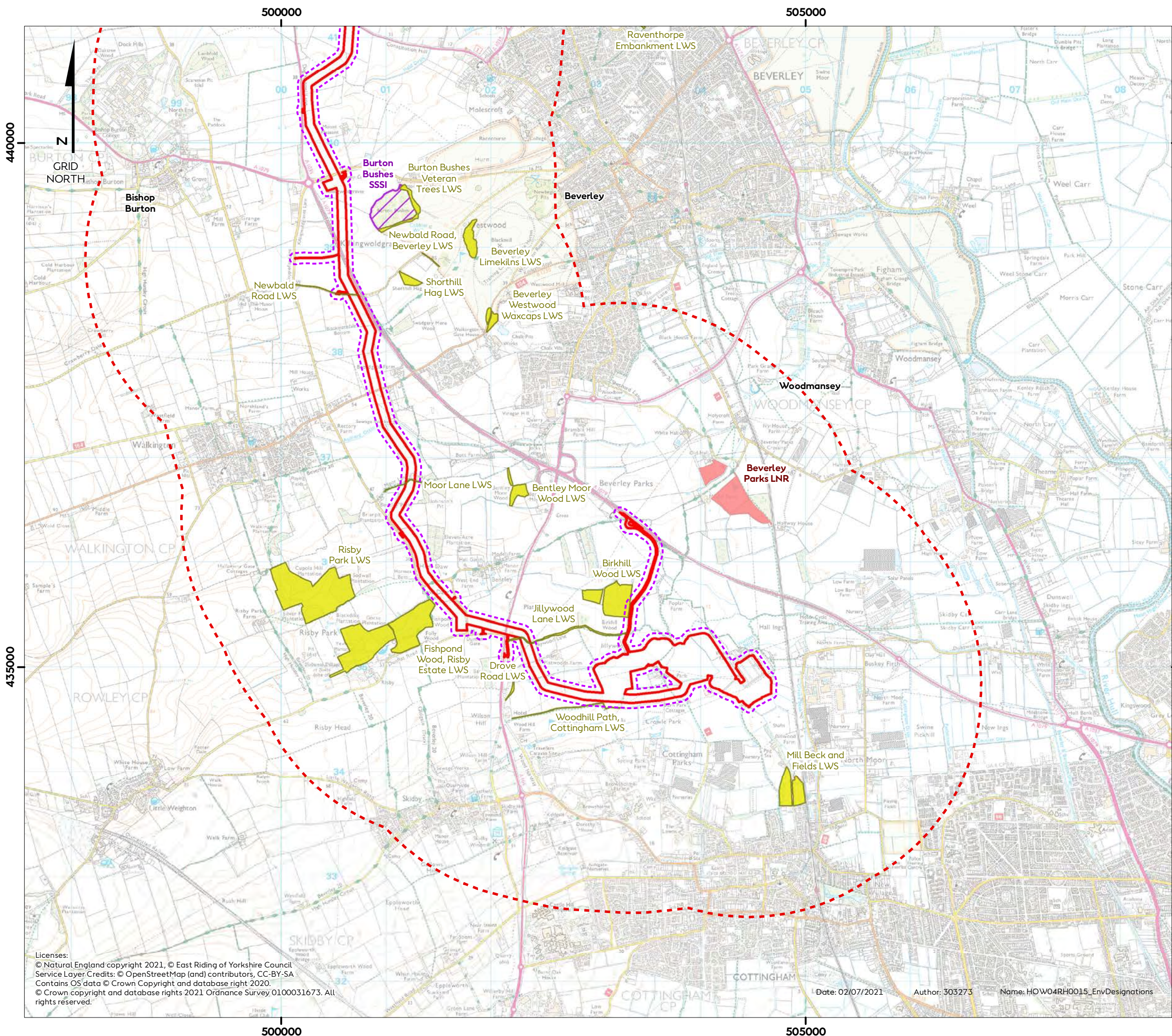
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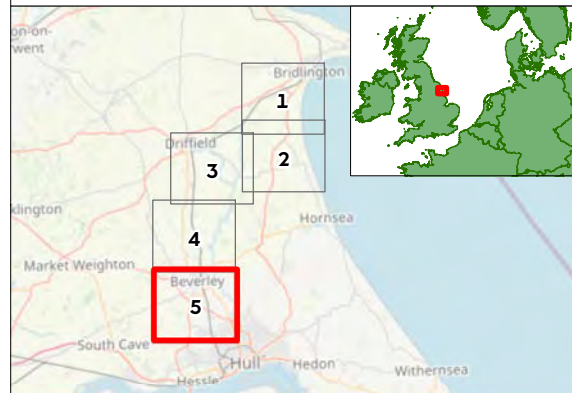
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**Hornsea Four**  
**Figure 6**  
 Statutory and Non Statutory  
 Environmental Designations (OnSS)  
 - Sheet 5 of 5

-  Order Limits
-  Data search study area
-  EP1HS Survey Area
- Non Statutory Designations**
-  Local Wildlife Sites (LWS)
- Statutory Designations**
-  Sites of Special Scientific Interest (SSSI)
-  Local Nature Reserves (LNR)



Coordinate system: British National Grid  
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 0 500 1,000 2,000 Yards













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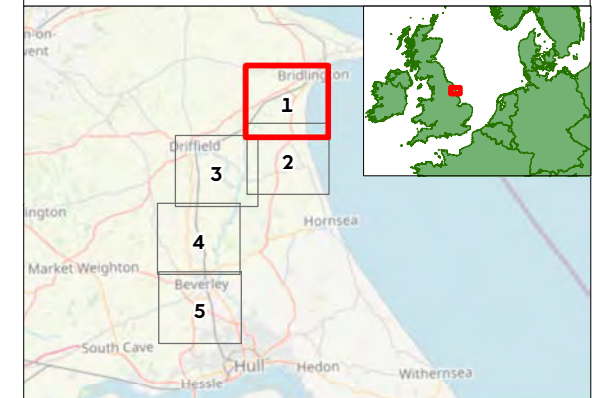
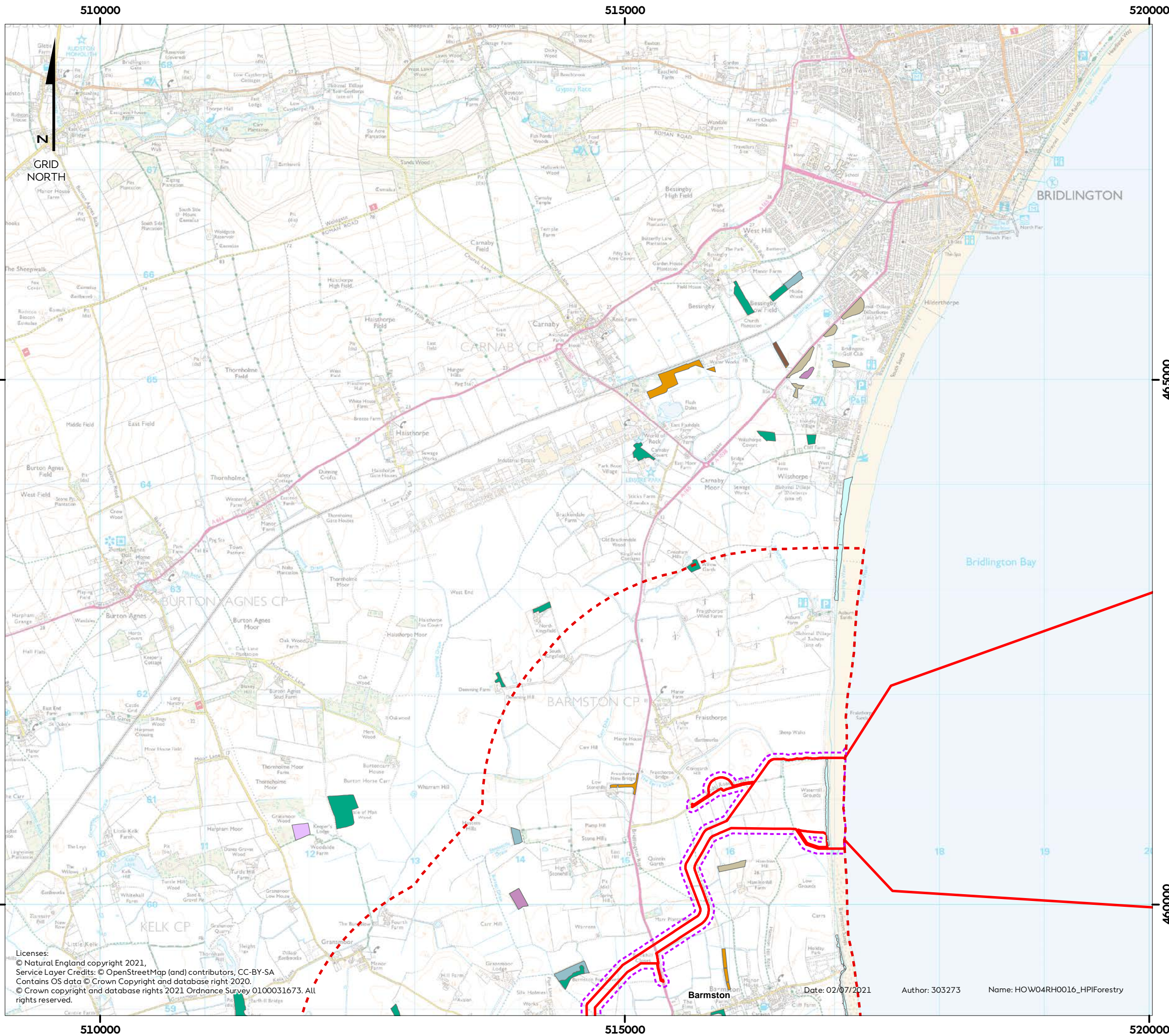
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# Hornsea Four

## Figure 7

UK Habitats of Principal Importance  
(Landfall 1) - Sheet 1 of 5

-  Order Limits
  -  Data search study area
  -  EP1HS Survey Area
- National Forest Inventory**
-  Assumed Woodland
  -  Broadleaved
  -  Conifer
  -  Felled
  -  Mixed - predominantly Conifer
  -  Mixed- predominantly Broadleaved
  -  Young Trees
- Priority Habitat Inventory**
-  Deciduous woodland
  -  Maritime cliff and slope



Coordinate system: British National Grid  
Scale@A3: 1:35,000

0 0.5 1 2 Kilometres

0 500 1,000 2,000 Yards

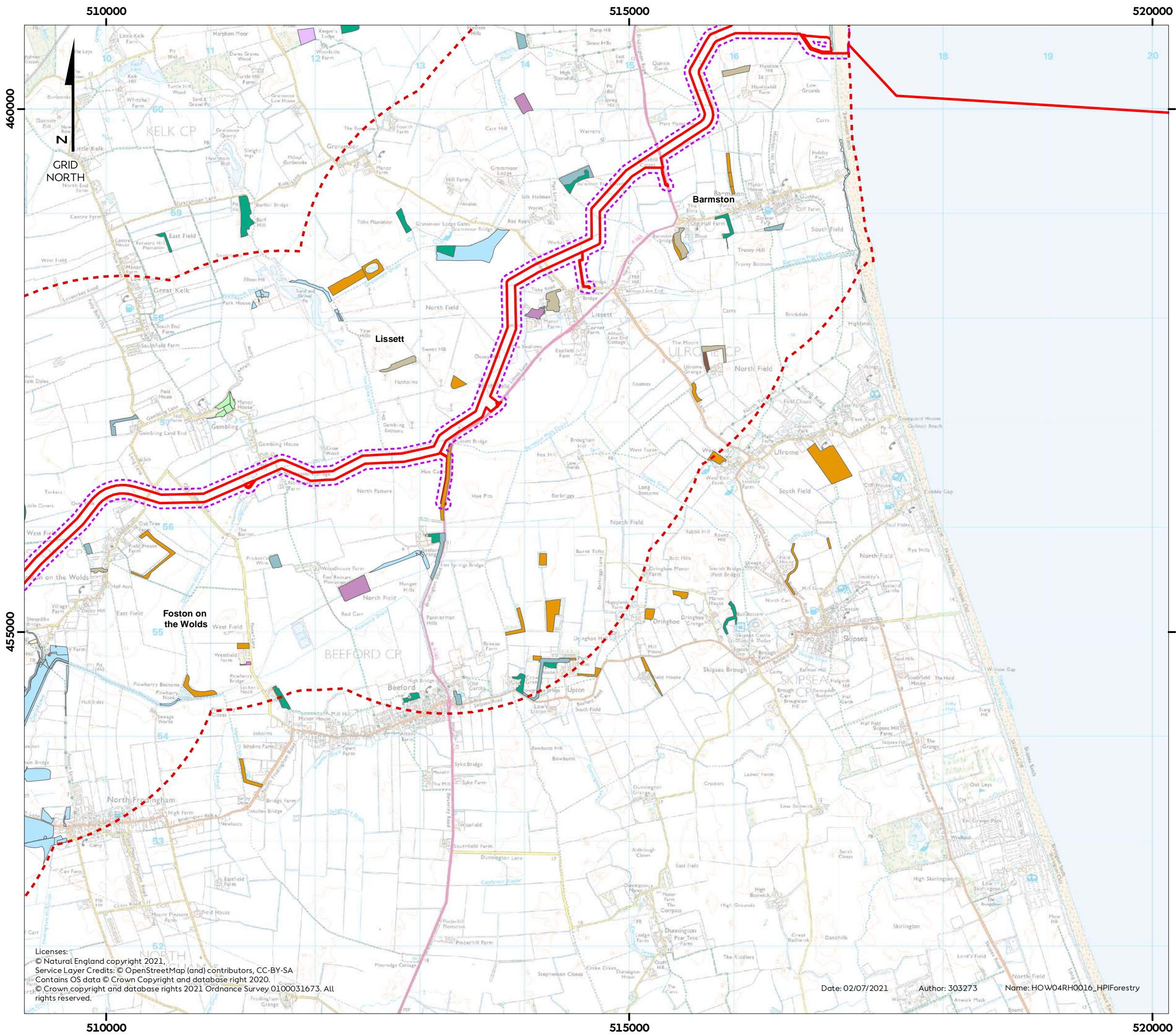
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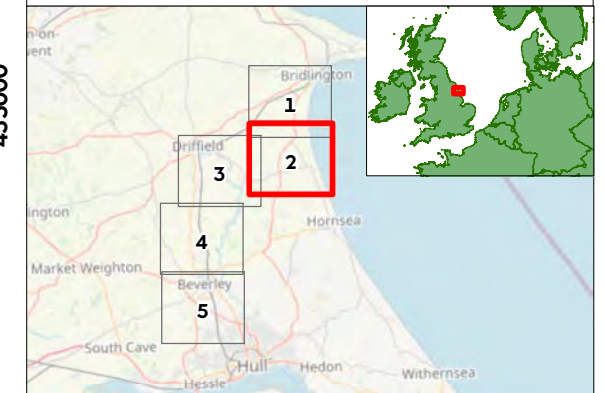
Title: UK Habitats of Principal Importance  
Document no: HOW04RH0016  
Created by: AZ  
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**Hornsea Four**  
**Figure 8**  
 UK Habitats of Principal Importance  
 (Landfall 2) - Sheet 2 of 5

- Order Limits
- Data search study area
- EP1HS Survey Area
- National Forest Inventory**
  - Assumed Woodland
  - Broadleaved
  - Conifer
  - Felled
  - Mixed - predominantly Conifer
  - Mixed - predominantly Broadleaved
  - Young Trees
- Priority Habitat Inventory**
  - Coastal and floodplain grazing marsh
  - Deciduous woodland
  - Good quality semi-improved grassland
  - Maritime cliff and slope
  - No main habitat but additional habitats present
  - Traditional orchard



Coordinate system: British National Grid  
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 0 500 1,000 2,000 Yards

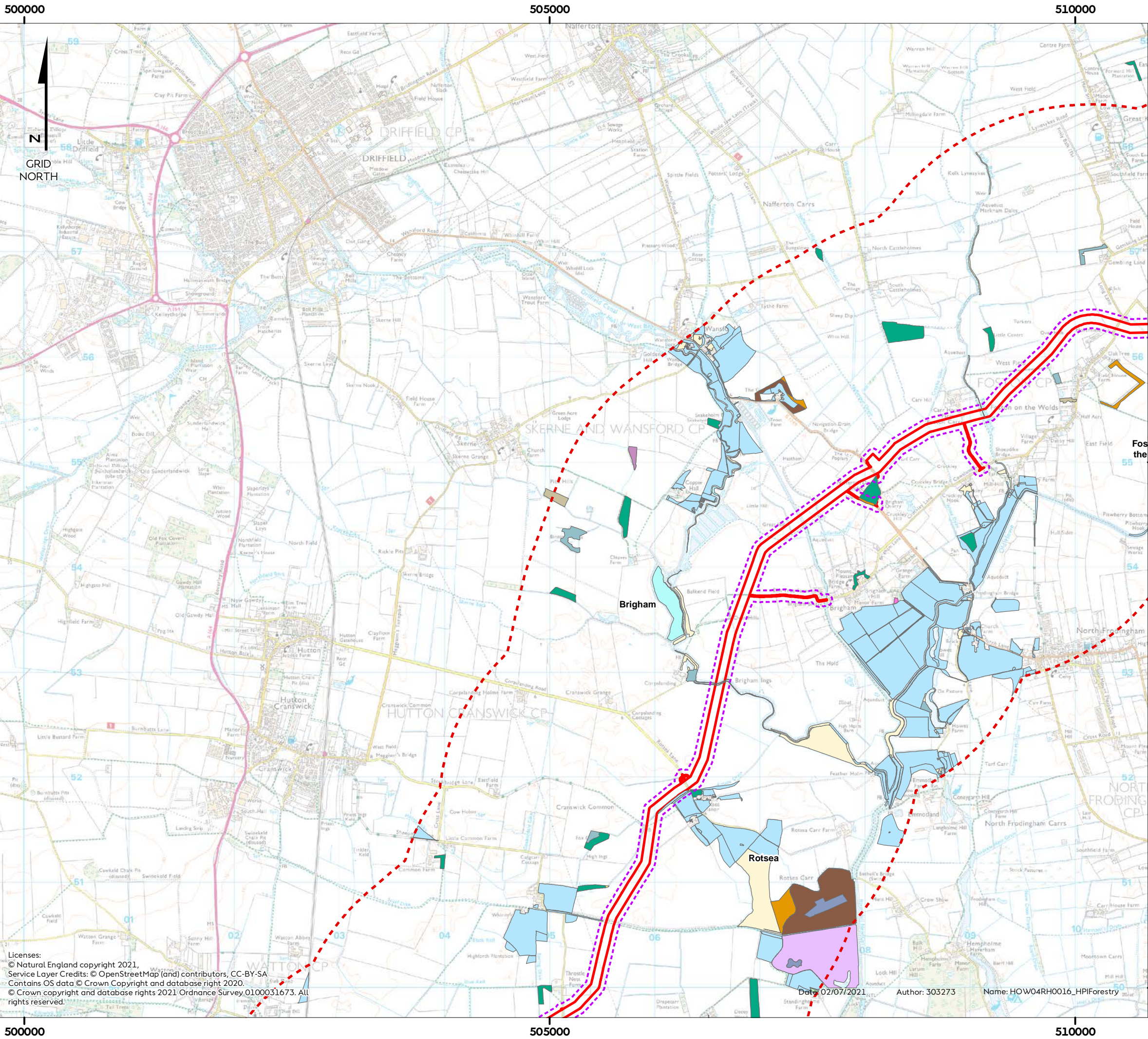
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**Hornsea Four**  
 Figure 9  
 UK Habitats of Principal Importance  
 (ECC 1) - Sheet 3 of 5

**Order Limits**

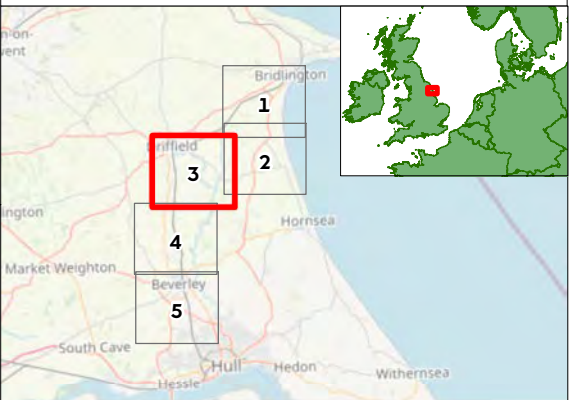
- Order Limits (Red solid line)
- Data search study area (Red dashed line)
- EP1HS Survey Area (Purple dashed line)

**National Forest Inventory**

- Assumed Woodland (Orange)
- Broadleaved (Green)
- Conifer (Blue)
- Felled (Purple)
- Interpreted Open Area (Grey)
- Mixed - predominantly Conifer (Brown)
- Mixed- predominantly Broadleaved (Dark Green)
- Young Trees (Dark Brown)

**Priority Habitat Inventory**

- Coastal and floodplain grazing marsh (Light Blue)
- Deciduous woodland (Yellow)
- Good quality semi-improved grassland (Light Green)
- No main habitat but additional habitats present (Light Yellow)
- Reedbeds (Cyan)
- Traditional orchard (Pink)



Coordinate system: British National Grid  
 Scale@A3: 1:35,000

0 0.5 1 2 Kilometres

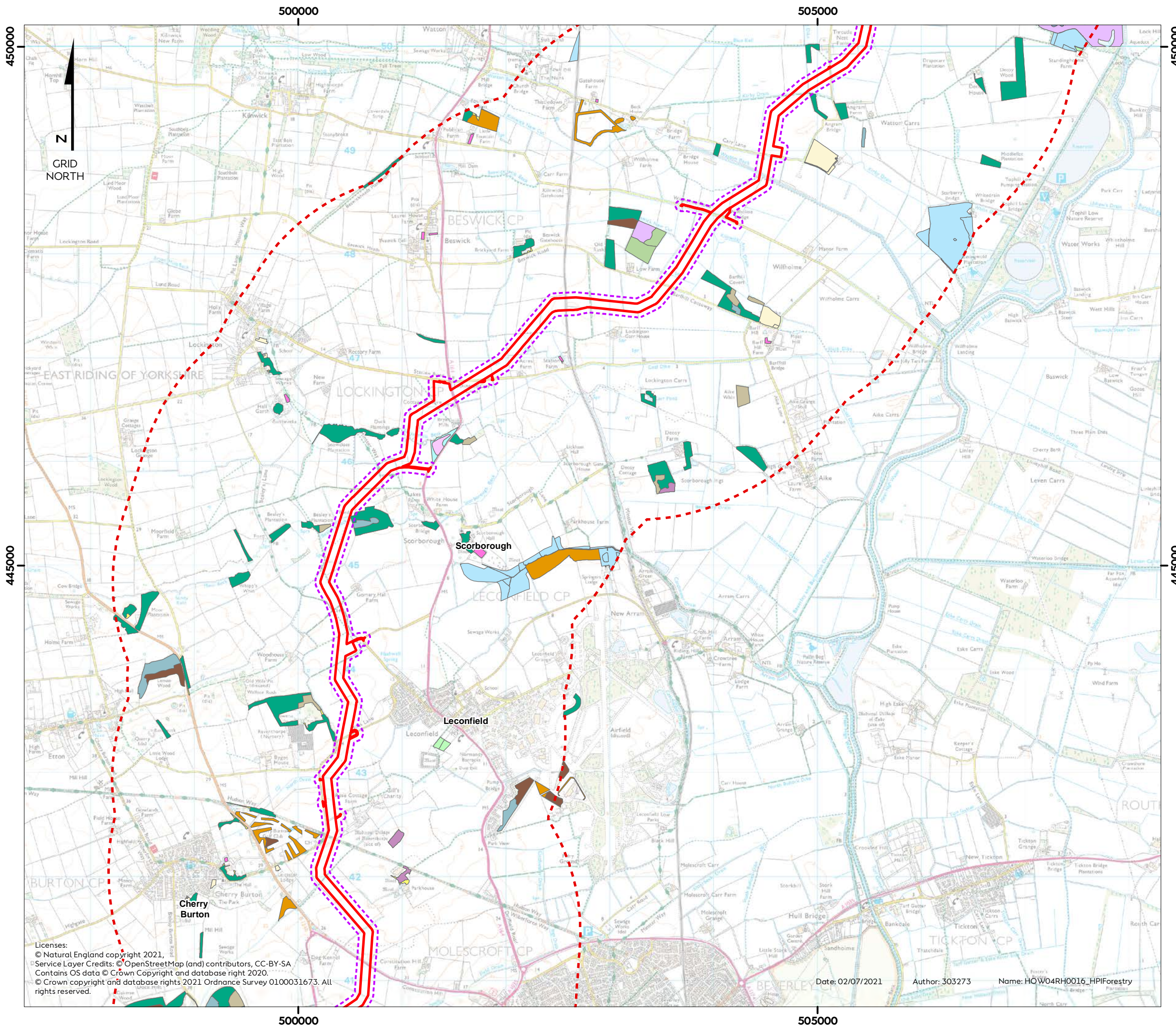
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Royal HaskoningDHV  
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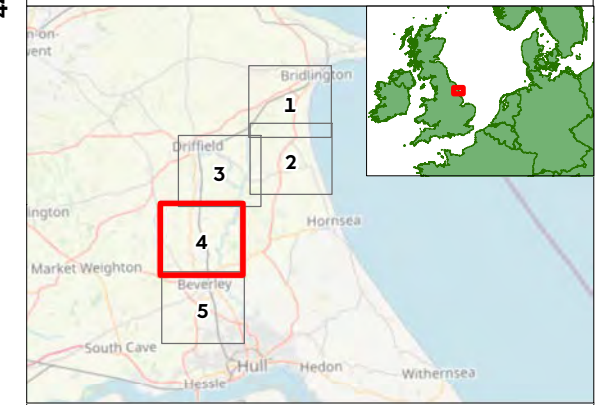


# Hornsea Four

## Figure 10

### UK Habitats of Principal Importance (ECC 2) - Sheet 4 of 5

- Order Limits
  - Data search study area
  - EP1HS Survey Area
- National Forest Inventory**
- Assumed Woodland
  - Broadleaved
  - Conifer
  - Felled
  - Ground Prepared for Planting
  - Interpreted Open Area
  - Mixed - predominantly Conifer
  - Mixed- predominantly Broadleaved
  - Young Trees
- Priority Habitat Inventory**
- Coastal and floodplain grazing marsh
  - Deciduous woodland
  - Good quality semi-improved grassland
  - Lowland fens
  - No main habitat but additional habitats present
  - Reedbeds
  - Traditional orchard





Coordinate system: British National Grid  
 Scale@A3: 1:35,000

0 0.5 1 2 Kilometres

0 500 1,000 2,000 Yards

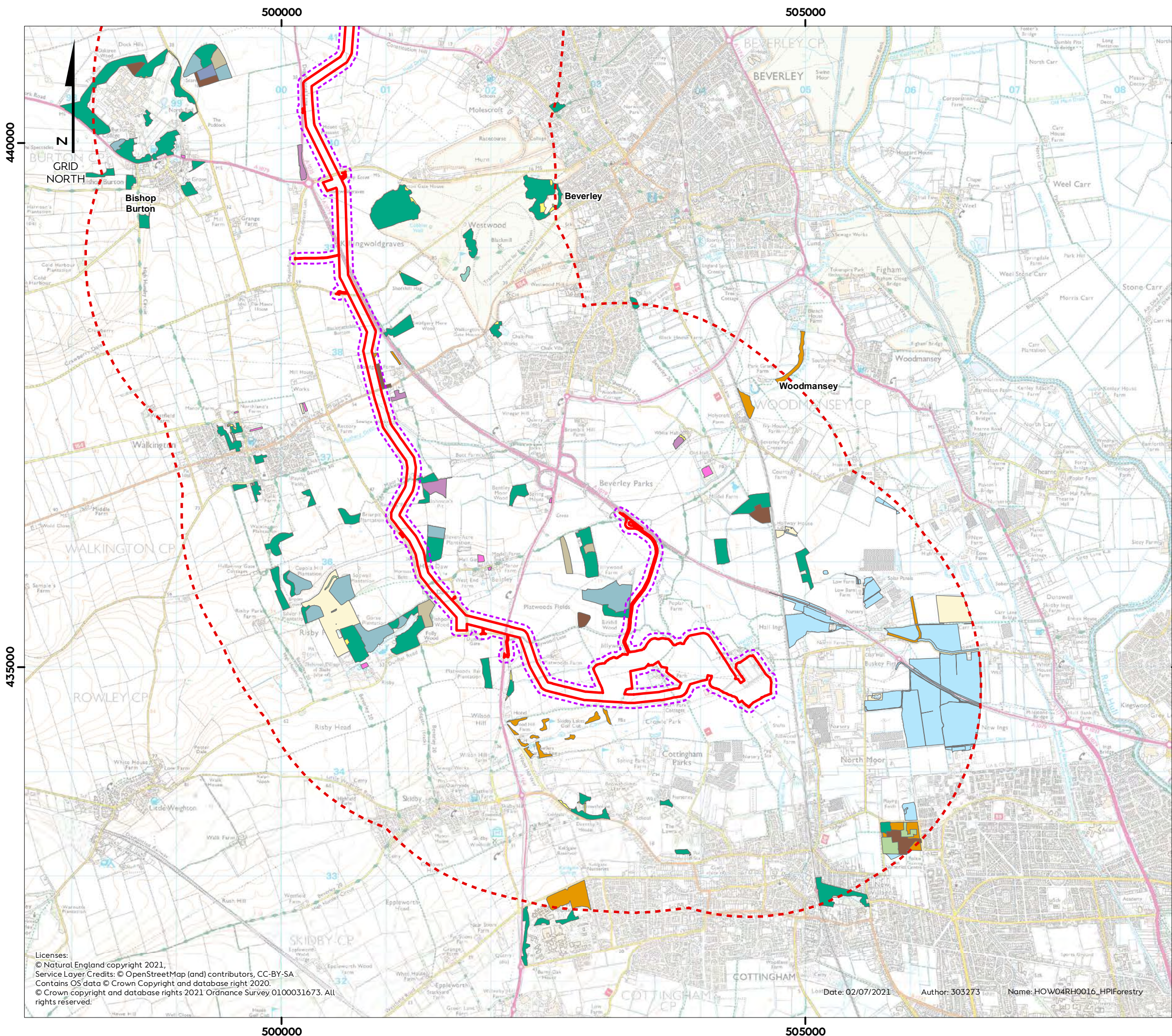
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A	Updated following PEIR consultations, for DCO	02/07/2021

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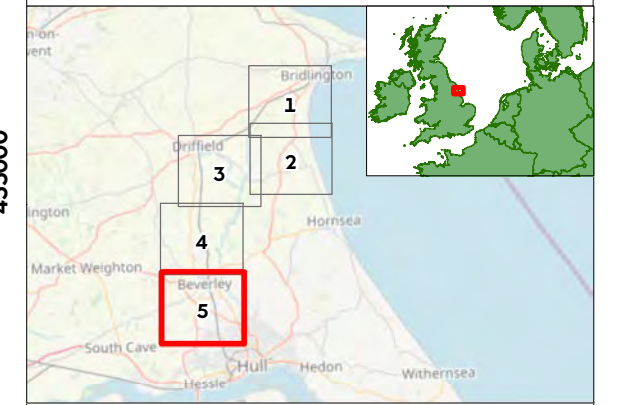


# Hornsea Four

## Figure 11

### UK Habitats of Principal Importance (OnSS) - Sheet 5 of 5

- Order Limits
  - Data search study area
  - EP1HS Survey Area
- National Forest Inventory**
- Assumed Woodland
  - Broadleaved
  - Conifer
  - Ground Prepared for Planting
  - Interpreted Open Area
  - Mixed - predominantly Conifer
  - Mixed- predominantly Broadleaved
  - Shrub Land
  - Young Trees
- Priority Habitat Inventory**
- Coastal and floodplain grazing marsh
  - Deciduous woodland
  - Good quality semi-improved grassland
  - No main habitat but additional habitats present
  - Traditional orchard



Coordinate system: British National Grid  
 Scale@A3: 1:35,000

0 0.5 1 2 Kilometres

0 500 1,000 2,000 Yards

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### 4.1.3 Protected species

4.1.3.1 This section summarises the records of all legally protected species which have been obtained during the desk-based assessment and highlights where those records are within the Hornsea Four EP1HS survey area.

