FIVE ESTUARIES
OFFSHORE WIND FARM

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PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

VOLUME 3, CHAPTER 4: ONSHORE BIODIVERSITY AND NATURE CONSERVATION

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TABLES

FIGURES

DEFINITION OF ABBREVIATIONS AND ACRONYMS

Term	Definition
AIL	Abnormal Indivisible Load
AIS	Air insulated substation
ANG	Accessible Natural Greenspace
ARC	Amphibian and Reptile Conservation
ASNW	Ancient semi-natural woodland
BNG	Biodiversity Net Gain
BoCC	Birds of Conservation Concern
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute for Ecology and Environmental Management
CoCP	Code of Construction Practice
CC	County Council
CRoW Act	Countryside and Rights of Way Act 2000
CSZ	Core Sustenance Zone
EA	Environment Agency
ECC	Export Cable Corridor
EcIA	Ecological Impact Assessment
ECOW	Ecological Clerk of Works
EFC	Essex Field Club
EIA	Environmental Impact Assessment.
EPSL	European protected species licence
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
EWT	Essex Wildlife Trust
FLL	Functionally Linked Land
GCN	Great crested newt
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment.
INNS	Invasive non-native species
IUCN	International Union for the Conservation of Nature

Term	Definition
LBAP	Local biodiversity action plan
LDP	Local development plan
LEDPP	Landscape and Ecology Design Principles Plan
LEMP	Landscape and Ecological Management Plan
LONI	Letter of No Impediment
LVIA	Landscape and Visual Impact Assessment
LoWS	Local Wildlife Site
MDS	Maximum Design Scenario
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NF OWF	North Falls Offshore Wind Farm
NG	National Grid
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OLEMP	Outline Landscape and Ecological Mitigation Plan
OnSS	Onshore Substation
PAWS	Plantation on Ancient Woodland Site
PEA	Preliminary Ecological Appraisal
PEIR	Preliminary Environmental Information Report.
PINS	The Planning Inspectorate
PPEIRP	Pollution Prevention and Emergency Incident Response Plan
RSPB	Royal Society for the Protection of Birds
S41	Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SoS	Secretary of State
SuDS	Sustainable Drainage Systems
TBC	To be confirmed
TCC	Temporary Construction Compound
TJB	Transition Joint Bay

Term	Definition
TPC	Tendring Parish Council
TWT	The Wildlife Trusts
WeBS	Wetland Bird Survey
VE	The Project, Five Estuaries Offshore Wind Farm
VE OWFL	Five Estuaries Offshore Windfarm Limited.

GLOSSARY OF TERMS

Term	Definition
Cable Works TCC	Temporary Construction Compounds (TCC) associated with onshore cable works.
Compensation	Compensation describes measures taken to offset residual effects resulting in the loss of, or permanent damage to, ecological features despite mitigation. For example, it may take the form of replacement habitat or improvements to existing habitats.
Construction Substation Access Zone	The area which will contain final OnSS access route during construction.
East Anglia Connection Node Substation	The new NGET substation. This will be subject to a DCO application submitted by NGET.
Effect	Term used to express the consequence of an impact.
Expert Topic Group	Key stakeholders and consultees involved in the scoping and design process.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial, resulting from the activities associated with the construction, operation and maintenance, or decommissioning of the project.
Jointing pits	There will be jointing pits which will require separate, smaller cable-testing pits (known as link boxes) to allow for fault testing. These will consist of a manhole set in a concrete plinth at ground level. These link boxes will fit within the standard cable route width.
Maximum Design Scenario	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed.
Mitigation	Mitigation measures are commitments made by the project to reduce and/ or eliminate the potential for significant effects to arise as a result of the project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
Onshore Export Cable Corridor (onshore ECC)	At PEIR, the Onshore ECC is the wider cable corridor within which the preferred cable route is located. The Onshore ECC is typically approximately 60m wide, however some areas require a wider corridor (such as where trenchless crossing may take place)
Priority Habitat	Habitat listed under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006

Term	Definition
Priority Species	Species listed under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006
Red Line Boundary (RLB)	The extent of development including all works, access routes, Temporary Construction Compounds (TCCs), visibility splays and discharge points. For the Environmental Statement (ES) the refined RLB will become 'the proposed Order Limits'.
Study area	This is the 2 km zone around the RLB.
Substation zone	The area in which the final substation footprint will be located. The footprint will be confirmed between the PEIR and the ES.
Substation search area	The area in which the final substation construction compound footprint and the final OnSS will be located.
Survey area	Except where stated otherwise, this is the 100 m zone around the RLB.
Waterbirds	The definition of waterbirds follows that used by the Wetland Bird Survey (WeBS) and includes wildfowl (ducks, geese and swans), waders, rails, divers, grebes, cormorants and herons.

4 ONSHORE BIODIVERSITY AND NATURE CONSERVATION

4.1 INTRODUCTION

4.1.1 This chapter considers the likely significant effects associated with the onshore elements of the Five Estuaries Offshore Wind Farm (VE) on onshore biodiversity and nature conservation receptors (including intertidal birds). It considers the construction, operational and decommissioning onshore activities. At this stage, the assessment is preliminary as many ecological baseline surveys are either ongoing or have not yet been analysed and reported at the time of writing (this includes badgers, bats, otter and water vole, reptiles and dormice). This chapter has therefore been prepared based upon desk study information, habitat survey results, great crested newt (GCN) *Triturus cristatus* survey results and the results of bird surveys completed to date, alone. Information from the remaining baseline surveys will be incorporated at the ES stage.

4.1.2 This chapter has been authored by Jess Colebrook, Principal Ecologist, CEnv, MCIEEM and subject to technical review by Duncan Watson, Technical Director, CEnv, MCIEEM. Both Jess and Duncan work for SLR Consulting Ltd and each have in excess of 20 years' professional ecological experience.

4.1.3 Relevant technical appendices that should be read alongside the chapter include:

- Volume 5, Annex 4.1: Preliminary Ecological Appraisal Report;
- Volume 5, Annex 4.2: Habitat and Hedgerow Survey Report, N of A120;
- Volume 5, Annex 4.3: Habitat and Hedgerow Survey Report, S of A120;
- Volume 5, Annex 4.4: Great Crested Newt Survey Report, N of A120;
- Volume 5, Annex 4.5: Great Crested Newt Survey Report, S of A120;
- Volume 5, Annex 4.6: Wintering Bird Survey (Landfall Locations) 2021/22;
- Volume 5, Annex 4.7: North Falls Offshore Wind Farm Holland Haven Marshes SSSI and adjacent land NVC Survey 2021
- Volume 5, Annex 4.8: North Falls Offshore Wind Farm Extended Phase 1 Habitat Survey 2021;
- Volume 5, Annex 4.9: North Falls Offshore Wind Farm Holland Haven Marshes SSSI: Survey and Assessment of Aquatic and Terrestrial Invertebrates 2021;
- Volume 5, Annex 4.10: North Falls Offshore Wind Farm Onshore Landfall Area: 2020/21 Non-breeding Bird Surveys;
- Volume 5, Annex 4.11: North Falls Offshore Wind Farm Onshore Landfall Area: 2021/22 Non-breeding Bird Surveys;
- Volume 5, Annex 4.12: North Falls Offshore Wind Farm Onshore Cable Route: Non-breeding Bird Surveys 2021-22;
- Volume 5, Annex 4.13: North Falls Offshore Wind Farm Onshore Landfall Area: Breeding Bird Surveys 2021;
- Volume 5, Annex 4.14: Five Estuaries Offshore Wind Farm Onshore Biodiversity Net Gain Approach;
- Volume 5, Annex 4.15: Statutory Designated Sites Qualifying/ Notified Features

- Volume 7, Report 3: Draft Code of Construction Practice (CoCP); and
- Volume 7, Report 5: Landscape and Ecology Design Principles Plan (LEDPP).

4.1.4 It is noted that Annexes 4.7 to 4.13 contain survey data collected on behalf of North Falls Offshore Wind Farm. However, the surveys are also relevant to VE and North Falls Offshore Wind Farm Ltd has granted permission for the reports to be used to inform this assessment.

4.1.5 The chapter has also been informed by the following other PEIR chapters:

- Volume 3, Chapter 1: Onshore Project Description;
- Volume 3, Chapter 2: Landscape and Visual Impact Assessment (LVIA);
- Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk;
- Volume 3, Chapter 10: Noise; and
- Volume 3, Chapter 11: Air Quality.

4.1.6 Other ecological receptors which are covered in separate chapters are as follows:

- Volume 2, Chapter 4: Offshore Ornithology;
- Volume 2, Chapter 5: Benthic and Intertidal Ecology;
- Volume 2, Chapter 6: Fish and Shellfish; and
- Volume 2, Chapter 7: Marine Mammals.

4.2 STATUTORY AND POLICY CONTEXT

4.2.1 This section identifies the legislation and policy that has informed the assessment of effects with respect to Onshore Biodiversity and Nature Conservation. A summary of the key provisions within the relevant legislation and policy is provided in Table 4.1.

4.2.2 Further information on policies relevant to the EIA and their status is provided in Volume 1, Chapter 2: Policy and legislative context.

NATIONAL LEGISLATION

CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2017 (AS AMENDED)

4.2.3 The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) are one of the pieces of domestic law that transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) into English and Welsh law. These regulations were last amended in 2019 to make them operable from 1 January 2021 despite the UK's withdrawal from the European Union (EU).

4.2.4 The Habitats Regulations cover the requirements for protecting sites that are internationally important for threatened habitats and species and set out a legal framework for species requiring strict protection.

RAMSAR CONVENTION

4.2.5 The Convention on Wetlands of International Importance especially as Waterfowl Habitat ('Ramsar Convention' or 'Wetlands Convention') was adopted in Ramsar, Iran in February 1971 and came into force in December 1975. It provides the only international mechanism for protecting sites of global importance and is thus of key conservation significance.

4.2.6 The UK ratified the Ramsar Convention and designated its first Ramsar Sites in 1976. The designation of UK Ramsar Sites has generally been underpinned through prior notification of these areas as Sites of Special Scientific Interest (SSSI). Government and the devolved administrations have also issued policy statements relating to Ramsar Sites which extend to them the same protection at a policy level as Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

WILDLIFE AND COUNTRYSIDE ACT 1981

4.2.7 The Wildlife and Countryside Act 1981 consolidated and amended existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Birds Directive. The Wildlife and Countryside Act is divided into four parts.

- Part I is concerned with the protection of wildlife;
- Part II relates to the countryside and national parks (and the designation of protected areas);
- Part III covers public rights of way; and
- Part IV deals with miscellaneous provisions of the Act.

PROTECTION OF BADGERS ACT 1992

4.2.8 The Protection of Badgers Act 1992 makes it illegal to kill, injure or take a badger *Meles meles* or to intentionally or recklessly interfere with a badger sett. Sett interference includes disturbing badgers whilst they are occupying a sett or obstructing access to it.

HEDGEROW REGULATIONS 1997

4.2.9 These regulations, enforced under the Environment Act 1995, restrict the removal of hedgerows. To be in protected under the regulations, a hedgerow must be at least 30 years old and over 20 m long and in addition must fulfil one of a number of criteria set out in the legislation.

ENVIRONMENT ACT 2021

4.2.10 The Environment Act has wide ranging provisions including those around:

- Environmental governance;
- Environmental regulation;
- Waste and resource efficiency;
- Air quality and environmental recall;
- Water;
- Nature and biodiversity; and

- Conservation covenants.

4.2.11 Schedule 15 of the Act is of particular relevance, and introduces "biodiversity gain in nationally significant infrastructure projects (NSIP)". The part of the Environment Act relating to biodiversity net gain (and the associated amendments to the Planning Act) is not yet in force, with the parts relating to NSIPs unlikely to commence until November 2025.

THE WATER ENVIRONMENT (WATER FRAMEWORK DIRECTIVE) (ENGLAND AND WALES) REGULATIONS 2017

4.2.12 Part 3 of the regulations provide for the protection of areas of habitats or species where maintenance of the status of water is an important factor. Under the regulations additional consideration may need to be given to sites in the form of a Water Framework Directive (WFD) assessment where a project lies in proximity to a water body or to linked water bodies which could be affected. This includes consideration of whether water bodies are WFD receptors, in particular those of high status or which have high status morphology.

NATURAL ENVIRONMENT & RURAL COMMUNITIES (NERC) ACT 2006

4.2.13 Section 40 of the NERC Act 2006 places a duty on public authorities to have regard to the purpose of conserving biodiversity in the exercise of their functions. Public authorities include government departments, local authorities and statutory undertakers.

4.2.14 Section 41 of the Act requires the publication of a list of habitats and species which are of principal importance for the purpose of conserving biodiversity. The Section 41 list is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.

NATIONAL PLANNING POLICY

NATIONAL POLICY STATEMENTS

4.2.15 The National Policy Statements (NPS) are a series of decision-making documents to guide decision making on Nationally Significant Infrastructure Projects (NSIP). Decisions under the Planning Act 2008 must be made in accordance with the relevant NPS where one is in force, and this assessment therefore makes explicit reference to the relevant NPS requirements.

4.2.16 Those relevant to this assessment are limited to Overarching National Policy Statement for Energy (EN-1).

4.2.17 Guidance specific to offshore wind farms is provided in NPS for Renewable Energy Infrastructure (EN-3), however the guidance regarding biodiversity relates to offshore impacts; for more generic ecology and biodiversity effects EN-3 refers to the relevant sections of EN-1. Similarly, guidance in relation to electricity network projects is provided within NPS for Electricity Networks Infrastructure (EN-5), however, with regard to biodiversity considerations for non-overhead line projects, EN-5 refers to relevant sections of EN-1.

4.2.18 In addition to the current NPS, draft NPSs were consulted upon in September to November 2021. The draft NPSs have been reviewed to determine the emerging expectations and changes from previous iterations of the NPSs. This includes the Draft Overarching NPS EN-1 (Department for Business Energy, and Industrial Strategy (DBEIS), 2021a), draft EN-3 (DBEIA, 2021b) and draft EN-5 (DBEIS, 2021c).

UK (ENGLAND) GOVERNMENT POLICY

NATIONAL PLANNING POLICY (ENGLAND) 2021

4.2.19 The National Planning Policy Framework (NPPF) sets out guidance for local planning authorities and decision-makers in how to apply planning policies when drawing up plans and making decisions about planning applications. Along with Government Circular 06/05, the broad policy objectives in relation to the protection of biodiversity and geological conservation in England through the planning system are set out.

4.2.20 The planning practice guidance for the Natural Environment explains key issues in implementing policy to protect and enhance the natural environment, including local requirements.

GOVERNMENT CIRCULAR 06/05

4.2.21 This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It complements the national planning policy in the National Planning Policy Framework and the relevant planning practice guidance.

LOCAL PLANNING POLICY

TENDING DISTRICT LOCAL PLAN 2013-2033 AND BEYOND – NORTH ESSEX AUTHORITIES' SHARED STRATEGIC SECTION 1, ADOPTED IN JANUARY 2021 AND SECTION 2 ADOPTED IN JANUARY 2022

4.2.22 Tendring District Local Plan guides planning decisions in the Tendring district. Four policies within the plan are of particular relevance to biodiversity and nature conservation, see Table 4.1 for details.

TENDRING INFRASTRUCTURE DELIVERY PLAN 2017

4.2.23 Tendring Infrastructure Delivery Plan includes a section on green infrastructure which is of relevance to this chapter. Refer to Table 4.1 for details.

TENDRING OPEN SPACES STRATEGY 2009

4.2.24 Tendring Open Spaces Strategy includes recommendations for natural and semi-natural greenspace that are of relevance to this chapter, refer to Table 4.1 for details.

ESSEX GREEN INFRASTRUCTURE STRATEGY 2020

4.2.25 This document seeks to champion high quality green space and green infrastructure in Essex, via delivery of seven main objectives several of which are pertinent to this chapter. Refer to Table 4.1 for details.

ESSEX BIODIVERSITY ACTION PLAN 1999

4.2.26 Essex Biodiversity Action Plan appears not to have been updated since 1999. It includes actions for species and habitats of conservation concern within the county.

4.3 GUIDANCE

4.3.1 The ecological impact assessment (EcIA) presented in this chapter has been carried out in accordance with the principles contained within:

- 'Guidelines for Preliminary Ecological Appraisal', 2nd edition, (CIEEM, 2017);
- 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2'. (CIEEM, 2022); and
- BS42020: Biodiversity – Code of Practice for Planning and Development.

4.3.2 Additional guidance in respect of the survey and/ or evaluation of habitats or species are referenced in the associated technical appendices and/ or the Method sections (Section 4.5 below and Annexes 4.1 – 4.14).

Table 4.1: Legislation and policy context

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
Legislation		
Conservation of Habitats and Species Regulations 2017 (as amended)	Protection of Special Protection Areas (SPAs) and Special Areas of Conservation (SAC). Protection of certain animal species and their places or rest or shelter. Protection of certain plant species.	The relevant provisions of the Habitats Regulations are addressed in Sections 4.5, 4.8, 4.10 and Sections 4.11-4.14.
Wildlife and Countryside Act 1981 (as amended)	Protection of Sites of Special Scientific Interest (SSSIs). Protection of certain animals and plant species and their place of shelter or protection. Prohibition of allowing certain plant species to grow or spread in the wild.	The relevant provisions of the Wildlife and Countryside Act are addressed in Sections 4.5, 4.8, 4.10 and Sections 4.11-4.14.
Protection of Badgers Act 1992	Protection of badgers from killing and injury, and badger setts from disturbance.	The relevant provisions of the Protection of Badgers Act are addressed in Sections 4.5, 4.8, 4.10 and sections 4.11-4.14.
Hedgerow Regulations 1997	Protection of hedgerows deemed "important" under ecological or historical criteria set out in the Regulations.	The relevant provisions of the Hedgerow Regulations addressed in Sections 4.5, 4.8, 4.10 and sections 4.11-4.14.
Environment Act 2021	Schedule 15 of the Act introduces "biodiversity gain in nationally significant infrastructure projects". These changes will be enactment through subsequent secondary legislation or regulations.	The relevant provisions of the Environment Act are addressed in Sections 4.5, 4.6, 4.8, 4.10 and Sections 4.11-4.14.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	Part 3 of the Regulations provide for the protection of areas of habitats or species where maintenance of the status of water is an important factor.	The relevant provisions of the Water Framework Directive are addressed in Sections 4.5, 4.8, 4.10 and Sections 4.11-4.14.
Natural Environment	Section 40 of the NERC Act 2006 places a duty on public authorities to	The relevant provisions of the NERC Act are addressed in

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
& Rural Communities (NERC) Act 2006	have regard to the purpose of conserving biodiversity in the exercise of their functions. Section 41 of the Act requires the publication of a list of habitats and species which are of principal importance for the purpose of conserving biodiversity. The Section 41 list is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.	Sections 4.5, 4.8, 4.10 and Sections 4.11-4.14.
National Planning Policy		
NPS EN-1	NPS EN-1 notes in Paragraph 4.3.1 that prior to an order to grant development consent, due consideration must be given as to whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects. Paragraph 5.3 of NPS EN-1 discusses the generic biodiversity and geological conservation effects associated with energy infrastructure, recognising the need to protect the most important biodiversity and geological conservation interests. Where the development is subject to EIA, the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity (NPS Section 5.3.3). The EIA should illustrate where the project has been able to use	Effects on internationally, nationally and locally designated sites, on protected species and on habitats and other species identified as being of importance for the conservation of biodiversity are assessed in Sections 4.11-4.14. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement, will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application.

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	opportunities to conserve and enhance biodiversity interests (Section 5.3.4) and should aim to avoid significant harm through the use of mitigation and considering reasonable alternatives. Where significant harm cannot be avoided, then appropriate compensation measures should be provided (Section 5.3.7).	
Draft NPS EN-1	Draft NPS EN-1 notes in Paragraph 4.2.9 that prior to an order to grant development consent, due consideration must be given as to whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects. Paragraph 4.2.10 goes on to describe the steps and further information the applicant should provide where the proposed development is likely to adversely impact the integrity of	Effects on internationally, nationally and locally designated sites, on protected species and on habitats and other species identified as being of importance for the conservation of biodiversity are assessed in Sections 4.11-4.14. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement, will be developed once ongoing baseline surveys

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	Habitats Regulation Assessment (HRA) sites.	have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14: Biodiversity Net Gain Approach Note.
	Paragraph 5.4.3 sets out that where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally, and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.	
	The draft NPS EN-1 encourages the applicant to consider how proposals can contribute to Biodiversity Net Gain (BNG) in Paragraph 5.4.4, noting that the scope of potential gains is dependent on the type, scale and location of each project. Paragraph 5.4.17 of the draft NPS states that: *'Proposals should also consider any opportunities to maximise the restoration, creation, and enhancement of wider biodiversity. Consideration should be given to improvements to, and impacts on, habitats and species in, around and beyond developments, for wider ecosystem services and natural capital benefits, beyond those under protection and identified as being of principal importance. This may include considerations and opportunities identified through Local Nature Recovery Strategies, and national goals and targets set through the government's strategy for nature for example.'* In addition, Paragraph 5.4.19 states that: *'Applicants should consider producing and implementing a Biodiversity Management Strategy as part of their*	

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	development proposals. This could include provision for biodiversity awareness training to employees and contractors so as to avoid unnecessary adverse impacts on biodiversity during the construction and operation stages.'	
UK (England) Government Policy		
NPPF	Specific policies relating to habitats and biodiversity are set out in Paragraphs 174 and 179-182 of the NPPF. Paragraph 174 states that: *'Planning policies and decisions should contribute to and enhance the natural and local environment by:* *a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);* *b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;* *c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;* *d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;* *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water*	Designated sites, protected species, and habitats and other species identified as being of importance for the conservation of biodiversity, are identified in Section 4.8. Effects upon important ecological features are assessed in Sections 4.11-4.14. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14: Biodiversity Net Gain Approach Note.

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and *f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate'.* Paragraph 179 states that: *'To protect and enhance biodiversity and geodiversity, plans should:* *a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and* *b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.'* Paragraph 180 of the NPPF states that: *'When determining planning applications, local planning authorities should apply the following principles:* *a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful*	

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; *b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;* *c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and* *d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.'* Paragraphs 181-182 relate to European sites (referred to in the NPPF as habitats sites) and state: *'The following should be given the same protection as habitats sites:* *a) potential Special Protection Areas and possible Special Areas of Conservation;*	

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	b) listed or proposed Ramsar sites; and *c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.* *The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.'*	
Govt Circular 06/05	This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It includes sections related to internationally designated sites, nationally designates sites, habitats and species as well as other duties by planning authorities. The circular makes clear that: *'4. Planning authorities should follow the procedures ….. for SPAs, cSACs, and SACs, and, more generally, should have regard to the [EC Birds and Habitats] Directives in the exercise of their planning functions in order to fulfil the requirements of the Directive in respect of the land use planning system.* *61. The Government expects all section 28G authorities, including planning authorities, to:*	The relevant provisions of the Habitats Regulations (which implement the EC Directives in the UK) are addressed in Sections 4.5, 4.8, 4.10 and Sections 4.11-4.14. Designated sites, protected species, and habitats and other species identified as being of importance for the conservation of biodiversity, are identified in Section 4.8. Effects upon important ecological features are assessed in Sections 4.11-4.14.

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	a) apply strict tests when carrying out any functions within or affecting SSSIs, to ensure that they avoid or at least minimise adverse effects; *b) adopt the highest standards of management in relation to SSSIs in their ownership, and to take appropriate action to prevent damage by third parties; and* *c) as owners or otherwise to take positive steps, wherever possible, to conserve and enhance the special interest features of a SSSI where their activities may be affecting it, or as opportunities arise in the exercise of their functions. English Nature will advise on a case by case basis as to opportunities for enhancement.* *99. It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted. However, bearing in mind the delay and cost that may be involved, developers should not be required to undertake surveys for protected species unless there is a reasonable likelihood of the species being present and affected by the development.'*	
Local Planning Policy		
Tending District Local	**Policy SP7 Place Shaping Principles** includes the following	Designated sites, protected species, and habitats and other

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
Plan 2013-2033 and Beyond – North Essex Authorities' Shared Strategic Section 1, adopted in January 2021 and Section 2 adopted in January 2022	place shaping principles that relate to biodiversity, and that all new development should reflect: *'Incorporate biodiversity creation and enhancement measures;* *Provide an integrated and connected network of biodiverse public open space and green and blue infrastructure, thereby helping to alleviate recreational pressure on designated sites; and* *Include measures to promote environmental sustainability including addressing energy and water efficiency, and provision of appropriate water and wastewater and flood mitigation measures including the use of open space to provide flora and fauna rich sustainable drainage solutions.'* **Policy HP 3 Green Infrastructure**, states that all development must be designed to include and protect and enhance existing Green Infrastructure in the local area, as appropriate. It goes on to state that: *'Green Infrastructure as identified on the Policy Map, will be protected, managed and where necessary enhanced by:* *a) Managing development to secure a net gain in green infrastructure;* *b) Supporting investment priority projects set out in the Green Infrastructure Delivery Plan;* *c) Not permitting development that compromises the integrity of the overall Green Infrastructure networks;*	species identified as being of importance for the conservation of biodiversity, are identified in Section 4.8. Effects upon important ecological features are assessed in Sections 4.11-4.14. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	d) Investing in enhancement and restoration where opportunities exist; and *e) Using developer contributions to facilitate improvements to their quality and accessibility.'* And that: *New Green Infrastructure should incorporate semi-natural habitats and provide net gains in biodiversity wherever possible. The long-term management of assets should include biodiversity recording/ monitoring to verify/ ensure the ecological integrity of GI networks. Green Infrastructure should, where appropriate, include access for the widest range of user groups.'* **Policy PPL3 The Rural Landscape**, includes specific reference that the Council will protect the rural landscape and refuse planning permission for any proposed development which would cause overriding harm to its character or appearance, including (but not limited to) estuaries, rivers and undeveloped coast and native hedgerows, trees and woodlands. **PPL 4 Biodiversity and Geodiversity** is the most directly relevant policy to this chapter, and its entire content applies. To summarise, it requires that statutory designated sites be protected from development likely to have an adverse impact, that there should be no significant impacts on protected species and that schemes should consider the preservation, restoration or re-creation of priority habitats, ecological networks and the protection and	

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	recovery of protected species populations. Sites designated for their local importance to nature conservation, including Local Wildlife Sites (LoWS), Ancient Woodlands, Protected Verges and aged or veteran trees will be protected from development likely to have an adverse impact on such sites or features. Proposals for enhancement of special interest and features will be supported, subject to other material planning considerations. Where new development would harm biodiversity or geodiversity, planning permission will only be granted in exceptional circumstances, where the benefits of the development demonstrably outweigh the harm caused and where adequate mitigation measures are included, to ensure no net loss, and preferably a net gain, in biodiversity. Proposals for new infrastructure and major development should consider the potential for enhanced biodiversity, appropriate to the site and its location, including, where appropriate, within Green Infrastructure. If protected species are present, a suitable mitigation plan will be required prior to planning permission being granted.	
Tendring Infrastructure Delivery Plan 2017	The delivery plan includes a chapter on Green Infrastructure and Open Space which notes that existing access to Accessible Natural Green Space (ANG) is poor in Tendring district, when compared against standards promoted by Natural England and Essex Wildlife Trust. It goes on to note that provision will	Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that

Legislation/ policy	Key provisions of relevance to this assessment	Section where key provisions addressed
	come forward as part of the comprehensive master planning of development sites.	will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network.
Essex Green Infrastructure Strategy 2020	The Green Infrastructure Objectives include the following which are pertinent to this chapter: *'Protect existing green infrastructure, especially designated sites;* *Improve existing green infrastructure so it's better functioning for people and wildlife;* *Create more high quality green infrastructure, especially in areas of deficiency; and* *Improve the connectivity of green infrastructure for people and wildlife.'*	Designated sites, protected species, and habitats and other species identified as being of importance for the conservation of biodiversity, are identified in Section 4.8. Effects upon important ecological features are assessed in Sections 4.11-4.14. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.

4.4 CONSULTATION AND SCOPING

4.4.1 To date, consultation with regards the scope of the EcIA has taken place via the Scoping Report (VEOWFL, 2021), via the VE Evidence Plan (Onshore Ecology Expert Topic Group (ETG)) process.

4.4.2 A Scoping Opinion for VE was sought from the Secretary of State (SoS) which included consultation responses from Natural England (NE), Environment Agency (EA), Essex County Council (Essex CC), Little Clacton Parish Council, Tendring Parish Council (TPC) (The Planning Inspectorate (PINS), 2021) that were relevant to this chapter. This included responses to the proposed assessment methodology for further consideration.

4.4.3 To date, the ETG consultation process has comprised the provision of technical papers on proposed methodology, provision of the Preliminary Ecological Appraisal (PEA) report (Volume 5, Annex 4.1), provision of summary of results following completion of surveys and initial discussion regarding the approach to biodiversity net gain (BNG) assessment with RSPB, EA, TDC, NE, Essex CC and Essex Wildlife Trust (EWT). Onshore Ecology ETG meetings were held on 18 May 2021 (pre-Scoping), 26 April 2022 (post Scoping) and 22 November 2022 (pre-PEIR).

4.4.4 Table 4.2 provides a summary of relevant consultation comments received to date relating to onshore biodiversity and nature conservation, and associated responses.

Table 4.2: Summary of consultation relating to onshore biodiversity and conservation

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
PINS Scoping Opinion, November 2021	*'The Inspectorate considers that there is insufficient evidence to predict that significant transboundary effects will not arise and does not agree that this matter can be scoped out of the assessment at this stage. Accordingly, the ES should include an assessment of these matters or information demonstrating the absence of LSE.'*	Transboundary effects are assessed in Section 4.16.
PINS Scoping Opinion, November 2021	*'The ES must provide clear justification as to how the final study area reflects the zone of influence of the Proposed Development.'*	The important ecological features that may be impacted by the project and the extent of the study areas (which vary depending upon the feature affected) have been agreed through the scoping and evidence plan process which are described within this table and in Sections 4.5 and 4.6.
PINS Scoping Opinion, November 2021	*'The Applicant should ensure that the desk-based assessment is as comprehensive as possible.'*	Full details of the data sources used for the desk-based assessment are provided in Section 4.5.
PINS Scoping Opinion, November 2021	The ES should include candidate Local Wildlife Sites where significant effects are likely.	No candidate Local Wildlife Sites have been identified as part of the desk study, or through the evidence plan process.
PINS Scoping Opinion, November 2021	*'The ES should explain why the approach to identifying survey sites for arable weeds can be considered robust and if possible include evidence of agreement with relevant stakeholders.'*	The survey scope for habitats and species has been agreed with relevant stakeholders through the scoping and evidence plan process which is described within this table and in Sections 4.5 and 4.6.
PINS Scoping Opinion, November 2021	*'The Inspectorate considers that in addition to identifying the location of ancient woodland, the ES should also identify the locations of veteran trees through appropriate desk and, where necessary, field-*	Veteran trees have been included in the assessment process, as described within this table and in Section 4.6.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	based survey. The ES should assess the effects of the Proposed Development on veteran trees where significant effects are likely to occur.'	
PINS Scoping Opinion, November 2021	*'The ES should explain how the indirect effects on ecological receptors have been identified and assessed.'*	The identification of the potential for indirect effects on ecological receptors has been agreed with relevant stakeholders through the scoping and evidence plan process. Further details are described within this table and in Sections 4.5, 4.6, Table 4.3, Table 4.4, Table 4.10 and Section 4.11.
PINS Scoping Opinion, November 2021	*'Potential significant effects from habitat fragmentation should be scoped into the assessment where significant effects are likely to occur.'*	Potential effects from habitat fragmentation are included within Table 4.10, Section 4.11 and Section 4.14.
PINS Scoping Opinion, November 2021	*'The ES must describe all the individual forms of damage identified which would lead to significant effects on designated sites.'*	Designated sites are identified in Section 4.8. Effects upon designated sites are assessed in Sections 4.11-4.14.
PINS Scoping Opinion, November 2021	The impact of HDD or similar trenchless methods should be addressed within the ES.	Effects upon important ecological features, including those arising from HDD or similar trenchless methods are assessed in Sections 4.11-4.14.
PINS Scoping Opinion, November 2021	The Inspectorate considers that there is potential for effects on aquatic species and watercourses, *'particularly as a result of watercourse crossings through changes to topography, channel morphology and flow during construction. These effects should be assessed in the ES where significant effects would arise.'*	Designated sites, protected species, and habitats and other species identified as being of importance for the conservation of biodiversity, are identified in Section 4.8; these include certain aquatic species and watercourses. Effects upon important ecological features are assessed in Sections 4.11-4.14.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
PINS Scoping Opinion, November 2021	*'Mitigation measures should aim to maintain the movement of bat species across the wider landscape and avoid leaving any population isolated.'*	Embedded mitigation measures are set out in Section 4.10 and additional mitigation measures for bats during construction are set out in Section 4.11. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network, and that will facilitate bat movement across the landscape.
PINS Scoping Opinion, November 2021	The ES should provide a rationale and a justification as to why the approach of using aerial imagery to prepare an initial habitat map followed by ground truthing provides a robust baseline.	The approach to habitat survey has been agreed with relevant stakeholders through the scoping and evidence plan process. Further details are described within this table and in Sections 4.5 and 4.6. Aerial imagery has been relied upon only where access for survey has not proved possible, as described in Sections 4.5 and 4.7 and shown on .
PINS Scoping Opinion, November 2021	*"The Scoping Report refers to wintering bird surveys being carried out in agricultural fields known to support or with potential to support key species located within the Area of Search plus*	The approach to wintering bird survey has been agreed with relevant stakeholders through the scoping and evidence plan process. Further details are described within

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	250m. No explanation is given as to why a 250m buffer is considered to be sufficient. The wintering bird surveys should extend to a 400 m buffer as advised by NE unless otherwise agreed with relevant stakeholders.'	this table and in Sections 4.5 and 4.6. Survey data for a 400 m buffer from the RLB has been gathered, except in a few locations identified on Figure 4.1 and detailed in Section 4.7.
PINS Scoping Opinion, November 2021	*'The Inspectorate notes that NE has highlighted the existence of a district level licensing scheme in Essex for great crested newts (GCN).* *'In the event that the Applicant chooses to pursue this, it would still be necessary to include information about effects on GCN in the ES.'*	The results of surveys for GCN are provided in Section 4.8. Effects upon important ecological features, including GCN, are assessed in Sections 4.11-4.14.
EA Scoping Opinion, November 2021	*'We have previously highlighted the residual risks of using HDD for cable laying under watercourses and designated sites. Leaks present a very real long term threat to water quality and key habitats and their biodiversity. Landfall through the Holland Haven Marshes SSSI may be a complex location to achieve the ideal safe drilling through impermeable geology and this will need careful consideration. All watercourse crossings will also need to be carefully planned to be absolutely safe.'*	Details in respect of potential watercourse crossings are provided in Volume 3 Chapter 1. Potential impacts to water quality are assessed in Volume 3 Chapter 6. Effects upon important ecological features as a result of the use of HDD or other trenchless techniques are assessed in Sections 4.11-4.14.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'In accordance with Regulation 14 of the EIA Regulations, the ES should provide a statement about the relevant expertise or qualifications of the competent experts involved in its preparation.'*	Details for the relevant expertise or qualifications of the experts involved in the preparation of this ES chapter are provided in section 4.1.2. For details of the staff who undertook ecological baseline surveys used to inform this chapter,

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
		please refer to the technical appendices at Volume 5 Annex 4.1 – 4.14.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'Where ecological impacts are scoped out of the VE EIA, it will be necessary to also provide sufficient information on non-significant impacts on protected and Priority species and habitats at DCO submission either in a non-EIA chapter or separate documentation.'*	The important ecological features that may be impacted by the project have been agreed through the scoping and evidence plan process and are described within this table and in Sections 4.5 and 4.6. The assessment has been undertaken in accordance with the industry standard (CIEEM, 2022) as described in Section 4.6. Effects upon important ecological features are assessed in Sections 4.11-4.14.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'A planning application will need to be supported by adequate ecological surveys and assessments to enable the SoS to determine that any application submitted is in line with national and local policy and its statutory duties.* *This will include likely impacts on designated sites (international, national and local), protected species and priority habitats and species - not just significant ones.'*	The important ecological features that may be impacted by the project have been agreed through the scoping and evidence plan process which are described within this table and in Sections 4.5 and 4.6. As noted in Paragraph 4.1.1, at this stage many ecological baseline surveys are either ongoing or have not yet been analysed and reported at the time of writing. Information from the remaining baseline surveys will be incorporated within the ES that will accompany the DCO application. The assessment has been undertaken in accordance with the industry standard (CIEEM, 2022) as described in Section 4.6. Effects upon important ecological features are assessed in Sections 4.11-4.14.
Essex CC Scoping Opinion, a joint response	*'Ecological assessments should take data search records & survey information and use professional judgement to come to reasoned*	The assessment has been undertaken in accordance with the industry standard (CIEEM, 2022) as described in Section 4.6.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
with TDC, November 2021	*conclusions as to the likelihood of species being present and affected by the proposed development. All surveys must be undertaken by suitably qualified ecologists at the appropriate time of year using standard methodologies.'*	For details of the staff who undertook ecological baseline surveys used to inform this chapter, please refer to the technical appendices at Volume 5 Annex 4.1 – 4.14.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*''Effective and robust measures, in line with the mitigation hierarchy, must be proposed which have a high degree of certainty for their deliverability in the long term. We welcome the embedded mitigation measures as part of the project.'*	The mitigation hierarchy has been applied, as described in Section 4.6. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'Where there are any residual impacts, these will need to be compensated for onshore or offshore with long term management secured, and appropriate enhancements, for both terrestrial and marine habitats, included to ensure measurable Biodiversity Net Gain from this development.'*	Residual impacts are identified within Sections 4.11-4.14, Table 4.12, Table 4.13 and Table 4.18. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.
Essex CC Scoping Opinion, a	*'We recommend that this report demonstrates the baseline assessment and details of losses*	Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
joint response with TDC, November 2021	*and compensatory habitat as well as biodiversity enhancements to demonstrate net gain of habitats in both the Terrestrial Ecology and Benthic ecology ES chapters.'*	compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. The VE approach to BNG for onshore biodiversity is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note. Benthic ecology is covered in Volume 2, Chapter 5: Benthic and Intertidal Ecology.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'We would support improving the condition of existing priority habitat as enhancements particularly in relation to losses from the cable landfall and onshore substation. We also expect this report to include details of enhancements for relevant species on the site and any need for off-site habitat provision and its long-term management and monitoring.'*	Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'Full Metric calculations should also be provided using v 3.0 or any successor.* *We recommend that the applicant thoroughly explores all reasonable options to deliver additionality for the measurable BNG to restore biodiversity networks & their ecological functionality and also provide enhancements for priority species affected by the development. We look forward to*	Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. The VE approach to BNG is set out in more detail in Section 4.6 and in

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	the BNG feasibility report to be submitted which shows how these species will benefit from these new habitats created and enhanced.'	Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'We note that bats, particularly barbastelle (Annex II species) – noted in 19.4.23 as recorded within the 2km study area - are included under Impact 19.9 as being likely to be affected by disruption of movement due to temporary habitat loss. We highlight that any temporary loss of the hedgerows will require temporary fencing to be used during construction to fill any gaps in hedgerows caused by the cable corridor works and remain until replacement hedging reaches a height where it can provide ecological functionality as a foraging or commuting route for these bats. We also highlight that all hedgerows will need assessment for bats as all with any passes of barbastelle bats may qualify hedgerows as Important Hedgerows under the Hedgerow Regulations.'*	Bats and hedgerows have been identified as important ecological features that may be impacted by the project as agreed through the scoping and evidence plan process which is described within this table and in Sections 4.5 and 4.6. Effects upon important ecological features are assessed in Sections 4.11-4.14, based upon available survey data (which currently excludes bats). Analysis and reporting of field survey work for bats is ongoing and survey information will be included in subsequent bat survey reports, which will be appended to the ES. Embedded mitigation measures are set out in Section 4.10 and additional mitigation measures for bats during construction are set out in Section 4.11. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'We highlight that a small population of dormice was found to be present in non-woodland habitat within the onshore scoping area.* *We recommend that the optimal survey window for Phase 2 dormouse surveys in East Anglia is*	Dormouse survey method has followed published good practice, which includes surveying into the autumn months. Analysis and reporting of field survey work for dormouse is ongoing and survey information will be included in a subsequent dormouse survey

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	later than Bright et al., 2006, and this change in methodology is to be published soon (pers. comm., Essex & Suffolk Dormouse Group).'	report, which will be appended to the ES.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'We would welcome early sight of the PEA wintering bird surveys to inform the scope of the project level Report to Inform an Appropriate Assessment (Shadow HRA) in relation to any functionally linked land for the coastal SPA & Ramsar sites, particularly at Hamford Water.'*	The results of wintering bird surveys completed to date are summarised in Section 4.8, with further details provided in Volume 5, Annexes 4.6, 4.10, 4.11 and 4.12. A Report to Inform an Appropriate Assessment (RIAA) has been produced.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'It is recommended as part of the habitat survey (that the report refers to that will be undertaken on page 96: 5.2.6), to include an audit of existing GI within the site boundary, identifying existing GI assets, areas for improvement and opportunities to meet gaps in provision in response to local need, that contributes to a wider GI landscape network.'*	The habitat survey provides comprehensive details of the type and extent of all habitats within 100m of the RLB, as detailed in Section 4.8 and Volume 5 Annexes 4.2 and 4.3. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network. Outline principles are included at Volume 7 Report 5 in the LEDPP. Further details are also included in Volume 3 Chapter 2 Onshore Landscape and Visual.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'Chapter 19 mentions that there will be some habitat fragmentation and impact on local ecology through the installation of cables and onshore substations. These impacts need to be minimised by mitigation measures and habitats or vegetation reinstated where appropriate. Any habitat enhancements, whether boundary hedgerow, field margin, grassland or wildflower meadow, grass strips, or woodlands all need to be connected to the landscape wide GI network to prevent fragmentation and promote biodiversity migration. It is recommended that a Landscape and Ecology Management Plan is produced that incorporates the mitigation measure for habitat/ GI removal, fragmentation and potential impact on protected designated sites (i.e., Holland Haven Marshes and Weeleyhall Wood SSSIs etc.) to be identified in the EIA. There should also be the inclusion of a 'Landscaping and Screening Proposal' for the onshore substation that could result in a beneficial impact.'*	The mitigation hierarchy has been applied, as described in Section 4.6. Embedded mitigation measures are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network. Outline principles are included at Volume 7 Report 5 in the LEDPP, this will be developed into an Outline Landscape and Ecology Management Plan (LEMP) that will be presented within the ES that will accompany the DCO application. Further details are also included Volume 3 Chapter 2 Onshore Landscape and Visual.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'The report on page 87 in Table 4 references Biodiversity Net Gain as part of the compensation measures, but It does not mention that the EIA will include an assessment of biodiversity net gain, that should be appended to the Terrestrial Ecology and Nature Conservation chapter of the ES. The Environment Bill now requires NSIPs to delivery biodiversity net gain. It is recommended as a*	The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	proposal from the EIA is the creation of a biodiversity enhancement plan (BEP). The purpose of the BEP is to lay out the specific objectives for biodiversity and the means by which these objectives will be achieved, including the protection of existing species and habitats (GI), the establishment of specific enhancements (including net gain), their maintenance and monitoring.'	
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'Biodiversity enhancements should be selected to fit the physical attributes of the site and should tie in with existing habitats and species of value on and around the site. Furthermore, they should be compatible with the primary purpose of the site – to generate wind power (albeit mainly onshore substations and underground cables). If agricultural production is also planned for the site, biodiversity enhancements should aim to dovetail with these goals.'*	Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'GI will require sustainable management and maintenance if it is to provide benefits and services in the long term. Documents such as the CEMP, Landscape and Ecological Management Plan (LEMP) and Biodiversity Enhancement Plan are documents that will help ensure appropriate tasks, mitigating measures and methods are in place to:* *Protect the retained trees and hedgerows.* *Schedule of advanced planting to create a landscape structure or evidence is shown that substantive*	A draft CoCP is provided in Volume 7, Report 3. The mitigation hierarchy has been applied, as described in Section 4.6. Embedded mitigation measures including protection of retained habitats are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	GI is secured as early as possible in subsequent phases. *Landscape management and maintenance plan and work schedule for a minimum of 10 years including how management company services for the maintenance of GI assets and green spaces shall be funded and managed for the lifetime of the development.* *Address recommendations within the habitat and ecology survey to enhance the ecological value through the proposed development.* *Demonstrate measurable net gains for biodiversity, as outlined under paragraph 8[C], 153, 174[a][d] and 179 of the National Planning Policy Framework updated 2021.* *Although we recommend these are submitted early in the planning process, these documents can be conditioned or submitted at reserved matters stage.'*	within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network. Outline principles are included at Volume 7 Report 5 in the LEDPP, this will be developed into an Outline LEMP that will be presented within the ES that will accompany the DCO application. Further details are also included Volume 3 Chapter 2 Onshore Landscape and Visual. The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'The development should be capable of removal and reversible* [sic] *i.e., at the end of the life of the development, the land can be return to an appropriate after use, either to its former use or an alternative use meeting local needs. Including removal of all cables, substation and other temporary structures onsite. It is recommended that restoration plans/ decommission programs are identified at early stage of planning and updated as development progresses and it needs to be a recommendation from the EIA.'*	A full project description, including onshore decommissioning is included at Volume 3 Chapter 1 Onshore Project Description. Potential impacts of decommissioning upon onshore biodiversity are assessed in Section 4.13.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'A stronger commitment (than purely to consider) is required (than is made in 5.3.2.) for the use of trenchless technologies such as HDD at the landfall to ensure existing sea defences are not compromised and to protect sensitive features and minimise the extent of direct interaction with the intertidal areas and coastal features. If beach access will be required for construction vehicles, equipment and materials at landfall (3.5.3) then it is important that measures are put in place to similarly protect the features mentioned above.'*	A full project description, including details of trenchless technologies that may be used, is included at Volume 3 Chapter 1 Onshore Project Description. Effects upon important ecological features are assessed in Sections 4.11-4.14. Embedded mitigation measures, including protection of retained habitats, are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application.
Essex CC Scoping Opinion, a joint response with TDC, November 2021	*'The brackets at the end of 3.6.3 listing key project parameters should also list that HDD will be used under Holland Haven Marshes SSSI (as stated in 19.5.7).'*	A full project description, including details of trenchless technologies that may be used, is included at Volume 3 Chapter 1 Onshore Project Description. HDD will be used under Holland Haven Marshes SSSI.
Little Clacton Parish Council Scoping Opinion, November 2021	*'Tendring combines an array of conservation areas, sites of special scientific interest, historical and ecological corridors. There is no doubt, that this project would cause significant harm to the natural landscapes, habitats, endangered species and people's way of life in this small rural pocket of East Anglia.* *There are currently two projects that are being presented to the people of Tendring and the most critical point to make is as follows:*	VE and North Falls OWF have been and continue to be in discussion with respect to project co-ordination and minimising impacts where feasible to do so.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	it should be part of the agreement for both projects, that a combined cable routing and shared onshore substation is fully investigated and feasibility studies undertaken to ensure only one cable route is designated and all cabling laid at the same time. *We do not want to have two huge disruptions when the cabling could and should be all put into one trench.'*	
Natural England Scoping Opinion, November 2021	NE recommend that the applicant consults with NE, Rural Payments Agency and landowners at the earliest opportunity to discuss possible interaction with Higher Level Stewardship Agreements and Countryside Stewardship Schemes, as a number of these are present within the Area of Search.	This point is being addressed in parallel with more detailed scheme design, and has not been included in this chapter but will be included in the ES that will accompany the DCO application.
Natural England Scoping Opinion, November 2021	*'Recommend the developer contact Operation Turtle Dove for records in the area and present these, where relevant in the ES.'*	Desk study data relating to birds were summarised in the PEA report (Volume 5, Annex 4.1). This included collation of turtle dove records from EFC and the RSPB which have been used to inform the assessment. Operation Turtle Dove will be contacted and any additional pertinent records, will also be used to inform the ES that will accompany the DCO application.
Natural England Scoping Opinion, November 2021	*'Include candidate Local Wildlife Sites in relevant ES figures and consider impacts to these sites within any EIA.'*	No candidate Local Wildlife Sites have been identified as part of the desk study, or through the evidence plan process.
Natural England Scoping	*'NE recommends consideration of light pollution effects on sensitive ecological receptors.'*	Potential effects of additional lighting are included in Sections 4.11 and 4.12.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
Opinion, November 2021		
Natural England Scoping Opinion, November 2021	*'Recommend that the applicant contact Natural England as soon as possible to discuss licensing and potential Letters of No Impediment (LONI).'*	Requirements for licensing and the potential for LONI have been (and will remain) subjects of discussion with key stakeholders through the evidence plan process.
Natural England Scoping Opinion, November 2021	*'Recommend that the applicant develop an Outline Landscape and Ecological Management Strategy (OLEMS), alongside an Outline Code of Construction Practice (OCoCP).'*	A draft CoCP is provided in Volume 7, Report 3. An outline LEMP (equivalent to OLEMS) will be presented within the ES that will accompany the DCO application.
Natural England Scoping Opinion, November 2021	*'The ES should carefully consider potential impacts on ancient woodland and demonstrate that these have been avoided wherever possible.'*	Ancient woodland has been included in the assessment, as referenced in Sections 4.6, 4.8 and 4.11. Direct impacts to ancient woodland will be avoided.
Natural England Scoping Opinion, November 2021	*'We note that the proposed [non-breeding bird] surveys cover an Area of Search plus 250 m buffer. Natural England recommend that a 400 m buffer be adopted around area of search.'*	The approach to wintering bird survey has been agreed with relevant stakeholders through the scoping and evidence plan process. Further details are described within this table and in Sections 4.5 and 4.6. Survey data for a 400 m buffer from the RLB has been gathered, except in a few locations identified on Figure 4.1and detailed in Section 4.7.
Natural England Scoping Opinion, November 2021	*'We recommend the applicant considers district level licensing for GCN.'*	Further details in respect of European Protected Species Licences (EPSL) for GCN will be discussed with ETG members as part of the evidence plan process. Details will provided in the ES once further design details are known and mitigation/ compensation