#### Birds

4.1.3.2 The NEYEDC records returned data of a total of 223 bird species within the Hornsea Four bat and bird study area. Of those records, a total of 11 were recorded within the Hornsea Four EP1HS survey area. Of these 11 records, none are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA 1981), four are listed on the Birds of Conservation Concern (BoCC) (Eaton et al. 2015) 'red list' of threatened species and one is listed on the BoCC 'amber list' of threatened species.

4.1.3.3 The bird species that were recorded within the EP1HS survey area include:

- yellowhammer *Emberiza citrinella* (BoCC 'red list');
- sparrowhawk *Accipiter nisus*;
- kestrel *Falco tinnunculus* (BoCC 'amber list');
- skylark *Alauda arvensis* (BoCC 'red list');
- swallow *Hirundo rustica*;
- lapwing *Vanellus vanellus* (BoCC 'red list');
- blackbird *Turdus merula*;
- swallow *Hirundo rustica*;
- herring gull *Larus argentatus* (BoCC 'red list');
- carrion crow *Corvus corone*; and
- willow warbler *Phylloscopus trochilus*.

#### Badger

4.1.3.4 Due to the persecution of badgers, the information pertaining to this species is provided separately to this report, in a confidential report, which is available upon request, [Annex 3.15: Badger Survey Report \(Confidential\)](#).

#### Bats

4.1.3.5 A total of 104 records of bats within the Hornsea Four bat and bird study area was returned from NEYEDC. Of these records, one result was recorded within the EP1HS survey area. Records of bats returned from NEYEDC included a total of five species of bats including daubenton's *Myotis daubentonii*, whiskered bat *Myotis mystacinus*, natterer's bat *Myotis nattereri*, noctule *Nyctalus noctule*, with the common pipistrelle *Pipistrellus pipistrellus*, being the most frequently encountered.

#### Water vole

4.1.3.6 A total of 126 records of water voles within the Hornsea Four EP1HS study area were returned from NEYEDC. Of those records, a total of 17 results were recorded within the EP1HS survey area.

## Otter

- 4.1.3.7 A total of 44 records of otters within the Hornsea Four EP1HS study area were returned from NEYEDC. Of those records, none were situated within the Hornsea Four EP1HS survey area.

## Great crested newt

- 4.1.3.8 A total of 18 records of great crested newt within the Hornsea Four EP1HS study area were returned from NEYEDC. Of those records, none were situated within the Hornsea Four EP1HS survey area.

## Reptiles

- 4.1.3.9 Only one record of reptiles within the Hornsea Four EP1HS study area was returned from NEYEDC, and this record of a grass snake *Natrix natrix*, was outside of the Hornsea Four EP1HS survey area.

## Dormice

- 4.1.3.10 There are no records of dormice within either the Hornsea Four EP1HS study area or the Hornsea Four EP1HS survey area.

## Invertebrates

- 4.1.3.11 A total of 397 records of invertebrates within the Hornsea Four EP1HS study area were returned from NEYEDC. Of those records, 18 were recorded within the Hornsea Four EP1HS survey area. The most recorded group consisted of moths.

## Fish

- 4.1.3.12 Records from the EA between 2004 and 2018 (Environment Agency 2020) have recorded species such as, but not limited to, perch *Perca fluviatilis*, pike *Esox Lucius*, roach *Rutilus rutilus*, lamprey *Petromyzontidae*, 3-spined stickleback *Gasterosteus aculeatus*, silver bream *Abramis bjoerkna*, stone loach *Barbatula barbatula*, European eel *Anguilla Anguilla* and bullhead *Cottus gobio* within the Hull and Humber catchment. Of these species none of these have been recorded in waterbodies that are within the Hornsea Four EP1HS survey area.

## Invasive non-native species

- 4.1.3.13 A total of 21 records of invasive species within the Hornsea Four EP1HS study area were returned from NEYEDC. Of those records, one (Canadian waterweed *Elodea canadensis*) was situated within the Hornsea Four EP1HS survey area.

## **4.2 Field Survey Results**

- 4.2.1.1 **Table 6** shows the key habitats that were recorded within the Hornsea Four EP1HS survey area (as shown on **Figure 12** to **Figure 42**) during the updated EP1HS.



Table 6: JNCC Phase 1 habitat areas recorded during the updated EP1HS.

JNCC Phase 1 Habitat Code	JNCC Phase 1 Habitat Survey Description	Area (ha)
A1.1.1	Broadleaved woodland – semi-natural	4.24
A1.1.2	Broadleaved woodland – plantation	2.31
A1.3.2	Mixed woodland – plantation	0.20
A2.1	Scrub – dense/continuous	17.20
B4	Improved grassland	35.71
B6	Poor semi-improved grassland	13.71
J1.1	Cultivated/disturbed land – arable	800.23
J3.6	Building/hard-standing	21.24
J4	Bare ground	1.25
Not surveyed in 2019/20	Not surveyed in 2019/20	21.60
JNCC Phase 1 Habitat Code	JNCC Phase 1 Habitat Survey Description	Length (m)
J2.1.1	Intact hedge – species rich	556.54
J2.1.2	Intact hedge – species poor	18789.68
J2.2.2	Defunct hedge – species poor	6,061.11
J2.3.1	Hedge with trees – species rich	2,699.86
J2.3.2	Hedge with trees – species poor	7,789.97
J2.6	Dry ditch	11593.43
G1	Standing water	6990.06
G2	Running water	2,188.38

4.2.1.2 The following sections relating to the habitats recorded during the updated EP1HS should be read in conjunction with [Table 6](#).

#### Arable land

4.2.1.3 The largest habitat by area within the Hornsea Four EP1HS survey area is arable land (JNCC Phase 1 Habitat code J1.1). At the time of the survey these ranged from fields that were in crop (such as *Brassica spp.*), were ploughed, and those that continued to have winter cover.

#### Boundary features

4.2.1.4 Field boundaries consisted primarily of hedgerows (154 hedgerows totalling approximately 36 km in length within the EP1HS survey area), of which the majority (83) are species-poor intact hedgerows (J2.1.2). However, additionally 28 species-poor hedgerows with trees (J2.3.2), 31 species-poor defunct hedgerows (J2.2.2), 10 species-rich hedgerows with trees (J2.3.1), as well as two species-rich intact hedgerows (J2.1.1.) were also recorded.

- 4.2.1.5 Further details on hedgerows can be found in [Annex 3.14: Hedgerow and Arboricultural Survey Report](#). The remaining fields were bordered by wet ditches/rivers (G1 and G2) and dry ditches (J2.6).
- 4.2.1.6 Species rich hedgerows (J2.1.1, J2.2.1 and J2.3.1) typically consisted of shrub and tree species including hawthorn *Crataegus monogyna*, oak *Quercus robur*, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica*, goat willow *Salix caprea*, hazel *Corylus avellana*, field maple *Acer campestre*, ivy *Hedera helix*, and holly *Ilex aquifolium*. Ground flora typically consisting of common nettle *Urtica dioica*, bramble *Rubus fruticosus*, cow parsley *Anthriscus sylvestris*, red-dead nettle *Lamium purpureum*, cleavers *Galium aparine*, common hogweed *Heracleum sphondylium*, and broad leaf dock *Rumex obtusifolius*.
- 4.2.1.7 Species poor hedgerows (J2.1.2, J2.2.2 and J2.3.2) were characterised by fewer than five woody species within a 30 m stretch and were typically dominated by hawthorn.

#### Semi-natural woodland

- 4.2.1.8 Areas of broadleaved semi-natural woodland (A1.1.1) were recorded in 35 locations within the Hornsea Four EP1HS survey area. These ranged from large areas of woodland through to small isolated pockets at field margins and along roads.
- 4.2.1.9 Broadleaved woodland typically consisted a mix of ash, sycamore and oak with typical understorey and ground flora species including thistle *Cirsium vulgare*, hawthorn, bramble and common nettle. Coniferous woodland species typically included Scots pine *Pinus sylvestris*.

#### Plantation woodland

- 4.2.1.10 Plantation woodland (A1.1.2 and A1.3.2) was recorded in 14 locations within the Hornsea Four EP1HS survey area and typically included sweet chestnut *Castanea sativa*, oak, Scots pine and hazel. Understorey and ground flora species consisted mainly of bramble and common nettle.

#### Scrub

- 4.2.1.11 A total of 108 areas of scrub (A2.1) were recorded within the Hornsea Four EP1HS survey area. These areas represented a range of habitat sub-types including transitional habitat between woodland and grassland, boundary features, waste ground, field margins and watercourse margins. Species present included bramble, gorse *Ulex spp.*, common nettle, common hogweed, cow parsley and cleavers.

#### Improved grassland

- 4.2.1.12 Improved grassland (B4) was recorded in 52 locations within the Hornsea Four EP1HS survey area. This habitat was formed of short sward grasses with areas of scrub vegetation typically being used for either grazing or paddocks.

### Poor semi-improved grassland

- 4.2.1.13 Poor semi-improved grassland (B6) was recorded in 21 locations within the Hornsea Four EP1HS survey area. These areas were comprised of coarse ruderal grass and herb species such as cock's foot *Dactylis glomerata*, broadleaf dock and white clover *Trifolium repens*.

### Standing and running water

- 4.2.1.14 There are a total of 80 watercourses (i.e. ditches and rivers, excluding ponds), these included both field margin ditches and running water.

## **4.2.2 Protected species**

### Birds

- 4.2.2.1 BoCC4 Red List (Eaton et al. 2015) species skylark was observed in song flight over an arable field in one location during the field survey (see **TN061** on **Figure 20** and further details can be found in **Annex 3.2: Extended Phase 1 Target Note Tables Part B**).

- 4.2.2.2 All hedgerows, isolated trees, grassland, scrub and woodland habitats were identified as potentially providing suitable nesting habitat for protected, notable and common species of birds. Relic bird nests were recorded within these habitats during the 2019 Hornsea Four EP1HS field survey.

- 4.2.2.3 Survey results regarding over-wintering and breeding bird species are reported separately in **Annex 3.3: Onshore Ornithology - Wintering and Migratory Birds Survey Report** and **Annex 3.4: Breeding Bird Survey Report**.

### Badger

- 4.2.2.4 Field survey results in relation to badgers are provided separately in **Annex 3.15: Badger Survey Report (Confidential)**.

### Bats

- 4.2.2.5 All features (i.e. trees, buildings, structures) noted during the 2019 field survey were assessed from the ground level and using binoculars for cracks and splits, hereafter referred to as Potential Roost Features (PRFs). The presence of PRFs, or lack of, allows each feature to be categorised for their suitability to support roosting bats (in line with standard BCT guidelines (Collins 2016)).

- 4.2.2.6 In total, 74 features were assessed for their suitability to support roosting bats. Of these, 23 were assessed as providing 'negligible' suitability for roosting bats, 24 were found to provide 'low' suitability, 25 as providing 'moderate' suitability and three as having 'high' suitability. **Table 7** below shows details of each feature and their assessments, and should be read in conjunction with **Figure 12** to **Figure 42**. Further information for the specific TN references that are made in **Table 7** is provided within **Annex 3.2 Extended Phase 1 Target Note Tables**.

**Table 7: Potential features assessed for their potential to support roosting bats.**

Target Note (TN)	Description	BCT category for potential to support roosting bats ('negligible', 'low', 'moderate' or 'high')
TN006	Small, open barn, no suitable features for roosting bats present.	negligible
TN008	Broadleaved plantation woodland (JNCC: A1.1.2) consisting of oak, ash, field maple and sycamore. Limited PRFs visible.	low
TN021	Species rich hedge with trees (JNCC: J2.3.1) consisting of hawthorn, aspen, horse chestnut, field maple, sycamore, ash and elder with no visible PRFs.	low
TN028	Broadleaved plantation woodland (JNCC: A1.1.2) consisting of sycamore, field maple and pines, no visible PRFs.	negligible
TN031	Large ash situated in hedge with no visible PRFs.	negligible
TN032	Large ash tree situated within the hedge, with several visible PRFs, including some broken limbs.	moderate
TN040	Large, ivy clad sycamore with limited PRFs visible from ground.	low
TN041	Horse chestnut tree situated in middle of improved grassland, used for grazing, no visible PRFs, tree also disconnected from wider habitat.	negligible
TN042	Large ash tree with PRFs and broken limbs.	moderate
TN046	Large ash tree with fallen limbs and PRFs present	moderate
TN047	Large sycamore tree with broken limbs and PRFs.	moderate
TN071	Large, mature sycamore tree with visible PRFs.	moderate
TN072	A single sycamore tree located on the edge of access road, one small PRF visible from ground.	low
TN073	Large mature ash tree with limited visible PRFs.	low
TN088	Broadleaved plantation woodland (JNCC: A1.1.2), trees present with no visible PRFs.	low
TN107	Shed made from prefabricated steel, numerous PRFs present but they are exposed to the weather and therefore considered to be too hot/cold to support roosting bats.	negligible
TN137	Large, mature oak tree with limited visible PRFs.	low
TN164	One mature oak tree within scrub (JNCC: A2.1) with visible PRFs.	moderate
TN166	One mature oak tree with some visible PRFs.	moderate
TN168	Group of young trees within survey buffer. All of which are young with no visible PRFs.	low
TN170	Mature oak tree with visible PRFs, situated adjacent to a stream, connected to woodland and scrub habitat.	moderate
TN182	Semi-natural broadleaved woodland (JNCC: A1.1.1) Small patch of woodland consisting of hawthorn and sycamore, semi mature trees. No visible PRFs.	negligible

Target Note (TN)	Description	BCT category for potential to support roosting bats ('negligible', 'low', 'moderate' or 'high')
TN187	Species poor hedge with trees (JNCC: J2.3.2) consisting of alder, blackthorn and willow. Trees all semi mature with no visible PRFs, some sections of hedge newly planted.	negligible
TN189	Semi-mature oak disconnected from wider habitat with no visible PRFs.	negligible
TN192	Bridge with some ivy cover, no visible PRFs in the brickwork.	negligible
TN193	Mature, ivy clad sycamore with no visible PRFs situated adjacent to road.	low
TN195	Semi-natural broadleaved woodland (JNCC: A1.1.1) Scattered trees and scrub vegetation lining each side of footpath; hawthorn, sycamore, bramble and dog rose. No visible PRFs.	negligible
TN200	Small copse of trees, some ivy clad, adjacent to road and arable field, limited PRFs visible from ground.	low
TN204	Small group of young and semi mature trees, no visible PRFs, disconnected from wider habitat.	negligible
TN216	Mature oak tree adjacent to busy road with limited PRFs.	low
TN217	Large mature ivy clad oak tree with multiple PRFs however feature is adjacent to a busy road and therefore not suitable for roosting bats.	low
TN218	Species poor hedge with trees (JNCC: J2.3.2) consisting of young trees with no PRFs lining public footpath and road.	negligible
TN219	Mature oak tree adjacent to busy road, limited visible PRFs.	low
TN220	Large mature oak tree, limited PRFs visible.	low
TN222	Two large mature oak trees with limited visible PRFs.	low
TN241	Broad-leaved plantation woodland (JNCC: A1.1.2) consisting of mostly young oak and hazel with no visible PRFs, fenced.	negligible
TN245	Broad-leaved plantation woodland (JNCC: A1.1.2) consisting of mostly semi mature and young trees with no PRFs.	negligible
TN250	Species poor hedge with trees (JNCC: J2.3.2) consisting of hawthorn, oak, bramble, thistle, broad leaved dock, common hogweed, nettle and ivy. Fenced. Trees present within hedge with no visible PRFs.	negligible
TN256	Semi-natural broadleaved woodland (JNCC: A1.1.1) consisting mainly of oak with scattered pine, bramble and nettle. No visible PRFs present.	negligible
TN257	Large mature oak tree with no visible PRFs.	negligible
TN263	Mature oak tree in hedge with visible PRFs.	moderate
TN264	Mature oak tree in hedge with PRFs.	moderate
TN265	Mature oak tree with PRFs, in hedge connected to woodland.	moderate
TN266	Dead ash tree in hedge, limited PRFs visible from ground.	low

Target Note (TN)	Description	BCT category for potential to support roosting bats ('negligible', 'low', 'moderate' or 'high')
TN273	Large mature oak tree on edge of woodland, relic ivy branches and lots of visible PRFs.	high
TN274	Large mature ivy clad oak tree within hedge with visible PRFs, close to woodland.	high
TN275	Three semi mature oak trees adjacent to hedge. No PRFs present.	negligible
TN279	Two dead ash trees with PRFs visible from ground.	moderate
TN282	Mature oak tree that is ivy clad, limited PRFs visible.	low
TN299	Mature oak tree with no visible PRFs.	low
TN300	Two oak trees with limited visible PRFs.	low
TN302	Two mature oak trees with no visible PRFs which are isolated from wider habitat as situated in middle of field.	low
TN304	Species poor hedge with trees (JNCC: J2.3.2) consisting of oak, crab apple and bramble, large gaps. No visible PRFs present.	negligible
TN305	Oak with PRFs consisting of large holes due to broken limbs, holes look to have smaller cavities further in.	moderate
TN308	Species poor hedge with trees (JNCC: J2.3.2) consisting of oak, ash, hawthorn, blackthorn, bramble. Some large gaps. No visible PRFs present.	negligible
TN314	Mature, partly ivy clad, oak tree with PRFs.	moderate
TN315	Mature oak tree with PRFs.	moderate
TN318	Dead oak tree with PRFs including some split limbs.	moderate
TN321	Mature oak tree with visible PRFs.	moderate
TN322	Mature oak tree with visible PRFs.	moderate
TN323	Large mature oak tree with visible PRFs set within hedge.	moderate
TN332	Scrub (JNCC: A2.1) - small patch of scrub with scattered semi-mature trees with no visible PRFs adjacent to arable fields and PRoW.	negligible
TN335	Mature oak tree within scrub adjacent to stream, ivy clad with broken branches and PRFs.	moderate
TN336	Oak tree with some visible PRFs consisting of peeling bark, however, limited spaces for bat access.	low
TN338	Group of mature and semi mature trees within scrub, one mature oak with visible PRFs.	moderate
TN351	Barns adjacent to house, some with tiled roofs with PRFs.	moderate
TN353	Mature, ivy clad oak tree in hedge, limited view from ground however some PRFs present.	moderate
TN356	Group of six mature oak trees with smooth bark, limited PRFs.	low
TN363	Three mature trees (oak and ash) in hedgerow, ivy clad, some PRFs visible.	moderate

Target Note (TN)	Description	BCT category for potential to support roosting bats ('negligible', 'low', 'moderate' or 'high')
TN368	Dead oak tree with multiple PRFs, including dead branches.	high
TN369	Two ivy clad field maple trees with limited visible PRFs.	low
TN370	Willow tree with no visible PRFs.	negligible
TN371	Mature, ivy clad sycamore tree with limited visible PRFs. Opportunistic potential only.	low
TN381	Mature oak tree within group of mature and semi-mature trees. Some PRFs visible from ground.	moderate

4.2.2.7 In addition to trees and structures (e.g. bridges and farm buildings), all linear features (e.g. watercourses, hedgerows) were assessed in terms of their potential suitability for supporting commuting or foraging bats, in accordance with BCT guidelines (BCT 2016).

4.2.2.8 In total, 98 features (comprising watercourses, hedgerows) were assessed for their suitability to support commuting or foraging bats. Of these, 13 were assessed as providing negligible suitability, 41 as providing low suitability, 43 as providing moderate suitability and one as having high suitability. **Table 8** provides further details and the assessment made of each feature. The locations are denoted by the use of TNs, the locations of which are shown on **Figure 12** to **Figure 42**. Further information for the specific TNs referenced in **Table 8** is provided within **Annex 3.2: Extended Phase 1 Target Note Tables (Part B)**.

4.2.2.9 All watercourses comprised of either running or standing water (i.e. rivers and drains) and have been given a unique number pre-ceded by the word 'ditch'. This is not a reference to the type of watercourse and includes rivers, streams and drainage ditches.

**Table 8: Potential features recorded and assessed for their suitability to support commuting and/or foraging bats.**

Target Note (TN)	Description	Potential for commuting and/or foraging (negligible, low, moderate or high)
TN002	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H001	low
TN005	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H002	moderate
TN007	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H003	negligible
TN008	Broadleaved plantation woodland (JNCC: A1.1.2)	moderate
TN010	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H004	low
TN012	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H005	low
TN013	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H006	negligible
TN014	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H007	negligible
TN016	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H008	negligible

Target Note (TN)	Description	Potential for commuting and/or foraging (negligible, low, moderate or high)
TN017	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H009	negligible
TN018	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H010	negligible
TN019	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H011	negligible
TN020	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H012	negligible
TN021	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H013	low
TN022	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H014	low
TN023	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H015	low
TN030	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H019	moderate
TN034	Watercourse – Ditch_B08	moderate
TN036	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H020	low
TN038	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H021	moderate
TN039	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H022	moderate
TN044	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H023	moderate
TN049	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H024	moderate
TN053	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H027	low
TN055	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H028	low
TN057	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H029	low
TN065	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H031	moderate
TN066	Watercourse – Ditch_B11	moderate
TN067	Species poor defunct hedgerow (JNCC: J2.2.2) – Hedge_H032	low
TN074	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H033	low
TN093	Watercourse – Ditch_B19	moderate
TN100	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H045	negligible
TN104	Watercourse – Ditch_B21	high
TN115	Watercourse – Ditch_B24	moderate
TN116	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H047	low
TN120	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H048	low
TN122	Watercourse – Ditch_B26	moderate
TN125	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H050	negligible
TN126	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H051	negligible
TN134	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H054	low
TN144	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H058	moderate
TN178	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H074	low
TN180	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H075	low
TN189	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H080	low
TN194	Semi-natural broadleaved woodland (JNCC: A1.1.1)	moderate
TN204	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H084	low
TN206	Row of young cherry trees lining road.	low



Target Note (TN)	Description	Potential for commuting and/or foraging (negligible, low, moderate or high)
TN207	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H085	low
TN209	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H086	low
TN217	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H088	negligible
TN220	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H090	low
TN213	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H091	low
TN227	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H094	low
TN229	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H093	low
TN231	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H095	low
TN232	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H096	low
TN236	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H097	low
TN235	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H098	low
TN239	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H099	low
TN242	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H100	moderate
TN245	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H101	low
TN246	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H102	low
TN247	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H103	low
TN249	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H104	moderate
TN252	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H105	moderate
TN257	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H107	moderate
TN258	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H106	moderate
TN261	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H108	moderate
TN266	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H109	moderate
TN268	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H110	moderate
TN269	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H111	moderate
TN276	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H113	low
TN275	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H112	low
TN280	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H114	low
TN285	Species poor defunct hedge (JNCC: J2.2.2) – Hedge_H116	low
TN286	Species rich intact hedge (JNCC: J2.1.1) – Hedge_H115	low
TN288	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H117	negligible
TN290	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H119	moderate
TN292	Semi-natural broadleaved woodland (JNCC: A1.1.1)	moderate
TN293	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H120	moderate
TN294	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H121	moderate
TN295	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H122	moderate
TN296	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H123	moderate
TN300	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H124	moderate
TN303	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H125	moderate

Target Note (TN)	Description	Potential for commuting and/or foraging (negligible, low, moderate or high)
TN305	Species rich hedge with trees (JNCC: J2.3.1) – Hedge_H126	moderate
TN307	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H127	moderate
TN315	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H131	moderate
TN318	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H129	moderate
TN331	Scrub (JNCC: A2.1)	moderate
TN332	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H134	moderate
TN343	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H136	moderate
TN345	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H137	moderate
TN347	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H130	moderate
TN351	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H132	moderate
TN363	Species poor hedge with trees (JNCC: J2.3.2) – Hedge_H133	low
TN372	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H138	moderate
TN377	Species poor intact hedge (JNCC: J2.1.2) – Hedge_H139	low

#### Water vole and otter

4.2.2.10 A total of 80 watercourses were recorded during the updated EP1HS. These 80 watercourses consisted of standing water, running water (i.e. rivers) and dry ditches. Any ditches noted as dry at the time of the survey were not surveyed for water vole. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). The survey results for the 2019 Hornsea Four water vole survey are contained within [Annex 3.6 Water vole Survey Report](#).

4.2.2.11 Of the 80 watercourses recorded, 14 were assessed as being suitable to support otters, therefore all 14 watercourses were surveyed for otters concurrently with the water vole surveys. The survey results for the 2019 Hornsea Four otter survey are contained within [Annex 3.7 Otter Survey Report](#).

4.2.2.12 The remaining 66 watercourses were assessed as sub-optimal habitat for otters, primarily as they were field drains of insufficient size and depth to support otters. Additionally, these watercourses were not functionally connected to the wider river network.

4.2.2.13 All 80 watercourses are shown on [Figure 12](#) to [Figure 42](#), which should be read in conjunction with the TN tables provided in [Annex 3.2 Extended Phase 1 Target Note Tables \(Part B\)](#).

#### Great crested newt

4.2.2.14 A total of 62 waterbodies (ponds) were identified within the Hornsea Four GCN study area. Access was granted to a total of 55 ponds within the GCN survey season (namely between mid-April and the end of June) during 2019. Access was subsequently granted to six of the remaining seven ponds in 2021 and were subject to a HSI and eDNA survey in June 2021. Full

survey results are contained within [Annex 3.5 Great Crested Newt Environmental DNA \(eDNA\) Survey Report](#). The location of these ponds is shown on [Figure 12](#) to [Figure 42](#).

### Reptiles

4.2.2.15 A total of 43 areas where suitable reptile habitat was recorded during the updated EP1HS. These areas comprise habitat mosaics and potential refugia locations which could potentially support common reptile species. [Table 9](#) provides further details of these areas, with additional supporting information provided in the TN tables contained in [Annex 3.2 Extended Phase 1 Target Note Tables \(Part B\)](#), and should be read in conjunction with [Figure 12](#) to [Figure 42](#).

**Table 9: Areas of suitable reptile habitat or potential refugia recorded during the updated EP1HS** (see [Figure 12](#) to [Figure 42](#) for TNs).

Target Note (TN)	Description
TN015	Improved grassland (JNCC: B4) potentially used for grazing but provides opportunities for basking and foraging reptiles.
TN029	Scrub (JNCC: A2.1) small patch of scrub between arable fields consisting of thistle, nettle and broad leaf dock, provides opportunities for basking and foraging reptiles.
TN037	Small patch of semi-natural broadleaved woodland (JNCC: A1.1.1) with fallen branches and leaf litter, providing hibernation options for reptiles.
TN043	Fallen tree offering potential reptile hibernation options.
TN045	Poor semi-improved grassland (JNCC: B6) providing foraging opportunities for reptiles
TN048	Scrub (JNCC: A2.1) consisting of gorse, bramble, nettle and hawthorn, offering foraging and basking opportunities for reptiles.
TN052	Boundary removed (JNCC: J2.7) bramble, nettle and scattered semi-mature trees remaining, providing basking and foraging opportunities for reptiles.
TN056	Improved grassland (JNCC: B4) potentially used for grazing, but provides opportunities for basking and foraging reptiles.
TN069	Improved grassland (JNCC: B4) Horses grazing, electric fencing present, but provides opportunities for basking and foraging reptiles.
TN070	Scrub (JNCC: A2.1) consisting of scattered trees, mostly semi mature, hawthorn and sycamore. Provides basking, foraging and hibernation opportunities.
TN075	Arable (JNCC: J1.1) – part cropped, part winter cover with wide grassy margins, providing foraging opportunities.
TN086	Large area of made ground with several log piles offering reptile hibernacula
TN089	Boundary formed of raised grass verge with bramble and nettle providing foraging opportunities.
TN096	Dry ditch with scattered hawthorn present offering foraging and basking potential.
TN103	Poor semi-improved grassland (JNCC: B6) grassland strip between river and arable fields, longer sward on river embankments with scrub vegetation present such as bramble, nettle and broad-leaved dock. Habitat mosaic provides basking, foraging and hibernation options.
TN106	Poor semi-improved grassland (JNCC: B6) mostly short sward, sections of scrub with teasel, thistle, hawthorn and bramble. Habitat mosaic provides basking, foraging and hibernation options

Target Note (TN)	Description
TN109	Scrub (JNCC: A2.1) Small area of scrub with hawthorn, bramble and common hogweed. Offers potential for basking and foraging.
TN111	Scrub (JNCC: A2.1) Small area of scrub with hawthorn, bramble and common hogweed. Offers potential for basking and foraging.
TN136	Poor semi-improved grassland (JNCC: B6) consisting of short sward grasses potentially used for grazing. White and red clover, thistle and dandelion also present. Provides opportunities for basking and foraging reptiles.
TN139	Scrub (JNCC: A2.1) small area of scrub, grasses and bramble adjacent to turbine and dyke. Habitat mosaic provides basking, foraging and hibernation options
TN154	Scrub (JNCC: A2.1) along edges of railway embankment, consisting of hawthorn, blackthorn, bramble and nettle. Habitat mosaic provides basking, foraging and hibernation options
TN164	Scrub (JNCC: A2.1) consisting of dense bramble and nettle with scattered mature oak and ash. Habitat mosaic provides basking, foraging and hibernation options
TN170	Scrub (JNCC: A2.1) consisting of dense bramble and hawthorn along stream banks with scattered trees. Habitat mosaic provides basking, foraging and hibernation options
TN171	Poor semi-improved grassland (JNCC: B6) Small area of grassland adjacent to woodland and arable field. Relatively short sward, broad leaved dock and nettle present and small wet patches with juncus spp. Habitat mosaic provides basking, foraging and hibernation options
TN197	Scrub (JNCC: A2.1) Patch of scrub adjacent to footpath and arable field, dense bramble throughout. Habitat mosaic provides basking, foraging and hibernation options
TN223	Large pile of vegetated woody debris, within hedge with wide grassy margins. Reptile hibernation feature connected to foraging habitat.
TN224	Scrub (JNCC: A2.1) - dense scrub with hawthorn, bramble, nettle and common hogweed. Provides opportunities for basking and foraging reptiles.
TN230	Scrub (JNCC: A2.1) - scrub and tree lined steep embankment adjacent to road consisting of hawthorn, pines and oak. Provides opportunities for basking and foraging reptiles.
TN237	Scrub (JNCC: A2.1) - scrub and tree lined steep embankment adjacent to road consisting of hawthorn, pines and oak. Provides opportunities for basking and foraging reptiles.
TN241	Poor semi-improved grassland (JNCC: B6) consisting of short sward grasses and limited herb species, potentially used for grazing, fenced. Provides opportunities for basking and foraging reptiles.
TN282	Poor semi-improved grassland (JNCC: B6) - small area of grassland within arable field, with section of tall ruderal vegetation adjacent to PRoW, broadleaved dock dominant. Habitat mosaic provides basking, foraging and hibernation options
TN297	Scrub (JNCC: A2.1) – consisting of hawthorn and blackthorn, dense bramble, nettle, broad leaved dock and thistle. Fenced. Provides opportunities for basking and foraging reptiles.
TN306	Soil heaps, woody debris and domestic waste piles offering reptile hibernation opportunities.
TN316	Semi-natural broadleaved woodland (JNCC: A1.1.1) – small patch of woodland, mostly open scrub with scattered mature trees, one dead, adjacent to ditch and arable fields. Thistle, broad leaved dock, bramble, hawthorn, nettle and oak present. Habitat mosaic provides basking, foraging and hibernation options
TN328	Scrub (JNCC: A2.1) with small open areas of rank grassland. Nettle, bramble, thistle, white clover present. Reptile mats also present during survey. Habitat mosaic provides basking, foraging and hibernation options

Target Note (TN)	Description
TN331	Scrub (JNCC: A2.1) - small patch of scrub with scattered semi-mature trees adjacent to arable fields and PRow. Habitat mosaic provides basking, foraging and hibernation options
TN338	Scrub (JNCC: A2.1) - area of scrub between arable fields, mainly bramble, common hogweed, nettle, cleavers and several ivy clad trees. Habitat mosaic provides basking, foraging and hibernation options
TN344	Improved grassland (JNCC: B4) – horses present. Provides opportunities for basking and foraging reptiles.
TN354	Improved grassland (JNCC: B4) - house, gardens and paddocks, used for grazing, electric fences and livestock shelters present. Provides opportunities for basking and foraging reptiles.
TN359	Scrub (JNCC: A2.1) – scrub with scattered trees, negligible bat roost throughout, several passerine bird calls heard (carrion crow). Provides opportunities for basking and foraging reptiles.
TN360	Small section of scrub with tree stumps present for potential reptile hibernacula and pond (pond A72).
TN371	Scrub (JNCC: A2.1) – small area of scrub between hedge, arable field and substation, includes access road for existing substation. Provides opportunities for basking and foraging reptiles.
TN379	Scrub (JNCC: A2.1) adjacent to woodland and Creyke Beck sub-station. Hawthorn, bramble and nettle present. Habitat mosaic provides basking, foraging and hibernation options

4.2.2.16 The mosaic of habitats where reptiles may be present include, but not limited to, scrub, woodland edges and grassland areas. The locations of these habitats are shown on [Figure 12](#) to [Figure 42](#).

#### Dormice

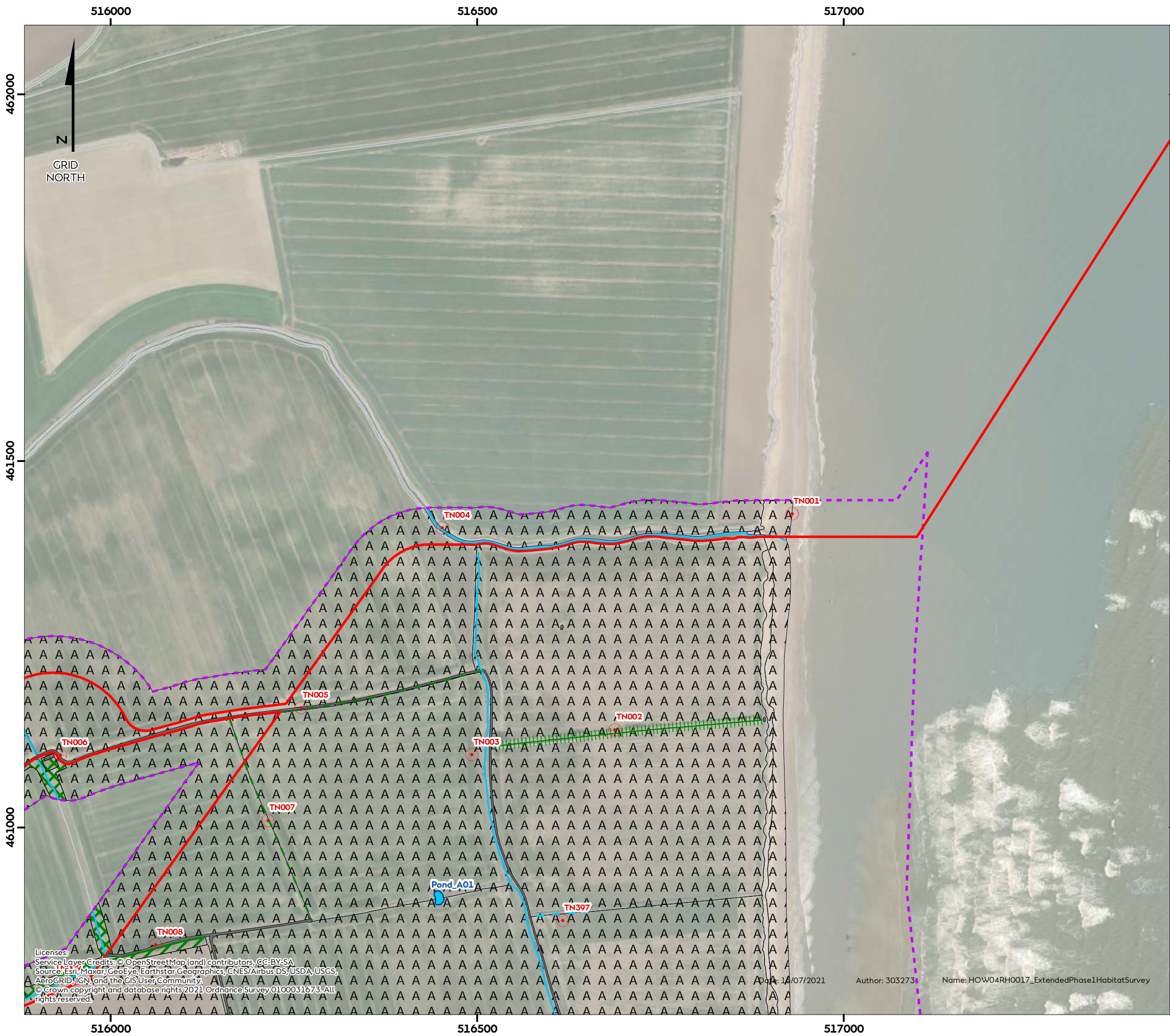
4.2.2.17 No records of dormice were returned during the desk study. Furthermore, no suitable habitats were recorded within the Hornsea Four EP1HS survey area during the updated EP1HS. Consequently, this species is considered to be absent and no further surveys will be required. As such this species has not been considered further in this report.

#### Invertebrates

4.2.2.18 No evidence of suitable habitat to support significant populations of notable species of invertebrates was noted during the updated EP1HS. Consequently, no further surveys will be required and as such these species have not been considered further.

#### Invasive non-native species

4.2.2.19 No invasive non-native species were recorded during the updated EP1HS.

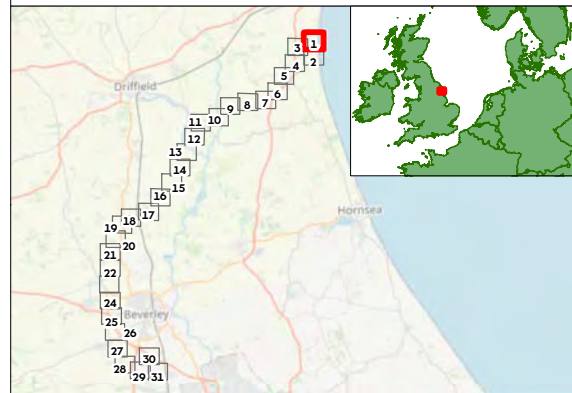


# Hornsea Four

## Figure 12

Updated EPH1HS - Sheet 1 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
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A	Updated following PEIR consultations, for DCO	16/07/2021

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# Hornsea Four







## Figure 13

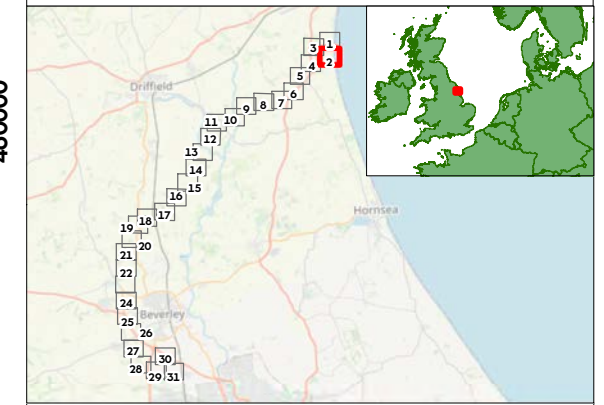
Updated EP1HS - Sheet 2 of 31



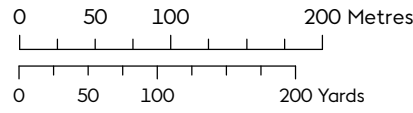
-  Order Limits
-  Target Note
-  EPH1HS Survey Area

**Phase 1 Habitat**

-  Standing Water
-  Intact Hedge - Species-poor
-  Planted Broadleaved Woodland
-  Dense / Continuous Scrub
-  Arable
-  Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000



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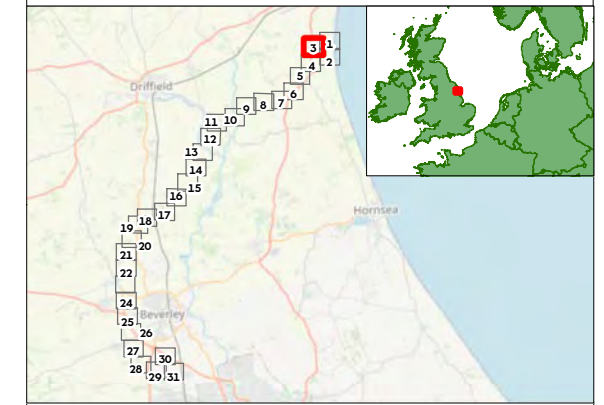




# Hornsea Four

Figure 14  
Updated EPH1HS - Sheet 3 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
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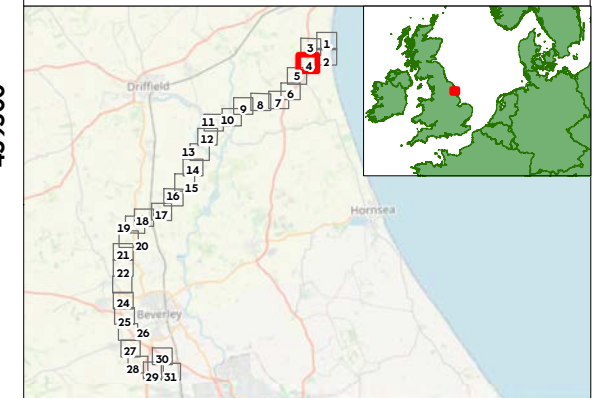
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# Hornsea Four

## Figure 15

Updated EP1HS - Sheet 4 of 31

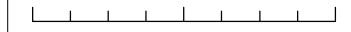
- Order Limits
- Target Note
- EP1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Dry Ditch
- Improved Grassland
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid

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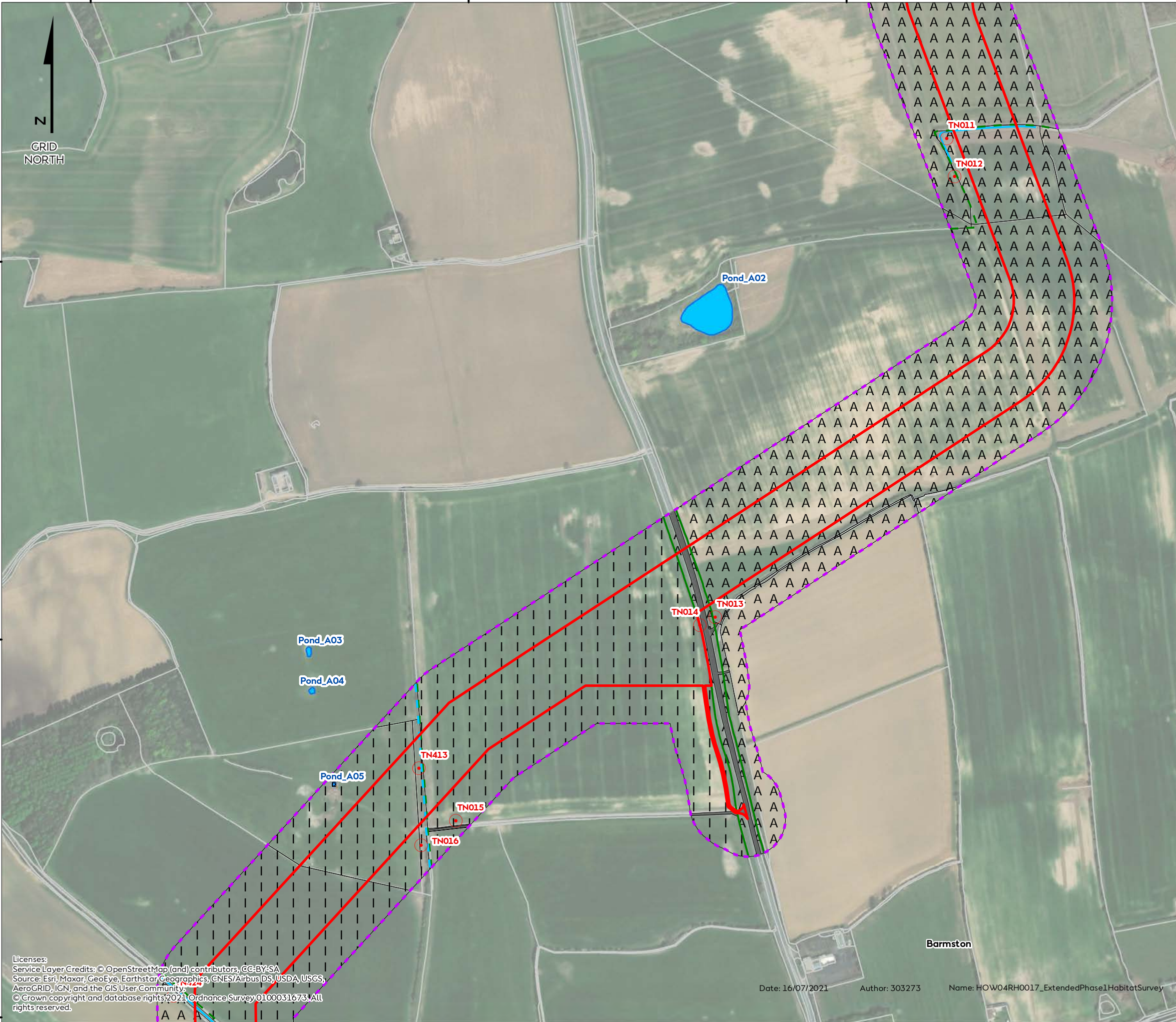
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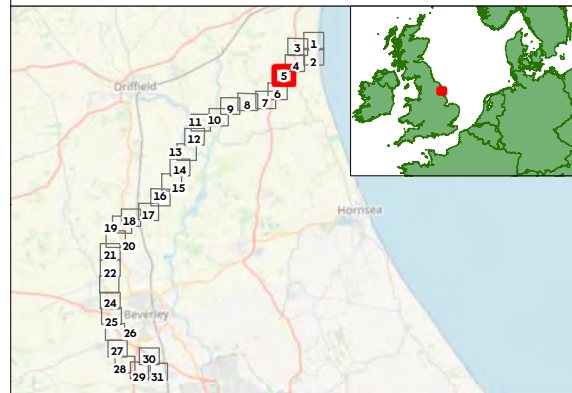


# Hornsea Four

## Figure 16

Updated EPH1HS - Sheet 5 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid  
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 0 50 100 200 Yards

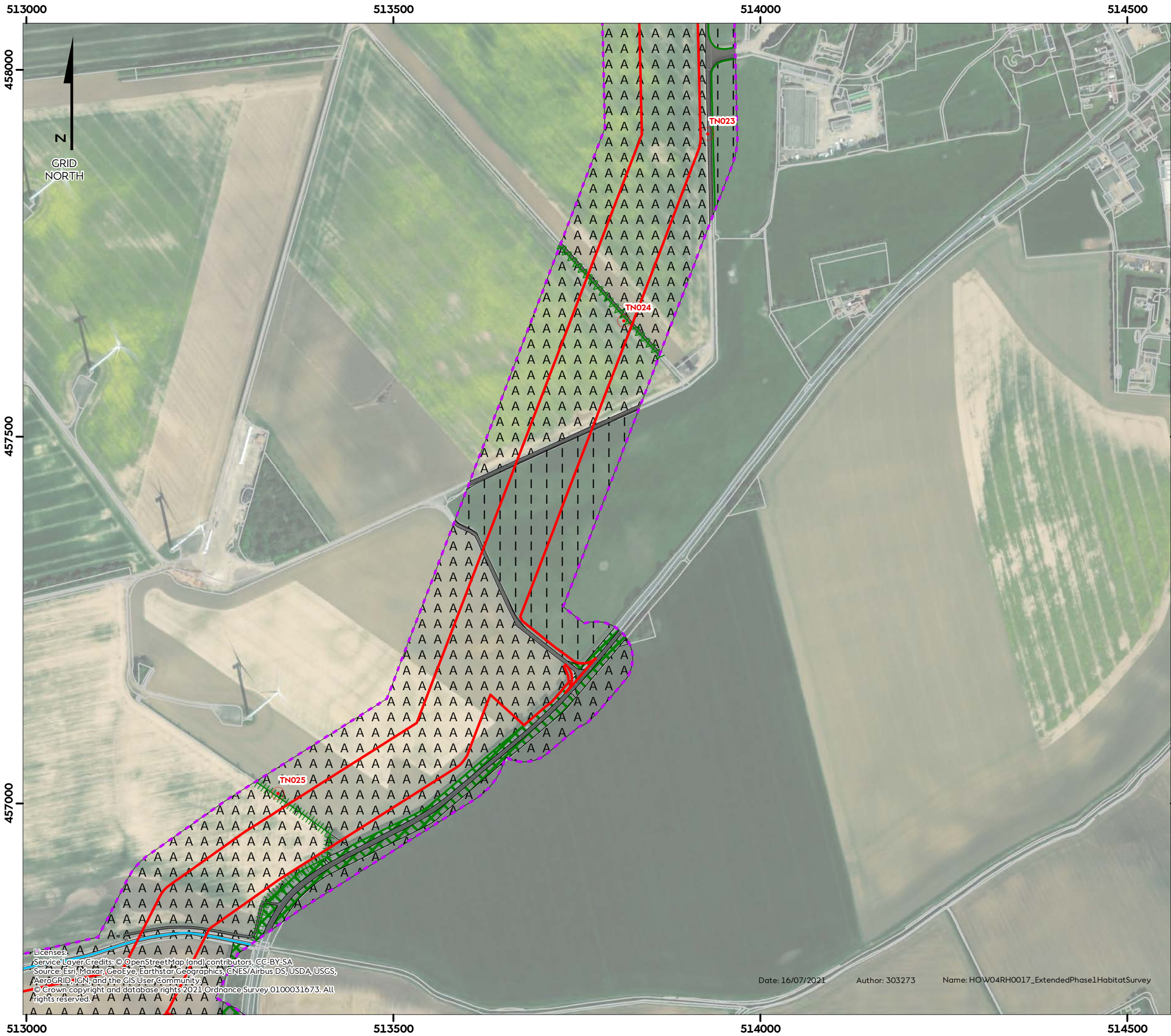
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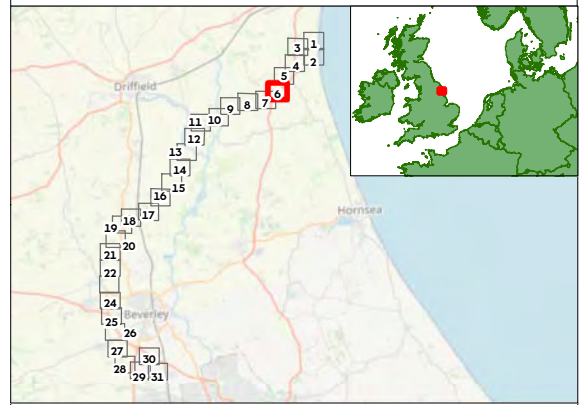


# Hornsea Four

## Figure 17

Updated EPH1HS - Sheet 6 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Native species-rich
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dense / Continuous Scrub
- Improved Grassland
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid  
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 0 50 100 200 Yards

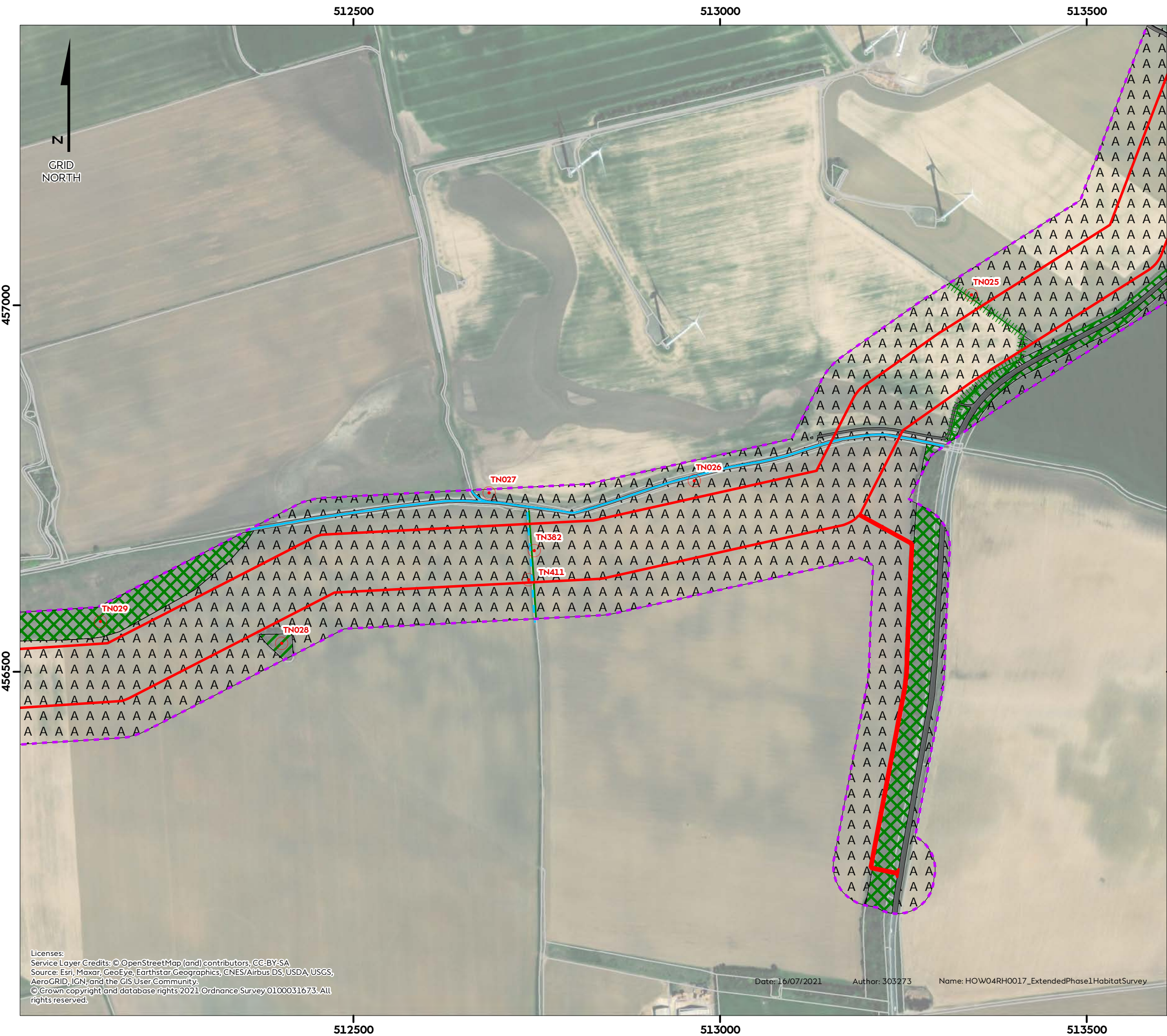
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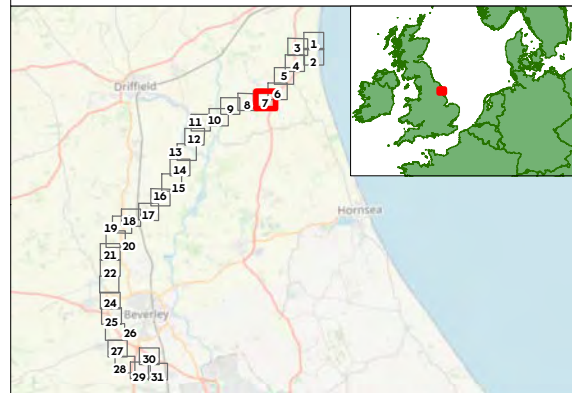