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
		proposals have been further developed. Draft EPSL applications will also be provided with the ES, if required.
Natural England Scoping Opinion, November 2021	*'The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 174), which should be demonstrated through the ES.* *We recommend applicant consider Climate Change adaptation in the ES as described.'*	Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network. Outline principles are included at Volume 7 Report 5 in the LEDPP. Climate change adaptation is considered within Volume 3: Chapter 11 Human Health and Climate Change.
Natural England Scoping Opinion, November 2021	*'There is currently no mention of net gain within the scoping and Natural England recommend that the applicant consider this within the proposal from an early stage in order to future proof proposals.'*	The VE approach to BNG is set out in Section 4.6 and in Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note.
Natural England Scoping Opinion, November 2021	*'Much of the scoping area is being considered for woodland creation and we suggest that the Applicant contact the Forestry Commission for further information regarding this and possible consideration within the EIA.'*	This has yet to be completed and is not addressed within this chapter. Details will be included in the ES that will accompany the DCO application, if appropriate.
Tendring Parish Council	*'There is an abundance of wildlife in the area – water vole, owls, bats,*	Details of surveys undertaken to date are provided in Sections 4.5

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
Scoping Opinion, November 2021	*otters, stoats, deer and so on – so we would request the survey incorporate the impact any work would have on natural habitats. These sites are recorded as part of Tendring District Council's planning policy and are taken into account when applying the National Planning Policy Framework to planning applications.'* https://www.tendringdc.gov.uk/sites/default/files/documents/planning/planning%20policy/LocalWildlifeSiteReview.pdf	and 4.8. Effects on internationally, nationally and locally designated sites, on protected species and on habitats and other species identified as being of importance for the conservation of biodiversity are assessed in Sections 4.11-4.14.
Pre-Scoping: Evidence Plan onshore ecology ETG August 2021, attended by EA, ECC, RSPB	Discussion about proposed survey methods for habitats and species likely to be present. The points listed below focus on points not picked up in subsequent scoping responses: Comments were invited on the 15 km buffer used to identify international designated sites for the purposes of HRA screening: no comments were received from attendees. Comments were invited on the 2 km buffer used for SSSI: no comments were received from attendees. RSPB noted that the Tendring peninsula is a relative stronghold for corn bunting. RSPB would be concerned about any loss of scrub, particularly for turtle dove *Streptopelia turtur*. RSPB are aware of some areas that attract turtle dove but are not aware of any in the Tendring area. RSPB also noted that black-tailed godwit is present in internationally	Desk study data relating to birds were summarised in the PEA report (Volume 5, Annex 4.1: Preliminary Ecological Appraisal (Onshore) Report). This included collation of turtle dove records from EFC and the RSPB which have been used to inform the assessment. The methods and results of bird surveys completed to date are provided in Sections 4.5 and 4.8 respectively, with further details provided in Volume 5, Annexes 4.6: Wintering Brid Survey (Landfall Locations) and 4.10-4.13: North Falls Offshore Wind Farm Onshore Landfall Area: Breeding Bird Surveys 2021.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	important numbers in the region in April and July, and suggested that consideration should be given to SPA species and when the features will be present. Surveys may be important beyond the wintering months. RSPB noted golden plover can distribute differently at night. However, RSPB concern was over the impact of pylons impacting golden plover at night but confirmed that this is not a concern with buried cables.	
Post-Scoping: Evidence Plan onshore ecology ETG April 2022 attended by ECC, TDC, NE, EA and EWT	Discussion about scoping opinion, findings of PEA and proposed survey scope. Main points arising were: 250 m or 400 m buffer for wintering bird survey; NE to confirm its position (see below NE Response in relation to PEA and detailed survey scope, August 2022). In respect of arable plant species, it was confirmed that the intention is to identify areas where rare species may be present during the habitat survey, with additional survey at other times of year undertaken if necessary. Confirmed that no candidate LoWS were included in data from Essex Field Club, TDC explained that there are candidate LoWS sites elsewhere in Essex and could confirm if there are any within the project area. Agreed to discuss with NE LONI in respect of GCN once further project design information is available.	No candidate Local Wildlife Sites have been identified as part of the desk study, or through the evidence plan process. Details in respect of potential trenchless techniques that may be employed are provided in Volume 3 Chapter 1. Potential impacts to water quality are assessed in Volume 3 Chapter 6. Effects upon important ecological features, including those arising from the use of HDD or similar trenchless methods are assessed in Sections 4.11-4.14.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	Noted that full survey reports would not be available for PEIR. EA requested that drilling depths and controls to minimise the risk of pollution on SSSI are included in the EIA. Natural England had undertaken a site visit to Holland Haven and now have lesser concerns about sink holes and frack out. Natural England's preference was for the HDD to go under the sea defence by the golf course (i.e. where it is flat). The EA's preference is to avoid any areas with high erosion and where ground conditions may be unconsolidated. EA agreed to provide details in respect of previous pollution incidents resulting from HDD and any lessons learned. When asked if anyone had any specific concerns in regard to transboundary effects on onshore ecology no concerns were raised. No concerns were raised over the survey scopes proposed.	
NE Response to April 2022 ETG meeting minutes May 2022	Whilst VE awaits final confirmation of the site selection for the East Anglia Connection Node Substation, it is important to ensure that their onshore surveys cover the appropriate area and provide sufficient data to cover the finalised onshore area. Advised that two further important ecological features (IEF) be included in the assessment: > The 2022 habitat surveys should be carried out with consideration to hedgerows/ treelines and	All specific feedback in relation to the survey scope has been incorporated into the relevant methodologies. The survey scope for habitats and species has been agreed with relevant stakeholders through the scoping and evidence plan process which are described within this table and in Sections 4.5 and 4.6. The mitigation hierarchy has been applied, as described in Section 4.6. IEF used for the assessment are detailed in Table 4.9. This includes

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	waterbodies (as these represent functionally linked land and mobile species). > Functionally Linked Land (FLL) should be considered: Holland Haven Marshes SSSI and Ancient Semi-Natural Woodland (ASNW) and Plantations on Ancient Woodland Sites (PAWS) which occur within 100m. Feedback in relation to survey scope provided for reptiles, breeding and wintering birds, bats, badger, otter and water vole and dormouse. Confirmed that in respect of BNG, the mitigation hierarchy must be adhered to. Net gain is additional to required mitigation and compensation measures and the project should aim for net gain of at least 10%.	hedgerows and waterbodies (ponds and rivers). FLL is not an independent IEF, but has been considered within the assessment where it is associated with designated sites, ASNW or PAWS in Sections 4.8, 4.11-4.14 and Table 4.9. The VE approach to BNG is set out in Section 4.6 and in Volume 5 Annex 4.14: Biodiversity Net Gain Approach Note.
RSPB response to PEA consultation June 2022	Works in the most sensitive areas or priority habitats should be undertaken outside of the main breeding period March – August. Wintering birds may be impacted and this should be addressed. HDD should be used to minimise impacts to SSSI and priority habitats. Noted that the 2016 UK Review of SPA outlined that the current status of SPAs is considered insufficient for many species including dark-bellied Brent Goose, which is a feature of Hamford Water SPA. Potential impacts on this SPA and its associated species should be	The important ecological features that may be impacted by the project have been agreed through the scoping and evidence plan process which are described within this table and in Sections 4.5 and 4.6. This includes wintering birds. Embedded mitigation measures, including measures to avoid or reduce impacts on birds, are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	avoided. The Hamford Water SPA boundary has been identified for review to ensure the importance of dark-bellied brent goose, golden plover and lapwing is recognized appropriately. The findings of the SPA review should be fully taken into account for any surveys or decisions associated with the VE potential cable route. Holland Haven Marshes SSSI and Great Holland Pits LoWS should be avoided where possible. Main concerns relate to direct loss and disturbance of this habitat and its dependent species. Support further breeding bird surveys. If there are any potential lighting impacts, these need to be addressed and avoided where possible in particular close to the SSSIs. Works should be careful not to impact turtle dove, corn bunting and nightingale *Luscinia megarhynchos* habitats, food sources and nesting. Any known territories of these species should be avoided during the breeding season. Some hedgerows may be of high ecological value and damage to these should be avoided. The use of dead hedging to block gaps in hedgerows to retain connectivity/replace cover appears sensible. RSPB welcomed recommendations to create and manage habitats to benefit notable bird species.	within the ES that will accompany the DCO application. Effects upon important ecological features, including those arising from the use of HDD or similar trenchless methods are assessed in Sections 4.11-4.14. HDD will be used under Holland Haven Marshes SSSI. Great Holland Pits LoWS will be avoided. Effects on SPA bird species have been specifically considered within Sections 4.11 to 4.14 of this chapter and in the draft RIAA. Potential effects of additional lighting are included in Sections 4.11 and 4.12. Effects on breeding birds have been considered within Sections 4.11 to 4.14, although it is noted that breeding bird survey data for much of the cable route have yet to be analysed and reported so are not assessed in this report. A full assessment of effects on breeding birds will be provided in the ES.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
ECC response to PEA consultation June 2022	Re-iterated that the Council wish to be involved in discussions relating to HRA and any compensation for temporary loss of FLL. Satisfied that the important ecological features identified and the requirements for further survey provide the basis for assessment of likely significant impacts for the Ecology chapter. Noted that the Council was unable to find any reference to Important Hedgerows and would appreciate confirmation that appropriate ecological assessment of any hedgerows which may be breached will be undertaken at areas to inform the route choices and the further survey requirements in Table 5.1 updated. As previously highlighted, all hedgerows with any passes of barbastelle bats may qualify hedgerows as Important Hedgerows under the Hedgerow Regulations. Welcome all opportunities to deliver biodiversity enhancements for habitats using the Defra Metric and submission of a detailed BNG assessment as well as potential for species enhancements.	Effects on SPA bird species have been specifically considered within Sections 4.11 to 4.14 of this chapter and in the draft RIAA. The important ecological features that may be impacted by the project has been agreed through the scoping and evidence plan process which are described within this table and in Sections 4.5 and 4.6. This includes important hedgerows and bats. The VE approach to BNG is set out in Section 4.6 and in Volume 5 Annex 4.14: Biodiversity Net Gain Approach Note.
NE response to PEA consultation June 2022	Whilst content with the survey methodology proposed for the relevant protected sites, NE advised consideration of potential impacts to functionally linked habitats supporting Special Protection Area (SPA) species. Furthermore, NE advised that potential impacts of bentonite breakout on Hamford Water and	Effects on SPA bird species, including birds using functionally linked habitats, have been specifically considered within Sections 4.11 to 4.14 of this chapter and in the draft RIAA. Effects upon important ecological features, including those arising from the use of HDD or similar

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	other protected sites or watercourses, should be fully assessed and mitigated for. Also advised that survey results be presented in the Preliminary Environmental Information Report (PEIR). Requested clarity on certain species scopes, i.e., buffer zones for wintering bird survey, deviations from standard practice with GCN survey, extent of water vole and otter survey, type of badger survey, hibernating bat survey scope. Advised that Reasonable Avoidance Measures should include a phased vegetation clearance, supervision by a suitably qualified Ecological Clerk of Works (ECOW), and be mapped within the PEIR and measures detailed in the management plan. Advised that the potential of air quality to impact upon designated sites should be assessed and the results detailed in the PEIR.	trenchless methods are assessed in Sections 4.11-4.14. Potential impacts to water quality are assessed in Volume 3 Chapter 6. Full details of survey scopes included in the PEIR are provided in Section 4.5 and Volume 5 Annexes 4.1: Preliminary Ecological Appraisal (Onshore) Report – 4.13: North Falls Offshore Wind Farm Onshore Landfall Area: Breeding Bird Surveys 2021. Embedded mitigation measures, including Reasonable Avoidance Measures, are set out in Section 4.10. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement will be developed once ongoing baseline surveys have been completed and more detailed project design information is available, and will be presented within the ES that will accompany the DCO application. Designated sites that may potentially be affected by changes to air quality are scoped out of this chapter, but are assessed in Volume 3, Chapter 11: Air Quality.
NE Response to further information provided after its response to the PEA August 2022	NE provided justification for its stance in respect of 400 m buffer requirement for inland wintering bird surveys. NE confirmed it does not hold specific data on where bat maternity colonies are present within churches. Confirmed that consideration of potential impacts to roosting bats should be applied where maternity roosts may be present inside or outside the survey area where there is	At the time of writing, data from bat surveys undertaken during 2022 have yet to be analysed and reported. Details of these surveys are therefore not included in the assessment presented in this chapter but will be included in the ES in due course. The proposed survey scope and methods for these surveys were outlined in the PEA Report (Volume 5, Annex 4.1: Preliminary Ecological Appraisal (Onshore) Report).

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	suitable connectivity to foraging/roosting habitats, if these habitats are to be impacted upon. Where trees that provide potential roost features for bats, including hibernating bats, are to be removed/managed, suitable mitigation must be followed. This advice also applies to potential roost features that cannot be fully assessed. This mitigation should be supervised by a suitably experienced ECOW. Advised that bat surveys should be spaced at least two weeks apart as a minimum.	
Essex CC August 2022	Provided information on likely future BNG legislation, guidance and requirements. Would like the project to deliver a minimum of 10% BNG, however, recognise this might not always be possible and state that off-site BNG delivery can provide biodiversity benefits and protection.	The VE approach to BNG is set out in more detail in Section 4.6 and in Volume 5 Annex 4.14: Biodiversity Net Gain Approach Note.
Pre-PEIR: Evidence Plan onshore ecology ETG November 2022 attended by ECC, TDC, NE, EA, EWT & RSPB	To discuss survey results, BNG approach, potential mitigation and compensation requirements. Minutes not yet agreed/available.	
NE Response to Pre-PEIR onshore ecology ETG November 2022 meeting minutes and	Overwintering birds: NE cannot confirm sufficiency of survey coverage for the cable corridor and substation search areas until it has seen a revised map more clearly indicating gaps than the map already provided.	Gaps in coverage during the 2021-22 wintering bird surveys for the onshore cable corridor are shown in Figure 4.2. As set out in Paragraph 4.7.6, the assessment is based on the precautionary assumption that golden plover could use any

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
associated documents January 2023	Golden plover: NE advised that implications of potential nocturnal golden plover presence should be considered for areas subject to 24-hour working. NE also advised that VE consider data from other nearby projects in relation to this species, including in combination impacts. With respect to SPA bird species NE reiterated that the: *'onshore scoping area should be based on the potential for species to be present in the area, the Impact Risk Zone (IRZ) for designated sites, ecology, and a consideration of Functionally Linked Land (FLL).'* Bats: NE reconfirmed that: *'Without knowing when surveys have been carried out, e.g. dates and spacing between surveys, Natural England cannot confirm that they agree with the survey methodology and impact assessment. The onus is on the Applicant to ensure that the data collected is sufficient to determine species presence/likely absence, make an assessment of potential impacts and in turn inform appropriate mitigation.'* Requested a copy of a cited reference in relation to tree survey efficacy. Re-iterated that back-to-back surveys count as a single survey visit. Advised that at least one survey be carried out between June and July. Desk Study: NE advised that that a revised data search for targeted species should be considered.	suitable fields within the relevant study area, at night as well as during the day. Embedded mitigation measures, including measures to avoid disturbance to bird species such as golden plover, are proposed in Table 4.11. Effects on SPA bird species, including birds using functionally linked habitats, have been specifically considered within Sections 4.11 to 4.14 of this chapter and in the draft RIAA. Bat survey data have yet to be analysed and reported. Further details regarding bat survey methodology will be provided to NE once available and will also be provided in the ES. Full details of desk study and survey scopes included in the PEIR are provided in Section 4.5 and Volume 5 Annexes 4.1: Preliminary Ecological Appraisal (Onshore) Report – 4.13: North Falls Offshore Wind Farm Onshore Landfall Area: Breeding Bird Surveys 2021. This includes data obtained from Essex Field Club. An update will be requested prior to submission of the ES and any new data will be incorporated within the ES. The VE approach to BNG is set out in Section 4.6 and in Volume 5 Annex 4.14: Biodiversity Net Gain Approach Note. An assessment of effects on the notified features of relevant SSSIs is provided in Sections 4.11 to 4.14. Embedded mitigation measures, including measures relating to SSSI notified features, are proposed in Table 4.11.

Date and consultation phase/ type	Consultation and key issues raised	Section where comments addressed
	BNG: NE confirmed that: *'Whilst BNG will not be mandatory [for NSIPS] at the time of consent for the project, we would welcome and encourage the inclusion of habitat management and monitoring plans, with the aim of securing them for a minimum of 30 years, in readiness of mandatory NSIP BNG commencing in 2025.'* BNG: NE provided a list of projects that may be helpful for the local community and VE in achieving BNG goals, and measures to be considered for inclusion at the OnSS to assist with local conservation aims. BNG: NE agreed with the approach outlined and offered further comment in respect of reinstated agricultural land and hedges. SSSIs: NE stated that the ES should include a full assessment of the direct and indirect effects of the development on the interest features of these sites and should identify such mitigation measures as may be required in order to avoid, minimise, or reduce any adverse significant effects. Survey Data: NE confirmed that advice provided at PEIR will be based on data provided at that stage and may therefore be subject to change. Cumulative Assessment: NE noted that publicly available data will be used for in-combination assessment, including that from North Falls (if available).	At the time of writing there is insufficient information available about the North Falls project to meaningfully include it in the cumulative assessment. Detailed cumulative impact assessment will be included in the ES (assuming North Falls project details are available at the time of writing).

4.5 SCOPE AND METHODOLOGY

4.5.1 The assessment scope has been informed by relevant national and local planning policy and guidance, established best practice and experience, as well as via the consultation process.

4.5.2 Several of the ecological surveys necessary to inform the EcIA process are either ongoing or survey data have yet to be analysed and reported at the time of writing. As a result, this chapter is largely informed by the same data as contained in the PEA report (Volume 5, Annex 4.1) (though updated habitat survey information, GCN survey and bird survey data obtained to date are also included). Like the PEA it seeks to:

- establish baseline conditions and identify important ecological features present (or those that could be present), as far as is possible at this time;
- identify important ecological features that could be impacted by the project, where possible;
- provide initial suggestions for mitigation or compensation, where possible, (noting that at this stage all recommendations are preliminary, depending on results of further surveys and final project design); and
- to identify initial opportunities for biodiversity enhancements as part of the project (note that enhancements have yet to be developed and will depend on results of further surveys and final project design – further details will be provided in the ES).

4.5.3 Unlike the PEA, where possible, this chapter also identifies potential impacts and their likely significance.

4.5.4 For the PEIR the design of the onshore elements of VE includes some optionality in relation to the final size and locations of infrastructure being proposed. The design and options for the onshore elements are described in detail within Volume 3, Chapter 1. The EcIA parameters are summarised in this chapter, in Section 4.9.

STUDY AREA

4.5.5 Assessment has been undertaken within study areas discussed and agreed with key stakeholders, which are defined as follows:

- Habitats and protected/ notable species (except those mentioned below) within the onshore Red Line Boundary (RLB), plus the surrounding 100 m (i.e., 100 m either side of the onshore ECC and to all sides of any other infrastructure or works areas such as Temporary Construction Compounds (TCCs) and access tracks). This includes all areas landward of Mean High Water Springs (MHWS). Areas below MHWS are covered in the relevant offshore chapters (Volume 2, Chapters 4-7).
- The 100 m buffer is based upon the premise that indirect impacts (such as noise or dust deposition) to un-designated habitats and/ or species (except those noted at the bullet points below) are unlikely to be significant beyond 100 m.
- Non-breeding birds – land within the onshore RLB, plus a buffer of at least 400 m to allow for possible disturbance effects outside the RLB. The 400 m buffer was requested by Natural England in line with advice provided to other offshore wind farm projects.

- Water courses and water bodies up to 250 m from the RLB where these may be suitable for use by otter *Lutra lutra*, water vole *Arvicola amphibius* or GCN.
- A 250 m up/downstream search area has been used for otter and water vole. This is because these are highly mobile, territorial species and it is possible that effects from the onshore elements of VE, such as habitat loss, may impact populations of these species that occur outside the RLB. The 250 m search area for GCN breeding ponds is based upon published guidance (English Nature, 2001) that states that the majority of adult GCN stay within 250 m of breeding ponds and that beyond 250 m impacts to GCN are normally low.
- Intertidal (where relating to birds) and onshore elements of nationally designated sites (Sites of Special Scientific Interest (SSSI), Local Nature Reserves (LNR)) and LoWS within 2 km of the onshore RLB and internationally designated sites (SAC, SPA and Ramsar Sites) within 15 km. The inclusion of a 15 km study area for internationally designated sites is to enable consideration of potential impacts on mobile qualifying species, particularly birds. Beyond 15 km, connectivity with designated sites is unlikely.

4.5.6 For further detail including the rationale for these distances, please refer to EIA Scoping Report Table 19.1 and Chapter 2 of the PEA report (Volume 5, Annex 4.1).

4.5.7 Within this report the following terms are used:

- Study area: This is the 2 km zone around the onshore infrastructure.
- Survey area: This is the 100 m zone around the onshore RLB.
- Areas other than these, which have been included in the EcIA (such as ponds within 250 m, or internationally designated sites within 15 km), are specifically described.

BASELINE DATA COLLECTION

4.5.8 Baseline data collection is being undertaken by a combination of desk study and field survey.

DESK STUDY

4.5.9 A comprehensive desk-based data search has been undertaken and is described in the PEA Report (Volume 5, Annex 4.1). This included gathering details for statutory and non-statutory designated sites for nature conservation, as well as pre-existing ecological records for protected and notable species. Subsequent to the PEA, records were received from North East Essex Badger Group in May 2022 and these have additionally been used to inform this chapter.

4.5.10 Additional sources that have been obtained and reviewed since the PEA also include:

- Tendring District Local Wildlife Site Review 2008 (Essex Ecology Services Ltd, 2009);
- Local Wildlife Site Selection Criteria (Essex Local Wildlife Sites Partnership, Revised 2016);
- Essex Bat Group website www.essexbatgroup.org; and
- Frost *et al*. (2021) (annual peak waterbird count data for nearby designated sites).

4.5.11 In instances where anecdotal reports of protected or notable species have been received from members of the public (but are not contained in any other data source previously mentioned), these are referenced in the relevant results section.

FIELD SURVEY

4.5.12 Field survey information used to inform this chapter was gathered specifically for VE, or else has been provided by North Falls OWF to VE, in instances where it held pertinent ecological survey data and reports. All technical reports upon which this chapter is based are included in the Annexes, regardless of initial source.

4.5.13 At the time of writing, data from several field surveys undertaken during 2022 have yet to be analysed and reported. Details of these surveys are therefore not included in the assessment presented in this chapter but will be included in the ES in due course. The proposed survey scope and methods for these surveys were outlined in the PEA Report (Volume 5, Annex 4.1). In addition, a second year of non-breeding bird survey is being undertaken for the onshore ECC and onshore substation (OnSS) search areas.

4.5.14 Some wintering and breeding bird surveys, GCN survey and an updated habitat survey (updating the surveys undertaken to inform the PEA) have now been concluded, and reports for each of these, including details of the scope and method, are provided at Volume 5, Annex 4.2 – 4.6 and 4.10 – 4.13. Details for Extended Phase 1 Survey, NVC survey and Invertebrate Survey at Holland Haven Marshes SSSI are also included in reports at Volume 5, Annex 4.7 – 4.9. A brief summary of methods for surveys which have been concluded and are included in this assessment is provided below and a brief summary of key findings is provided in Section 4.8.

HABITAT SURVEY

4.5.15 Habitats within the survey area were classified and mapped using UKHab v1.1 (Butcher *et al*., 2020), during late summer 2021, summer and autumn 2022. Habitats were also subject to condition assessment in accordance with Defra Metric 3.1, undertaken in conjunction with the UKHab survey; results of the condition assessment are not included in the PEIR, but will form part of the BNG assessment that is to be presented with the ES.

4.5.16 More detailed botanical recording was undertaken during the habitat survey at areas that were known or suspected to support protected or notable plant species and that may be impacted, specifically arable margins, the ditch network, hedgerows and woodlands. The presence of invasive non-native plant species was also recorded during the habitat survey.

4.5.17 Sufficient data were also gathered during the habitat survey to determine whether hedgerows that could be breached/ removed as a result of the onshore elements of VE might meet the definition of "important" under the Hedgerow Regulations (1997). Any such hedgerows were then subject to more detailed survey, also in summer – autumn 2022.

4.5.18 National Vegetation Classification (NVC) survey was undertaken at terrestrial and aquatic habitats at Holland Haven Marshes SSSI, on behalf of North Falls OWF in July and August 2021. Terrestrial habitats within 50 m of the SSSI boundary were included, and aquatic habitats within 200 m. Full details are included in Volume 5, Annex 4.7.

4.5.19 Details from an Extended Phase 1 Habitat Survey undertaken on behalf of North Falls (full details included at Volume 5, Annex 4.8) are also pertinent to large parts of the VE project area and have been referenced.

INVERTEBRATE SURVEY

4.5.20 Terrestrial and aquatic invertebrate survey was undertaken at Holland Haven Marshes SSSI, on behalf of North Falls OWF between May and August 2021. Sixteen aquatic sample locations and six terrestrial sample locations were used to obtain baseline values for invertebrates present within the SSSI. Full details are included in Volume 5, Annex 4.9.

GREAT CRESTED NEWT SURVEY

4.5.21 A total of 117 water bodies were initially identified through desk study and aerial photography as potentially requiring field survey as they occurred within 250m of the onshore RLB under consideration at the time of survey. Fourteen were not accessible for survey (refer to Paragraph 4.7.3 for details). Ponds north of the A120 which could potentially be within 250m of permanent habitat loss (as a result of the OnSS) were subject to I assessment, plus presence/ absence surveys using a minimum of three methods including trapping, netting, torching and egg search and/ or environmental DNA (eDNA) survey. All other ponds were subject IHSI assessment, eDNA survey and egg search.

4.5.22 All surveys were undertaken in accordance with survey timings recommended within published good practice guidance (English Nature, 2001 and Biggs *et al.* 2014) between April and mid-June 2022.

WINTERING BIRD SURVEY

4.5.23 Wintering bird surveys were undertaken at the landfall and surrounding area, by MacArthur Green, on behalf of North Falls OWFL, in 2020-21 and 2021-22. In 2020-21, survey work was undertaken during each month from October to March. This comprised a series of twice monthly transect walks (incorporating regularly-spaced vantage points) to record bird numbers, distribution and activity within the area surveyed. Target species included all wildfowl, wader and raptor species, although any other species of high conservation concern were also recorded. The "look-see" methodology advised for Wetland Bird Survey (WeBS) core counts was followed, which determines that efforts should be made to ensure all suitable areas within the area surveyed should be surveyed to within 500 m. Evidence of actual, and possible, disturbance sources to birds was also noted during surveys, to help inform baseline disturbance levels within the area surveyed. In 2021-22, surveys followed the same methodology used in 2020-21, with the addition of monthly transect walks during August and September. Further details are provided in Volume 5, Annex 4.10: North Falls OWF Onshore Landfall Area and Volume 5, Annex 4.11: North Falls OWF Onshore Cable Route.

4.5.24 Wintering bird surveys were also undertaken at the landfall by SLR, on behalf of VE, in 2021-22. Surveys were undertaken at each of the proposed landfall zones currently under consideration plus a buffer zone of at least 500 m. Surveys specifically focused on the recording of waterbird species, although other notable sightings were recorded incidentally. Surveys took place twice per month from September 2021 to March 2022 inclusive. To account for changes in bird numbers and distribution due to the tidal state, each survey was undertaken 'through the tide', either starting at low tide and ending at high tide or starting at high tide and ending at low tide. During each survey, counts were undertaken hourly. On each count the number and location of all waterbirds were mapped and the behaviour of each bird or flock was noted, to provide an indication of how birds use the area surveyed. Any potential anthropogenic disturbance events that took place during each count were recorded incidentally to provide an indication of the levels of existing disturbance within the area surveyed (although a detailed study of existing disturbance was not carried out as the primary focus of the survey was to record bird numbers, distribution and activity). Further details are provided in Volume 5, Annex 4.6: Wintering Bird Survey Report.

4.5.25 Wintering bird surveys were undertaken for the Onshore Export Cable Corridor (ECC) and OnSS search areas, by MacArthur Green, on behalf of North Falls OWFL, in 2021-22. Target species for the surveys included geese, particularly dark-bellied brent goose and European white-fronted goose, and waders, particularly any that are qualifying features of nearby designated sites, but also those that are known to utilise inland habitats in winter, primarily lapwing, curlew and golden plover. Any other Annex I, Schedule 1 or rare red-listed species were also considered as target species and recorded during the surveys. Surveys were undertaken twice each month from October 2021 to March 2022 and focussed on areas of suitable habitat for target species. Recording followed a similar methodology to that employed for the surveys completed on behalf of North Falls OWFL at the landfall in 2020-21 and 2021-22 (see above). Further details are provided in Volume 5, Annex 4.12.

4.5.26 Survey area boundaries for all non-breeding bird surveys carried out are shown in Figure 4.2. Note that the non-breeding bird survey areas differ from the generic survey area definition provided in Paragraph 4.5.7.

BREEDING BIRD SURVEY

4.5.27 Breeding bird surveys were undertaken at the landfall and surrounding area by MacArthur Green, on behalf of North Falls OWFL, in 2021. Surveys comprised a series of twice monthly transect walks (incorporating regularly-spaced vantage points) in April, May and June 2021, plus a single visit in July 2021, to record bird numbers, distribution and activity within the area surveyed. Target species included species listed on Annex I of the EU Birds Directive and/or Schedule 1 of the Wildlife & Countryside Act 1981 (as amended), all nearby SPA and SSSI qualifying features and rare species included on the red list of Birds of Conservation Concern (BoCC) in place at that time (Eaton *et al*., 2015). Surveys focussed on areas of suitable habitat likely to be utilised by target species, e.g., wetlands, marshy fields, field margins, scrub. Grid references of target species were obtained using a GPS to be able to identify nest locations or territory centres and the breeding status of all birds encountered was noted, using standard British Trust for Ornithology (BTO) codes. Further details are provided in Volume 5, Annex 4.13: North Falls OWF Onshore Landfall area.

4.5.28 Survey area boundaries for the breeding bird surveys carried out at the landfall and surrounding area are shown in Figure 4.2. Note that the breeding bird survey area differs from the generic survey area definition provided in Paragraph 4.5.7.

4.6 ASSESSMENT CRITERIA AND ASSIGNMENT OF SIGNIFICANCE

4.6.1 Whilst Volume 1, Chapter 3: EIA Methodology provides an indicative EIA assessment matrix, it also identifies that assessment methodologies may differ in accordance with the prevailing technical area guidance and specific requirements of receptor groups. As such the following sections provide a description of the assessment criteria and assessment methodologies of relevance to onshore biodiversity and nature conservation, which are derived from best practice guidance documents applicable to this topic and differ from those presented in the broader EIA methodology chapter.

4.6.2 The ecological evaluation and impact assessment approach used in this report is based on CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland ("CIEEM guidelines") (CIEEM, 2022), which are widely regarded as industry best practice.

4.6.3 As stated previously, this methodology has not been able to be applied in full for all receptors within this PEIR chapter, owing to several baseline surveys either being ongoing or survey data having not been analysed and reported at the time of writing.

IMPORTANT ECOLOGICAL FEATURES

4.6.4 Ecological features can be important for a variety of reasons and the rationale used to identify them is explained below. Importance may relate, for example, to protected status, the quality or extent of the site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

4.6.5 Important habitats are considered here to be those which:

- match descriptions of habitats listed on Annex 1 of the Habitats Directive, so far as it applies to the UK and as transposed by The Conservation of Habitats and Species Regulations 2017 (as amended);

- match descriptions of habitats of principal importance for biodiversity under S41 of the NERC Act 2006;
- comprise irreplaceable habitats; such as (but not limited to) limestone pavement, sand dunes, ancient woodland and veteran trees;
- Meet the Local Wildlife Site selection criteria for Essex; and/ or
- comprise a significant habitat resource for an important species (see below).

4.6.6 Important species are considered here to be those:

- of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive) so far as it applies to the UK and as transposed by The Conservation of Habitats and Species Regulations 2017 (as amended);
- specially protected under the terms of the Wildlife and Countryside Act 1981 (as amended);
- of principal importance for biodiversity under S41 of the NERC Act 2006;
- Red listed or listed as near threatened using International Union for the Conservation of Nature (IUCN) criteria (IUCN, 2012; IUCN, 2016; IUCN 2019), e.g. in one of the UK Species Status Project reviews, or, where a more recent assessment of the taxonomic group has not yet been undertaken, listed in a Red Data Book);
- for birds, a potentially important population of a species which is red or amber listed in the UK (Stanbury et al., 2021);
- which are listed as a Nationally Rare or Nationally Scarce species (e.g., in one of the Species Status Project reviews) or listed as a nationally notable species where a more recent assessment of the taxonomic group has not yet been undertaken;
- endemic to a country or geographic location (it is appropriate to recognise endemic sub-species, phenotypes, or cultural behaviours of a population that are unique to a particular place); and/or
- Meet the Local Wildlife Site selection criteria for Essex.

4.6.7 For birds, where appropriate, the value of species populations has been determined using the standard '1% criterion' method, as used, for example, within the Guidelines for the Selection of Biological SSSIs (Drewitt, Whitehead & Cohen, 2020). Under this method a site holding >1% of the biogeographic population is important at the relevant level, e.g., a site holding >1% of the national population of a species is nationally important for that species.

4.6.8 The CIEEM guidelines state that the importance of an ecological feature should be considered within a defined geographical context. At the time of writing, it is not possible to determine this element for most species as baseline surveys have yet to be completed or reported. However, the following frame of reference is used for features for which survey data are available (e.g., habitats, GCN and birds) and will be used for other species in the ES:

- International;
- National (i.e. UK);
- Regional (i.e., East Anglia);
- County (i.e., Essex); and

- Local (i.e., within circa 5 km of the RLB).

4.6.9 For the purposes of this assessment only ecological features of local importance or greater and/ or subject to legal protection are subject to detailed assessment (and are referred to as "important ecological features"). Effects on other ecological features of lower importance are considered unlikely to be significant in legal or policy terms so are not subject to detailed assessment.

IMPACT ASSESSMENT

4.6.10 The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

4.6.11 When describing impacts, reference has been made to the following characteristics, as appropriate:

- Beneficial, negligible or adverse;
- Extent;
- Magnitude;
- Duration (short term <5years, mid-term 5-10 years, long term >10 years);
- Timing;
- Frequency; and
- Reversibility.

4.6.12 The impact assessment process considers both direct and indirect impacts:

- direct ecological impacts are changes that are directly attributable to a defined action, e.g., the physical loss of habitat occupied by a species during the construction process.
- Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g., the interruption of water courses which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of downstream habitats.

SIGNIFICANT EFFECTS

4.6.13 The concept of ecological significance is addressed in Paragraphs 5.24 through to 5.28 of the CIEEM guidelines. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of an EcIA, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

4.6.14 Paragraphs 5.29 – 5.34 of the CIEEM guidelines cover how significant effects are determined. To summarise:

- for designated sites – effects may be significant if they are likely to undermine the conservation objectives of the site; or positively or negatively affect the conservation status of species or habitats for which the site is designated; or may affect the condition of the site or its interest/qualifying features.
- for ecosystems – effects may be significant if the project is likely to result in a change in ecosystem structure and function. Consideration should be given as to whether any processes or key characteristics will be removed or changed, if there will be an effect on the nature, extent, structure and function of component habitats or if there is an effect on the average population size and viability of component species.
- for habitats and species – consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance. Conservation status is defined as follows:
- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

CUMULATIVE AND INTER-RELATED EFFECTS

4.6.15 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered cumulatively with impacts of other proposed or permitted plans and projects, can result in significant effects.

4.6.16 More detail in respect of the approach used for the cumulative effects assessment is provided in Volume 1, Chapter 3, Annex 3.1: Cumulative Effects Assessment Methodology and in Section 4.14 of this chapter.

4.6.17 Inter-related effects assessment considers the potential for multiple impacts from the construction, operation or decommissioning of VE on the same receptor to result in a greater effect than each impact when considered in isolation. More detail in respect of the approach used for the inter-related effects assessment is provided in Volume 1, Chapter 3: EIA Methodology and in Section 4.15 of this chapter.

AVOIDANCE, MITIGATION AND ENHANCEMENT

4.6.18 Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied, residual effects are then identified along with any necessary compensation measures, and incorporation of proposals for biodiversity enhancement.

4.6.19 It is important for the EcIA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- **Avoidance** is used where an impact has been avoided, e.g., through changes in scheme design;
- **Mitigation** seeks to reduce and/ or eliminate the potential for significant effects to arise as a result of the project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects;
- **Compensation** describes measures taken to offset residual effects resulting in the loss of, or permanent damage to, ecological features despite mitigation. For example, it may take the form of replacement habitat provision or improvements to existing habitats; and
- **Enhancement** is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

4.6.20 Within the EcIA, mitigation measures should be described clearly and their likely success assessed. When seeking mitigation or compensation solutions, the CIEEM guidelines state that efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population that is significant at a county scale should ensure, wherever possible, there are no adverse effects upon the population status at a county scale. The relative geographic scale at which the effect is significant therefore has a bearing on the required outcome which must be achieved.

BIODIVERSITY NET GAIN

4.6.21 BNG is an approach to development activities that leaves the natural environment in a measurably better state than it was before. BNG works with and does not replace the mitigation hierarchy. It does not replace existing legal requirements (e.g., in relation to protected species) and it should not be applied to compensate for impacts on irreplaceable habitats. The VE project is cognisant of the good practice in respect of BNG and will align with the ten principles developed by CIEEM, IEMA and CIRIA (Baker *et al.*, 2019) summarised below.

- Principle 1. Apply the Mitigation Hierarchy. Avoid and then minimise impacts on biodiversity. As a last resort, and in agreement with stakeholders and decision-makers, compensate for losses that cannot be avoided.
- Principle 2. Avoid losing biodiversity that cannot be offset by gains elsewhere. Avoid impacts on irreplaceable biodiversity – these impacts cannot be offset.
- Principle 3. Be inclusive and equitable. Engage stakeholders in designing, implementing, monitoring and evaluating the approach to Net Gain. Share the benefits fairly among stakeholders.
- Principle 4. Address risks. Mitigate difficulty and/or uncertainty using well-accepted ways to add contingency when calculating biodiversity losses and gains.
- Principle 5. Make a measurable Net Gain contribution. Achieve a measurable, overall gain for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.
- Principle 6. Achieve the best outcomes for biodiversity. Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge.
- Principle 7. Be additional. Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e., do not deliver something that would occur anyway).
- Principle 8. Create a Net Gain legacy. Ensure Net Gain generates long-term benefits.
- Principle 9. Optimise sustainability. Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.
- Principle 10. Be transparent. Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

4.6.22 In respect of Principle 5, VE will use the Defra Metric 3.1 (or its successor) to demonstrate measurable Net Gain contribution. It is however worth highlighting here that since the metric is a proxy, it does not account for species-specific mitigation, compensation or enhancement. Loss/ gains in this respect will be measured against monitoring targets set out within the relevant European Protected Species Licence(s) (if applicable) and OLEMP that will be submitted alongside the ES.

4.6.23 The VE approach to BNG is set out in more detail in the BNG approach note at Volume 5 Annex 4.14 Biodiversity Net Gain Approach Note. As set out in Section 5 of that document, a BNG assessment is not being submitted as part of the PEIR consultation as there is insufficient detail to provide one. This is because habitat condition assessment data collected in summer 2022 is still being compiled and reviewed, there is not yet an indicative project footprint and compensation/ enhancement proposals have yet to be determined.

4.6.24 Additional detail will be provided within the ES, based upon the indicative scheme design. This will include baseline and post-project plans as well as a completed BNG Metric 3.1 spreadsheet.

4.6.25 The requirements for auditing against the BNG objectives will be set out within an appendix to the OLEMP.

4.7 UNCERTAINTY AND TECHNICAL DIFFICULTIES ENCOUNTERED

4.7.1 At the time of writing, most ecological surveys required for robust impact assessment are either ongoing or yet to be reported and therefore it is only possible to assess impacts on a limited range of important ecological features at this stage. A full assessment for all important ecological features will be provided in the ES.

4.7.2 No significant limitations were associated with the PEA, or the Habitat Survey north of the A120. Extreme hot and dry weather may have limited data accuracy in respect of species assemblage and abundance for areas south of the A120, in particular at grassland habitats. This limitation has been taken into account when evaluating habitats and potential impacts. Please refer to the reports in Volume 5, Annex 4.1: Preliminary Ecological Appraisal Report - 4.3: Offshore Ornithology Collision Risk Modelling for details in respect of the main assumptions and limitations associated with each.

4.7.3 In total, fourteen ponds within 250 m of the RLB were not accessible for GCN survey. Five of these are north of the A120 and the following comments have been made based on aerial images and OS maps:

- Pond 89 – agricultural reservoir, more than 500 m from other mapped ponds.
- Pond 92 – pond in scrub in field corner, more than 500 m from other mapped ponds.
- Pond 93 – pond with scrub in field corner, more than 500 m from other mapped ponds.
- Pond 96 – pond with scrub at field edge. One other pond within 500 m, located 470m distant (outside of survey area).
- Pond 97 – pond in woodland adjacent to road, more than 500 m from other mapped ponds.

The landscape north of the A120 contains widely dispersed ponds and no positive GCN results from those surveyed, or from desk study data. On balance, it is considered highly unlikely that a significant population of GCN are present in any of the unsurveyed ponds.

4.7.4 South of the A120 pond clusters are increasingly present, and in particular around Thorpe le Soken. The following comments are made in respect of the unsurveyed ponds south of the A120, based on aerial images and OS maps:

- Pond 21 – Large pond within scrubby area, just beyond 250m from the RLB. Four other ponds within 500 m (PO080 and three others beyond the survey area).
- Pond PO80 – indistinct, within horse paddock/residential curtilage. Five other ponds within 500m, two of which (pond numbers 23 and 24) are within the survey area. Pond 24 occurs 365 m to the north west, and GCN are confirmed present.

The above two ponds occur within the same pond cluster (based on 500 m dispersal distance),and are theoretically within the range of GCN present at pond 24. GCN presence is therefore presumed at Pond 21 and Pond PO080.

- Pond PO196 – relatively recent water management feature (part of ongoing residential development) at junction of Henderson Road and Landermere Road. No vegetation evident on aerial images, shown as built up areas and

gardens on Habitat Plan. No other mapped ponds within 500 m of PO196. GCN considered highly unlikely to be present based upon these factors, and presumed absent for the basis of this assessment.

- Pond 31- indistinct, within scrub/woodland at field corner.
- Pond 32 – indistinct, within scrub/woodland at field corner.
- Pond 35 – within scrub at field edge.

The above three ponds occur within the same pond cluster (based on 500 m dispersal distance), which also includes Pond 34. The closest GCN record to this cluster lies approximately 730 m south of Pond 34. There is considered insufficient evidence upon which to determine the likely presence of GCN at these ponds, and on that basis a precautionary approach has been applied and presence assumed. However, if possible, access will be sought in 2023 to conclusively determine if the species is present.

- Pond 58 – within woodland near to Tendring Brook, just over 250 m distant from RLB.
- Pond 59 – within woodland near to Tendring Brook, just over 250 m distant from RLB.

The above two ponds are within a cluster of thirteen (assuming 500 m dispersal distance), of which GCN presence is confirmed within five ponds. The closest of these (Pond 57) occurs 332m south-east of Pond 58. GCN presence is therefore assumed at Ponds 58 and 59.