# Hornsea Four

## Figure 18

Updated EPH1HS - Sheet 7 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



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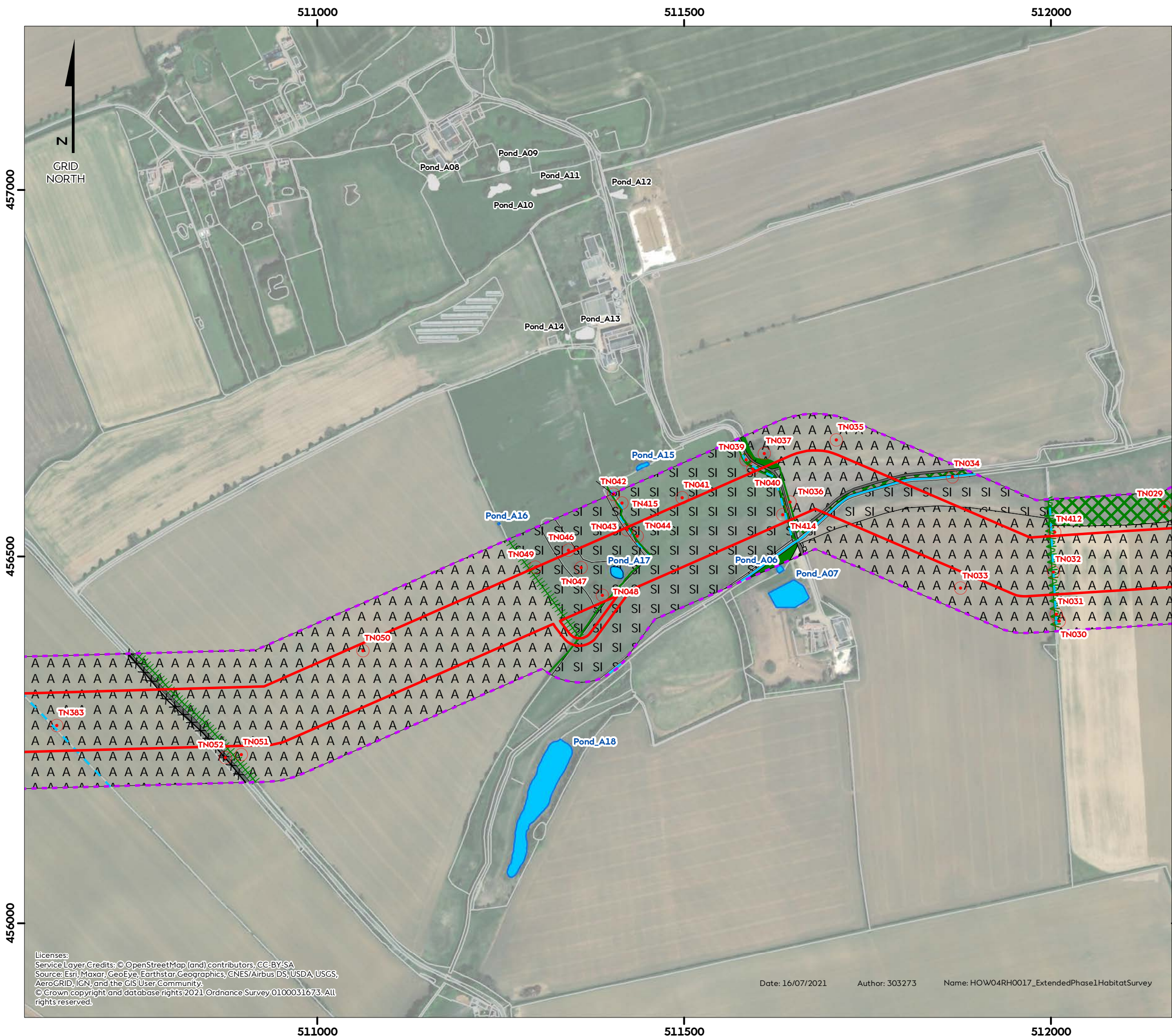
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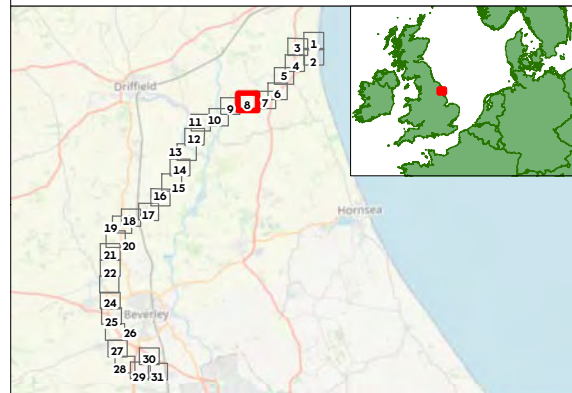


# Hornsea Four

## Figure 19

Updated EPH1HS - Sheet 8 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Pond no longer within GCN Study Area
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Hedge and Trees - species-poor
- Dry Ditch
- Boundary Removed
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

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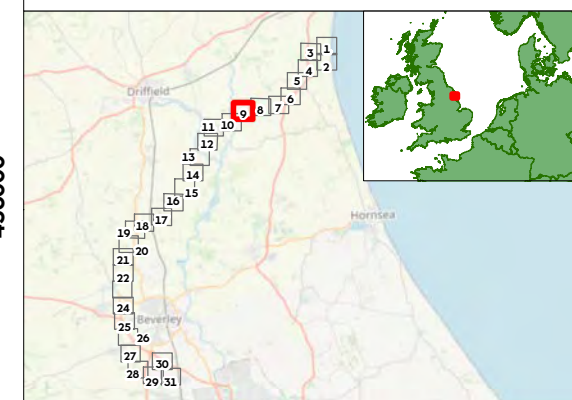
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# Hornsea Four

## Figure 20

Updated EP1HS - Sheet 9 of 31

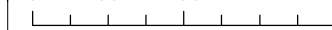
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  - Target Note
  - EPH1HS Survey Area
  - GCN Ponds
  - Pond no longer within GCN Study Area
- Phase 1 Habitat**
- Intact Hedge - Species-poor
  - Dry Ditch
  - XXXX Boundary Removed
  - Semi-natural Broadleaved Woodland
  - Improved Grassland
  - A A A Arable
  - Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 50 100 200 Metres



0 50 100 200 Yards

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Pond\_A20

Pond\_A19

TN065

TN064

TN063

TN062

TN061

TN060

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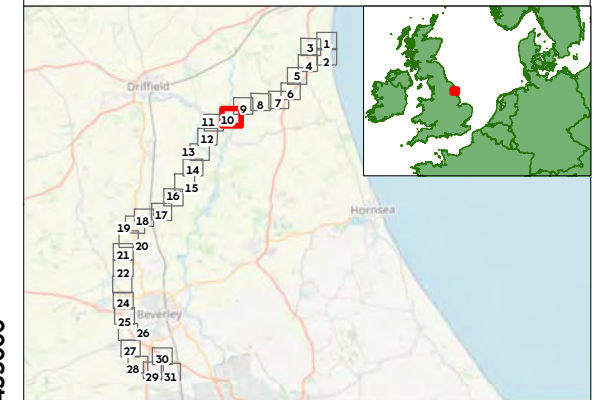
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# Hornsea Four

## Figure 21

Updated EP1HS - Sheet 10 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- ||||| Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- | | | Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
 0 50 100 200 Yards

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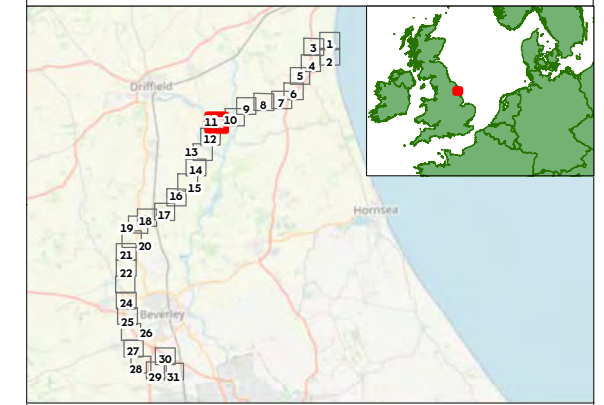
Date: 16/07/2021 Author: 303273 Name: HOW04RH0017\_ExtendedPhase1HabitatSurvey

# Hornsea Four

## Figure 22

Updated EP1HS - Sheet 11 of 31

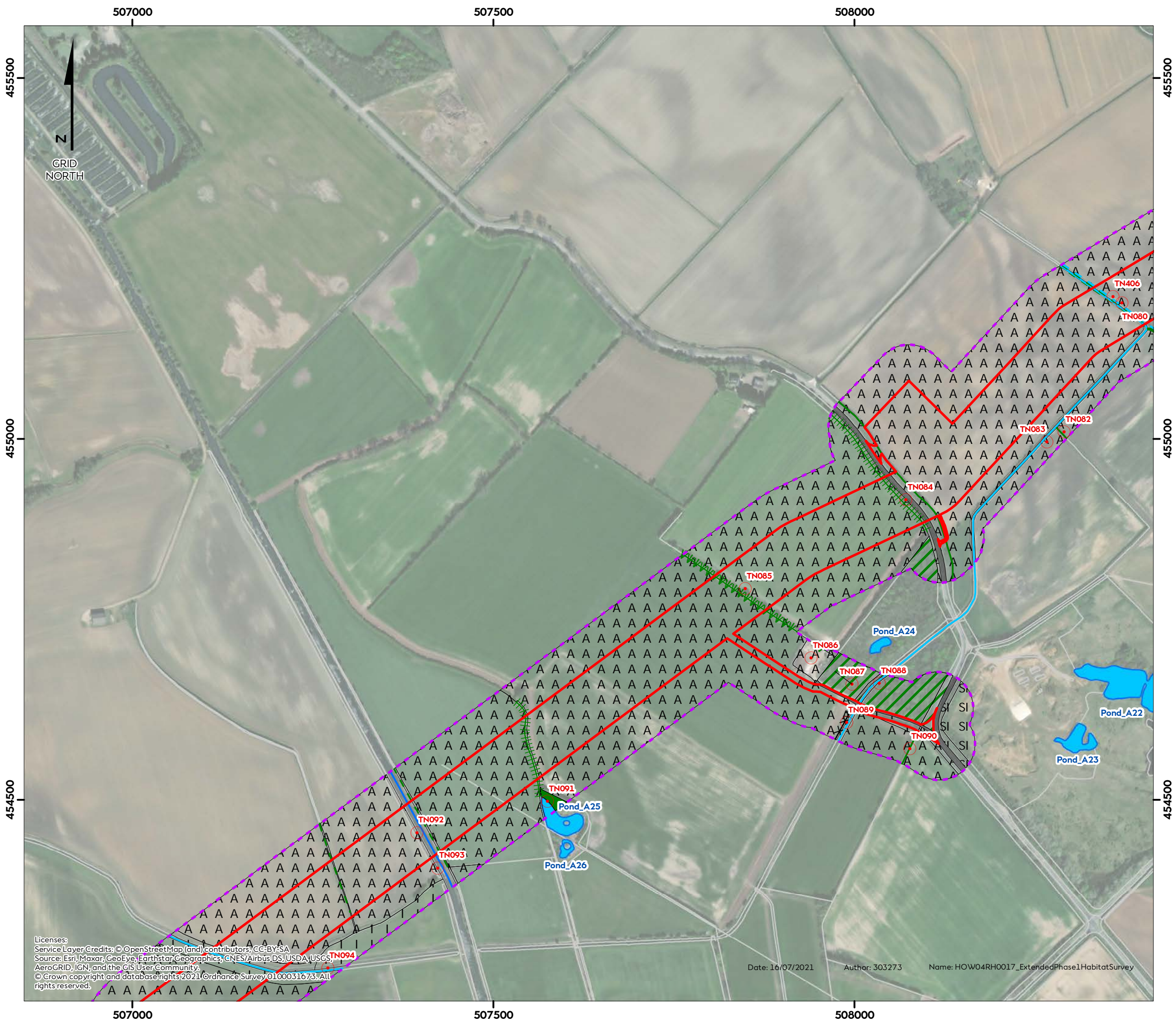
- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Hedge and Trees - species-poor
- Dry Ditch
- Boundary Removed
- Semi-natural Broadleaved Woodland
- Planted Broadleaved Woodland
- Improved Grassland
- Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
 0 50 100 200 Yards

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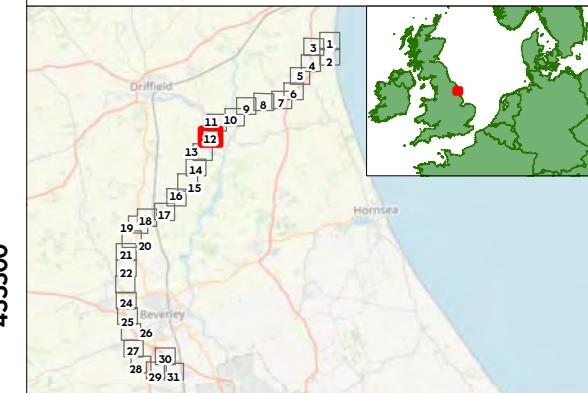
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# Hornsea Four

## Figure 23

Updated EP1HS - Sheet 12 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Running Water
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding
- No access



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
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 0 50 100 200 Yards

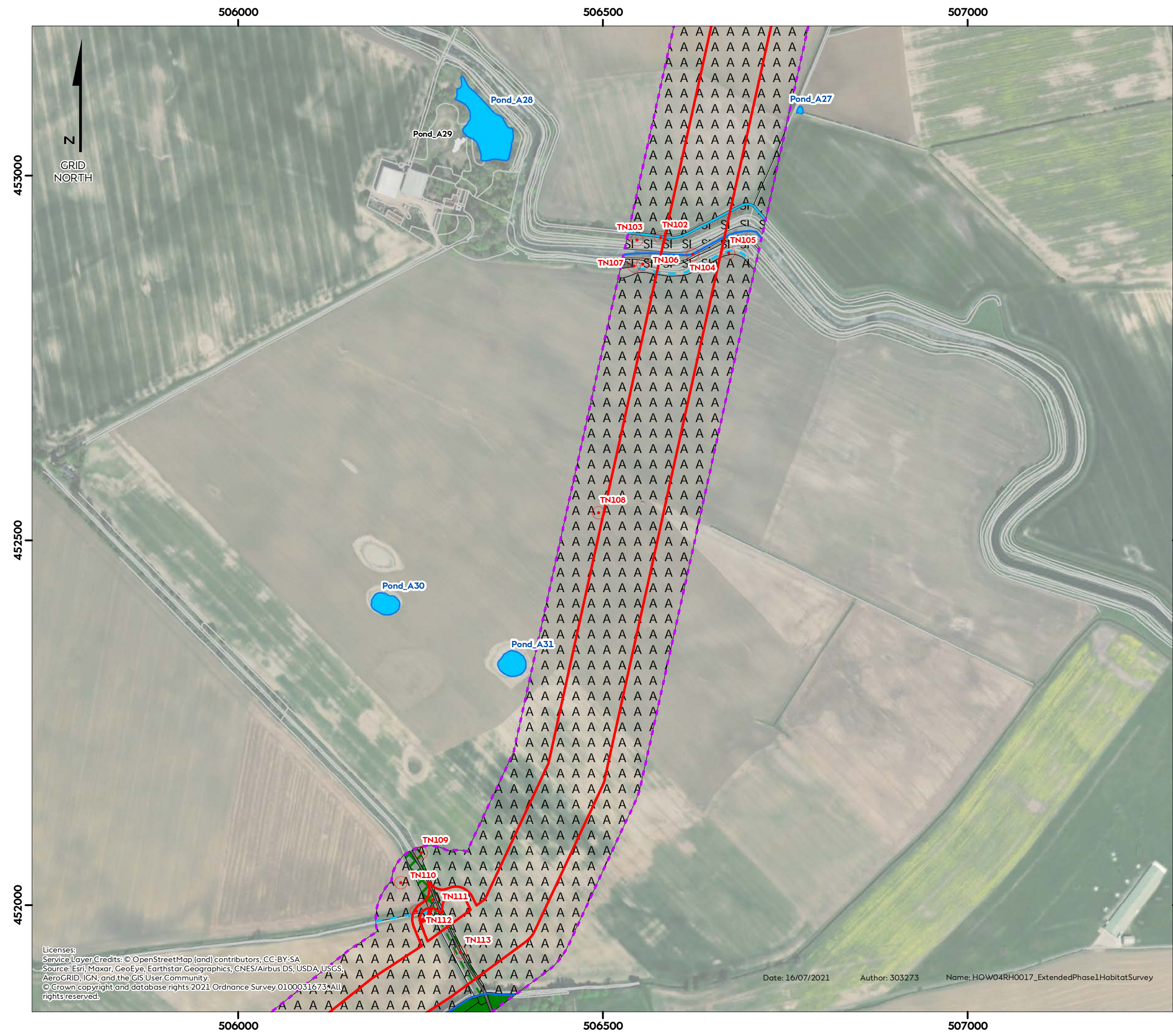
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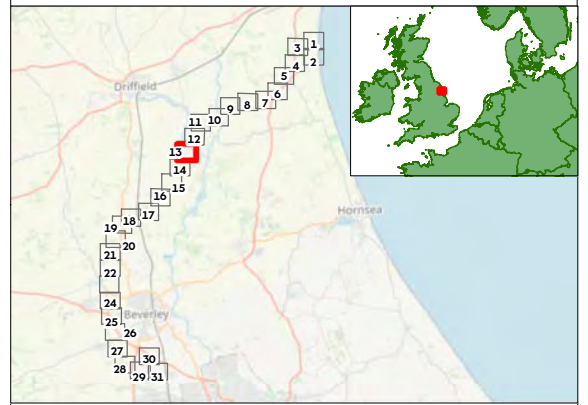


# Hornsea Four

## Figure 24

Updated EP1HS - Sheet 13 of 31

- Order Limits
  - Target Note
  - EPH1HS Survey Area
  - GCN Ponds
  - Pond no longer within GCN Study Area
- Phase 1 Habitat**
- Standing Water
  - Running Water
  - Defunct Hedge - Species-poor
  - Dry Ditch
  - Semi-natural Broadleaved Woodland
  - Dense / Continuous Scrub
  - Semi-improved Grassland
  - Arable
  - Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

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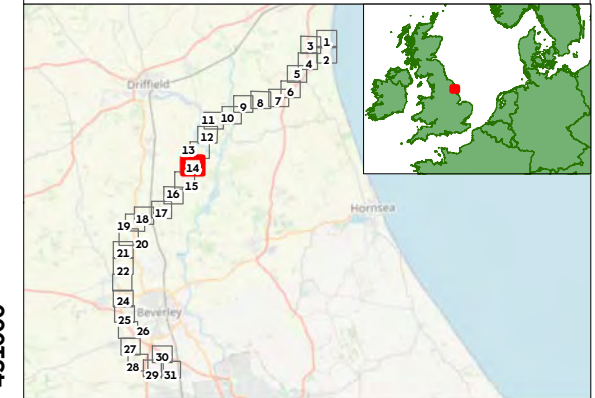
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# Hornsea Four