- Pond 68 – farm reservoir/lake with scrub and trees adjacent at Tendring Heath There are two other waterbodies within 500 m, both of which are outside the survey area. One is a large lake surrounded by scrub and trees 240 m to the west south-west and the other is a field pond about the same distance to the south-west. The field ponds appears to potentially be seasonal based on aerial images. The nearest GCN record is 870 m to the north-west (Pond 72). Pond 68 is referenced as PO123 in Figure 3 k in the North Falls Extended Phase 1 Habitat Report at Volume 5, Annex 4.8, but there is no additional information provided for it.

There is considered insufficient evidence upon which to determine the likely presence of GCN at this pond, and on that basis a precautionary approach has been applied and presence assumed. However, if possible, access will be sought in 2023 to conclusively determine if the species is present.

4.7.5 The non-breeding bird surveys undertaken for the onshore ECC and OnSS search areas in 2021-22 (Volume 5, Annex 4.12) covered almost all of the area within the onshore RLB and 400 m buffer. However, following minor changes to the onshore ECC and OnSS search areas after the surveys were completed, there are a few small areas in which survey coverage didn't include all of the land within the 400 m buffer. These are shown in Figure 4.2 together amount to 153.2 ha, which represents 4.6% of the area within the onshore RLB and 400 m buffer. In many cases target species were recorded in these areas anyway, despite lying just outside the survey area boundary (see Figures 2-7 in Volume 5, Annex 4.12: North Falls OWF Onshore Cable Route). Given the small area affected, much of which was included in the survey anyway, the gaps in survey coverage are not likely to significantly affect the conclusions of the assessment. Note also that a second year of non-breeding bird surveys for the onshore ECC and OnSS search areas are currently in progress and will cover the small gaps in coverage during the 2021-22 surveys. Further details of the ongoing surveys will be provided in the ES in due course.

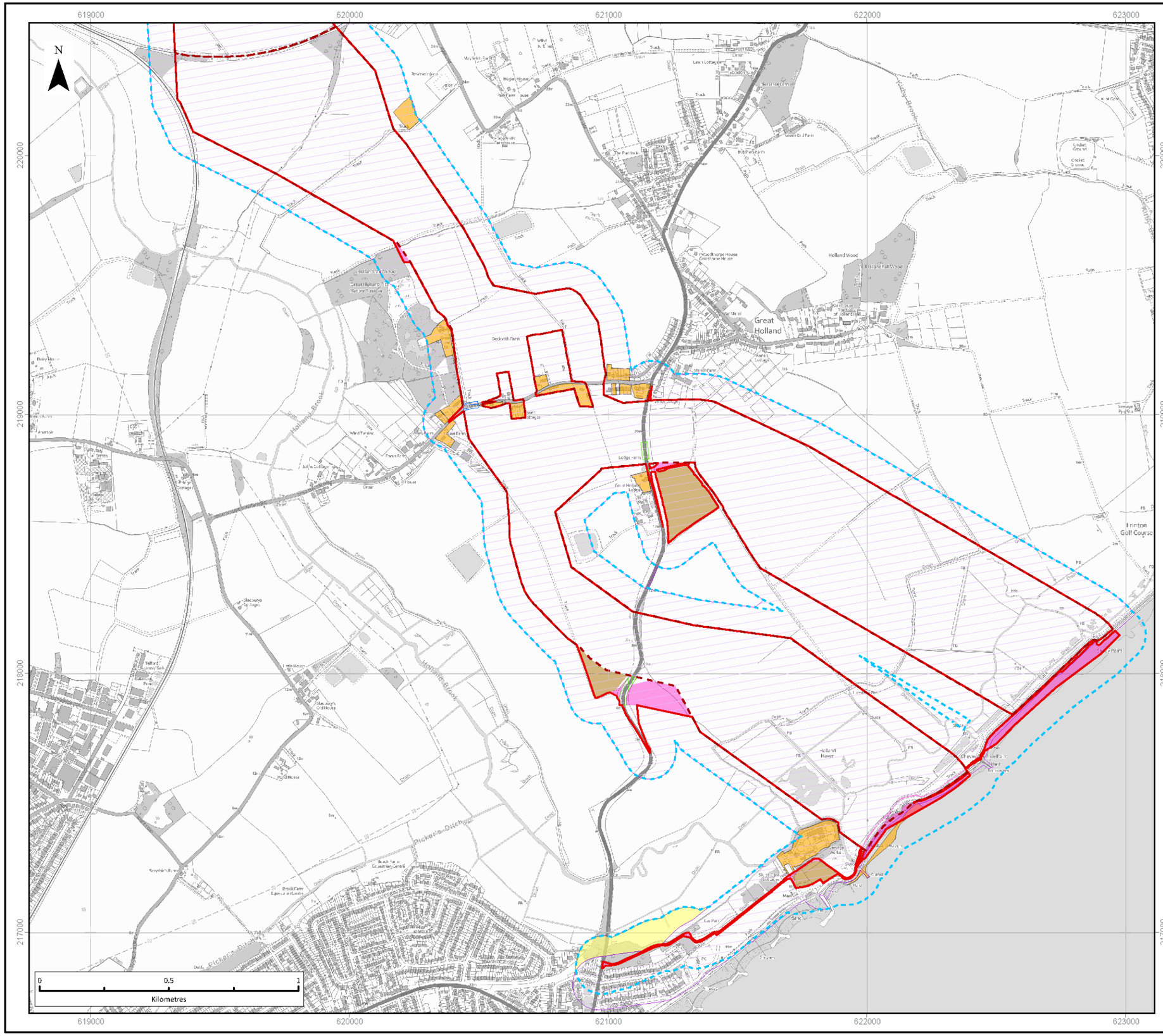
4.7.6 Surveys for non-breeding birds did not include surveys undertaken at night, which would have been very difficult to carry out in any meaningful way over such a large area. It is acknowledged that some wader species, such as lapwing and golden plover, can feed on agricultural land at night, potentially using different fields at night to those used during the day. However, the assessment is based on the precautionary assumption that such species could use any suitable fields within the relevant study area, not just the fields they were recorded using during the day. Therefore the lack of nocturnal survey data makes no difference to the assessment of habitat loss and disturbance. Note also that it is very unlikely that peak counts of birds used in the assessment would have been larger at night than during the day, primarily due to limitations in viewing and counting birds at night. The lack of nocturnal survey data would therefore not affect the count data on which the assessment is based.

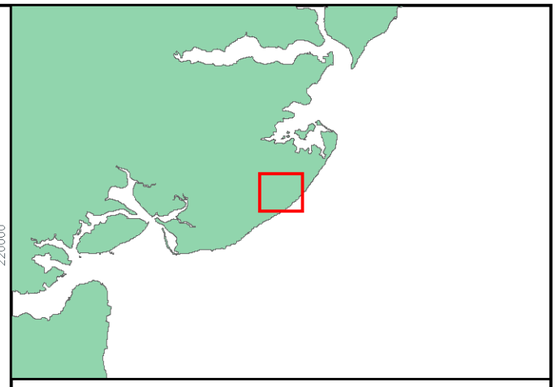
4.7.7 Additional limitations associated with the bird surveys completed are described in Section 2.2.3 of Volume 5, Annex 4.6: Wintering Bird Survey; Section 2.2 of Volume 5, Annex 4.12: North Falls OWF Onshore Cable Route and Section 2.4 of Volume 5, Annex 4.13: North Falls OWF Onshore Land Area. All of the limitations described are minor and none significantly affect the conclusions of the assessment. No survey limitations are described for the North Falls OWFL non-breeding bird surveys at the landfall area in either 2020-21 or 2021-22 (see Volume 5, Annex 4.10: North Falls OWF Onshore Landfall Area – 2020_21 Non Breeding Bird Surveys and Volume 5, Annex 4.11: North Falls OWF Onshore Landfall Area – 2021_22 Non Breeding Bird Surveys).

4.7.8 As parts of the scheme design remain to be resolved, the Maximum Design Scenario (MDS) identified in Table 4.10 has been selected as having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (Volume 3, Chapter 1: Onshore Project Description). Effects of greater significance are not predicted to arise should any other development scenario to that assessed here be taken forward in the final design scheme, within the assessed boundaries.

4.7.9 Due to recent design developments, certain areas of the RLB have not been subject to detailed habitat survey; these areas are identified on

4.7.10 . Aerial photograph interpretation has been used to establish the habitat types present, and have determined that arable land and associated field boundaries are present. This will be ground truthed in early 2023, and any additional surveys necessary to inform the EIA shall be undertaken and included within the ES.





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)
- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Areas with Potential Habitat Data Gaps

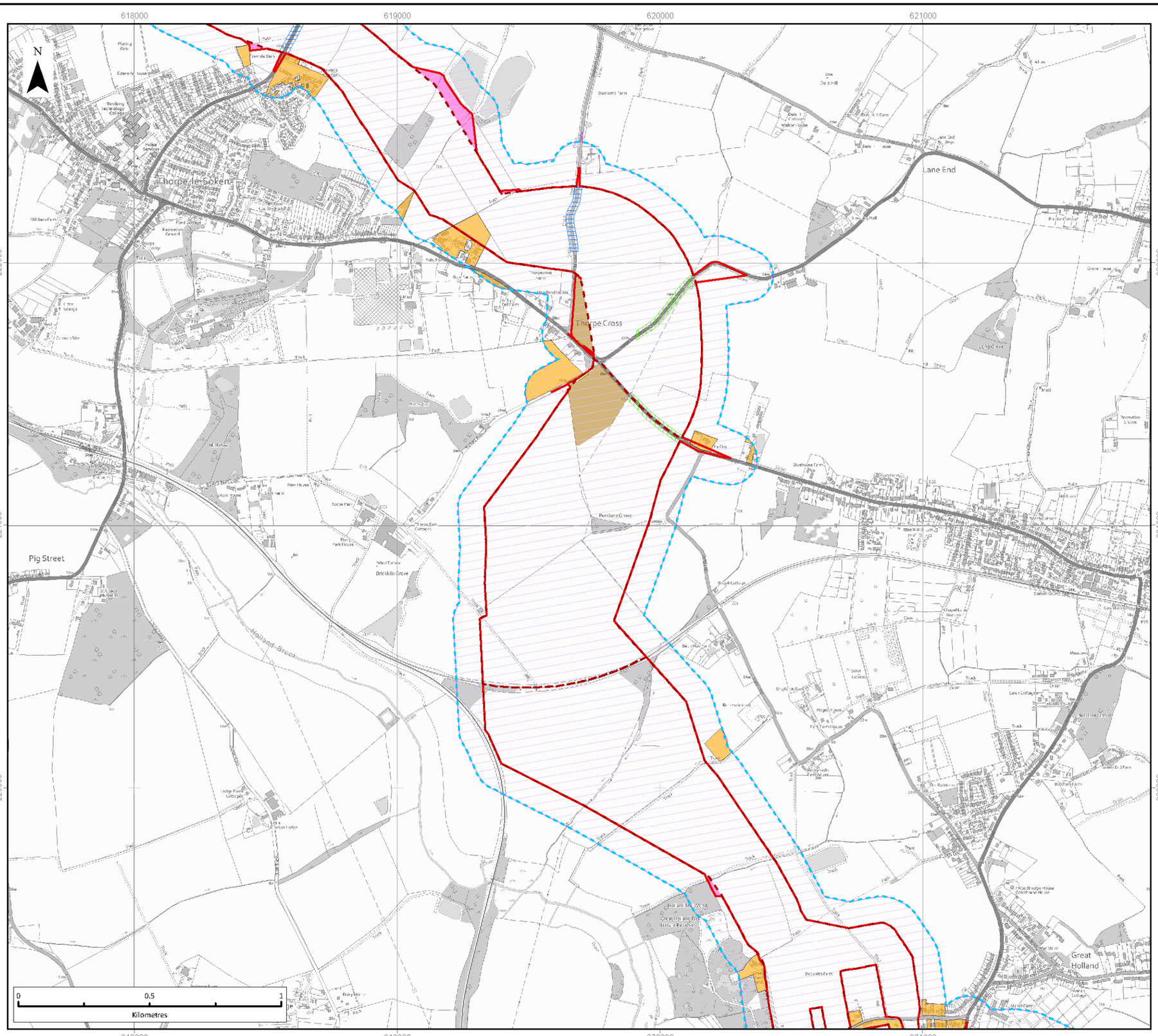
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

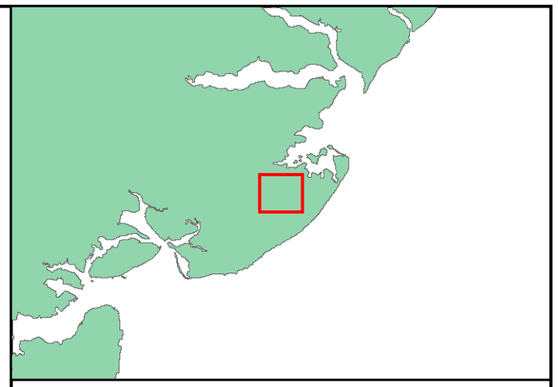
DRAWING NUMBER:

FIGURE 4.1
Page 1 of 6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:15,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)
- No Survey Access: Aerial Image Interpretation Used (2022)

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Areas with Potential Habitat Data Gaps

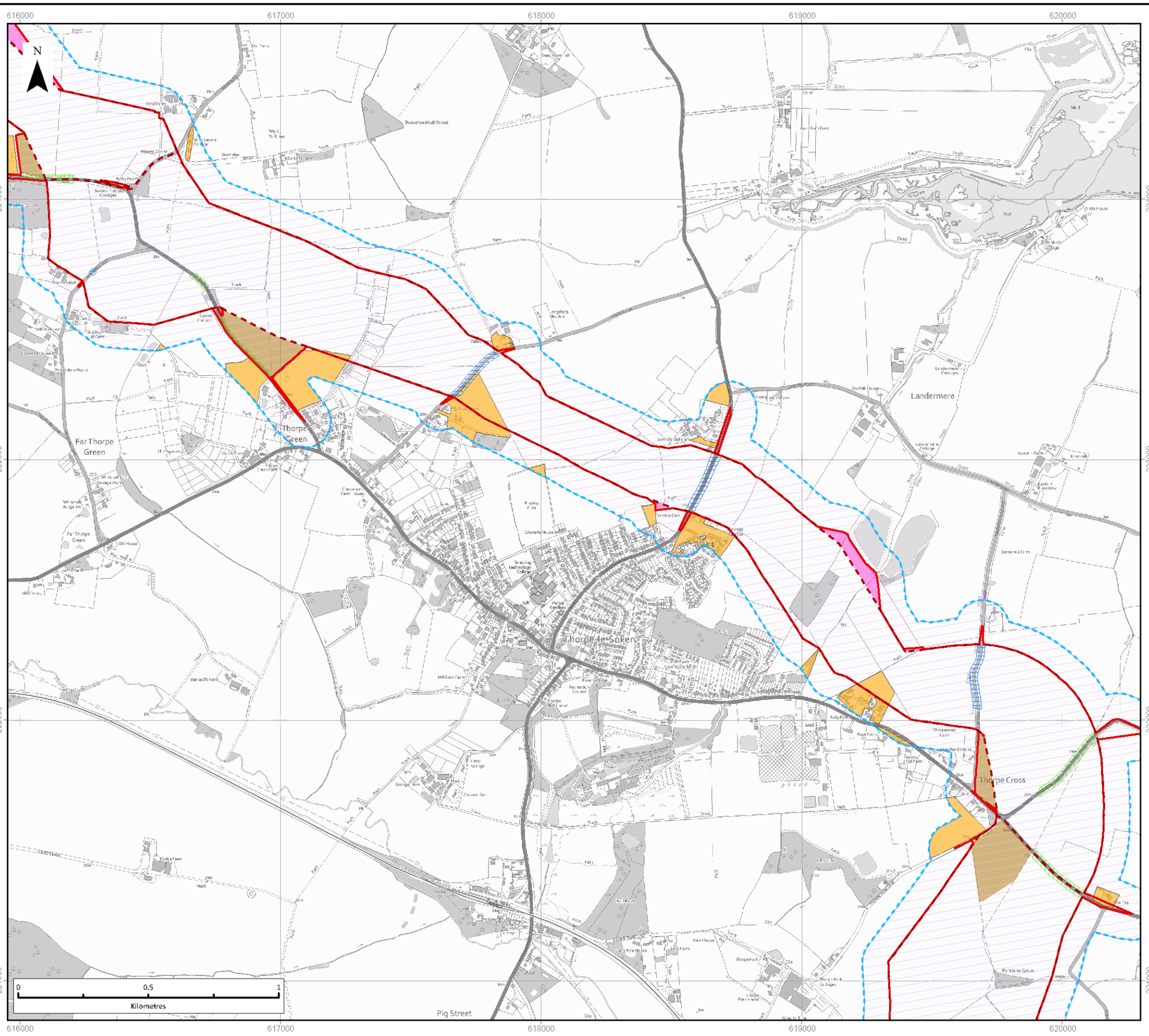
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

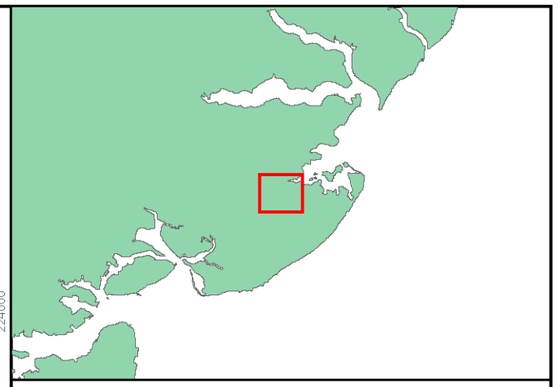
DRAWING NUMBER:

FIGURE 4.1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:15,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)
- No Survey Access: Aerial Image Interpretation Used (2022)

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Areas with Potential Habitat Data Gaps

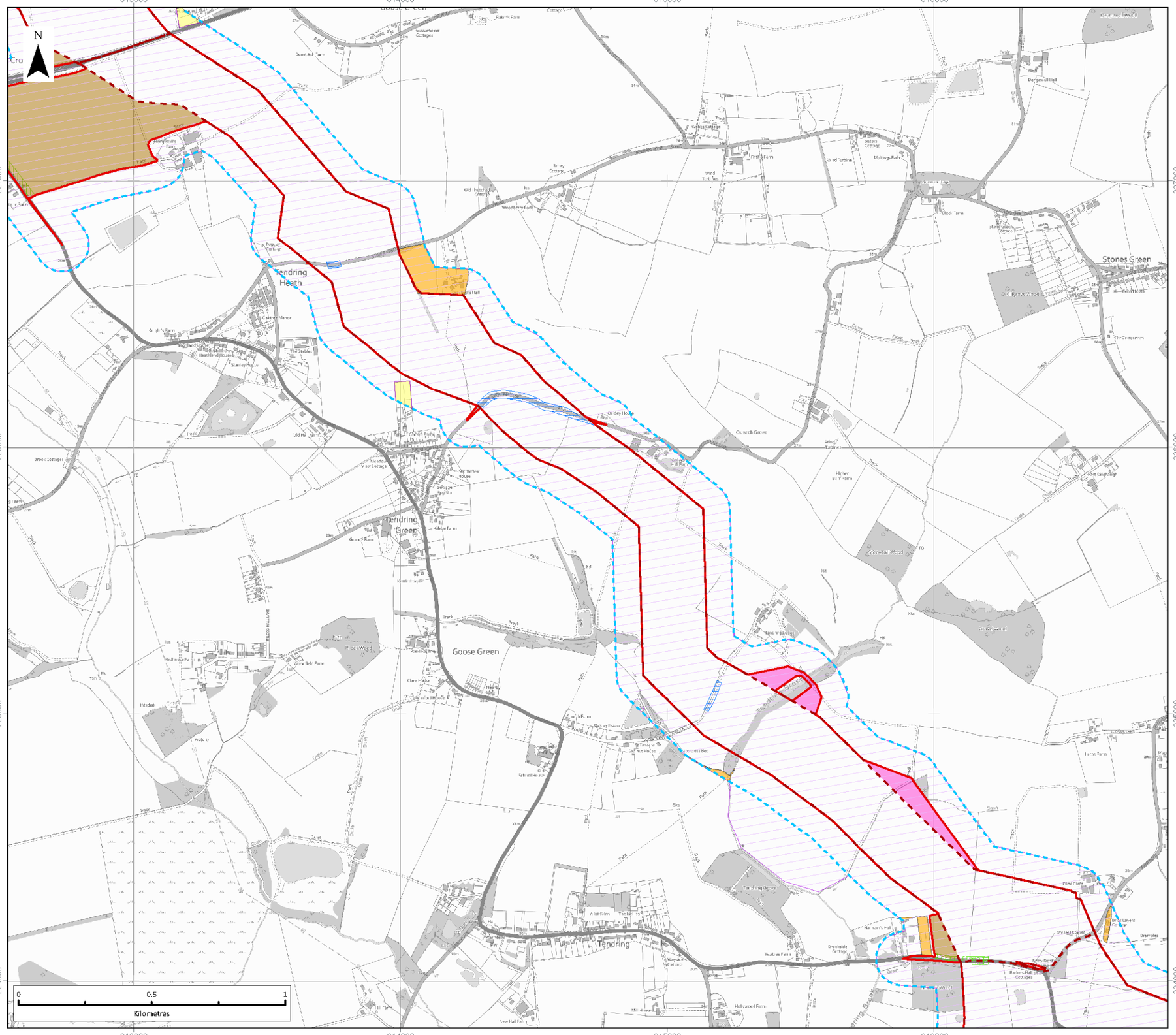
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

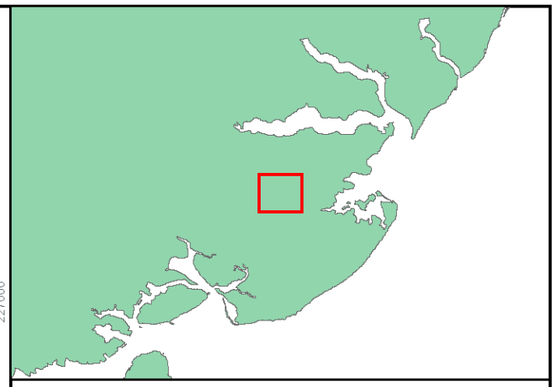
DRAWING NUMBER:

FIGURE 4.1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:15,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)
- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Areas with Potential Habitat Data Gaps

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

FIGURE 4.1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:15,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

609000 610000 611000 612000 613000

229000 228000 227000 226000

N

SSA East

SSA West

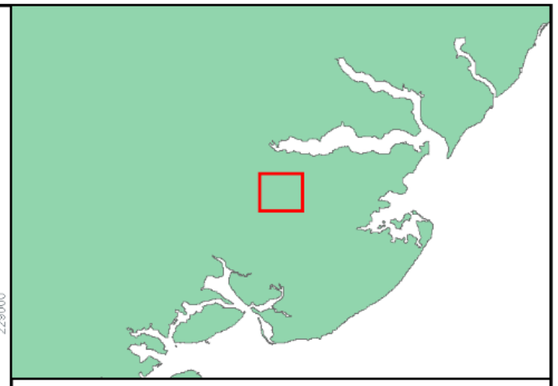
Bromley

Horsleycross Street

Horsley Cross

Holland Brook

0 0.5 1
Kilometres



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access
- SLR Habitat Survey Area (2022)
- RHDHV Habitat Survey Area (2022)
- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Areas with Potential Habitat Data Gaps

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

FIGURE 4.1
Page 5 of 6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:15,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

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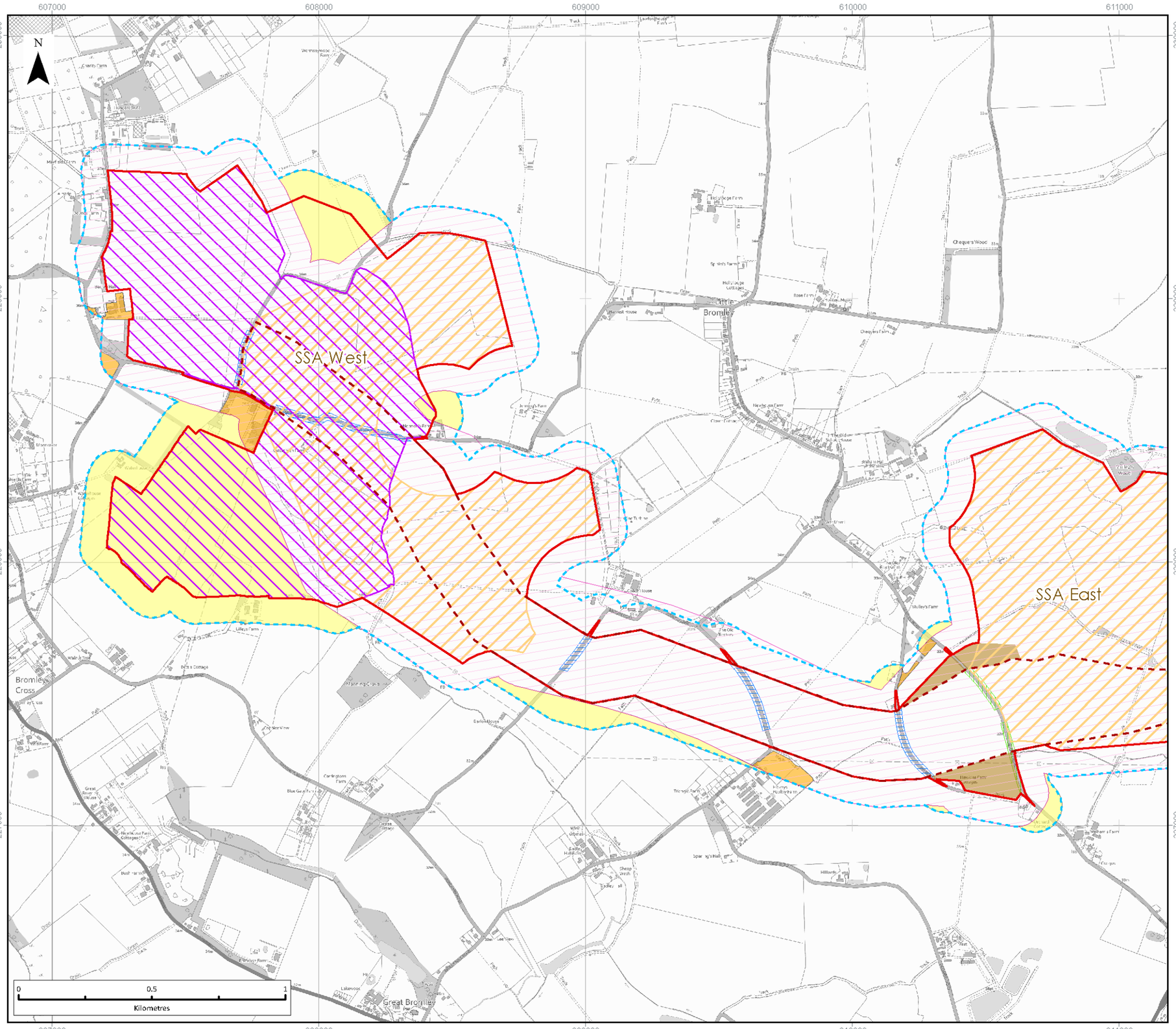

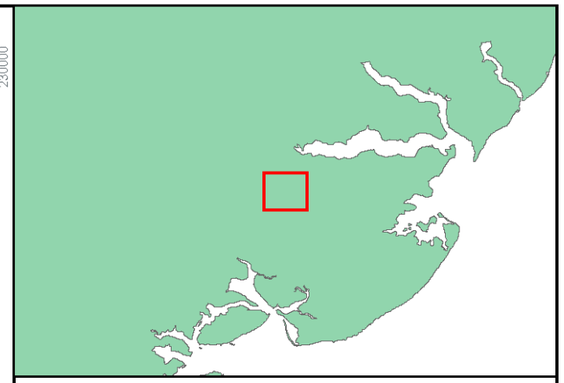

LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access
- SLR Habitat Survey Area (2022)
- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Areas with Potential Habitat Data Gaps

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

FIGURE 4.1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:15,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

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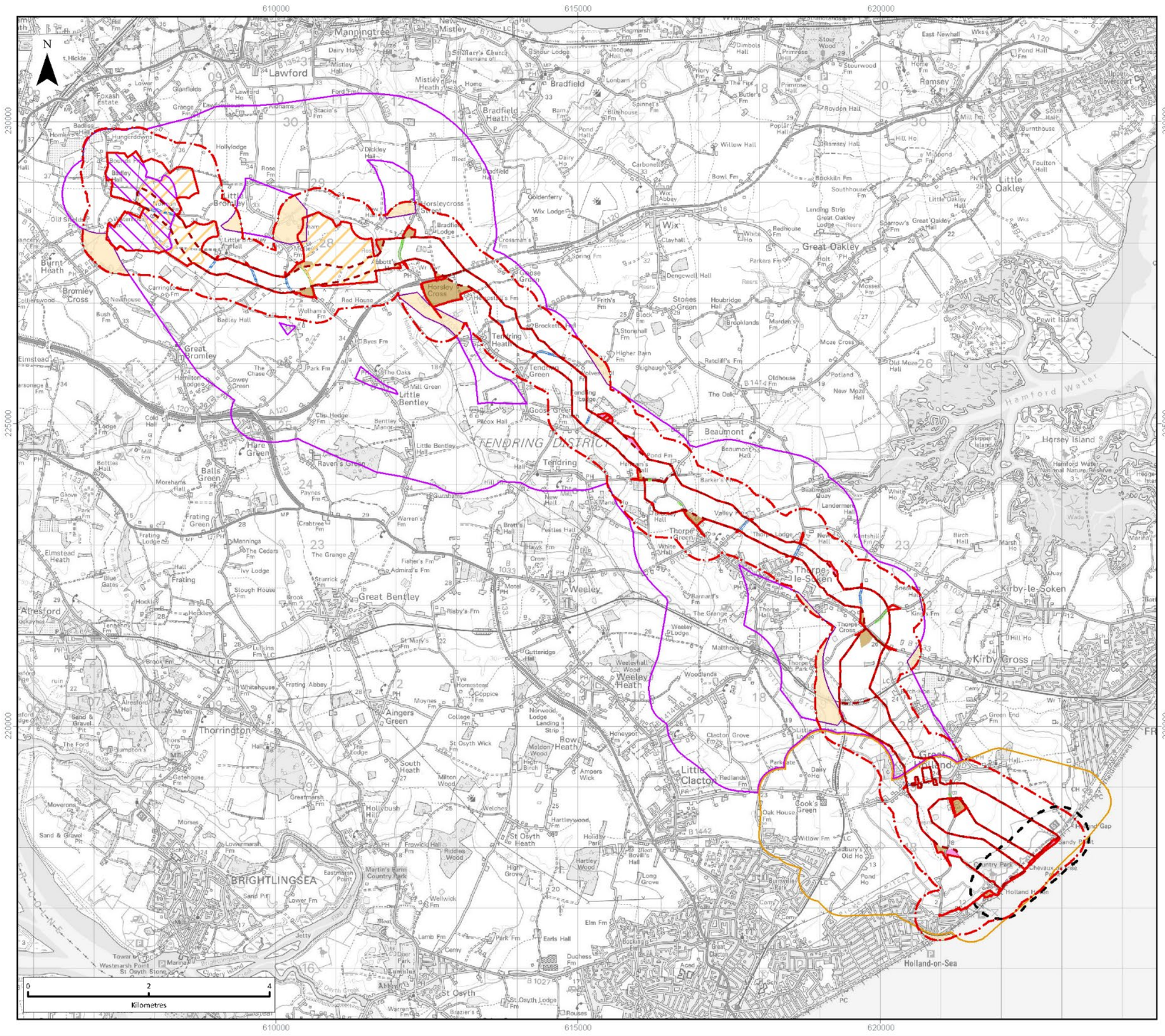
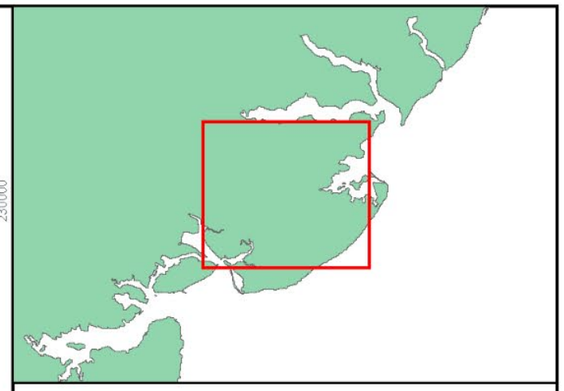




LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 400 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Five Estuaries Landfall Locations Survey Area Non-breeding 2021-22
- North Falls Landfall Survey Area Non-breeding 2020-21 & 2021-22 and Breeding 2021
- North Falls Onshore Cable Route Survey Area Non-breeding 2021-22
- Areas within Onshore Red Line Boundary 400m Buffer that Lie Outside Relevant Survey Areas

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Bird Survey Areas

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:

FIGURE 4.2

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:65,000	A3	OSGB1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

4.8 EXISTING ENVIRONMENT

GENERAL CONTEXT

4.8.1 The study area is situated on and close to the Essex coast within the Tendring District. The landfall area is situated between Holland-On-Sea and Frinton-On-Sea and the onshore export cable corridor (ECC) continues northwest inland, crossing predominantly agricultural land. The OnSS search areas are located north of the A120 within intensively agricultural land, that also includes hedgerows and small areas of woodland.

4.8.2 The Holland Brook, sometimes called the Holland River, runs parallel to the west of the cable corridor. Its source begins near Little Bentley, and it meets the sea at the proposed landfall area at Little Holland. The Tendring Brook is a tributary of the Holland Brook and bisects the cable corridor northeast of Tendring. Several smaller watercourses are also present within the survey area.

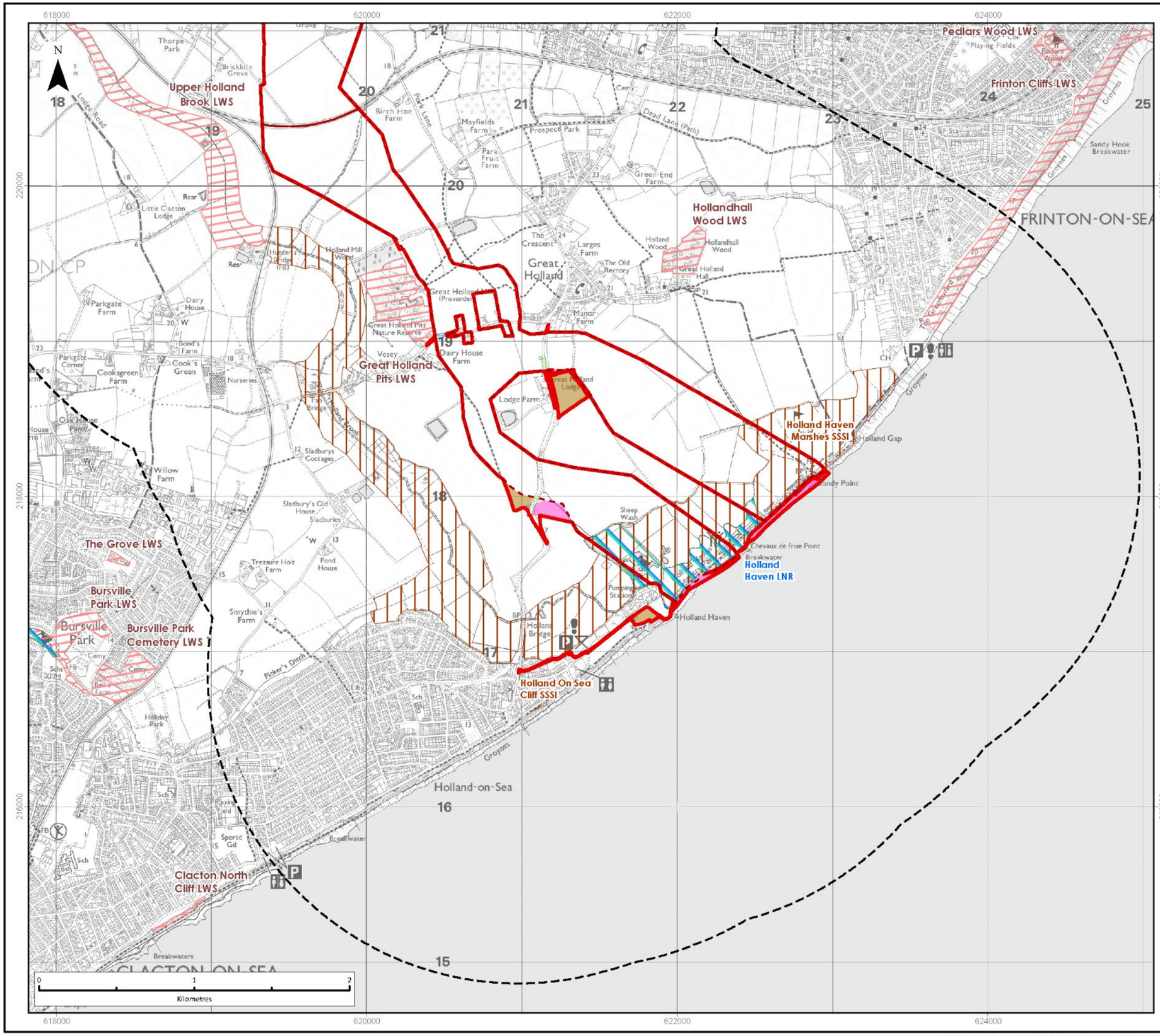
4.8.3 The Survey Area comprises two broadly distinct areas:

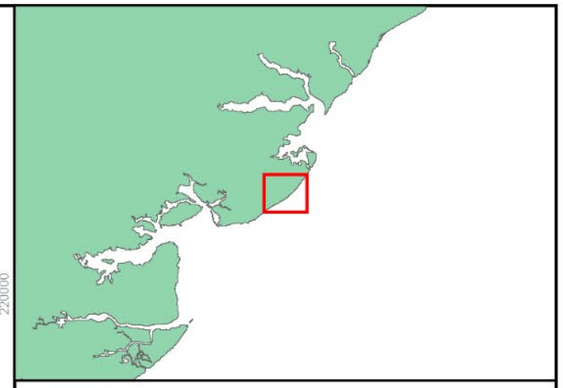
- Coastal Strip including Holland Haven Marshes SSSI: Low lying agricultural fields with areas of fen, scrub and hedgerows, Frinton Golf Course, and including the southeastern section of the Holland Brook. A pedestrian footpath is present between these and the adjacent beach, which also includes man-made sea-defences and a small area of maritime cliffs and slopes;
- North of Holland Haven Marshes SSSI: habitats are predominantly agricultural in nature comprising various cereal crops, clover leys and pasture, intersected by hedgerows and tributaries of the Holland Brook, other water courses and land drains. Waterbodies (including several irrigation reservoirs) and small areas of woodland are occasional. Wide arable field margins are few with many fields cropping right up to the hedge base. The onshore ECC occasionally passes residential dwellings, farm buildings and skirts around small villages/hamlets.

DESIGNATED SITES

4.8.4 Figure 4.3 shows the location of statutory and non-statutory designated sites in relation to the project. Summary descriptions for each site and a brief rationale for scoping sites in or out of the assessment via consultation on the PEA report are provided in Table 4.3 and Table 4.4 respectively. Full descriptions for the qualifying/ notified features for each site are appended at Volume 5 Annex 4.15: Statutory Designated Sites Qualifying or Notified Features. Note that Table 4.4 includes some designated sites which have been scoped into the assessment of air quality effects (see Volume 3, Chapter 11: Human Health & Climate Change) but have been scoped out of the assessment presented in this chapter.

4.8.5 Further information in respect of SACs, SPAs and Ramsar sites can also be found in the Habitats Regulations Assessment (HRA) Screening Assessment, the conclusions of which are presented in the VE RIAA.





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 2 km Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Local Wildlife Site (LWS)

Data Source:
© Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2021. Contains data from Tendring District Council.

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Statutory & Non-Statutory Sites

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	DB	JS

DRAWING NUMBER:

FIGURE 4.3
Page 3 of 7

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:25,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

Table 4.3: Designated sites scoped into the assessment

Site name & designation	Reason for notification/ designation	Reason for scoping in
Hamford Water SSSI NNR SAC SPA and Ramsar	Hamford Water is of international importance for breeding little tern *Sternula albifrons* and wintering dark-bellied brent geese *Branta bernicla*, wildfowl and waders, and of national importance for many other bird species. It also supports communities and species of coastal plants which are rare or extremely local in Britain, including hog's Fennel *Peucedanum officinale* which elsewhere is found only in Kent. It is also one of only two localities for Fisher's estuarine moth *Gortyna borelii lunata.*	Located 717 m east of the onshore RLB and hydrologically linked to it. A tributary joins the onshore RLB in one area and crosses in another. Indirect impacts possible through being functionally linked to land used by designated site bird populations. For Fisher's estuarine moth (a feature of this site) see the invertebrate section 4.8.21 onward.
Stour and Orwell Estuaries SSSI SPA and Ramsar	The Stour Estuary is nationally important for 13 species of wintering waterfowl and three species on autumn passage. The estuary is also of national importance for coastal saltmarsh, sheltered muddy shores, two scarce marine invertebrates and a scarce vascular plant assemblage. The component SSSIs are the Stour Estuary SSSI, Orwell Estuary SSSI and Cattawade Marshes SSSI. The Stour Estuary includes an RSPB reserve.	Located 3,146 m north-north-east from the onshore RLB with no hydrological links. Indirect impacts possible through being functionally linked to land used by designated site bird populations.
Colne Estuary (Mid-Essex Coast Phase 2) SSSI NNR SPA and Ramsar	The Colne Estuary is of international importance for wintering dark-bellied brent geese and black-tailed godwit *Limosa limosa* and of national importance for breeding little tern and five other species of wintering waders and wildfowl. The variety of habitats, which include mudflat, saltmarsh, grazing marsh, sand and shingle spits, disused gravel pits and reed	Located 7,256 m south-west from the onshore RLB with no hydrological links. Indirect impacts possible through being functionally linked to land used by designated site bird populations.

Site name & designation	Reason for notification/ designation	Reason for scoping in
	beds, support outstanding assemblages of invertebrates and plants.	
Abberton Reservoir SPA Ramsar SSSI	Abberton is the largest freshwater body in Essex with a water area of about 500 ha, and one of the most important reservoirs in Britain for wildfowl. About thirty thousand birds visit the reservoir annually including internationally important numbers of one species and nationally important members of twelve others.	Located 11,465 m west-south-west from the onshore RLB and not hydrologically linked to it. Indirect impacts possible through being functionally linked to land used by designated site bird populations.
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA Ramsar SSSI NNR	The Blackwater Estuary is the largest estuary in Essex north of the Thames and, is one of the largest estuarine complexes in East Anglia. Its mudflats, fringed by saltmarsh on the upper shores, support internationally and nationally important numbers of overwintering waterfowl. Shingle and shell banks and offshore islands are also a feature of the tidal flats. The surrounding terrestrial habitats; the sea wall, ancient grazing marsh and its associated fleet and ditch systems, plus semi-improved grassland are also of high conservation interest. This rich mosaic of habitats supports an outstanding assemblage of nationally scarce plants and a nationally important assemblage of rare invertebrates.	Located 13,923 m from the onshore RLB and not hydrologically linked to it. Indirect impacts possible through being functionally linked to land used by designated site bird populations.
Holland Haven Marshes SSSI LNR	The ditch network at Holland Haven Marshes represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, which include several nationally and locally scarce species. The adjoining grasslands are of botanical importance as well as	Located within the landfall area and the onshore ECC.

Site name & designation	Reason for notification/ designation	Reason for scoping in
	acting as a buffer zone to the ditch system. Further interest is provided by the aquatic and terrestrial invertebrates and the birds which frequent the area, especially in winter. Includes Holland Haven LNR.	
LoWS within or adjacent to the onshore RLB, including > Simon's Wood > Great Holland Pits; and > Thorpe Green	**Simon's Wood** This ancient woodland has been densely replanted with conifers, particularly pines *Pinus* spp. with scattered larch *Larix decidua*. Supports S41 habitat lowland mixed deciduous woodland and ancient woodland. **Great Holland Pits** The varied habitats of this ex-gravel pit include heathy grassland, pasture, a remnant of old woodland, large and small pools and wet depressions. Supports S41 habitat open mosaic habitat on previously developed land. **Thorpe Green** Thorpe Green contains a good mix of grass and herb species. Supports S41 habitat lowland meadow.	LoWS directly adjacent or partly lies within onshore RLB and may be directly affected.
LoWS within c.200m of the onshore RLB, including > Little Bromley Churchyard > Manning Grove > Upper Holland Brook.	**Little Bromley Churchyard** This small churchyard represents a remnant of the dry acid grassland that would formerly have been widespread on the Tendring plateau. It is now the only such grassland, other than the nearby Great Bromley churchyard, that remains in an otherwise intensively cultivated landscape. Supports S41 habitat lowland meadow. **Manning Grove**	LoWS within 200 m of the onshore RLB and may be indirectly affected.

Site name & designation	Reason for notification/ designation	Reason for scoping in
	Ancient woodland. Lowland mixed deciduous woodland. **Upper Holland Brook** This site comprises grassland, scattered trees, secondary woodland, scrub and a reservoir along the upper reaches of the Holland Brook, upstream from the SSSI. Near Hunters Bridge (at the downstream end) the first part of this site is flood plain grazing marsh, currently grazed by cattle. Located west of Rice Bridge, this site continues as a former brickfield which has now developed into scrub woodland.	

Table 4.4: Designated sites scoped out of the assessment

Site Name and Designation	Reason for Notification/ Designation	Reason for Scoping Out
Essex Estuaries SAC	Essex Estuaries SAC contains a very wide range of marine and estuarine sediment communities, including extensive saltmarsh, and intertidal mudflats and sandflats. The component SSSIs are the Blackwater	Located 7,256 m south-south-west from the onshore RLB. No direct impacts anticipated due to separation distance and the nature of the qualifying habitats. Potential indirect impacts as a result of changes to air quality are assessed in Volume 3 Chapter 11: Human Health & Climate Change.

Site Name and Designation	Reason for Notification/ Designation	Reason for Scoping Out
	Estuary SSSI, Colne Estuary SSSI, Crouch and Roach Estuaries SSSI, Dengie SSSI and Foulness SSSI.	
Weeleyhall Wood SSSI	Weeleyhall Wood is one of the largest ancient woods in the Tendring peninsula. It contains one of the best examples in Essex of base-poor springline alder woodland, a type of woodland which is rare in the county, as well as good examples of lowland hazel-pedunculate oak and some wet ash-maple woodland, and chestnut coppice-with-standards derived from	The site is approximately 2 km from the onshore RLB and is hydrologically linked via a tributary of the Holland Brook (i.e. the woodland is upstream of the RLB). Potential indirect effects are limited to air quality changes and have been included in the air quality assessment at Volume 3, Chapter 11: Human Health & Climate Change.