## Figure 25

Updated EP1HS - Sheet 14 of 31

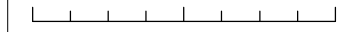
- Order Limits
- Target Note
- EPH1HS Survey Area
- Phase 1 Habitat**
- Running Water
- Defunct Hedge - Species-poor
- ~~~~~ Hedge and Trees - Native species-rich
- Dry Ditch
- Semi-natural Broadleaved Woodland
- A  
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A Dense / Continuous Scrub
- A  
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A Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

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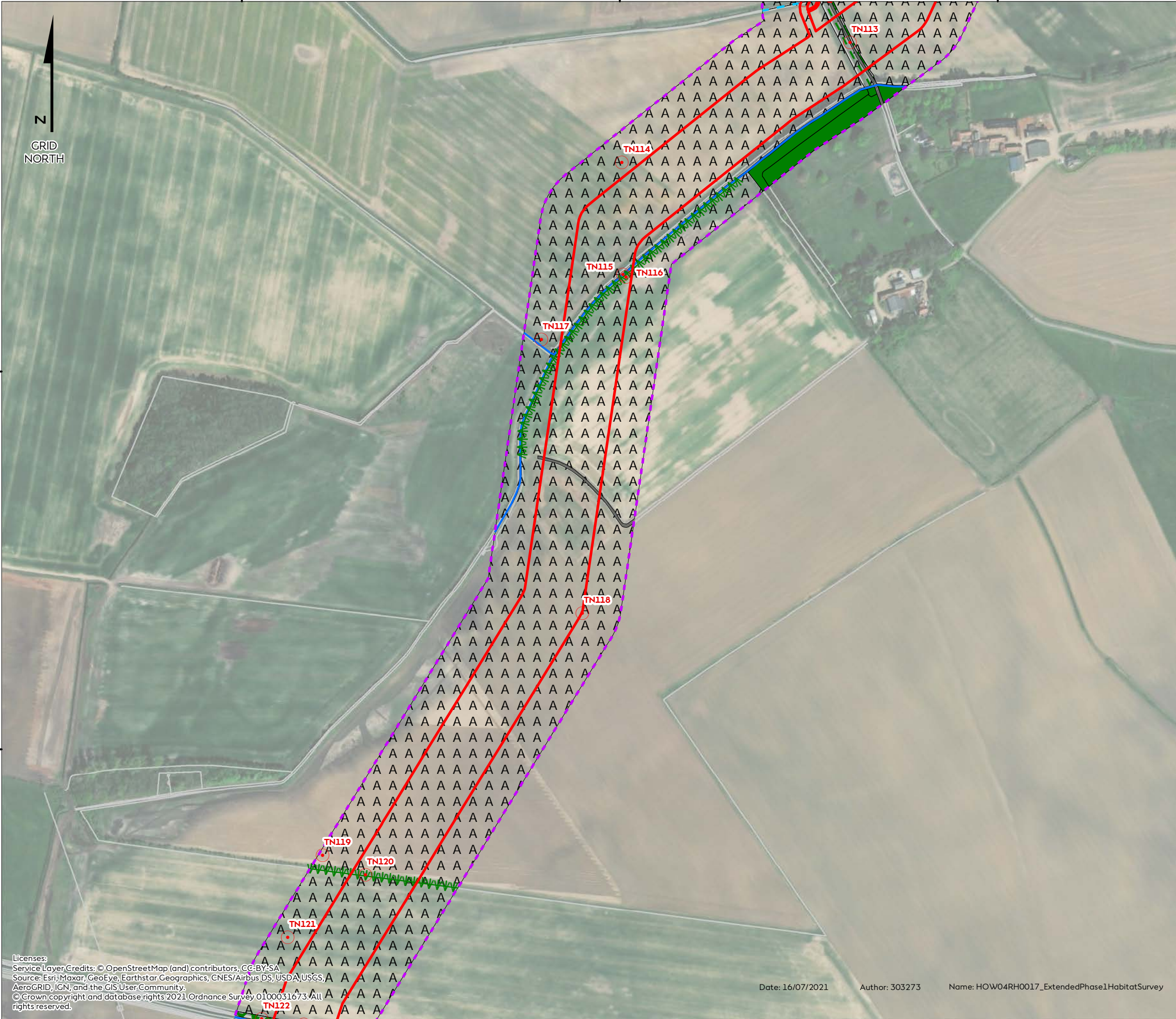


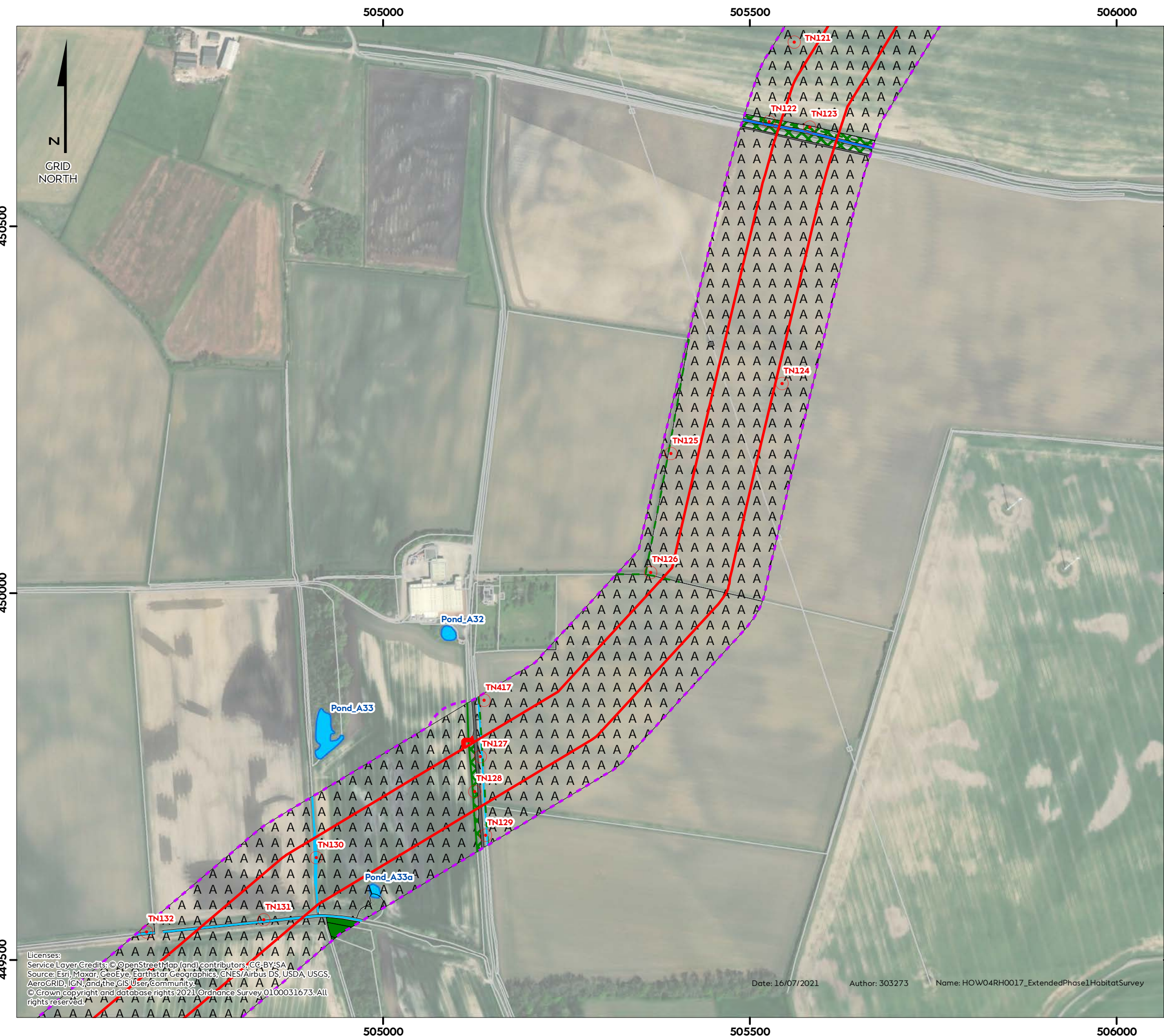
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Author: 303273

Name: HOW04RH0017\_ExtendedPhase1HabitatSurvey



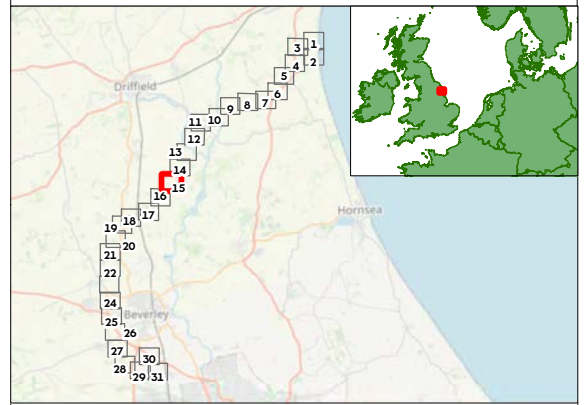


# Hornsea Four

## Figure 26

Updated EP1HS - Sheet 15 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- SI SI Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
 0 50 100 200 Yards

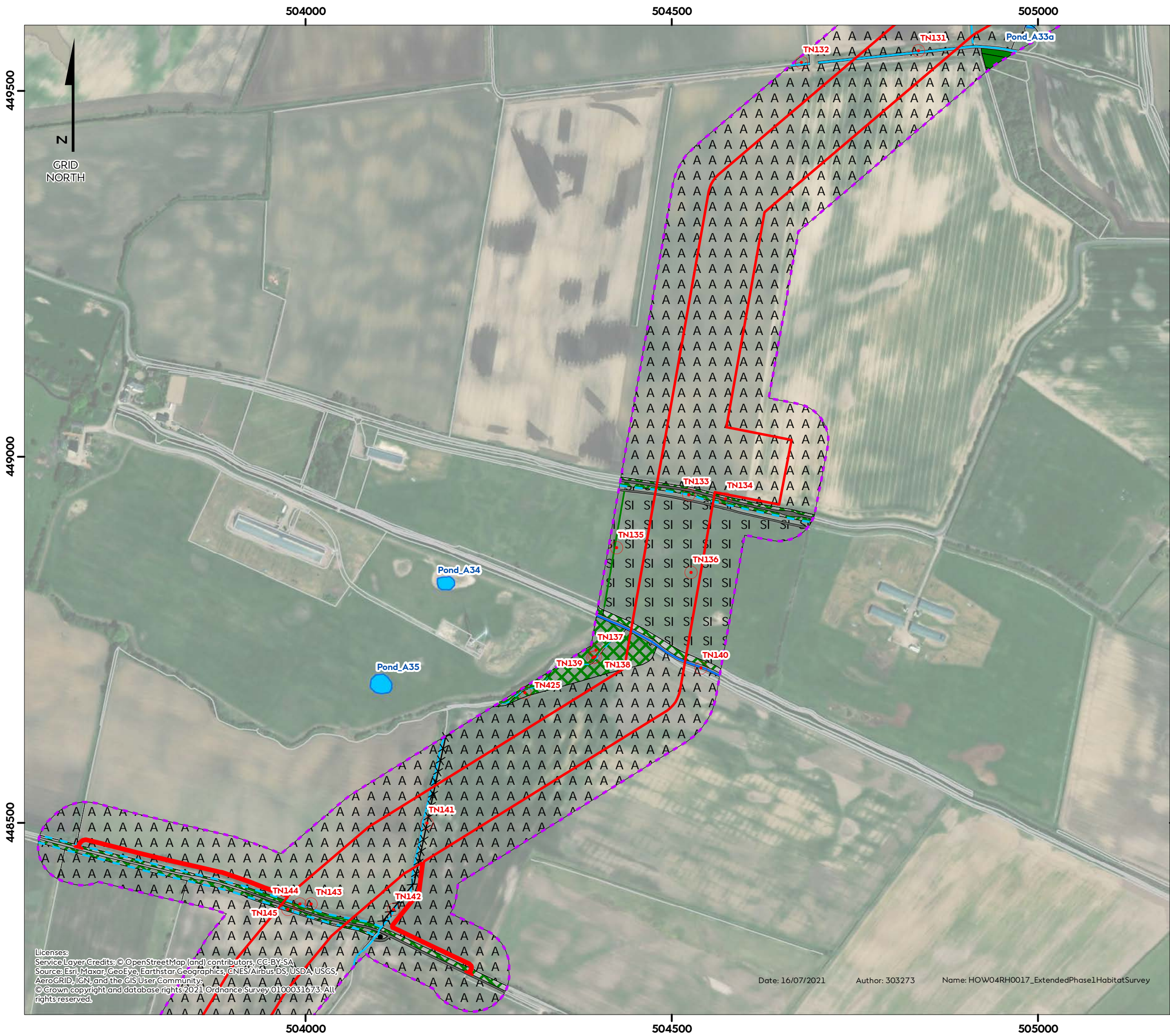
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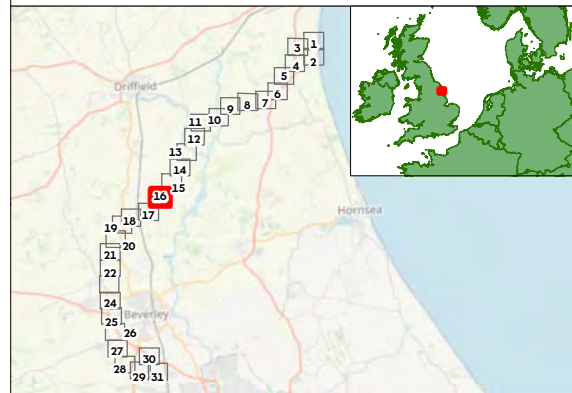


# Hornsea Four

## Figure 27

Updated EP1HS - Sheet 16 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Dry Ditch
- XXXX Boundary Removed
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Semi-improved Grassland
- A A A Arable
- ● ● Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
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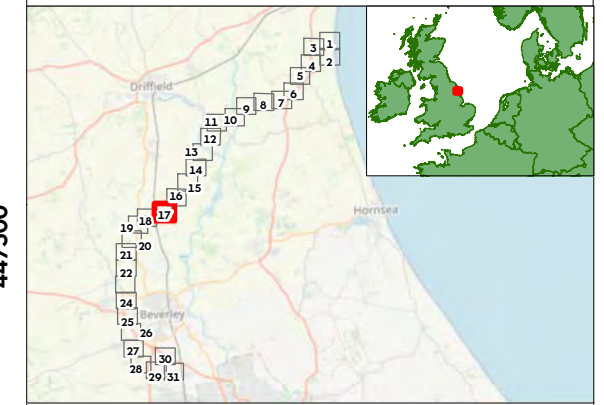
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# Hornsea Four

## Figure 28

Updated EP1HS - Sheet 17 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- Phase 1 Habitat**
  - Standing Water
  - Intact Hedge - Species-poor
  - Defunct Hedge - Species-poor
  - Dry Ditch
  - Boundary Removed
  - Dense / Continuous Scrub
  - Arable
  - Bare Ground
  - Building / Hardstanding



Coordinate system: British National Grid  
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 0 50 100 200 Yards

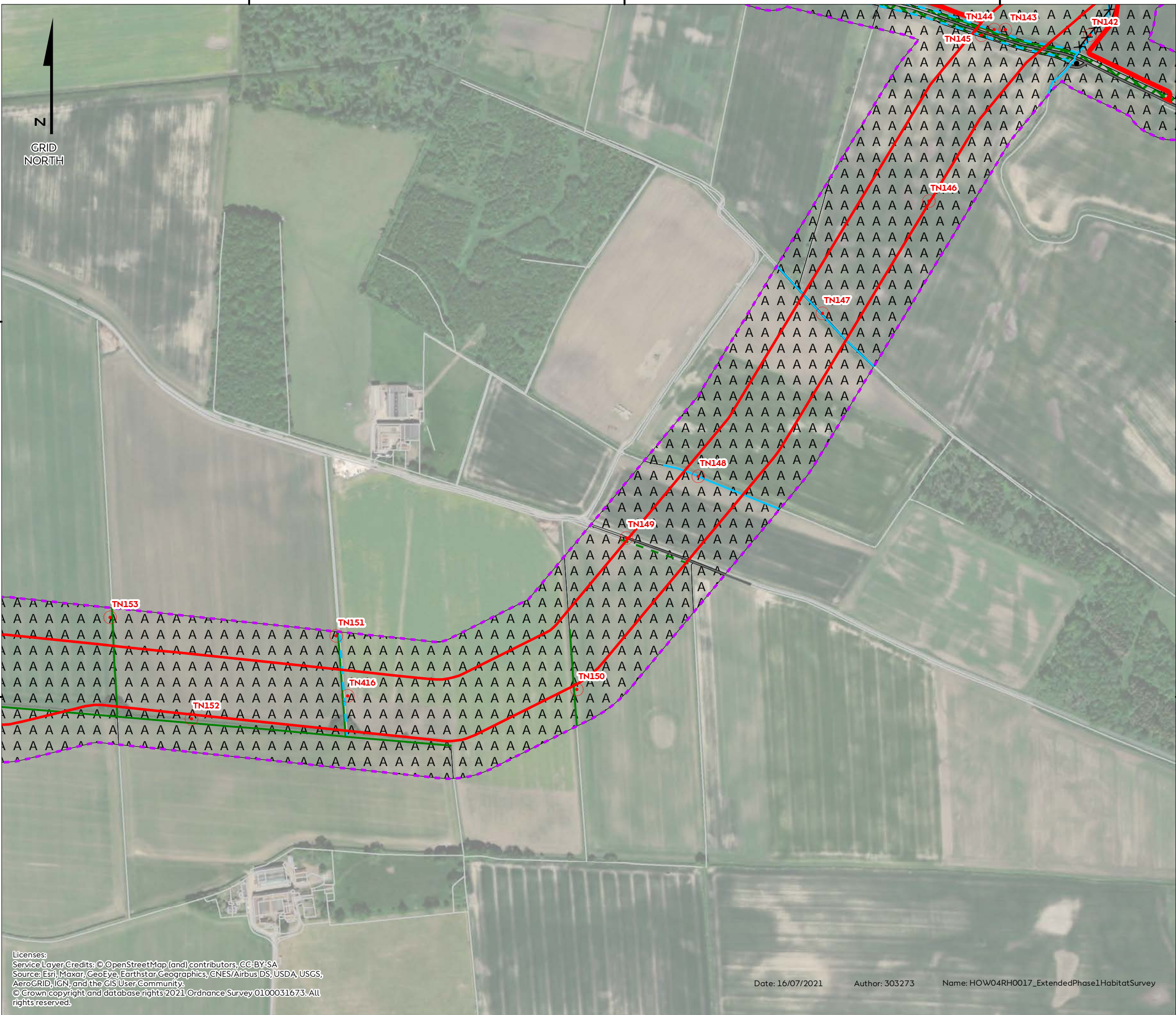
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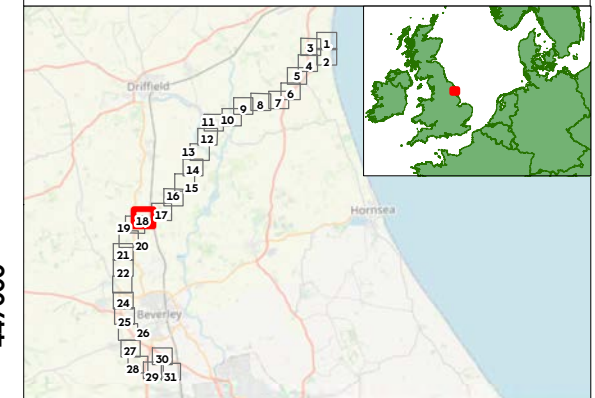
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# Hornsea Four

## Figure 29

Updated EP1HS - Sheet 18 of 31

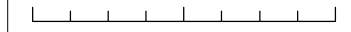
- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 50 100 200 Metres



0 50 100 200 Yards

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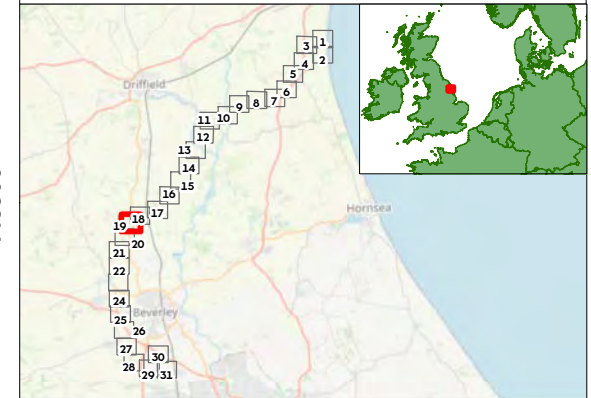
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# Hornsea Four

## Figure 30

Updated EP1HS - Sheet 19 of 31

-  Order Limits
-  Target Note
-  EPH1HS Survey Area
-  GCN Ponds
- Phase 1 Habitat**
-  Standing Water
-  Intact Hedge - Species-poor
-  Defunct Hedge - Species-poor
-  Hedge and Trees - species-poor
-  Dry Ditch
-  Dense / Continuous Scrub
-  Improved Grassland
-  Arable
-  Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

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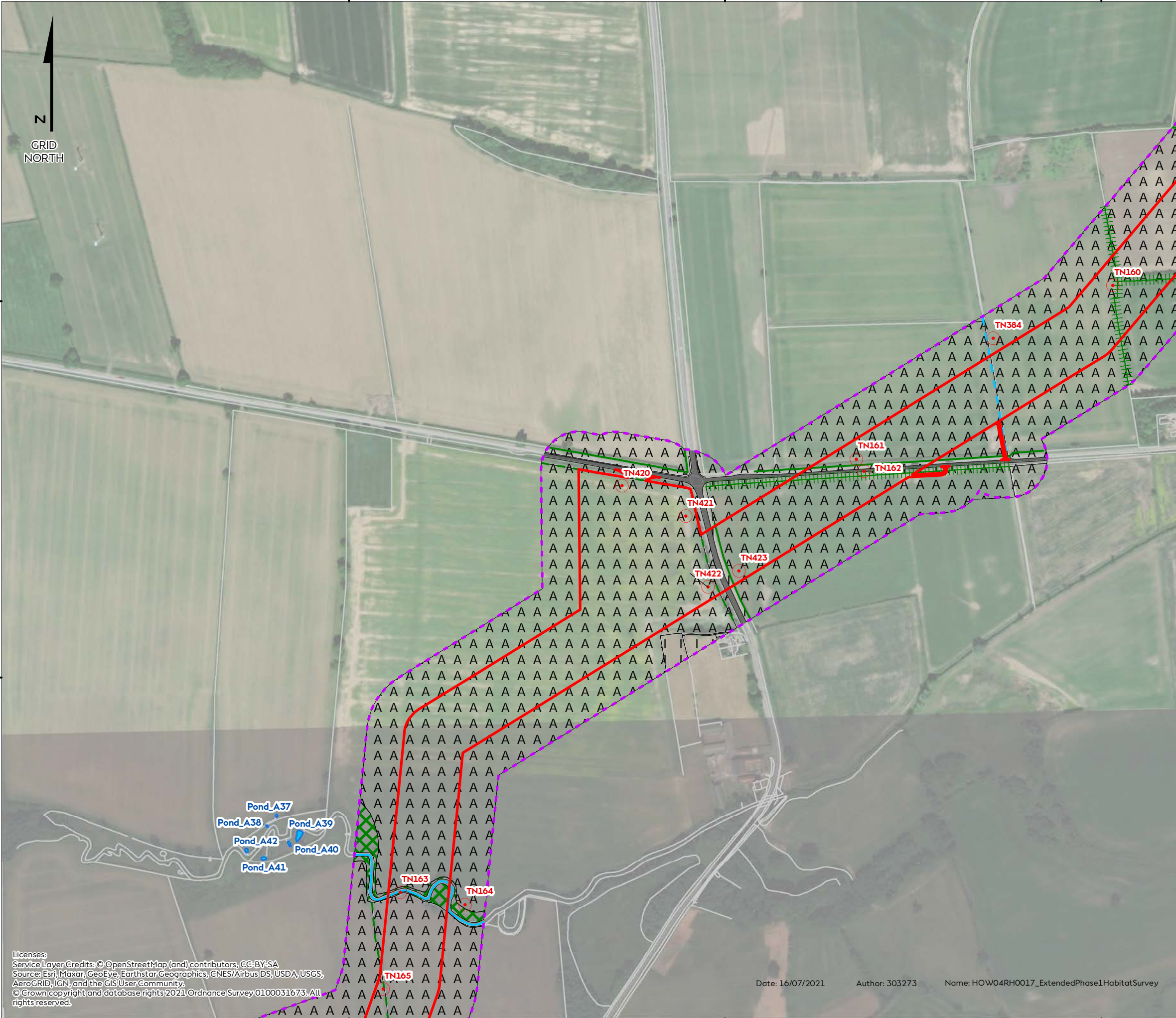


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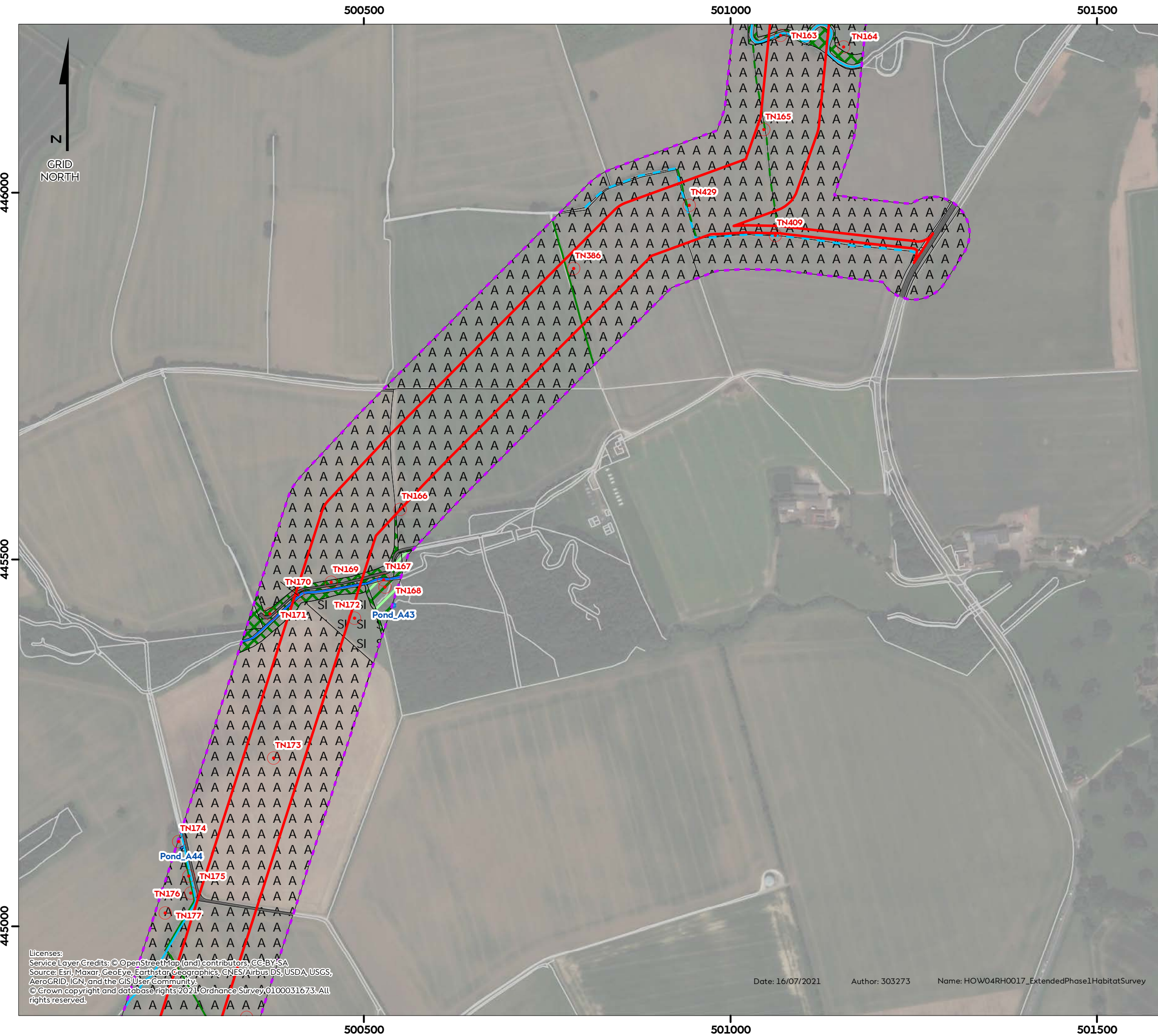
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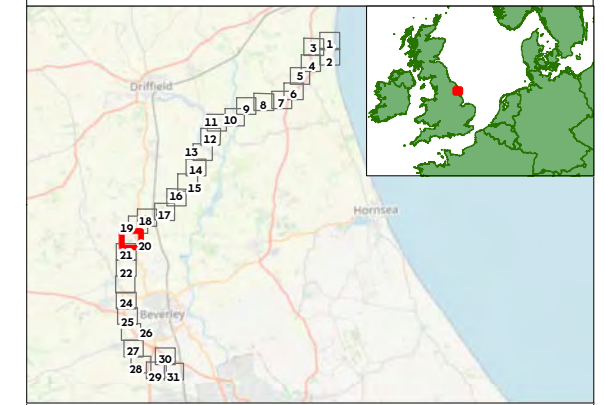


# Hornsea Four

## Figure 31

Updated EP1HS - Sheet 20 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Dry Ditch
- Planted Mixed Woodland
- Dense / Continuous Scrub
- SI SI Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
 0 50 100 200 Yards

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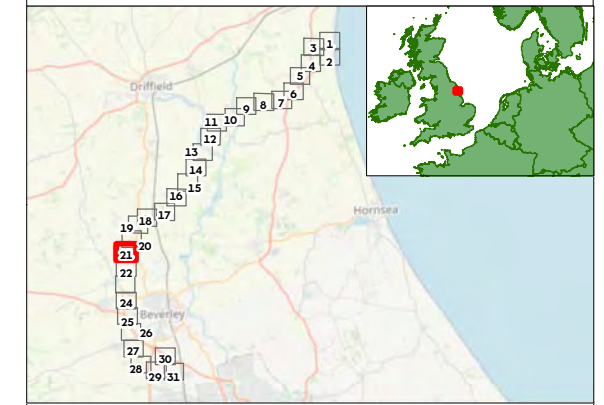
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# Hornsea Four

Figure 32  
Updated EP1HS - Sheet 21 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid  
Scale@A3: 1:5,000

0 50 100 200 Metres

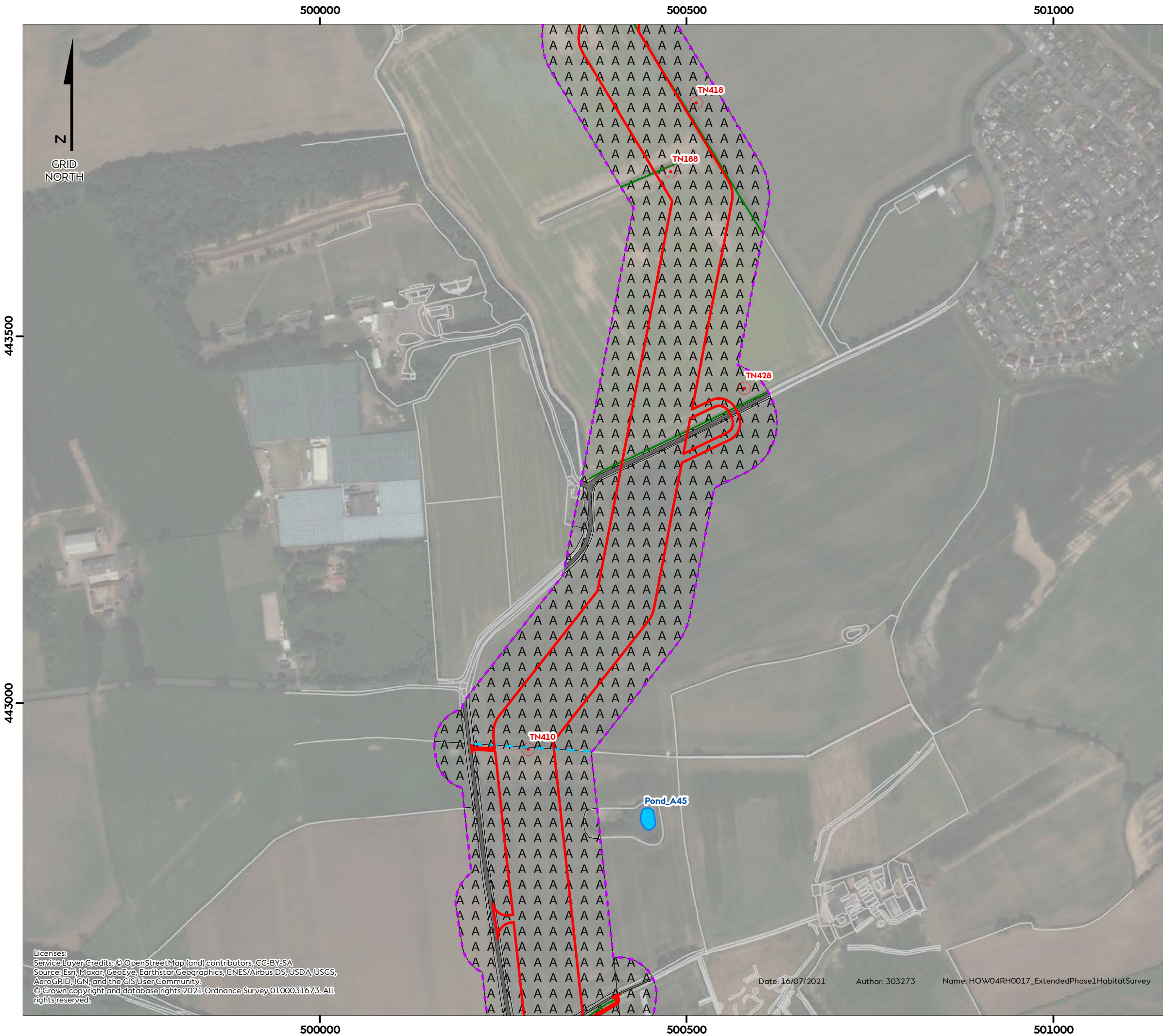
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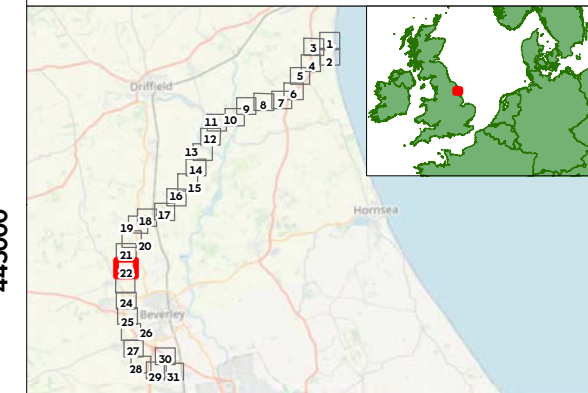


# Hornsea Four

## Figure 33

Updated EP1HS - Sheet 22 of 31

- Order Limits
  - Target Note
  - EPH1HS Survey Area
  - GCN Ponds
- Phase 1 Habitat**
- Intact Hedge - Species-poor
  - Dry Ditch
  - A A A Arable
  - Building / Hardstanding

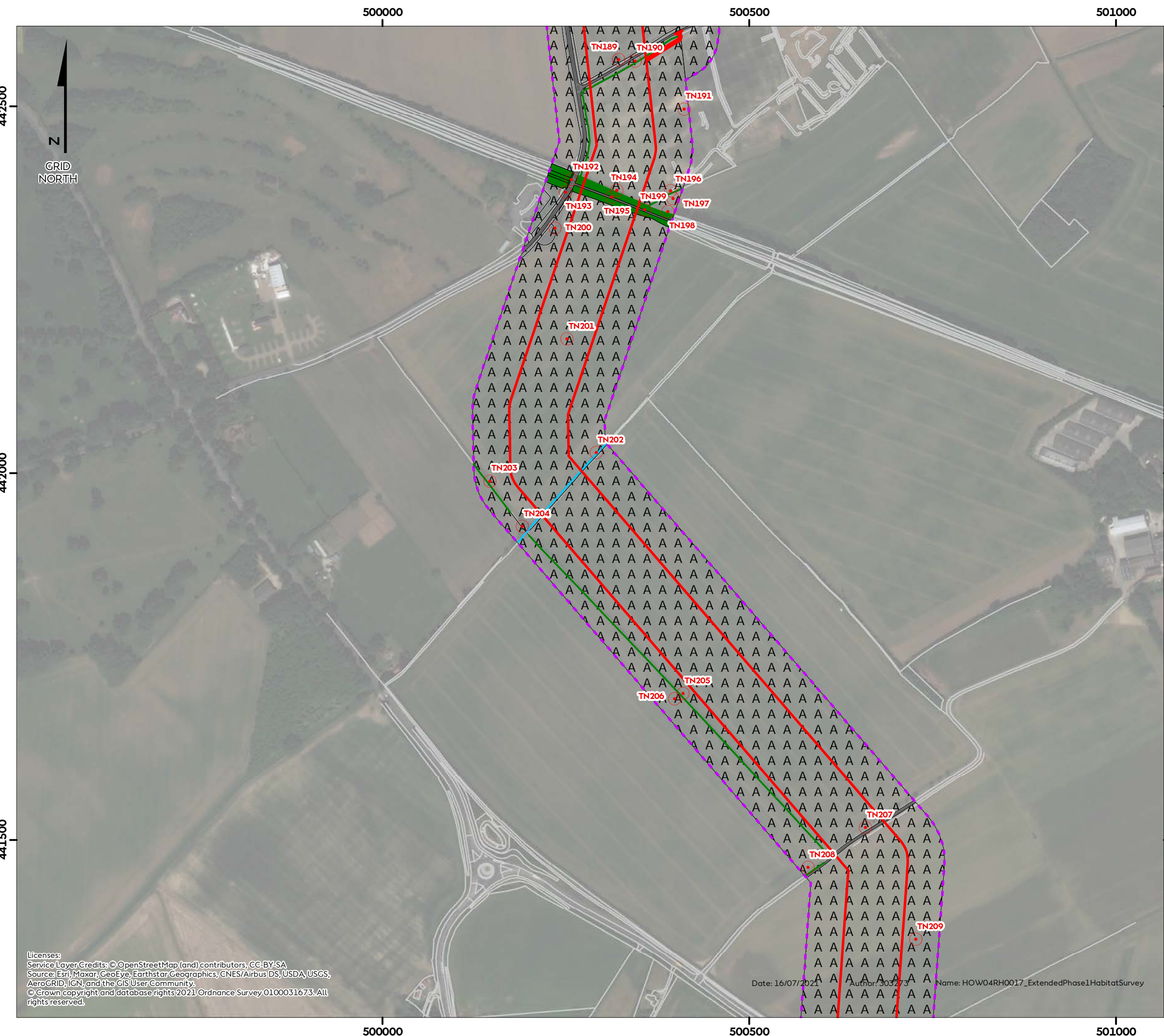


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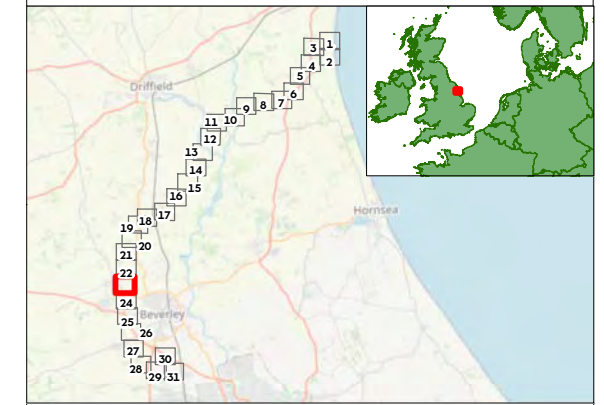
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# Hornsea Four

Figure 34  
Updated EP1HS - Sheet 23 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- Phase 1 Habitat**
- Standing Water
- Intact Hedge - Species-poor
- Semi-natural Broadleaved Woodland
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid  
Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

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Document no: HOW04RH0017  
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Checked by: CC  
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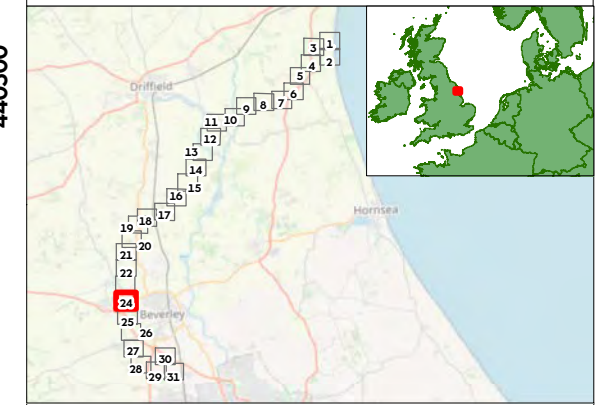
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# Hornsea Four

Figure 35  
Updated EP1HS - Sheet 24 of 31

- Order Limits
  - EPH1HS Survey Area
  - GCN Ponds
  - GCN Study Area
- Phase 1 Habitat**
- Intact Hedge - Species-poor
  - Defunct Hedge - Species-poor
  - Dense / Continuous Scrub
  - Arable
  - Building / Hardstanding
  - Not surveyed in 2019/20



Coordinate system: British National Grid  
Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

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





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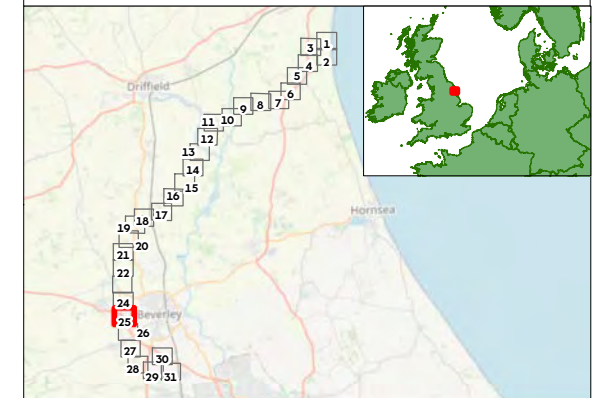
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# Hornsea Four

## Figure 36

Updated EP1HS - Sheet 25 of 31

-  Order Limits
  -  Target Note
  -  EPH1HS Survey Area
  -  GCN Ponds
  -  Pond no longer within GCN Study Area
- Phase 1 Habitat**
-  Intact Hedge - Species-poor
  -  Hedge and Trees - species-poor
  -  Dense / Continuous Scrub
  -  Arable
  -  Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	16/07/2021

Title: Updated EP1HS  
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Date: 16/07/2021

Author: 303273

Name: HOW04RH0017\_ExtendedPhase1HabitatSurvey

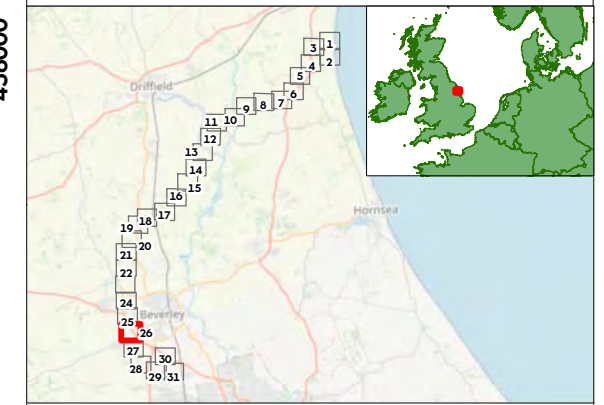




# Hornsea Four

Figure 37  
Updated EP1HS - Sheet 26 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Phase 1 Habitat**
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid  
Scale@A3: 1:5,000

0 50 100 200 Metres

0 50 100 200 Yards

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	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	16/07/2021

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Document no: HOW04RH0017  
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Checked by: CC  
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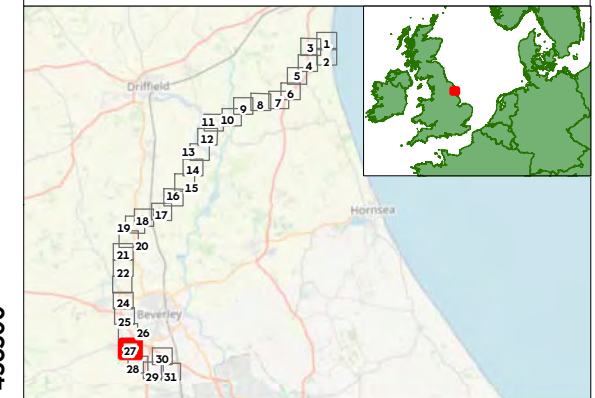
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# Hornsea Four

## Figure 38

Updated EP1HS - Sheet 27 of 31

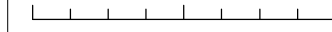
-  Order Limits
-  Target Note
-  EPH1HS Survey Area
-  GCN Ponds
- Phase 1 Habitat**
-  Intact Hedge - Species-poor
-  Hedge and Trees - Native species-rich
-  Hedge and Trees - species-poor
-  Dry Ditch
-  Semi-natural Broadleaved Woodland
-  Dense / Continuous Scrub
-  Improved Grassland
-  Arable
-  Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 50 100 200 Metres



0 50 100 200 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	16/07/2021

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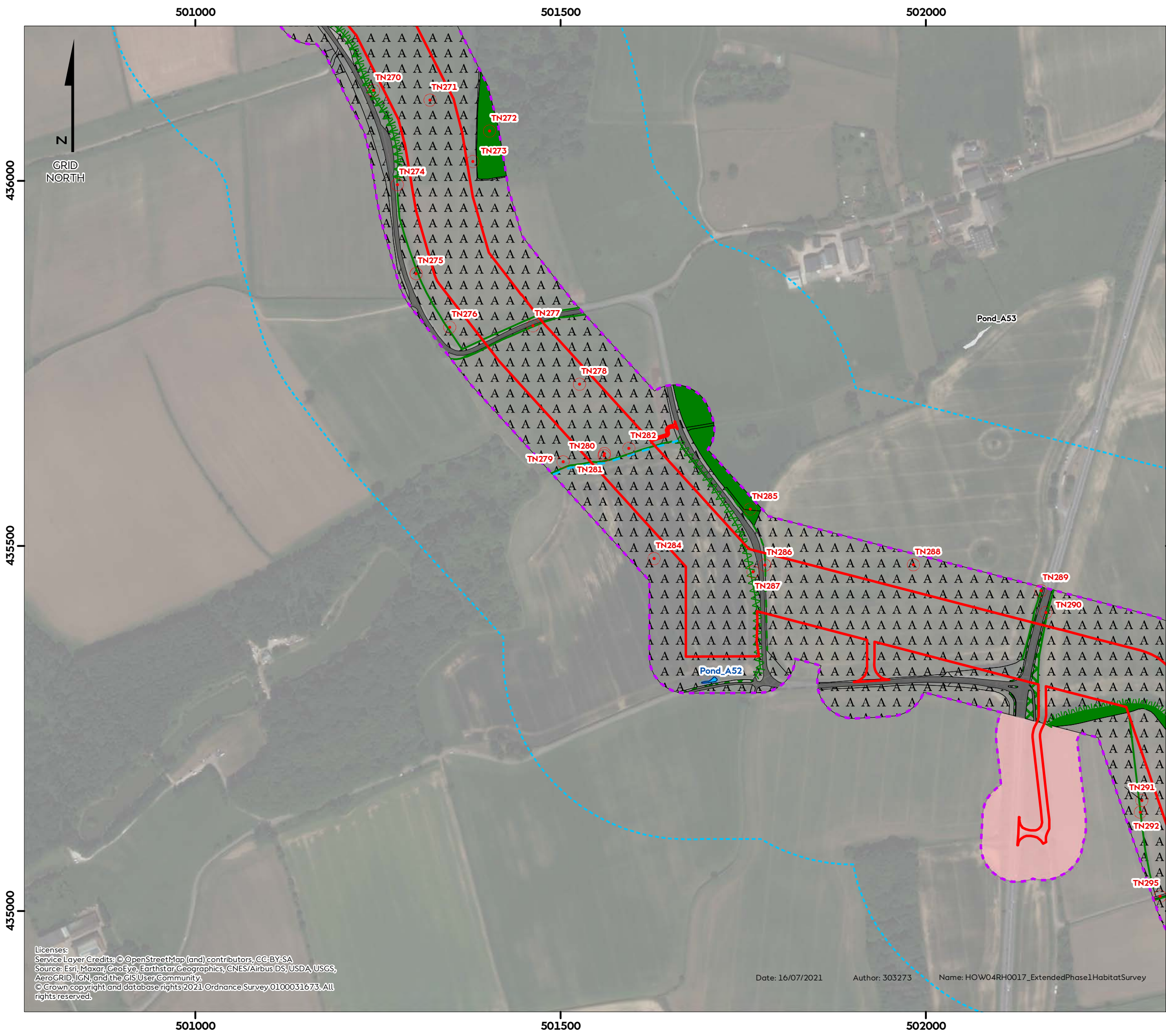
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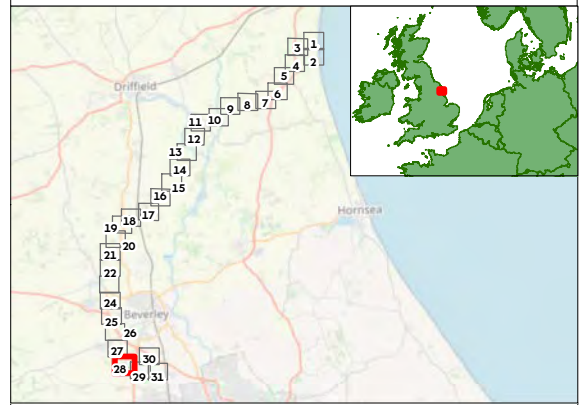
# Hornsea Four

## Figure 39

Updated EP1HS - Sheet 28 of 31



- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- Pond no longer within GCN Study Area
- GCN Study Area
- Phase 1 Habitat**
- Intact Hedge - Native species-rich
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding
- Not surveyed in 2019/20



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
 0 50 100 200 Yards

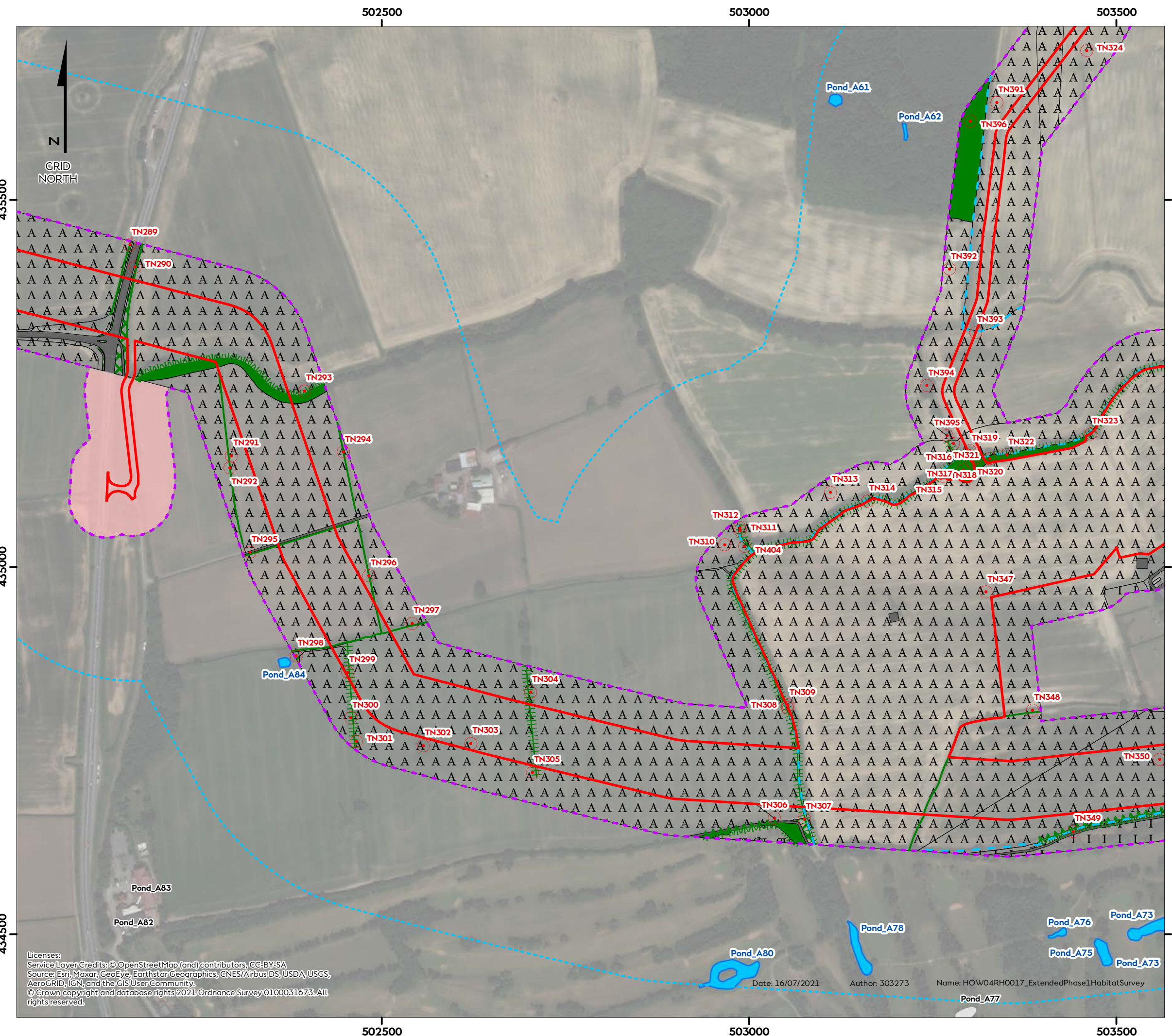
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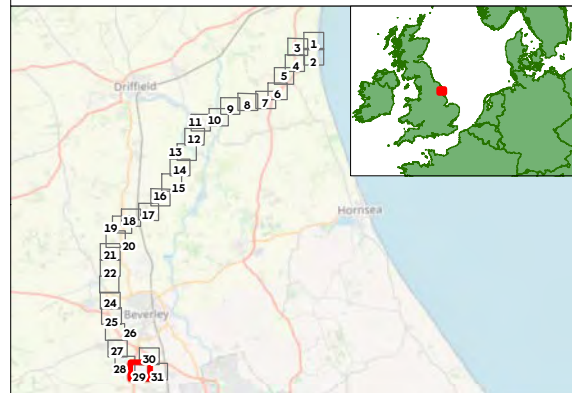



# Hornsea Four

## Figure 40

Updated EP1HS - Sheet 29 of 31

- Order Limits
  - Target Note
  - EPH1HS Survey Area
  - GCN Ponds
  - Pond no longer within GCN Study Area
  - GCN Study Area
- Phase 1 Habitat**
- Intact Hedge - Species-poor
  - Hedge and Trees - Native species-rich
  - Hedge and Trees - species-poor
  - Dry Ditch
  - Semi-natural Broadleaved Woodland
  - Dense / Continuous Scrub
  - Improved Grassland
  - Semi-improved Grassland
  - Arable
  - Bare Ground
  - Building / Hardstanding
  - Not surveyed in 2019/20



Coordinate system: British National Grid  
 Scale@A3: 1:5,000  
 0 50 100 200 Metres  
 0 50 100 200 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	16/07/2021

Title: Updated EP1HS  
 Document no: HOW04RH0017  
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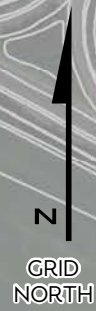


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






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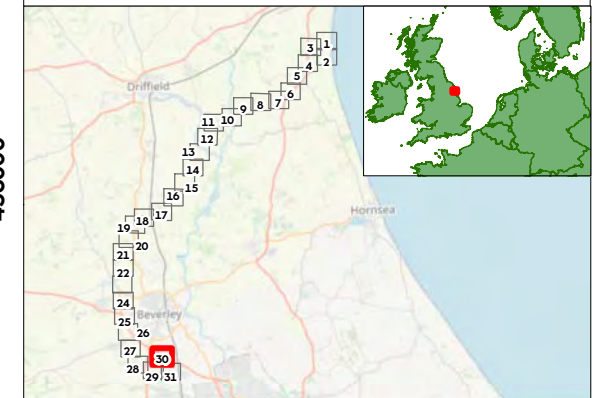
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# Hornsea Four

## Figure 41

Updated EP1HS - Sheet 30 of 31

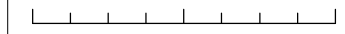
-  Order Limits
  -  Target Note
  -  EPH1HS Survey Area
  -  GCN Ponds
  -  Pond no longer within GCN Study Area
- Phase 1 Habitat**
-  Hedge and Trees - species-poor
  -  Dry Ditch
  -  Semi-natural Broadleaved Woodland
  -  Dense / Continuous Scrub
  -  Arable
  -  Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 50 100 200 Metres



0 50 100 200 Yards

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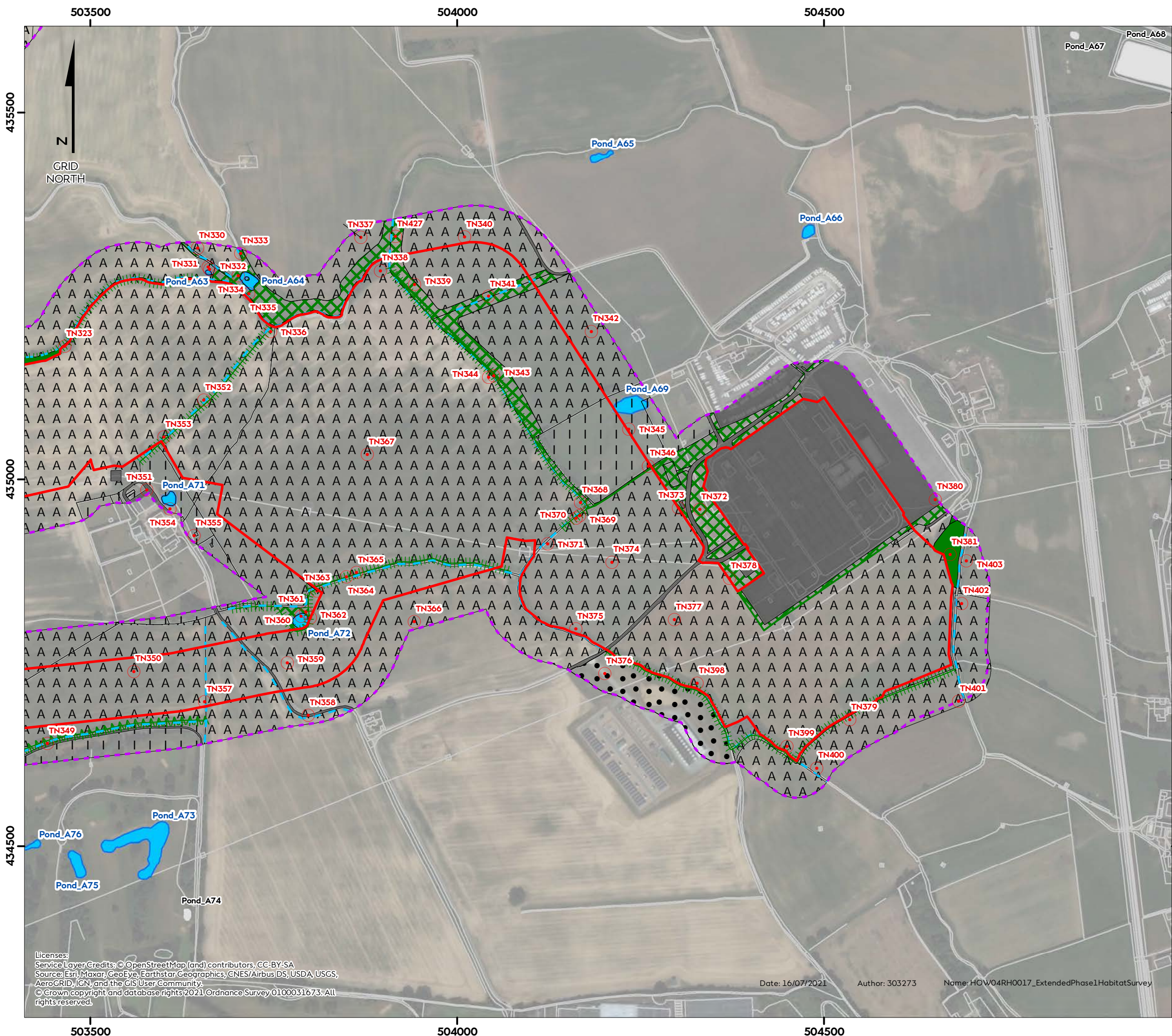
Date: 16/07/2021

Author: 303273

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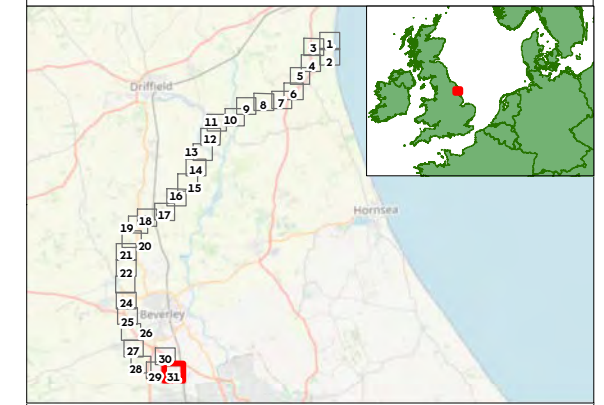




# Hornsea Four

Figure 42  
Updated EP1HS - Sheet 31 of 31

- Order Limits
  - Target Note
  - EP1HS Survey Area
  - GCN Ponds
  - Pond no longer within GCN Study Area
- Phase 1 Habitat**
- Intact Hedge - Species-poor
  - Hedge and Trees - Native species-rich
  - Hedge and Trees - species-poor
  - Dry Ditch
  - Semi-natural Broadleaved Woodland
  - Dense / Continuous Scrub
  - Improved Grassland
  - Arable
  - Bare Ground
  - Building / Hardstanding



Coordinate system: British National Grid  
Scale@A3: 1:5,000  
0 50 100 200 Metres  
0 50 100 200 Yards

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## 4.3 Summary of Phase 2 Survey Requirements

4.3.1.1 **Table 10** provides a summary of the Phase 2 species specific surveys that have been identified following the completion of the updated Hornsea Four EP1HS. Further information on the suite of these Phase 2 surveys is provided in [Section 5.2](#) and an indicative survey program is provided in [Section 5.3](#). Proposed mitigation measures, including those for species that are not recommended for Phase 2 surveys is provided in [Section 5.4](#). Further details on proposed mitigation measures can be found in [Volume F2, Chapter 3: Outline Ecological Management Plan](#).

**Table 10: Summary of requirements for Phase 2 species specific surveys.**

Species	Phase 2 survey required (yes/no)
Birds	<b>Yes</b> – a suite of over-wintering ( <a href="#">Annex 3.3</a> ) and breeding bird surveys ( <a href="#">Annex 3.4</a> ) have been undertaken in 2018 and 2019.
Badger	<b>Yes</b> - Information relating to badgers is reported separately within <a href="#">Annex 3.15: Badger Survey Report</a> .
Bats	<b>Yes</b> – further surveys to establish the presence of roosting bats (dusk/dawn emergence/re-entry surveys) and commuting/foraging bats (monthly activity transect surveys and static detector survey). See <a href="#">Annex 3.8</a> to <a href="#">Annex 3.13</a> .
GCN	<b>Yes</b> – an eDNA survey to establish the presence or likely absence of GCN in ponds within, and up to 250 m of the Hornsea Four Order Limits was undertaken in May and June 2019 and June 2021. See <a href="#">Annex 3.5 Great Crested Newt Survey Report</a> .
Water vole	<b>Yes</b> – presence/absence surveys (two survey visits). See <a href="#">Annex 3.6</a> .
Otter	<b>Yes</b> – presence/absence surveys (two survey visits). See <a href="#">Annex 3.7</a> .
Reptiles	<b>No</b> – no specific survey will be undertaken. However, mitigation measures (i.e. Reptile Precautionary Method of Working - PMoW) are proposed for all areas of habitat that have been identified and assessed as providing optimal habitat for common reptile species. These measures are outlined within <a href="#">Volume F2, Chapter 3: Outline Ecological Management Plan</a> and were agreed with Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-3.2).
Invertebrates	<b>No</b>
Dormice	<b>No</b>
Botanical survey	<b>No</b>

## 5 Summary

### 5.1 Overview

5.1.1.1 [Section 4.2](#) identifies those habitats which have the potential to support legally protected or notable species, and also sightings / field signs for selected legally protected species. In light of these findings and in order to characterise the ecological baseline for the Hornsea Four Order Limits, further Phase 2 species specific surveys were identified and subsequently undertaken in 2019. The findings of which are provided in separate technical annexes and the information has not been repeated here.

5.1.1.2 Due to the mobility of animals, further surveys and/or pre-construction surveys will be required. Where these have been identified, this has been referred to below.

### 5.2 Phase 2 Species Specific Surveys

#### 5.2.1 Badger presence/absence survey

5.2.1.1 The badger presence/absence survey was undertaken in accordance with Natural England's standing advice on badger surveys (Natural England 2015) and in line with the methodology outlined in [Section 3.4](#).

5.2.1.2 The badger presence/absence baseline survey data has been provided in [Annex 3.15: Badger Survey Report \(Confidential\)](#).

#### 5.2.2 Bat roost emergence/re-entry surveys

5.2.2.1 As outlined in [Section 4.2](#), the updated EP1HS identified and assessed a total 28 features as providing moderate or high suitability to support roosting bats within the Hornsea Four EP1HS study area. In accordance with the BCT guidelines (BCT2016), all features assessed as providing moderate or high suitability for supporting roosting bats require additional surveys (i.e. emergence/re-entry surveys) to confirm the likely presence and/or absence of a bat roosts.

5.2.2.2 All trees assessed as providing low suitability for supporting roosting bats will still be considered as potentially supporting opportunistic roosts in the future, but further surveys are not required to confirm presence or absence, following the guidelines set out by the BCT guidelines (BCT2016). Mitigation measures for trees assessed as providing low suitability for roosting bats will be provided and is outlined in [Section 5.4](#). No structures (i.e. buildings or bridges) were recorded as providing low suitability for roosting bats.

5.2.2.3 The emergence / re-entry surveys were undertaken in accordance with the methodology outlined in the BCT guidelines (BCT2016). For each feature offering moderate suitability, two survey visits (i.e. one dusk emergence survey and one dawn re-entry survey) were undertaken. Each dusk emergence survey commenced 15 minutes before sunset ceased 1.5-2 hours after sunset. The dawn re-entry surveys commenced 1.5-2 hours before sunrise and ceased 15 minutes after sunrise. The surveys were undertaken at least two weeks apart and

were undertaken between May and September with one survey visit between May and August. For each feature offering high suitability, an additional dusk emergence or dawn re-entry survey was undertaken, in line with BCT guidance.

- 5.2.2.4 Hand-held bat detectors (any type) and recording equipment to record any echolocation calls were used for each survey. Laboratory sound-analysis was used to identify the calls of any bat species picked up using the bat detectors. Species, timing, and activity were noted for each bat picked up during the survey.
- 5.2.2.5 Weather conditions including temperature, wind speed and precipitation, were recorded at the start and end of each survey visit. Surveys were not carried out when the temperatures were below 10°C at sunset, or during heavy rain or strong wind unless justified by the surveying ecologist.
- 5.2.2.6 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.16).
- 5.2.2.7 The results of the Hornsea Four bat emergence and re-entry surveys is reported within the following annexes.
  - [Annex 3.12: Bat Emergence and Re-entry Survey Report Part A](#); and
  - [Annex 3.13: Bat Emergence and Re-entry Survey Report Part B](#).

### 5.2.3 Bat activity transect and static detector surveys

- 5.2.3.1 [Section 4.2](#) identified linear habitats (i.e. hedgerows and watercourses) with the potential to support commuting and foraging bats within the Hornsea Four EP1HS study area. In accordance with the BCT guidelines (BCT 2016), all habitats assessed as providing moderate or high suitability for supporting commuting and/or foraging bats require further bat activity surveys in order to confirm the number of bats, whether they are used by foraging and/or commuting bats, and to identify the species which might be present.
- 5.2.3.2 All features assessed as providing low suitability for supporting commuting and/or foraging bats will still be considered as potentially supporting small numbers of commuting/foraging bats, but further surveys are not necessary to confirm presence or absence, as set out by the BCT guidelines (BCT2016). Mitigation measures for features assessed as providing low suitability for commuting and/or foraging bats are provided in [Section 5.4](#).
- 5.2.3.3 The updated EP1HS identified a total 44 features as providing moderate or high suitability for commuting and/or foraging bats.
- 5.2.3.4 The monthly bat activity transect surveys were undertaken in accordance with the guidelines (BCT 2016). Transect surveys involved walking at a constant speed along each

linear bat habitat recording observations such as number of bats, flight direction, flight height, behaviour, appearance and relative speed.