Site Name and Designation	Reason for Notification/ Designation	Reason for Scoping Out
	these last two. The alder valleys support a rich ground flora. Additional interest is provided by two ponds and damp, grassy rides.	
All other LoWS not listed in Table 4.3	Various	All other LoWS are located >250 m from the onshore RLB and are not hydrologically linked to it. No direct or indirect impacts are anticipated as a result of lack of potential impact pathways (with the exception of air quality impacts which are assessed for relevant LoWS at Volume 3, Chapter 11: Human Health & Climate Change). They are therefore scoped out of further assessment.

HABITATS

4.8.6 Table 4.5 shows the habitat types present within the survey area and those within the onshore RLB itself (further details are provided in the PEA and habitat survey reports (Volume 5, Annex– 5.1: Minerals Safeguarding Assessment - 5.3: Habitat and Hedgerow Survey Report, South of A120 and 5.8: Traffic and Transport Technical Baseline Report). Those in **bold** are S41 habitat types.

Table 4.5: Habitats present within the survey area

UK Hab Primary Code	Habitat Type	Present in Survey Area	Present within RLB
c1	Arable and horticulture	x	x
c1a6	**Arable margins sown with wild flowers or a pollen and nectar mix**	**x**	**x**
c1a8	**Game bird mix strips and corners**	**x**	**x**
c1b	Temporary grass and clover leys	x	x
c1c	Cereal crops	x	x
c1c7	Other cereal crops	x	x
c1d	Non-cereal crops	x	x

UK Hab Primary Code	Habitat Type	Present in Survey Area	Present within RLB
c1d8	Other non-cereal crops	x	x
f2d	Aquatic marginal vegetation	x	
f2e	**Reedbeds**	**x**	
g1c	Bracken	x	x
g3	Neutral grassland	x	
g3a	**Lowland meadow**	**x**	**x**
g3c	Other neutral grassland	x	x
g3c5	*Arrhenatherum* neutral grassland	x	x
g4	Modified grassland	x	x
h2a	**Hedgerow (priority habitat)**	**x**	**x**
h2b	Other hedgerows	x	
h3	Dense scrub	x	x
h3a	Blackthorn scrub	x	
h3d	Bramble scrub	x	x
h3h	Mixed scrub	x	x
r1	Standing open water and canals	x	x
r1a	**Eutrophic standing waters**	**x**	**x**
r2	Rivers and streams	x	
s1	Inland rock	x	x
t1	Littoral Rock	x	x
t2	Littoral Sediment	x	x
t2h	Beach	x	
u1	Built-up areas and gardens	x	x
u1b	Developed land; sealed surface	x	x
u1b5	Buildings	x	x
u1b6	Other developed land	x	x
u1c	Artificial unvegetated, unsealed surface	x	x
u1d	Suburban/ mosaic of developed/ natural surface	x	x
u1e	Built linear features	x	x
w1	Broadleaved mixed and yew woodland	x	x

UK Hab Primary Code	Habitat Type	Present in Survey Area	Present within RLB
w1f7	**Other Lowland mixed deciduous woodland**	**x**	**x**
w1g	Other woodland; broadleaved	x	x
w1g6	Line of trees	x	x
w1g7	Other broadleaved woodland types	x	x
w1h	Other woodland; mixed	x	x
w1h5	Other woodland; mixed; mainly broadleaved	x	x
w1h6	Other woodland; mixed; mainly conifer	x	x
w2c	Other coniferous woodland	x	

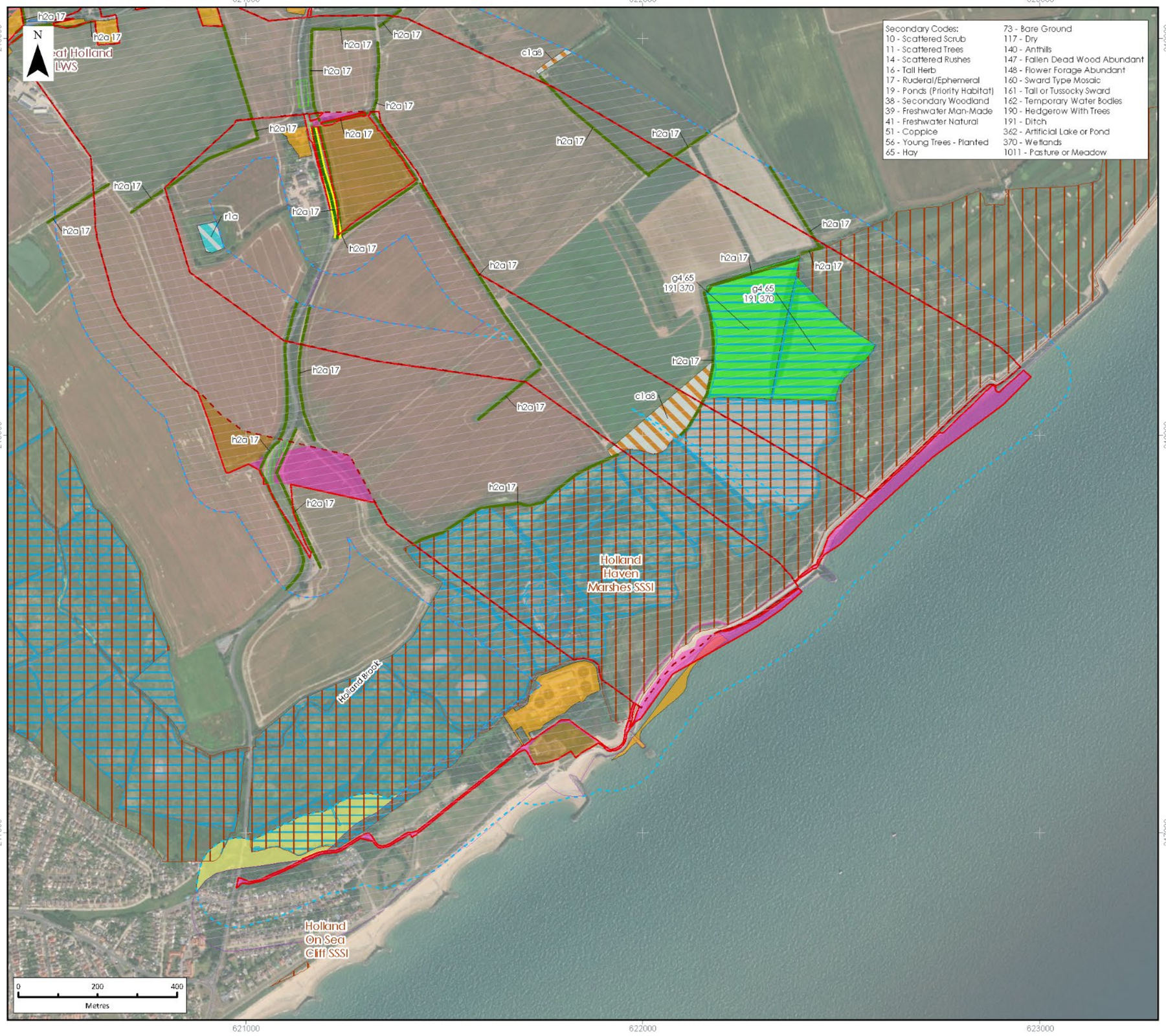
4.8.7 The above primary habitat types also include secondary habitats such as (but not limited to) scattered trees or scrub, details of secondary habitats for each habitat polygon or line feature have been retained within a GIS and can be provided upon request.

4.8.8 Some S41 habitat types exist as habitat mosaics and these are indicated via the application of relevant secondary codes which can be applied across a range of habitat types. Within the survey area the most pertinent including: –:

- 19 - Ponds (priority habitat) – note that when ponds are too small to map (i.e., less than 5 m x 5 m), this code has been applied to the area of habitat they occur within.
- 25 - Coastal and Floodplain Grazing Marsh (priority habitat) – this applies to some of the low-lying fields near to the Holland Brook, irrespective of grassland type.
- 33 Ancient Woodland Site – this applies to ASNW (and PAWS, with PAWS having the additional code 36 Plantation, applied).

4.8.9 Four hedgerows within the survey area are considered to meet the definition of 'important hedgerows' in relation to wildlife and landscape criteria under the Hedgerow Regulations 1997, as shown on Figure 4.4 (for consideration of historically important hedgerows please refer to Volume 3, Chapter 7 Onshore Archaeology and Cultural Heritage).

4.8.10 Figure 4.4 shows the type and location of important hedgerows and S41 habitats within the survey area (i.e., RLB plus 100 m), including secondary habitat codes for each. It also includes the locations of notable plant species recorded during field survey (refer to Paragraph 4.8.13.



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)

Important Hedgrow (Hedgerow Regulations Assessment)

- Important Hedgrow

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)

Section 41 Habitats

- c1a8 - Game Bird Mix Strips and Corners
- g4 - Modified Grassland
- r1a - Eutrophic Standing Water
- Coastal and Floodplain Grazing Marsh (Natural England)

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)
- Site of Special Scientific Interest (SSSI)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

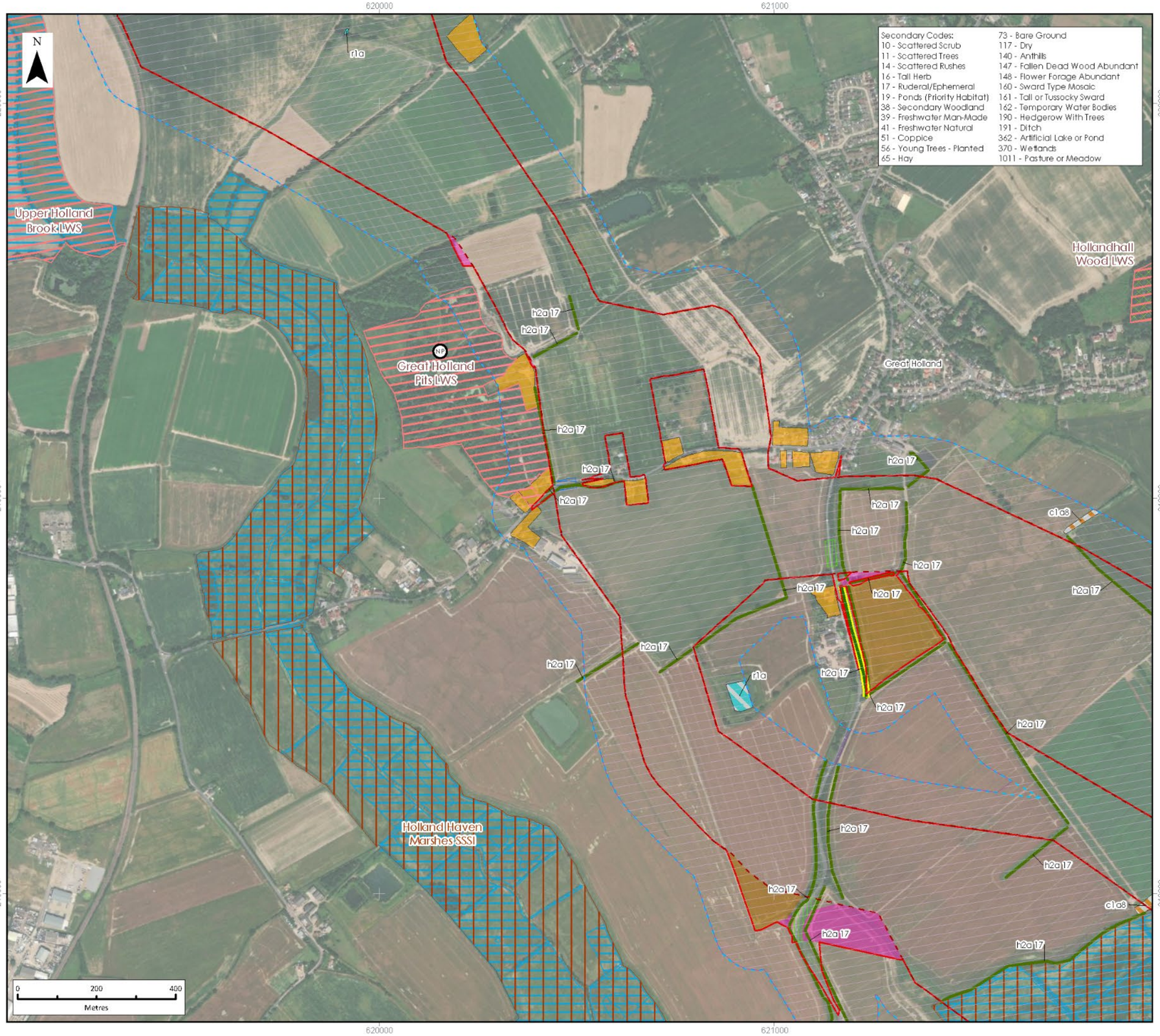
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

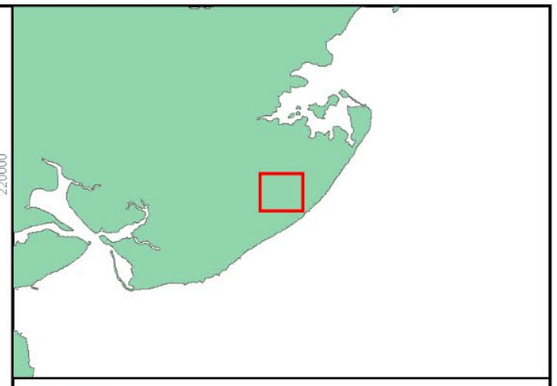
DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)

Invasive Species (Field Survey 2022)

- NP New Zealand Pigmyweed

Important Hedgrow (Hedgerow Regulations Assessment)

- Important Hedgrow

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)

Section 41 Habitats

- c1a8 - Game Bird Mix Strips and Corners
- r1a - Eutrophic Standing Water
- Coastal and Floodplain Grazing Marsh (Natural England)

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)
- Site of Special Scientific Interest (SSSI)
- Ancient and Semi-Natural Woodland (Natural England)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

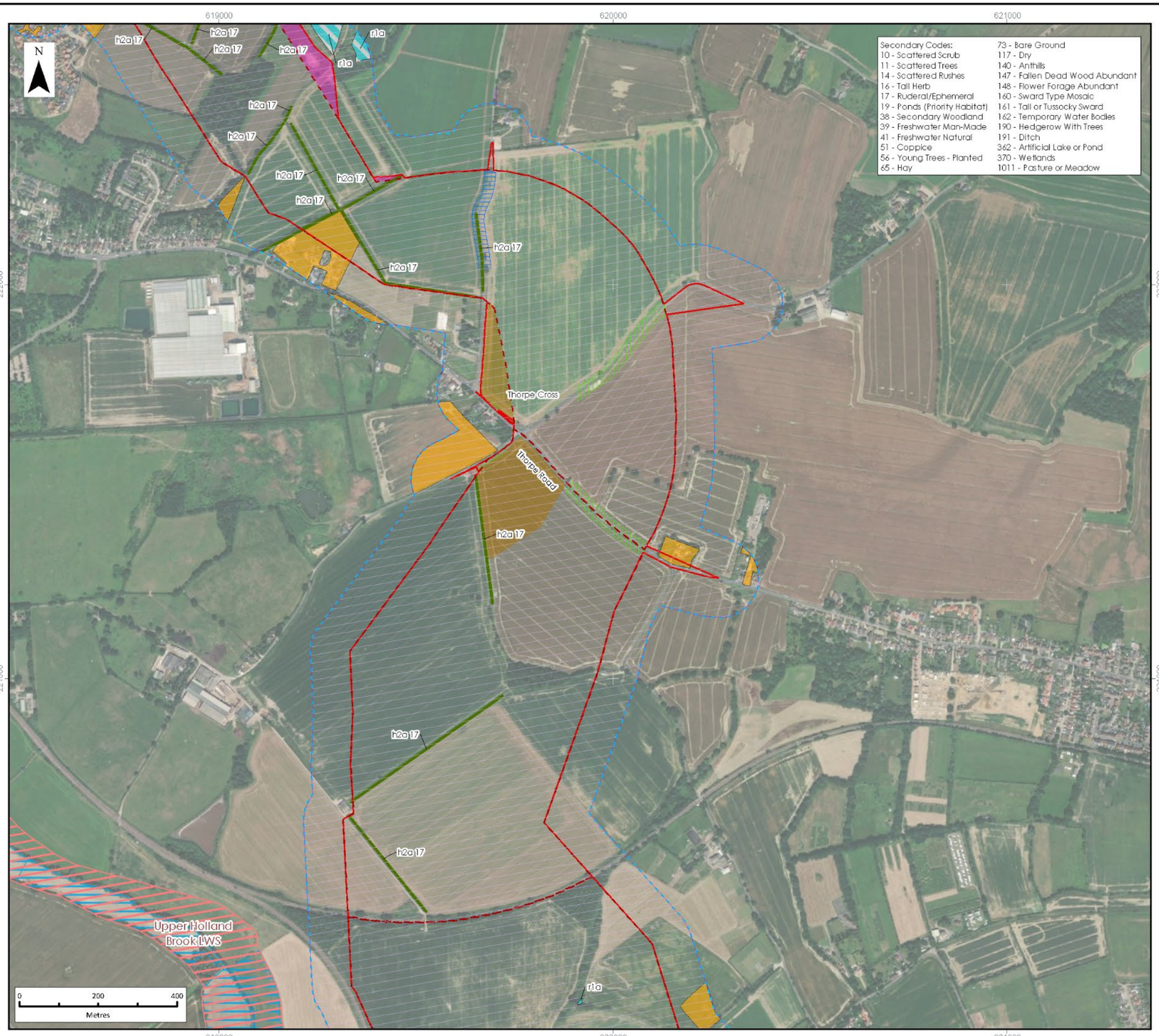
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

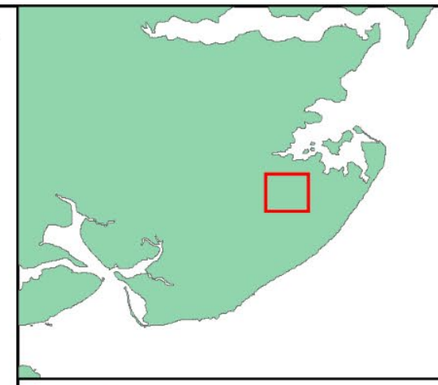
DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)

Section 41 Habitats

- r1a - Eutrophic Standing Water
- Coastal and Floodplain Grazing Marsh (Natural England)

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

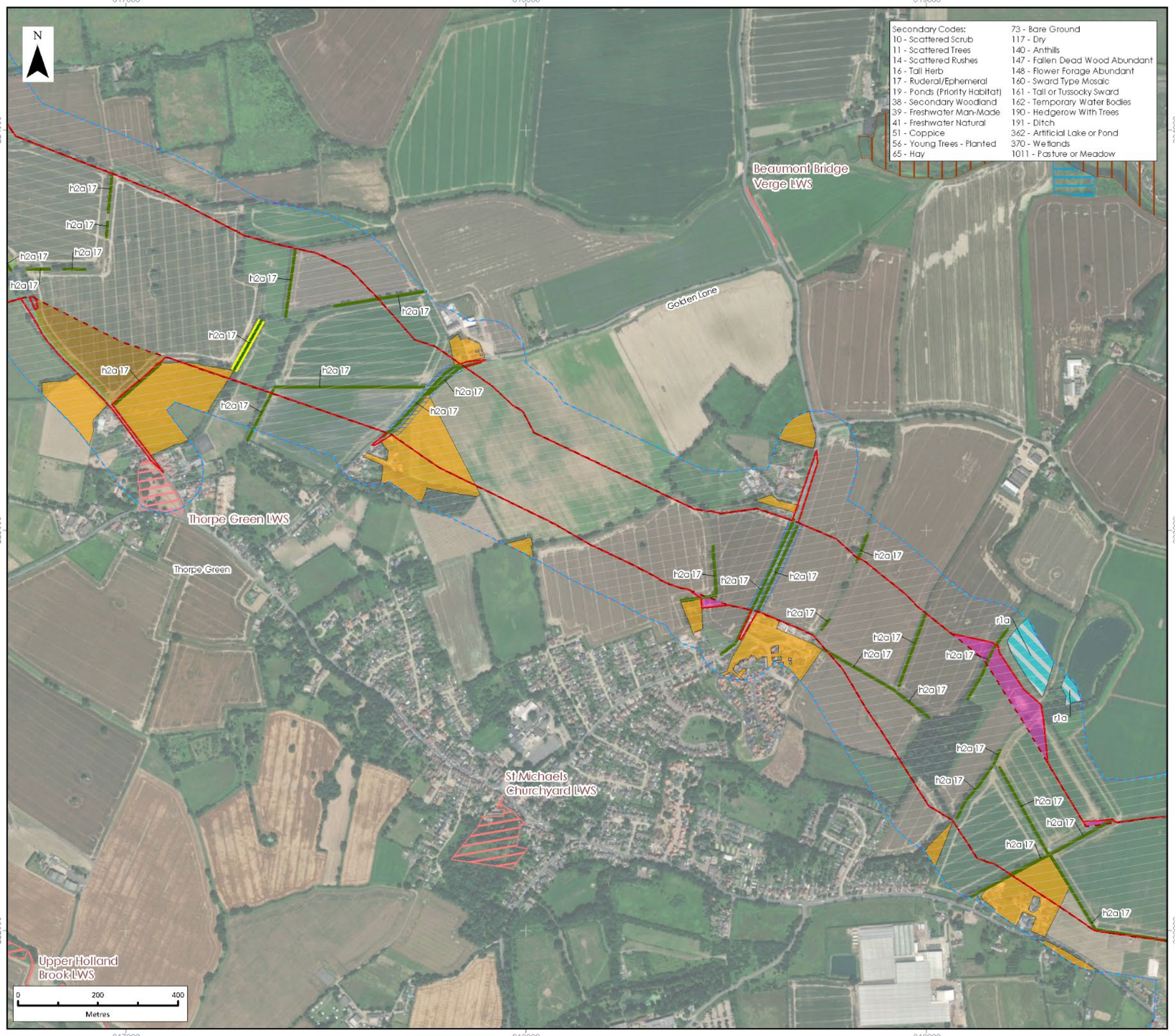
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)

Important Hedgrow (Hedgerow Regulations Assessment)

- Important Hedgrow

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)

Section 41 Habitats

- r1a - Eutrophic Standing Water
- Coastal and Floodplain Grazing Marsh (Natural England)

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)
- Site of Special Scientific Interest (SSSI)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