- 5.2.3.5 Static detector surveys involved the placement of a static detector at locations identified as suitable, such as within hedgerows or along woodland edges. Data from these surveys was recorded and subject to laboratory sound-analysis to identify species and pass numbers following the survey.
- 5.2.3.6 Each habitat scoped into the survey, and assessed as providing moderate or high suitability for commuting or foraging bats was subject to one transect survey visit per month from May to October (a total of six visits), including one dusk and pre-dawn survey within a 24-hour period, and static bat detector surveys at up to three locations within each habitat collected on five consecutive nights per month, including one dusk and pre-dawn survey within a 24 hour period. The transect surveys commenced at sunset and ceased 2-3 hours after sunset. The static detector surveys commenced 30 minutes before sunset and ceased 15 minutes after sunrise.
- 5.2.3.7 The surveyors used hand-held bat detectors (any type) and recording equipment to record any echolocation calls picked up during the survey. The same model of detector was used for all surveys. Laboratory sound analysis was used to identify the calls of any bat species picked up using the bat detectors.
- 5.2.3.8 Weather conditions including temperature, wind speed and precipitation, was recorded at the start and end of each survey visit. Surveys were not carried out when the temperature was below 10°C at sunset, or during heavy rain or strong wind, unless justified by the surveying ecologist.
- 5.2.3.9 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.16).
- 5.2.3.10 The results of the Hornsea Four bat activity transect and static detector surveys is reported within the following annexes:

- [Annex 3.8: Bat Static Detector Survey Report Part A](#);
- [Annex 3.9: Bat Static Detector Survey Report Part B](#);
- [Annex 3.10: Bat Activity Transect Survey Report Part A](#); and
- [Annex 3.11: Bat Activity Transect Survey Report Part B](#).

## 5.2.4 Birds

- 5.2.4.1 An over-wintering bird survey effort was undertaken between November 2018 and March 2019. The survey included a combination of Vantage Points (VP) and a walkover survey in



order to determine the usage of habitats present within the Hornsea Four Order Limits by overwintering bird species.

- 5.2.4.2 Standard recording procedures were used to note the species, number of sightings and activity (Bibby et al. 2000). The surveyors also recorded the exact route taken, so that during subsequent visits alternative circuitous routes of each transect could be used to ensure that all parts of each survey area can be surveyed at a different time of day.
- 5.2.4.3 A breeding bird survey effort was undertaken between April and June 2019 (inclusive) and comprised of two visits per month. The methodology followed the same as the overwintering bird survey effort.
- 5.2.4.4 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.13).
- 5.2.4.5 The results of the breeding bird survey and the over-wintering bird survey is reported within the following technical annexes:
- [Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report](#); and
  - [Annex 3.4: Breeding Bird Survey Report](#).

## 5.2.5 Water voles

- 5.2.5.1 A total of 80 watercourses were identified as potentially providing optimal habitat for water voles and as such a water vole presence/absence survey, comprising two separate survey visits was undertaken in May and August 2019.
- 5.2.5.2 The water vole surveys were undertaken in accordance with the protocol for Environmental Assessment Surveys set out in the Water Vole Conservation Handbook (Strachan et al. 2011). Surveys were undertaken from the banks and where possible within the watercourse. Surveyors searched for field signs of water voles primarily within the marginal vegetation along the bank toe and along the length of the watercourse within the Hornsea Four EP1HS study area (50 m upstream and downstream), and up to 1 m either side of this vegetation along one bank of the watercourse. All field signs of water vole were recorded, including sightings, burrows, latrines, feeding stations, lawns, nests, footprints and runways. Field signs, habitat information, and weather conditions at the time of the survey were also recorded alongside their location.
- 5.2.5.3 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from

Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.11).

5.2.5.4 The results of the water vole survey are reported within [Annex 3.6: Water Vole Survey Report](#), the findings of which will be used to inform the ecological impact assessment reported in [Volume A3, Chapter 3: Ecology and Nature Conservation](#).

## 5.2.6 Otter

5.2.6.1 Fourteen water bodies were assessed as having the potential to support otters.

5.2.6.2 The otter survey (comprising two separate visits) was undertaken in accordance with the protocol set out by Scottish Natural Heritage (Otters and Development 2016). Surveys were conducted on one bank for the full length of each optimal watercourse within the Hornsea Four Order Limits, plus an additional 250 m upstream and 250 m downstream. Each watercourse was walked by an ecologist, and all field signs of otter was recorded. This included signs of mink, spraints, holts, couches, prints, feeding remains, anal jelly and sightings. The field sign and its location were recorded. Surveys were not undertaken following heavy rain.

5.2.6.3 Due to the overlap in survey methodology and in habitats, the otter survey was conducted concurrently with the water vole survey, with one survey visit undertaken in May and the second survey visit undertaken in August 2019.

5.2.6.4 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.12).

5.2.6.5 The results of the otter survey is reported within [Annex 3.7: Otter Survey Report](#), the findings of which will be used to inform the ecological impact assessment reported in [Volume A3, Chapter 3: Ecology and Nature Conservation](#).

## 5.2.7 Great crested newt

5.2.7.1 A total of 62 ponds were identified within the Hornsea Four GCN study area. All accessible ponds were subject to a daytime HSI assessment in accordance with standard methodology (Oldham et al. 2000). The HSI assessment considers habitat attributes that are considered to influence the suitability of a pond for breeding great crested newts. These attributes are as follows:

- Location;
- Area;
- Drying;
- Water quality;

- Shade;
- Waterfowl presence;
- Fish presence;
- Terrestrial habitat;
- Macrophyte presence; and
- Number of waterbodies within 1 km.

5.2.7.2 Each accessible pond was subsequently subject to an environmental DNA (eDNA) survey following the field sampling protocol as set out in Briggs et al. (2014). A total of 35 samples were collected from around the accessible parts of each water body perimeter by a GCN licenced ecologist, including open water areas and areas with vegetation present. Each water body sampling has been completed with a fresh sampling pack to avoid cross contamination.

5.2.7.3 Each sample was then sent to the Food and Environmental Research Agency (FERA) for analysis for eDNA in accordance with approved field and laboratory protocols (Briggs et al. 2014). The presence or absence of GCN from each of the surveyed ponds was determined based on the results of the eDNA analysis.

5.2.7.4 The HSI assessment and subsequent eDNA survey was undertaken between mid-April and the end of June 2019 and June 2021.

5.2.7.5 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.15).

5.2.7.6 Survey results relating to GCN is provided in [Annex 3.5: Great Crested Newt Environmental DNA \(eDNA\) Survey Report](#), the findings of which will be used to inform the ecological impact assessment reported in [Volume A3, Chapter 3: Ecology and Nature Conservation](#).

## 5.3 Survey Programme

5.3.1.1 Based on the results obtained from the updated EP1HS, [Table 11](#) provides an indicative programme for the further species-specific surveys outlined in [Section 5.2](#).

**Table 11: Indicative onshore ecology Phase 2 survey programme (based on the findings of the updated EP1HS).**

Survey	Number of visits	Survey Season	Total visits	Notes
Monthly bat (activity transect survey) – moderate/high suitability	One per month	May to October (weather dependant)	7	One survey to incorporate an evening (after dusk) and a morning (before dawn) within one 24hr period.
Bat (static detector)	One per month	May to October (weather dependant)	7	Each month, detectors will be left in situ, recording, for 5 consecutive nights.
Bat (emergence/re-entry) – high suitability	Three visits	May to October (weather dependant)	3	One dusk emergence survey and one dawn re-entry survey plus an additional dusk or dawn survey. One visit to be undertaken between May and August.
Bat (emergence/re-entry) – moderate suitability	Two visits	May to October (weather dependant)	2	One dusk emergence survey and one dawn re-entry survey. One visit to be undertaken between May and August.
Badger presence/absence	One visit	February to December	1	One visit to be undertaken in May/June.
Breeding birds	Two visits per month	April to June	5	Survey consisting of both walkover survey and VP
Great crested newt HSI and eDNA	One	April to June	1	Survey undertaken in May/June.
Water vole and otter presence/absence surveys	Two	April to September	2	Survey visit 1 to be undertaken in May. Survey visit 2 to be undertaken in August.

## 5.4 Pre-construction Mitigation Measures

5.4.1.1 The following section details mitigation measures that is proposed to be incorporated to ensure no harm to a species or to their habitats occurs, as well as ensuring legal compliance. This mitigation will be further developed as part of the development of a project specific [Volume F2, Chapter 3: Outline Ecological Management Plan](#).

### 5.4.2 Bats

5.4.2.1 As stated in [Section 5.2](#), no further surveys are required for those features assessed as providing low suitability for commuting and/or foraging bats (BCT 2016). However, the following mitigation measures will be required in order to reduce any adverse, long term impacts on bats:

- Where possible, a reduction in the working width at hedgerow crossings to enable bat species to utilise a potential commuting feature during construction works;
- Any lighting required during construction works will be designed to minimise light scatter;
- In areas that require 24 hour working (for example, where horizontal directional drilling may take place under watercourses which may host bats), any lighting of the working corridor will be low level and directional; and
- Post construction habitat reinstatement.

5.4.2.2 Although no further survey is required for trees identified as providing low suitability for roosting bats, should any of these trees require removing during the project's construction period, a 'soft fell' approach should be taken in line with the BCT guidelines (BCT 2016). This ensures that where tree limbs are cut, these are left grounded over night to allow any bats that might be present to make their way out. This should be done under the supervision of a licenced bat ecologist.

5.4.2.3 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-3.15).

### 5.4.3 Reptiles

5.4.3.1 As stated in [Section 4.2](#) a reptile presence/absence survey will not be undertaken for Hornsea Four. However, robust mitigation is recommended for the project's construction period to ensure that there is no indirect damage to reptile habitats. As such, should vegetation removal be required within these areas, the following measures will be required in respect to reptiles:

- A PMoW with respect to reptiles will be included within the final Ecological Management Plan (EMP) and will include details relating to the following items:

- a. A tool box talk will be delivered to site operatives prior to works, illustrating any risk areas on site for reptiles, what the penalties are for killing or injuring reptiles, and the procedure to be followed should any reptiles be found on site during construction;
- b. Dismantling by hand of any potential reptile hibernacula. This will be done by a suitably qualified ecologist during the reptile active season (April to September inclusive, after night time temperatures are above 5°C); and
- c. Habitat manipulation of the working area to ensure it is unfavourable to reptiles during the works. This will include a vegetation trim down to 150 mm of all vegetation in areas of vehicle tracking or construction works, at least 48 hours prior to construction and all cut vegetation removed outside the proposed works area, to give any reptiles present time to leave the area. After the 48-hour period the remaining vegetation can be trimmed to a closer cut if required. Pre-construction vegetation clearance will be supervised by a suitably qualified ecologist.

5.4.3.2 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8 and ON-ECO-3.2).

#### 5.4.4 Nesting birds

5.4.4.1 Reports on over-wintering birds and breeding birds within the Hornsea Four EP1HS study are presented separately to this document ([Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report](#) and [Annex 3.4: Breeding Bird Survey Report](#)). However, habitats suitable for protected, notable and common species of birds were recorded during the updated EP1HS. These areas include grassland, scrub, woodland and isolated trees. The following measures will be required with respect to nesting birds:

- Where possible any tree, scrub or hedgerow removal required to facilitate the development will be carried out outside the breeding bird season (removal undertaken between September and February inclusive); or
- If this is not possible the vegetation shall be checked by an ecologist no more than 48hrs prior to the commencement of works to ensure no nesting birds are present.
- Any nest in use or being built during this survey will need to be left undamaged until the chicks have fledged and an alternative approach to the works proposed. In the event a common bird species is found to be nesting during the pre-construction check, a suitable buffer will need to be implemented. This could be between 2 m and 10 m but is dependent on the species which is noted.

## 6 Conclusions

6.1.1.1 An updated EP1HS was undertaken to record the habitats within the Hornsea Four EP1HS survey area to identify the presence or likely presence of legally protected and notable species. The updated EP1HS covered approximately 95% of the onshore Hornsea Four boundaries. The remaining 5% equates to a small section that is currently unsurveyed due to no landowner access being granted (denoted in grey on [Figure 35](#)). This area was reviewed using aerial imagery and where possible ground-truthed from adjacent land

parcels where landowner access had been granted in order to determine the scope for any further survey requirements, therefore has not had a detrimental effect to the baseline data collection. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.18).

6.1.1.2 There are four statutory designated sites within the Hornsea Four EP1HS study area, one of which is inside the Hornsea Four Order Limits. In addition, there are six non-statutory designated sites within the Hornsea Four Order Limits and a further 33 within the EP1HS study area

6.1.1.3 The following UK Habitats of Principal Importance are present within the Hornsea Four EP1HS survey area:

- Coastal and Floodplain Grazing Marsh;
- Maritime Cliff and Slope; and
- Reedbeds.

6.1.1.4 The updated EP1HS noted that the Hornsea Four EP1HS survey area is dominated by arable fields interspersed with field margin drains, larger streams and rivers and areas of woodland and scrub. Field boundaries are typically composed of species poor intact hedges and species poor hedges with trees. Habitats present with higher biodiversity value include semi-natural and plantation woodlands, scrub, poor semi-improved grassland, water bodies and isolated trees.

6.1.1.5 Key features for protected and notable species have been identified within the Hornsea Four EP1HS survey area for a range of protected species and are summarised in [Table 12](#). Further surveys have been undertaken within the appropriate survey periods during 2019 in relation to these species and as agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8).

**Table 12: Summary of key features for protected and notable species identified during the updated EP1HS.**

Species	Summary of key findings
Water vole	80 watercourses identified, further surveys were undertaken in May and August 2019 (two separate survey visits)
Otter	14 watercourses identified, further presence/absence surveys were undertaken in May and August 2019 (two separate survey visits)
Bats	44 linear features of moderate and high suitability – these features were subject to monthly bat activity transect and static detector surveys between May and October 2019.

Species	Summary of key findings
	<p>41 linear features of low suitability for commuting/foraging bats – in line with standard guidance (BCT, 2016) no further survey effort is required on features offering low suitability for commuting/foraging bats, however mitigation measures have been included for these features in <a href="#">Section 5.4.2</a>.</p> <p>28 features of moderate/high suitability for roosting bats – these features were subject to monthly emergence/re-entry surveys between May and October 2019</p> <p>24 features (trees) of low suitability for roosting bats – in line with standard guidance (BCT, 2016) no further surveys required on trees offering low suitability for roosting bats, however mitigations have been included within <a href="#">Section 5.4.2</a>.</p>
GCN	62 ponds identified, 55 of which had landowner access agreed and as such, were subject to HSI assessment and eDNA survey between mid-April and end-June 2019, with six of the remaining seven ponds subject to HSI assessment and eDNA survey June 2021.
Reptiles	A total of 43 areas noted as providing suitable habitat, including potential refugia. Although no specific reptile surveys are to be undertaken, appropriate mitigation will be required including adherence to a reptile PMoW to ensure legal compliance during construction works.



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## Appendix A2021 Survey Addendum



# Hornsea Project Four: Environmental Statement (ES)

## Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report – 2021 Survey Addendum

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A6.3.2 Addendum  
Version A

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## Glossary

Term	Definition
Birds of Conservation Concern (BoCC) 'Red List'	The 'red list' includes birds of the highest conservation concern in the UK, Channel Islands and Isle of Man needing urgent action.
Commitment	A term used interchangeably with mitigation and enhancement measures. Commitments are Embedded Mitigation Measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more National Significant Infrastructure Projects (NSIP).
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
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
Export Cable Corridor (ECC)	The specific corridor of seabed (seaward of Mean High-Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.

Term	Definition
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The limits within which Hornsea Project Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Potential Roost Feature (PRF)	Potential bat roosts which can include visible cracks, holes, gaps or splits that allow access for roosting bats.

## Acronyms

Acronym	Definition
ACIEEM	Associate Member of Chartered Institute of Ecology and Environmental Management
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BoCC	Birds of Conservation Concern
CIEEM	Chartered Institute of Ecology and Environmental Management
DCO	Development Consent Order
EA	Environment Agency
EBI	Energy Balancing Infrastructure
EC	European Commission
ECC	Export Cable Corridor
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EP1HS	Extended Phase 1 Habitat Survey
ES	Environmental Statement
EU	European Union
FERA	Food and Environmental Research Agency
GCN	Great Crested Newt
HSI	Habitat Suitability Index
HVAC	High Voltage Direct Current
HVDC	High Voltage Alternating Current
IEMA	Institute of Environmental Assessment
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside



MCIEEM	Member of Chartered Institute of Ecology and Environmental Management
MEECoW	Member of the Association of Environmental and Ecological Clerk of Works
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NE	Natural England
NERC	Natural Environmental and Rural Communities
NEYEDC	North and East Yorkshire Ecological Data Centre
NGET	National Grid Electricity Transmission
OEMP	Outline Ecological Management Plan
OnSS	Onshore Substation
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PMoW	Precautionary Method of Working
PRF	Potential Roost Feature
PRoW	Public Right of Way
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TN	Target Note
WCA	Wildlife and Countryside Act

## Units

Unit	Definition
°C	degrees Celsius
ha	hectare
km	kilometre
kV	kilovolt
m	metre
mph	miles per hour

## 1 Introduction

- 1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop the Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.
- 1.1.1.2 Royal HaskoningDHV was commissioned to undertake an updated Extended Phase 1 Habitat survey (EP1HS) within and up to 50 m from the onshore Hornsea Four Order Limits (i.e. the landfall, onshore export cable corridor (ECC), OnSS and 400 kV National Grid Electricity Transmission (NGET) connection area).
- 1.1.1.3 To inform the Scoping stages of the project, an initial habitat assessment was conducted, comprising a desktop review of high-resolution aerial imagery obtained in July 2018, followed by a ground-truthing exercise. This is reported in the Hornsea Four Scoping Report (Orsted 2018).
- 1.1.1.4 An Extended Phase 1 Habitat Survey (EP1HS) was undertaken between 6<sup>th</sup> and 15<sup>th</sup> February 2019 and between the 4<sup>th</sup> and 13<sup>th</sup> September 2019 to record the habitats within the Hornsea Four EP1HS survey area and to identify the presence or likely presence of legally protected and notable species. The findings of this survey are provided in [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and [Annex 3.2: Extended Phase 1 Target Note Tables](#).
- 1.1.1.5 Due to refinements of the onshore Hornsea Four Order Limits since the 2019 EP1HS survey, in combination with landowner access not being granted for 5 % of the Hornsea Four Order Limits in 2019, a further EP1HS of areas not previously surveyed was undertaken in June 2021 ([Figure 1](#)). Ongoing consultation with landowners has been undertaken by The Applicant's land agents and consequently access to those areas previously unsurveyed in 2019 was granted in June 2021. This addendum has been produced to present the findings from the 2021 survey effort and should be read in conjunction with [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and [Annex 3.2: Extended Phase 1 Target Note Tables](#).
- 1.1.1.6 This addendum, in combination with [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and [Annex 3.2: Extended Phase 1 Target Note Tables](#), have been produced to update the habitat information following the scoping stage survey and to characterise the baseline environment and identify the requirement for Phase 2 species-specific surveys to inform and support the ecological impact assessment in [Volume A3, Chapter 3: Ecology and Nature Conservation](#) of the Hornsea Four Environmental Statement (ES).
- 1.1.1.7 Due to the amount of data collated during the Hornsea Four EP1HS, the technical report has been split into two parts:

- [Annex 3.1: Extended Phase 1 Habitat Survey Report 2021 Addendum](#) (this document) – outlines the methodology, survey results, conclusions and mitigation; and
- [Annex 3.2: Extended Phase 1 Target Note Tables 2021 Addendum](#) – presents the target notes table.

1.1.1.8 The 2021 survey addendum has also been split into two parts to accompany the respective technical annexes listed above.

## 1.2 Aims

1.2.1.1 The aim of the 2021 EP1HS was to record the habitats within those areas where access had not been granted in 2021 as well as recording the habitats within those areas where refinements have been made to the onshore Hornsea Four Order Limits since the 2019 survey. The 2021 EP1HS also included a resurvey of the proposed River Hull Headwaters Site of Special Scientific Interest (SSSI) crossing location to note any changes in the site conditions since those previously recorded.

1.2.1.2 Third-party information had also been provided to The Applicant regarding badger activity being recorded within the Hornsea Four Order Limits. Therefore, to confirm the validity of this received information, and where landowner access was granted at the time of the 2021 survey, these areas were also checked as part of the 2021 EP1HS.

1.2.1.3 A desktop review was undertaken as part of the 2019 EP1HS as well as the obtainment of biological data from the North and East Yorkshire Ecological Data Centre (NEYEDC). This data had initially been obtained during the scoping stages of the project (NEYEDC 2018), and more recently updated in April 2020. This information was reviewed and used to supplement the findings of the 2019 EP1HS field survey effort. There is no specific date for determining that desk study records of a certain age are no longer valid, and therefore each record has been considered on its own merits. As the desktop review and biological records data was updated in April 2020, it is therefore considered to remain valid. The findings from the desk study, where relevant to the 2021 EP1HS, is presented within [Section 4.1](#) of this report.

1.2.1.4 This report has been prepared following the guidelines as set out in the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines on Ecological Report Writing (CIEEM 2017).

## 2 Legislation and Policy

2.1.1.1 This section summarises the relevant information regarding the legal protection afforded to the habitats and species mentioned in this report. However, it should be noted that this is for information only and is not intended to be exhaustive or to replace specialised legal advice.

2.1.1.2 [Table 1](#) provides a summary of the key legislation and policy relevant to Hornsea Four.

**Table 1: Summary of key legislation and policy relevant to the onshore survey area.**

Legislation	Relevance
Wildlife and Countryside Act 1981 (as amended) (WCA 1981)	Codifies the European Union (EU) Directive 2009/147/EC (the Birds Directive) into UK law; provides legal protection for European designated sites (Special Protection Areas (SPA), Ramsar sites) and Sites of Special Scientific Interest (SSSI); outlines legal offences in relation to wild birds, animals, and invasive species; and provides lists of species which are protected under the Act.
The Conservation of Habitats and Species Regulations 2017 (as amended) (Conservation of Habitats and Species Regulations 2017)	Codifies the EU Directive 92/43/EEC (The Habitats Directive) into UK law, and provides legal protection for European designated sites (Special Area of Conservation (SAC)).
Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	Makes changes to the Conservation of Habitats and Species Regulations 2017 following the UK's exit from the European Union (EU).
Natural Environment and Rural Communities Act 2006 (NERC 2006)	Details a list of UK habitats and species of 'principle importance,' which require protection within the UK.
Protection of Badgers Act 1992 (Protection of Badgers Act 1992)	Outlines legal offences in relation to badgers, including taking, injuring or killing badgers, and interfering with badger setts.
The Hedgerow Regulations 1997 (Hedgerow Regulations 1997)	Outlines the definition of 'important' hedgerows and legal offences in relation to their disturbance or removal.
UK Post-2010 Biodiversity Framework (JNCC 2012)	Supersedes the UK Biodiversity Action Plan (UK BAP), which fulfilled a legal obligation under the Convention on Biological Diversity to identify and produce action plans for priority habitats and species.

### 3 Methodology

3.1.1.1 This section presents the methodology used to undertake the 2021 field survey of the areas shown on [Figure 1](#).

3.1.1.2 As stated in [Paragraph 1.2.1.2](#), an updated desk study and/or obtainment of biological records has not been undertaken as these were updated in 2020 and are therefore considered to remain valid. This conclusion was agreed with Natural England (ON-ECO-1.23).

### 3.2 Study area

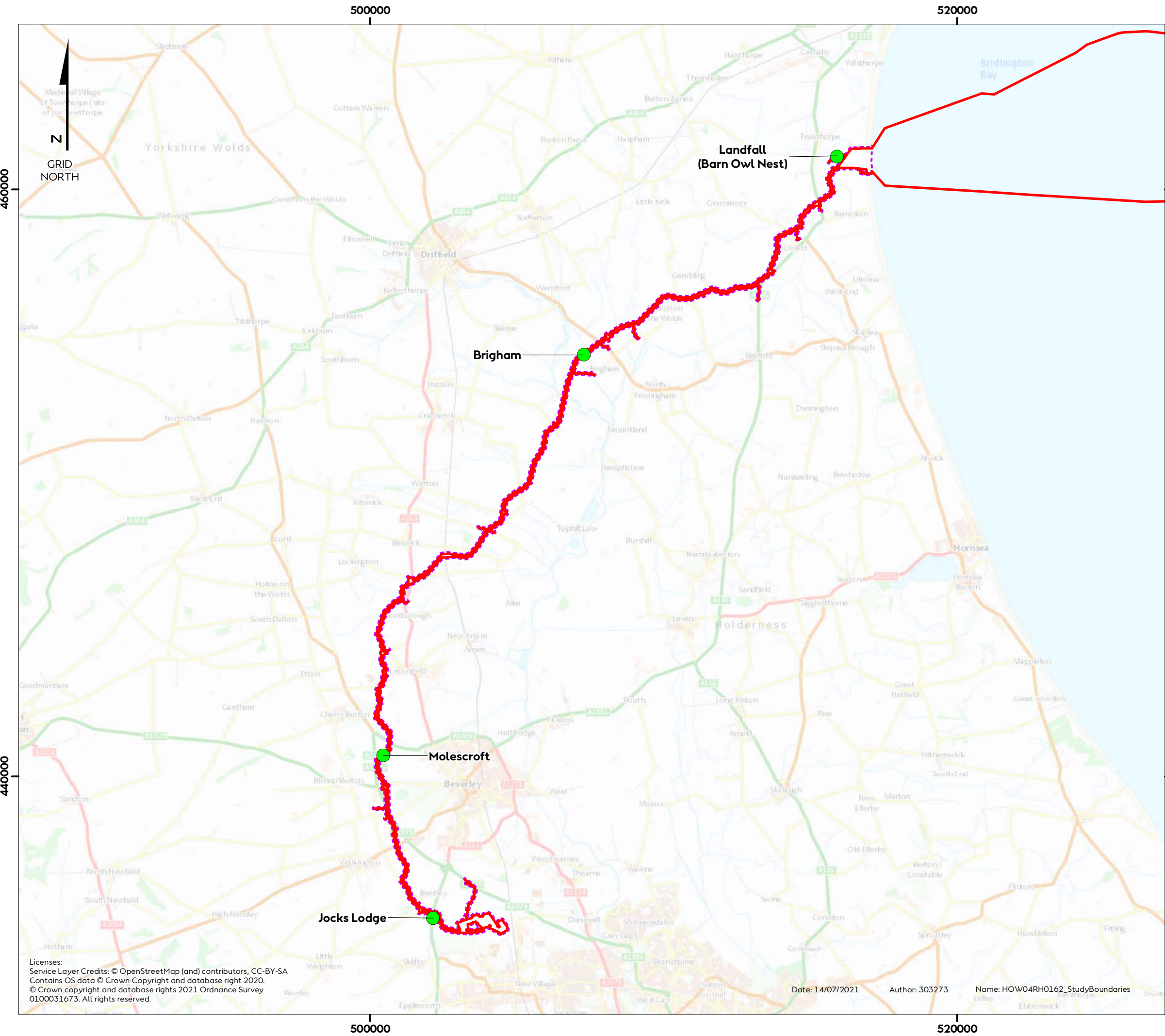
#### 3.2.1 2021 Field Survey Study Area

3.2.1.1 The 2021 EP1HS included all areas where landowner access had not been granted in 2019 as well as those areas where refinements have been made to the onshore Hornsea Four Order Limits since the 2019 EP1HS, plus an additional 50 m buffer. The 2021 EP1HS survey area is shown in the inset on [Figure 1](#).

3.2.1.2 For completeness, **Table 2** summarises the study areas and survey area that have been utilised for both the 2019 and 2021 survey efforts.

**Table 2: Study areas relevant to the 2019 and 2021 EP1HS.**

Study/survey area name	Description
Bat and bird study area	Search area for records of bat and bird species within and up to 5 km of the onshore Hornsea Four Order Limits
EP1HS study area	Search area for records of protected and notable species and habitats within and up to 2 km of the onshore Hornsea Four Order Limits
Great crested newt (GCN) <i>Triturus cristatus</i> study area	Search area for suitable water bodies and habitat for GCN within and up to 250 m of the onshore Hornsea Four Order Limits
EP1HS survey area	Area that was covered by either the 2019 or 2021 EP1HS field survey, covering habitats within and up to 50 m of the onshore Hornsea Four Order Limits



# Hornsea Four

## Figure 1

### 2021 EP1HS Study Areas

- Order Limits
- EP1HS Survey Area (50m Buffer)
- 2021 EP1HS Locations



Coordinate system: British National Grid  
 Scale@A3: 1:125,000

0 2 4 6 Kilometres

0 2 4 Miles

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Date: 14/07/2021 Author: 303273 Name: HOW04RH0162\_StudyBoundaries



Title: 2021 EP1HS Study Area  
 Document no: HOW04RH0162  
 Created by: AZ  
 Checked by: CS  
 Approved by: CS

## 3.3 Desktop review

- 3.3.1.1 As stated in [Paragraph 1.2.1.2](#), an updated desk study and/or obtainment of biological records has not been undertaken as these were updated in 2020 and are therefore considered to remain valid. This conclusion was agreed with Natural England (ON-ECO-1.23).
- 3.3.1.2 Full details on the desk study (including the biological records) is provided in [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and has not been repeated in this document.

## 3.4 Field Survey Methodology

- 3.4.1.1 Following the refinements of the onshore Hornsea Four Order Limits since the 2019 EP1HS, in combination with some areas not being granted landowner access in 2019, a EP1HS of these areas was undertaken on the 15<sup>th</sup> and 16<sup>th</sup> June 2021 by a suitably qualified ecologist. The aim of this survey was to record the habitats within these areas and to identify the presence or likely presence of legally protected and notable species.
- 3.4.1.2 The 2021 EP1HS was undertaken using the same methodology as that followed in 2019, i.e. in accordance with the 'Extended Phase 1' methodology as set out in Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment (IEMA 1995)). This method of survey enabled information on the habitats within the 2021 survey areas to be recorded and enabled an assessment of the potential for legally protected species to be present on, or adjacent to, the areas subject to the survey. All habitats have been recorded using the system set out within the Joint Nature Conservation Committee (JNCC) '*Handbook for Phase 1 habitat survey: A technique for environmental audit*' (JNCC 2010).
- 3.4.1.3 All of the habitats surveyed in 2021 have been mapped and Target Notes (TN) used to provide details of characteristic habitats, species composition and to highlight any features of ecological interest. Due to the size of the 2019 EP1HS survey area and the large number of TNs, the TNs are presented within a separate annex, [Annex 3.2 Extended Phase 1 Target Note Tables](#). An addendum to this technical annex has been produced which includes the 2021 TNs.
- 3.4.1.4 An assessment of hedgerows within the areas surveyed in 2021 was also undertaken. The methodology followed the same as that used in the 2019 survey, i.e. in accordance with the Hedgerow Survey Handbook (Defra 2007) and in line with the Hedgerow Regulations (Hedgerow Regulations 1997). All hedgerows were recorded using the JNCC habitat classifications (JNCC 2010), as shown in [Table 3](#).
- 3.4.1.5 A separate hedgerow survey was undertaken by a suitably qualified arboriculturalist in 2019 and not updated as part of the 2021 survey effort. The results from the 2019 survey are presented in [Annex 3.14 Hedgerow and Arboricultural Survey Report](#).

**Table 3: Hedgerow classifications.**

Classification	Description	JNCC Classification	Notes
Intact hedgerow	Species-rich	J2.1.1	Hedgerow with no significant gaps that remains stock proof and contains five or more woody species per 30 m length.
	Species-poor	J2.1.2	Hedgerow with no significant gaps that remains stock proof and contains less than five woody species per 30 m length.
Defunct hedgerow	Species-rich	J2.2.1	Hedgerow with significant gaps that is not stock proof and contains five or more woody species per 30 m length.
	Species-poor	J2.2.2	Hedgerow with significant gaps that is not stock proof and contains less than five woody species per 30 m length.
Hedgerow with trees	Species-rich	J2.3.1	Hedgerow that is made of a mix of tree and shrub species, with five or more woody species per 30 m length.
	Species-poor	J2.3.2	Hedgerow that is made of a mix of tree and shrub species, with less than five woody species per 30 m length.

3.4.1.6 Following the Guidelines for Baseline Ecological Assessment (CIEEM 2017), the 2021 habitat survey was 'extended' to make preliminary investigations in respect to the following legally protected and/or notable species. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8<sup>th</sup> April 2019 (ON-ECO-1.8).

Birds

3.4.1.7 It should be noted that specific bird surveys (over-wintering and breeding birds) were undertaken in 2019 and the findings are reported separately in the following technical annexes:

- [Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report](#); and
- [Annex 3.4: Breeding Bird Survey Report](#).

3.4.1.8 As part of the 2021 EP1HS, a search for all habitats with suitability to support breeding and over-wintering birds was undertaken, with a focus on those habitats with the suitability to support birds listed on Schedule 1 of the Wildlife and Countryside Act (WCA 1981) and International Union for Conservation of Nature (IUCN) 'Red' and 'Amber' List species (IUCN 2019). Such habitats include trees, hedgerows, water bodies, grazing marsh or fen, lowland heath and agricultural land.

Badgers

3.4.1.9 A search for signs of badgers *Meles meles* activity within the areas surveyed in 2021 was undertaken. Signs such as setts, tracks, hairs, bedding and spoil heaps, snuffle holes and latrines, were checked for. These results are reported separately in the confidential technical annex: [Annex 3.15: Badger Survey Report \(Confidential\)](#).



3.4.1.10 Where active setts were found, they were classified using the following categories:

- **Main sett** - Several holes with large spoil heaps and obvious paths leading from and between sett entrances;
- **Annexe sett** - Normally less than 150 m from main setts, comprising several holes. May not be in use all the time, even if main sett is very active;
- **Subsidiary sett** - Usually at least 50 m from main sett with no obvious paths connecting to other setts. May only be used intermittently; and
- **Outlier sett** - Little spoil outside holes, with no obvious paths connecting to other setts. Only used sporadically and may be used by foxes and rabbits.

#### Bats

3.4.1.11 All trees, buildings and structures (e.g. bridges and farm buildings) were assessed for their potential to support roosting bats from the ground using binoculars. Each feature was assigned a classification of either negligible, low, moderate or high suitability for supporting roosting bats following the guidelines set out in Table 4.1 of the Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (BCT 2016).

3.4.1.12 All trees, water bodies and hedgerows were also assessed for their potential to provide commuting and foraging habitat for bats, in accordance with BCT guidelines (BCT 2016).

3.4.1.13 Full 2019 survey results for bat species are contained within the following annexes:

- [Annex 3.8: Bat Static Detector Survey Report Part A](#);
- [Annex 3.9: Bat Static Detector Survey Report Part B](#);
- [Annex 3.10: Bat Activity Transect Survey Report Part A](#);
- [Annex 3.11: Bat Activity Transect Survey Report Part B](#);
- [Annex 3.12: Bat Emergence and Re-entry Survey Report Part A](#); and
- [Annex 3.13: Bat Emergence and Re-entry Survey Report Part B](#).

#### Water voles and otters

3.4.1.14 All standing and running water bodies within the areas surveyed in 2021 were recorded. Assessments of a water body's suitability for water voles and otters was made in line with the Mammal Society guidance (Dean et al. 2016) and standing advice from Natural England (Natural England 2015).

3.4.1.15 Full 2019 survey results for water vole and otter are provided in the following annexes:

- [Annex 3.6: Water Vole Survey Report](#); and
- [Annex 3.7: Otter Survey Report \(confidential\)](#).

#### Great crested newts

3.4.1.16 All standing water bodies within the Hornsea Four GCN study area have been mapped and were subject to a Habitat Suitability Index (HSI) assessment (following Oldham et al. 2000)

and an Environmental DNA (eDNA) survey within the appropriate survey window (between mid-April and the end of June) in 2019 or 2021.

3.4.1.17 Further details on the survey methodology and results are provided in [Annex 3.5: Great Crested Newt Environmental DNA \(eDNA\) Survey Report](#).

Reptiles

3.4.1.18 Where present, habitat mosaics (e.g. a collection of suitable habitats for reptile hibernation, basking, and foraging occur together) were noted as providing potential opportunities for reptiles. These habitats include habitat transitions (ecotones), rank grassland, lowland heath, piles of debris (hibernacula), or bare ground (Edgar et al. 2010).

Invasive non-native species

3.4.1.19 The location and extent of invasive non-native species was recorded. Due to the large number of invasive non-native species present in the UK, the 2021 EP1HS (as did the 2019 EP1HS) focussed on the species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (WCA 1981).

**3.4.2 Surveyors**

3.4.2.1 The 2021 EP1HS was led by Claire Smith, a Chartered Ecologist and Environmentalist and Full Member of CIEEM (MCIEEM) and assisted by Ashleigh Holmes BSc. MSc. Claire has over 14 years of experience in Extended Phase 1 Habitat surveying.

**3.4.3 Weather conditions**

3.4.3.1 [Table 4](#) summarises the weather conditions encountered during the 2021 EP1HS.

**Table 4: Weather conditions during the 2021 EP1HS.**

Survey Date (2021)	Weather conditions
15 <sup>th</sup> June	Dry, sunny, moderate breeze and approximately 22°C.
16 <sup>th</sup> June	Dry, sunny, slight breeze and approximately 26°C.

**3.4.4 Survey limitations**

3.4.4.1 The 2021 EP1HS covered the 5 % of the Hornsea Four Order Limits that was unable to be surveyed in 2019 due to landowner access not being granted, as well as the areas where refinements to the onshore Hornsea Four Order Limits had been made since the 2019 EP1HS. Therefore, all of the Hornsea Four Order Limits have been subject to an EP1HS in either 2019 or 2021.

3.4.4.2 Some areas of habitats could not be fully accessed during the 2021 EP1HS due to the presence of physical barriers, such as dense scrub, which in turn prevented safe entry for the surveyors. However, these areas were small and discrete (such as dense bramble) and were encountered infrequently. In the few locations where they were encountered, they were

recorded as potentially providing field signs which could not be picked up during the field survey.

3.4.4.3 The 2021 EP1HS was undertaken in June, which is considered to be within the optimal survey period. Therefore, it is considered that the 2021 survey (and its results), in combination with the 2019 survey and its findings, are robust in being used to characterise the existing site conditions and in turn be used to inform and support the ecological impact assessment set out in [Volume A3, Chapter 3: Ecology and Nature Conservation](#) of the Hornsea Four ES. This conclusion was agreed by Natural England via the Hornsea Four onshore ecology Evidence Plan Technical Panel meeting held on the 1 April 2020 (ON-ECO-1.18).

3.4.4.4 Additionally, although the survey team made the utmost effort to cover every habitat and pick up all field signs present during the 2021 EP1HS, on occasion some field signs can be missed. Despite this, the data presented in this report is considered to provide an accurate description of the habitats within the Hornsea Four Order Limits.

## 4 Results

### 4.1 Desktop review results

#### 4.1.1 Statutory and Non-statutory designated sites

4.1.1.1 Information relating to designated sites that have been identified during the desk-based review are listed in [Table 5](#) (and shown on [Figure 2](#) to [Figure 6](#)) of [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) have not been re-provided in this document.

4.1.1.2 No changes or additional designated sites have been identified as a result of the 2021 survey or refinements made to the Hornsea Four Order Limits since the 2019 and 2020 desk study.

#### 4.1.2 UK Habitats of Principal Importance

4.1.2.1 Information relating to UK Habitats of Principal Importance are presented on [Figure 7](#) to [Figure 11](#) of [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and have not been re-provided in this document.

4.1.2.2 No changes or additional UK Habitats of Principal Importance have been identified as a result of the 2021 survey or refinements made to the Hornsea Four Order Limits since the 2019 and 2020 desk study.

#### 4.1.3 Protected species

4.1.3.1 [Section 4.1.3](#) of [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) summarises the records of all legally protected species which have been obtained during the desk-based assessment and highlights where those records are within the 2019 and 2021 Hornsea Four EP1HS survey area. This information has not been repeated in this document.

4.1.3.2 No changes or additional records of legally protected species has been identified as a result of the 2021 survey or refinements made to the Hornsea Four Order Limits since the 2019 and 2020 desk study.

## 4.2 Field Survey Results

4.2.1.1 **Table 5** shows the key habitats that were recorded within the 2021 Hornsea Four EP1HS survey area (as shown on **Figure 2** to **Figure 5**).

**Table 5: JNCC Phase 1 habitat areas recorded during the updated EP1HS.**

JNCC Phase 1 Habitat Code	JNCC Phase 1 Habitat Survey Description	Area (ha)
A1.1.1	Broadleaved woodland – semi-natural	0.18
A2.1	Scrub – dense/continuous	1.35
J1.1	Cultivated/disturbed land – arable	19.94
J3.6	Building/hard-standing	0.33
JNCC Phase 1 Habitat Code	JNCC Phase 1 Habitat Survey Description	Length (m)
J2.1.2	Intact hedge – species poor	1740.68
J2.2.2	Defunct hedge – species poor	145.78

4.2.1.2 The following sections relating to the habitats recorded during the 2021 EP1HS should be read in conjunction with **Table 5**.

### Semi-natural woodland

4.2.1.3 An area of broadleaved semi-natural woodland (A1.1.1) was recorded during the 2021 survey and consisted a mix of ash *Fraxinus excelsior*, sycamore *Platanus occidentalis* and English oak *Quercus robur* with typical understorey and ground flora species including thistle *Cirsium vulgare*, hawthorn *Crataegus monogyna*, bramble *Rubus fruticosus* and common nettle *Urtica dioica*.

### Scrub

4.2.1.4 Areas of scrub (A2.1) were recorded within the 2021 survey areas. Species present within these areas predominately included bramble, gorse *Ulex spp.*, common nettle, common hogweed *Heracleum sphondylium*, cow parsley *Anthriscus sylvestris* and cleavers *Galium aparine*.

### Arable land

4.2.1.5 The largest habitat by area within the areas surveyed in 2021 comprised arable land (JNCC Phase 1 Habitat code J1.1). At the time of the survey these were in crop.

## Boundary features

- 4.2.1.6 Field boundaries consisted primarily of hedgerows, of which the majority are species-poor intact hedgerows (J2.1.2). However, species-poor defunct hedgerows (J2.2.2) are also present.
- 4.2.1.7 Species poor hedgerows (J2.1.2 and J2.2.2) were characterised by fewer than five woody species within a 30 m stretch and were typically dominated by hawthorn.

## Standing and running water

- 4.2.1.8 No watercourses (i.e. ditches and rivers, excluding ponds) were recorded during the 2021 EP1HS.

## **4.2.2 Protected species**

### Birds

- 4.2.2.1 No BoCC4 Red List bird species (Eaton et al 2015) were recorded during the 2021 survey. The disused barn at the landfall ([Figure 1](#)) was noted as remaining to be used by nesting barn owl *Tyto alba*, as per the 2019 EP1HS.
- 4.2.2.2 All hedgerows, trees and scrub within the 2021 EP1HS were noted as potentially providing suitable nesting habitat for protected, notable and common species of birds.
- 4.2.2.3 2019 survey results regarding over-wintering and breeding bird species are reported separately in [Annex 3.3: Onshore Ornithology - Wintering and Migratory Birds Survey Report](#) and [Annex 3.4: Breeding Bird Survey Report](#).

### Badger

- 4.2.2.4 Field survey results from 2019 and 2021 in relation to badgers are provided separately in [Annex 3.15: Badger Survey Report \(Confidential\)](#).

### Bats

- 4.2.2.5 All features (i.e. trees, buildings, structures) noted during the 2021 field survey were assessed from the ground level and using binoculars for cracks and splits, hereafter referred to as Potential Roost Features (PRFs). The presence of PRFs, or lack of, allows each feature to be categorised for their suitability to support roosting bats (in line with standard BCT guidelines (Collins 2016)).
- 4.2.2.6 No features were assessed as providing suitability to support roosting bats were recorded within the 2021 survey area to those already identified in 2019.
- 4.2.2.7 In addition to trees and structures (e.g. bridges and farm buildings), all linear features (e.g. hedgerows) within the 2021 surveyed areas were assessed in terms of their potential suitability for supporting commuting or foraging bats, in accordance with BCT guidelines (BCT 2016).

## Water vole and otter

- 4.2.2.8 No additional watercourses were recorded within the 2021 survey areas to those already identified in 2019.
- 4.2.2.9 Full survey results are contained within [Annex 3.6 Water Vole Survey Report](#) and [Annex 3.7 Otter Survey Report](#).

## Great crested newt

- 4.2.2.10 No additional waterbodies (ponds) were identified within the 2021 survey areas to those already identified in 2019.
- 4.2.2.11 Full survey results are contained within [Annex 3.5 Great Crested Newt Environmental DNA \(eDNA\) Survey Report](#).

## Reptiles

- 4.2.2.12 No additional areas suitable for common reptiles was recorded during the 2021 EP1HS to those already identified in 2019.

## Dormice

- 4.2.2.13 No suitable habitats for dormice was recorded during the 2021 EP1HS. Consequently, this species remains to be considered as absent and no further surveys will be required. As such this species has not been considered further in this report.

## Invertebrates

- 4.2.2.14 No evidence of suitable habitat to support significant populations of notable species of invertebrates was noted during the 2021 EP1HS. Consequently, no further surveys will be required and as such these species have not been considered further.

## Invasive non-native species

- 4.2.2.15 No invasive non-native species were recorded during the 2021 EP1HS.

## **4.3 Phase 2 Survey Requirements**

- 4.3.1.1 The findings from the 2021 EP1HS has not identified any changes or additional requirement for any Phase 2 species to those identified in [Table 10](#) of [Annex 3.1: Extended Phase 1 Habitat Survey Report](#).

## **5 Summary**

### **5.1 Overview**

- 5.1.1.1 The 2021 EP1HS recorded the following broad habitats:
- Semi-natural broadleaved woodland;
  - Dense/continuous scrub;
  - Arable land;
  - Areas of hardstanding (associated with existing roads, tracks and/or footpath);

- Species-poor intact hedgerows; and
- Species-poor defunct hedgerows.

5.1.1.2 Although additional areas of these habitats have been recorded in 2021, there are no additional Phase 2 species survey requirements to those presented in [Annex A6.3.1: Extended Phase 1 Habitat Survey Report](#). Further Phase 2 species specific surveys were identified and subsequently undertaken in 2019 or 2021 and the findings of which are provided in separate technical annexes and the information has not been repeated here.

5.1.1.3 Due to the mobility of animals, further surveys and/or pre-construction surveys will be required. Where these have been identified, they have been included in the outline Ecological Management Plan (oEMP) ([Volume F2, Chapter 3: Outline Ecological Management Plan](#)).

## 5.2 Pre-construction Mitigation Measures

5.2.1.1 No changes or additional mitigation measures following completion of the 2021 EP1HS have been identified. Therefore, the mitigation measures that will be incorporated to ensure no harm to a species or to their habitats occurs, as well as ensuring legal compliance is presented in [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and have not been repeated here. These measures are also presented in the oEMP ([Volume F2, Chapter 3: Outline Ecological Management Plan](#)).

## 6 Conclusions

6.1.1.1 A EP1HS was undertaken in June 2021 to record the habitats within those areas where access had not been granted in 2021 as well as recording the habitats within those areas where refinements have been made to the onshore Hornsea Four Order Limits since the 2019 survey. The results from the 2021 EP1HS, in combination with the 2019 EP1HS, provide a complete and comprehensive understanding of the existing conditions within the onshore Hornsea Four Order Limits.

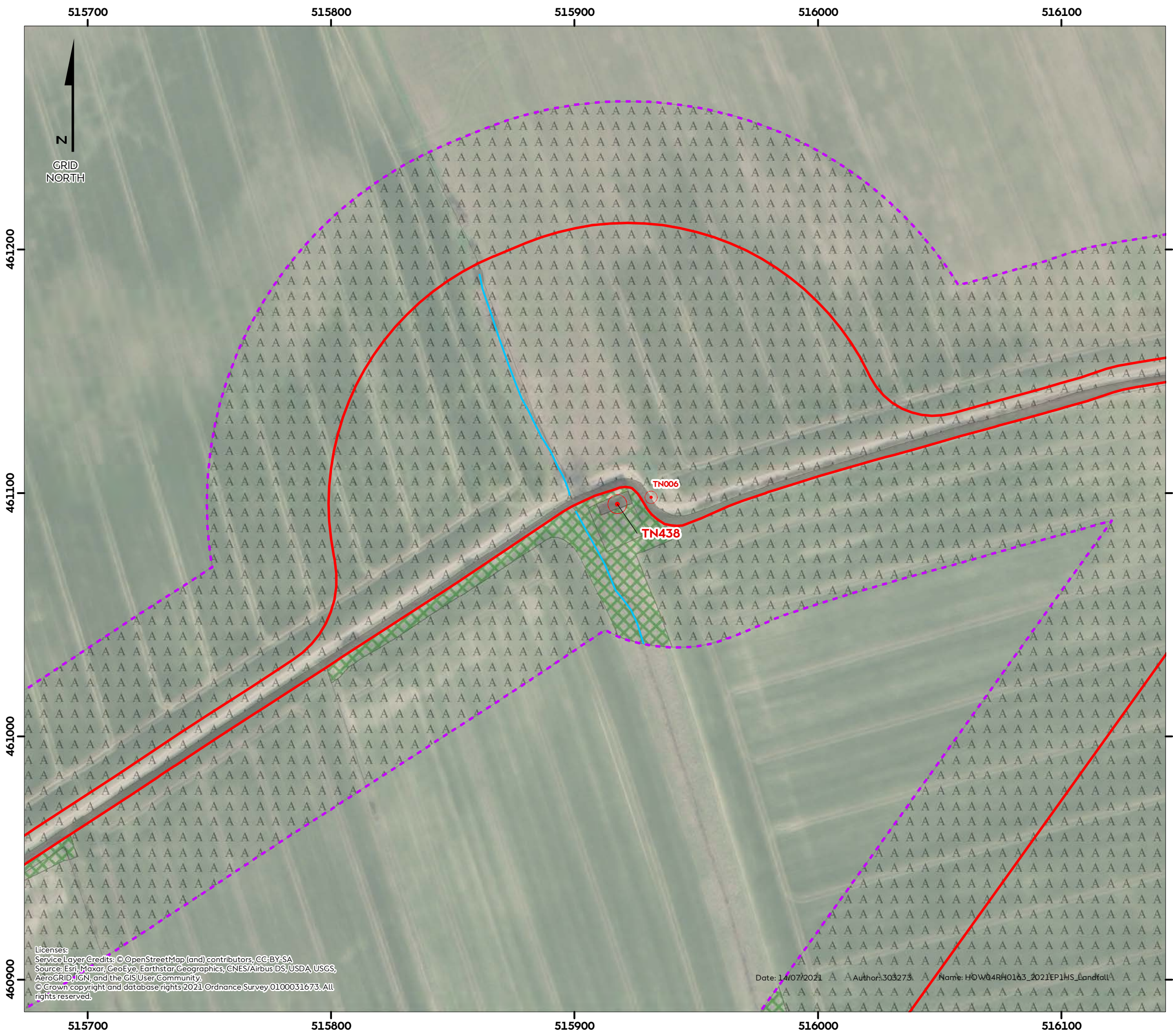
6.1.1.2 There are no changes or additional designated sites or records of legally protected/notable species to those identified in 2019 or 2020, and therefore remain as presented in [Annex 3.1: Extended Phase 1 Habitat Survey Report](#).

6.1.1.3 The Hornsea Four EP1HS survey area (both the 2019 and 2021) remains dominated by arable fields interspersed with field margin drains, larger streams and rivers, and areas of woodland and scrub. Field boundaries are typically composed of species poor intact hedges and species poor hedges with trees. Habitats present with higher biodiversity value include semi-natural and plantation woodlands, scrub, poor semi-improved grassland, water bodies and isolated trees.

6.1.1.4 Key features for protected and notable species have been identified within the Hornsea Four Order Limits and the findings from the 2021 EP1HS do not change those conclusions drawn from the 2019 EP1HS, and as presented in [Annex 3.1: Extended Phase 1 Habitat Survey Report](#). Further surveys have been undertaken within the appropriate survey periods during

2019 and 2021 in relation to these species and as agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8 April 2019 (ON-ECO-1.8).



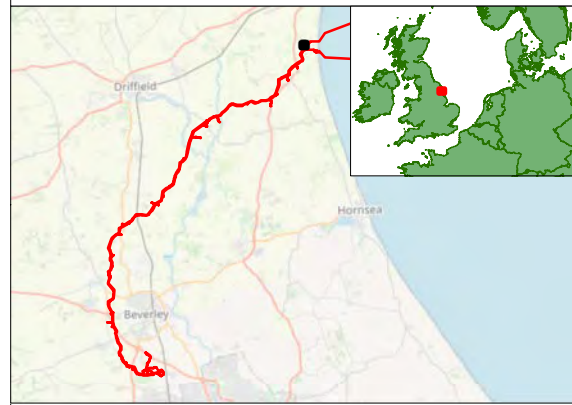


# Hornsea Four

## Figure 2

### 2021 EP1HS - Landfall

- Order Limits
- EPH1HS Survey Area
- GCN Study Area
- 2021 Phase 1 Habitat Survey**
- Target Notes
- Existing Phase 1 Habitat**
- Target Notes
- Standing Water
- Defunct Hedge - Species-poor
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid  
 Scale@A3: 1:1,500

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	First Issue for DCO	14/07/2021

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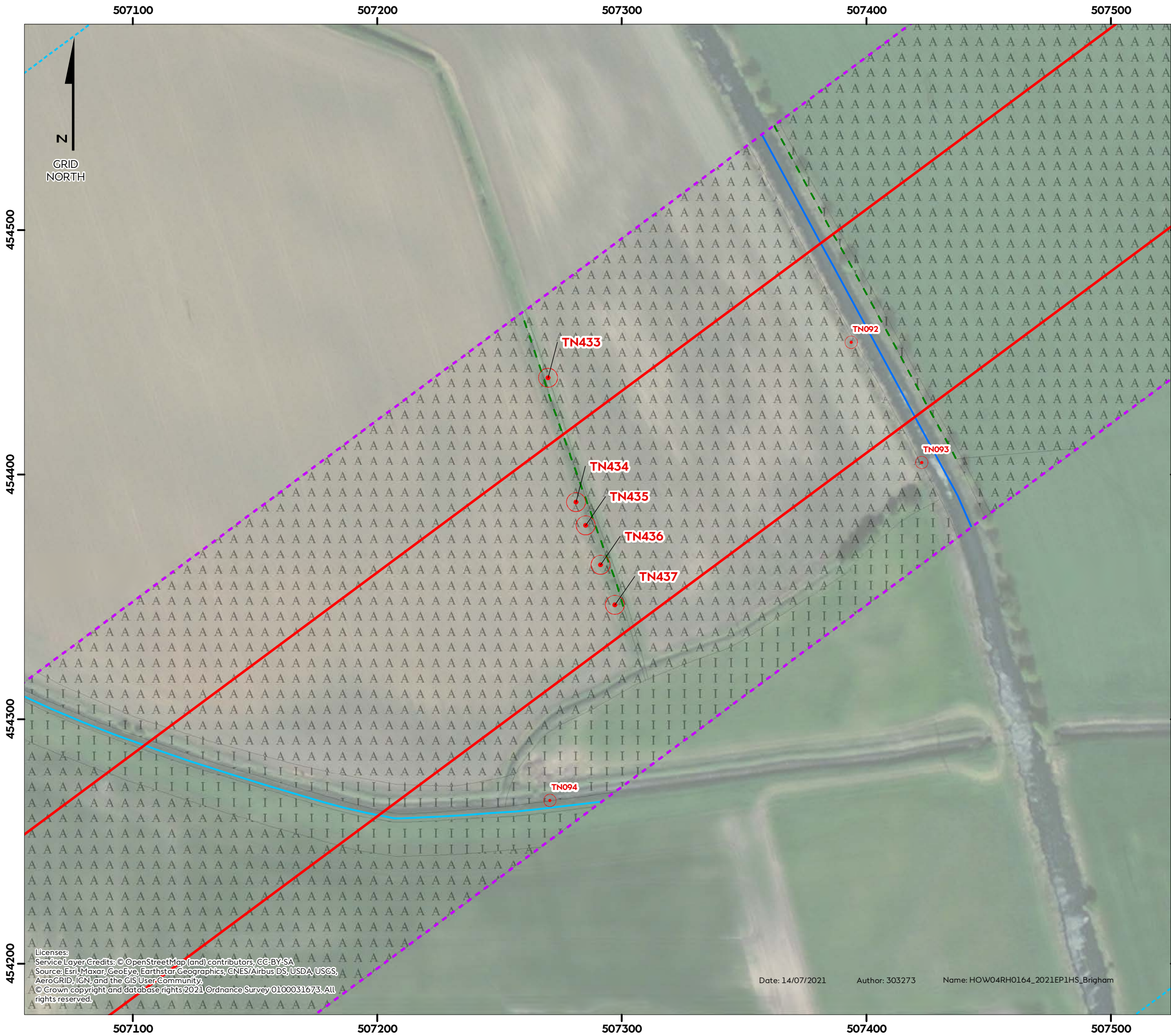
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Title: 2021 EP1HS - Landfall  
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# Hornsea Four

## Figure 3

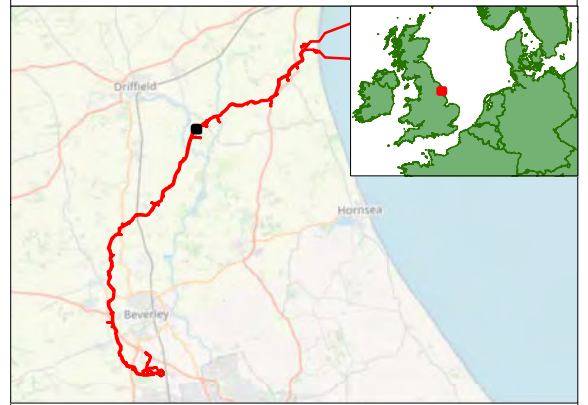
### 2021 EP1HS - Brigham



- Order Limits
- EPH1HS Survey Area
- GCN Study Area

#### 2021 Phase 1 Habitat Survey

- Target Notes
- Existing Phase 1 Habitat
- Standing Water
- Running Water
- Defunct Hedge - Species-poor
- | | | Improved Grassland
- A A A Arable



Coordinate system: British National Grid  
 Scale@A3: 1:1,500

0 30 60 Metres  
 0 30 60 90 Yards

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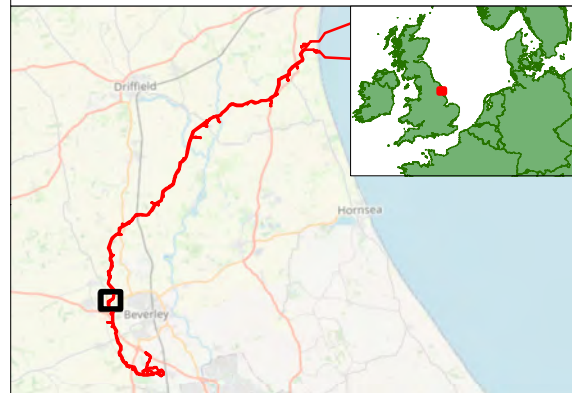


# Hornsea Four

## Figure 4

### 2021 EP1HS - Molescroft

- Order Limits
  - EPH1HS Survey Area
  - GCN Ponds
  - GCN Study Area
- 2021 Phase 1 Habitat Survey**
- Target Notes
  - Intact Hedge - Species-poor
  - Defunct Hedge - Species-poor
  - Dense / Continuous Scrub
  - Arable
- Existing Phase 1 Habitat**
- Target Notes
  - Intact Hedge - Species-poor
  - Defunct Hedge - Species-poor
  - Dense / Continuous Scrub
  - Arable




Coordinate system: British National Grid  
 Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

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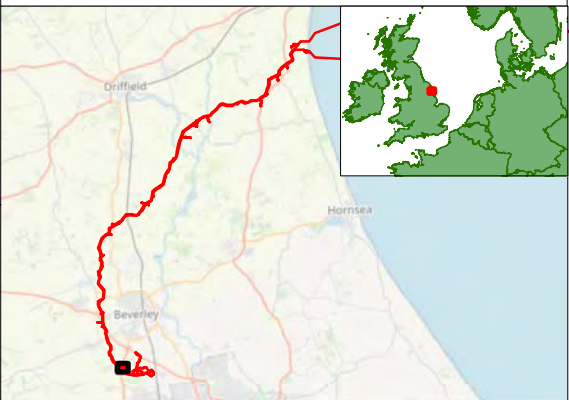


# Hornsea Four

## Figure 5

### 2021 EP1HS - Jock's Lodge

- Order Limits
  - EPH1HS Survey Area
  - GCN Study Area
- 2021 Phase 1 Habitat Survey**
- Target Notes
  - Intact Hedge - Species-poor
  - Semi-natural Broadleaved Woodland
  - Dense / Continuous Scrub
  - Arable
- Existing Phase 1 Habitat**
- Target Notes
  - Intact Hedge - Species-poor
  - Hedge and Trees - Native species-rich
  - Semi-natural Broadleaved Woodland
  - Dense / Continuous Scrub
  - Arable



Coordinate system: British National Grid  
 Scale@A3: 1:2,500

REV	REMARK	DATE
	First Issue for DCO	14/07/2021

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