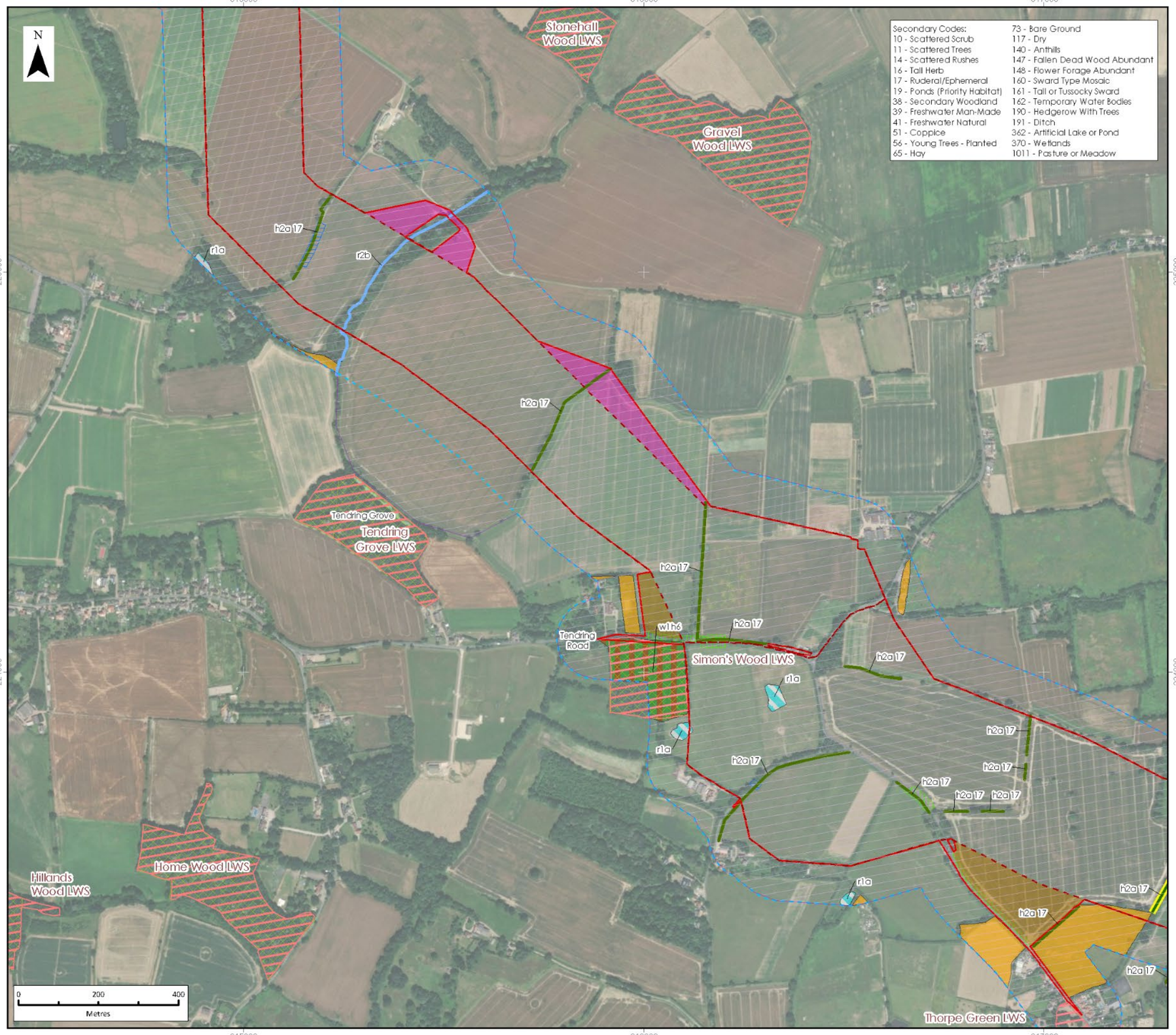
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

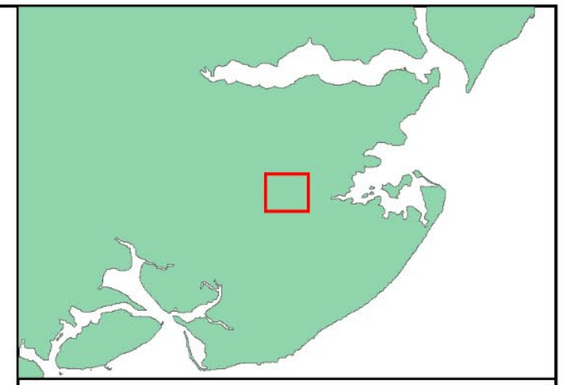
DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- RHDHV Habitat Survey Area (2022)

Important Hedgrow (Hedgerow Regulations Assessment)

- Important Hedgrow

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)
- r2b - Other River and Stream

Section 41 Habitats

- r1a - Eutrophic Standing Water
- w1h6 - Other Woodland; Mixed; Mainly Conifer

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)
- Ancient and Semi-Natural Woodland (Natural England)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

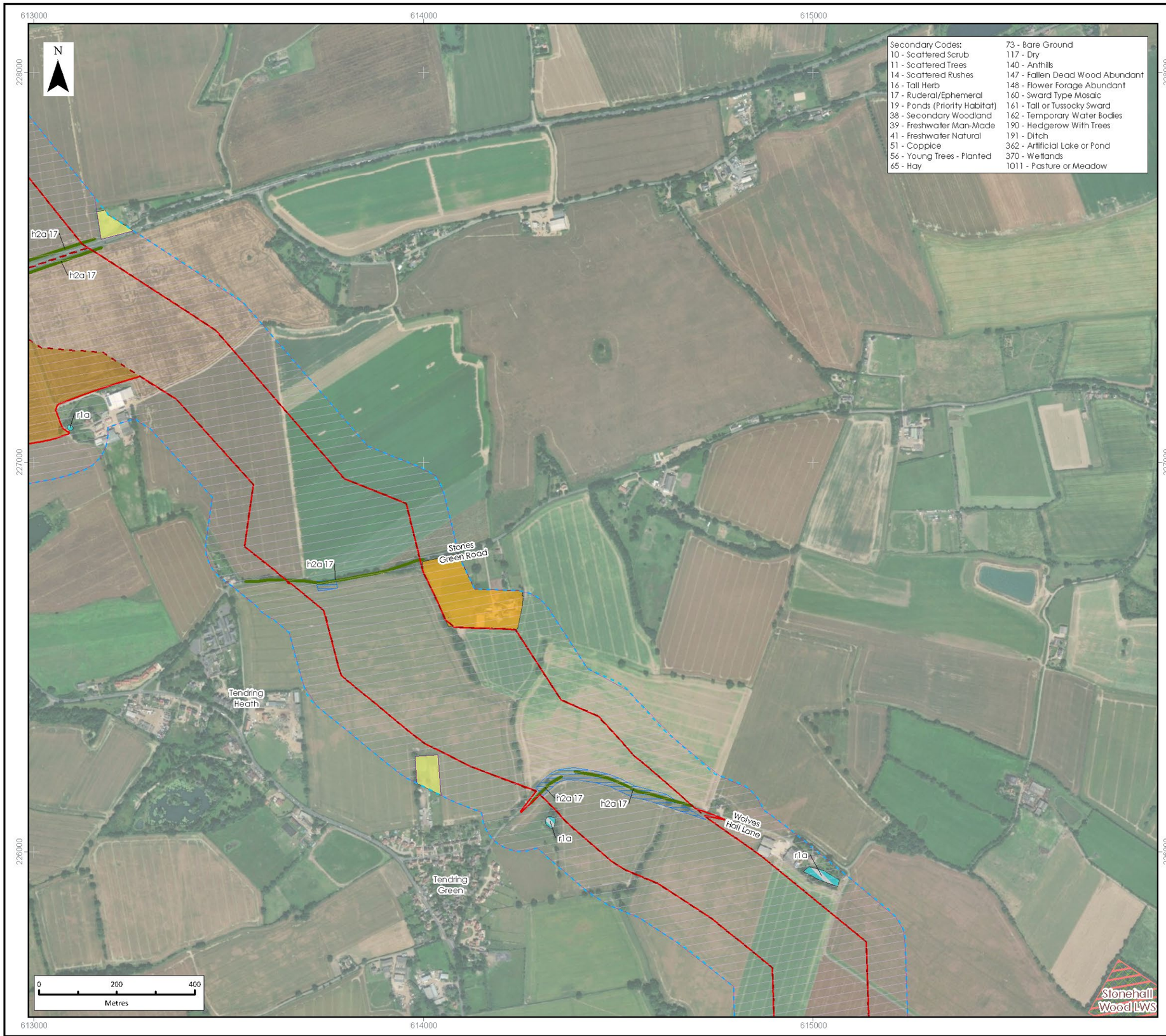
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

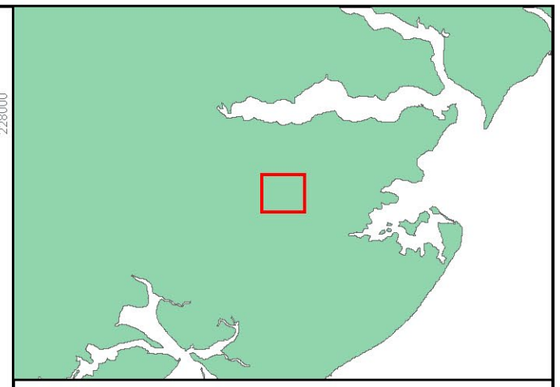
DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Haul Road Crossings
- RHDHV Habitat Survey Area (2022)

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)

Section 41 Habitats

- r1a - Eutrophic Standing Water

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)
- Ancient and Semi-Natural Woodland (Natural England)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

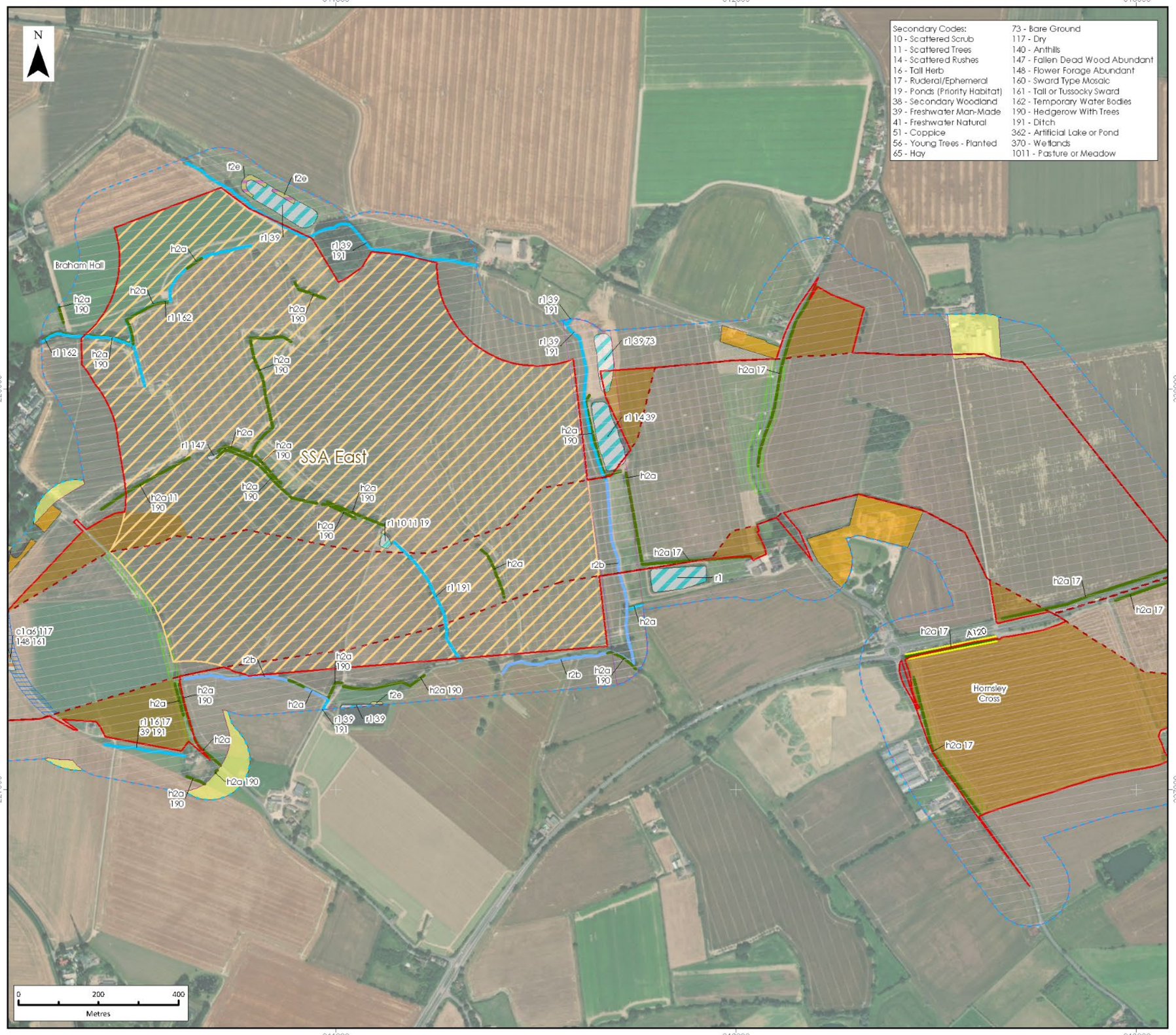
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

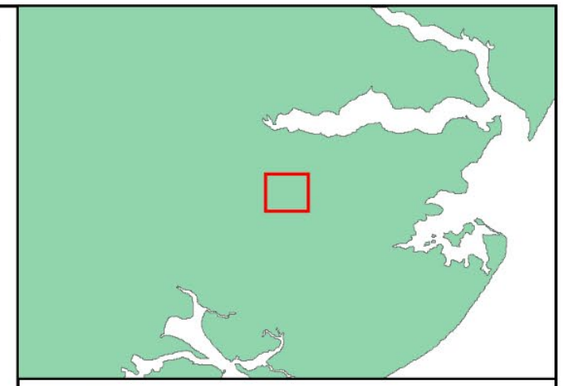
DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access
- SLR Habitat Survey Area (2022)
- RHDHV Habitat Survey Area (2022)

Important Hedgrow (Hedgerow Regulations Assessment)

- Important Hedgrow

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)
- r1 - Standing Open Water and Canals
- r2b - Other River and Stream

Section 41 Habitats

- c1a6 - Arable Margins Sown with Wild Flowers or a Pollen and Nectar Mix
- f2e - Reedbeds
- r1 - Standing Open Water and Canals

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

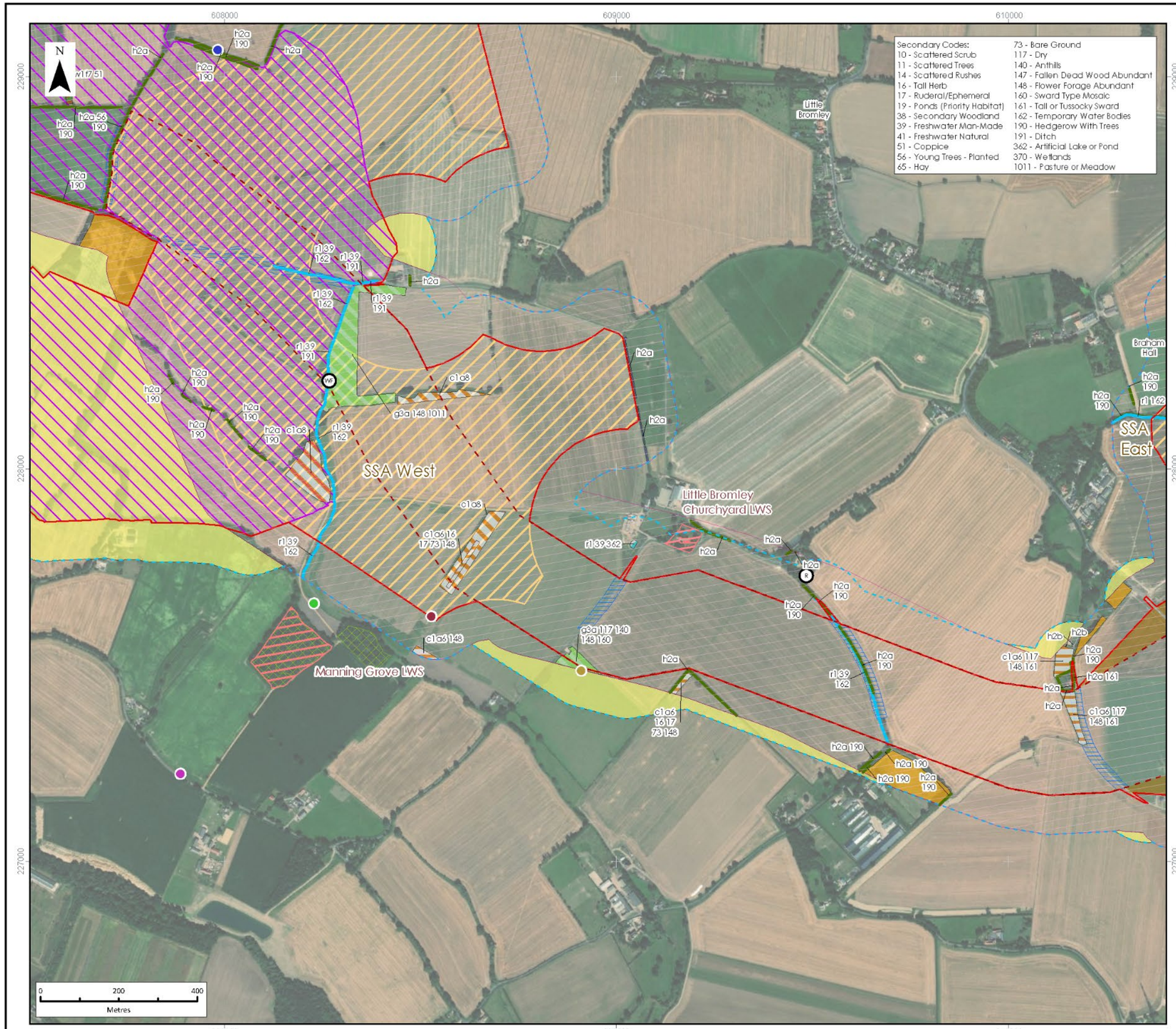
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

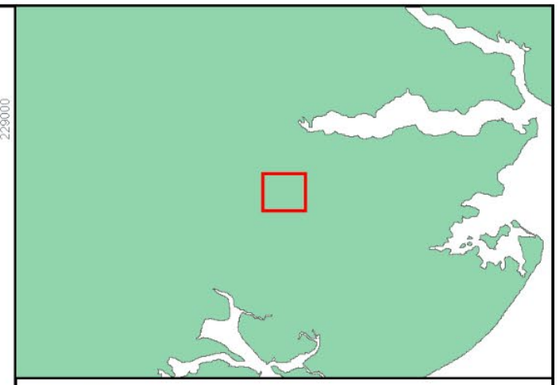
DRAWING NUMBER:

FIGURE 4.4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- SLR Habitat Survey Area (2022)

Notable Plants (Field Survey 2022)

- Chicory
- Common Cudweed
- Corn Spurrey
- Pyramidal Orchids
- Sea Holly

Invasive Species (Field Survey 2022)

- Rhododendron
- Water Fern

Section 41 Habitats (Linear)

- h2a - Hedgerow (Priority Habitat)
- r1 - Standing Open Water and Canals

Section 41 Habitats

- c1a6 - Arable Margins Sown with Wild Flowers or a Pollen and Nectar Mix
- c1a8 - Game Bird Mix Strips and Corners
- g3a - Lowland Meadows
- h2a - Hedgerow (Priority Habitat)
- r1 - Standing Open Water and Canals
- w1f7 - Other Lowland Mixed Deciduous Woodland

Statutory and Non-Statutory Sites

- Local Wildlife Site (LWS)
- Ancient and Semi-Natural Woodland (Natural England)

Areas With Potential Habitat Data Gaps

- No Survey Access: Aerial Image Interpretation Used (2022)
- No Survey Access To Date

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Sites, Hedgerows, S41 Habitats and Notable Plant Species Recorded within the Survey Area

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

FIGURE 4.4

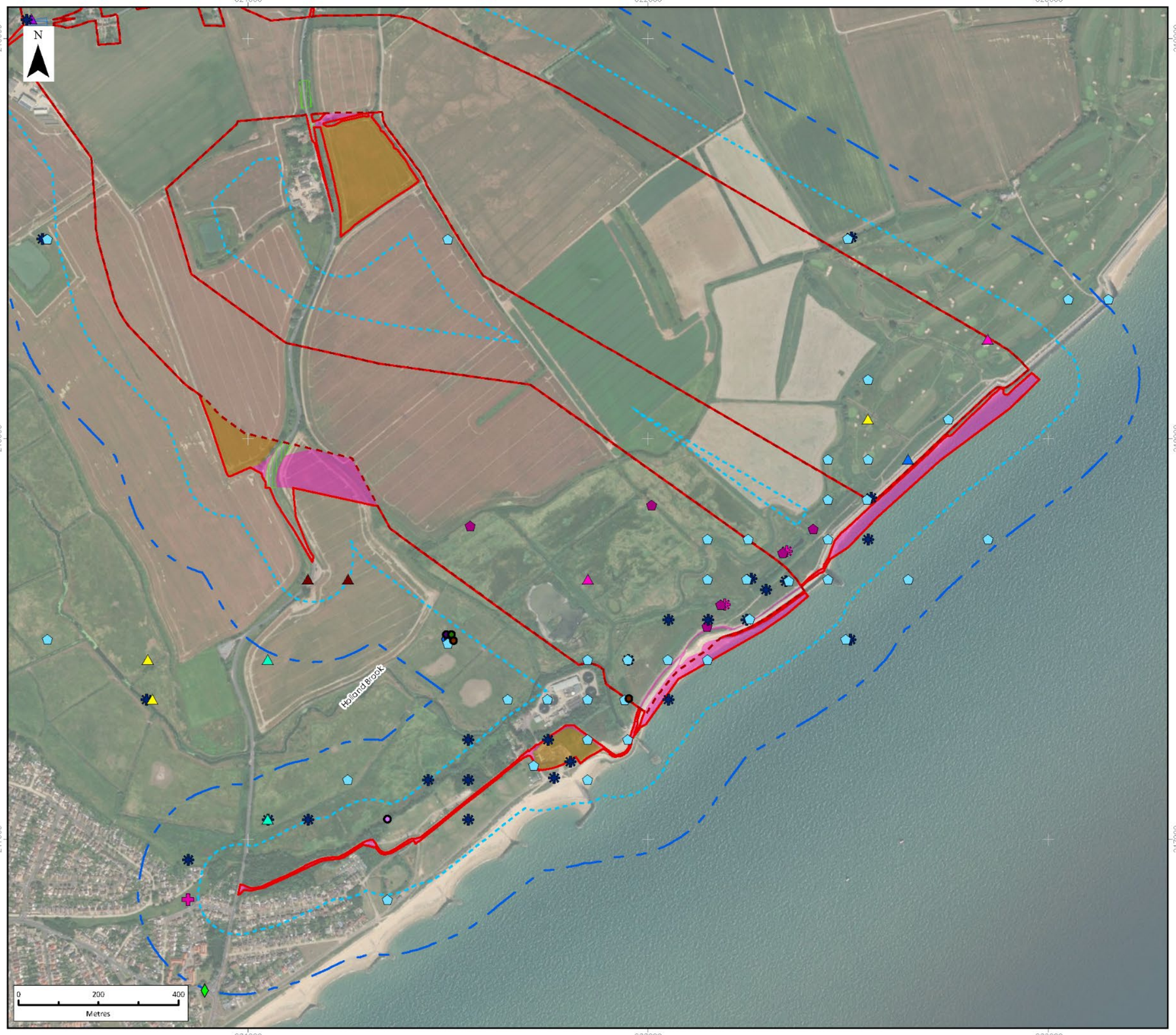
SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

SPECIES

4.8.11 As field survey and/ or reporting is ongoing (except for plants, GCN and some bird surveys), the following sections are based on a combination of desk study information and an assessment of the likely value of the habitats present for each species or group of species. Additional detail from field survey data has been used for plants, GCN, non-breeding and breeding birds (surveys for which analysis and reporting has been completed only).

4.8.12 Refer to Figure 4.5 for locations where important non-avian species have been recorded in desk study information; note that the degree of accuracy for desk study records may vary (as explained in text below).



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Plant
- Hog's Fennel
- Other Plant

Amphibian
- Common Frog

Reptile
- Adder
- Common Lizard

Invasive and Non-Native Species
- Japanese Rose
- New Zealand Pigmyweed
- Parrot's Feather
- Water Fern

Invertebrate
- Fisher's Estuarine Moth
- Other Invertebrate

Other Mammal
- Brown Hare
- Otter
- Northern Water Vole
- Harvest Mouse
- Hazel Dormouse
- Western Hedgehog

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

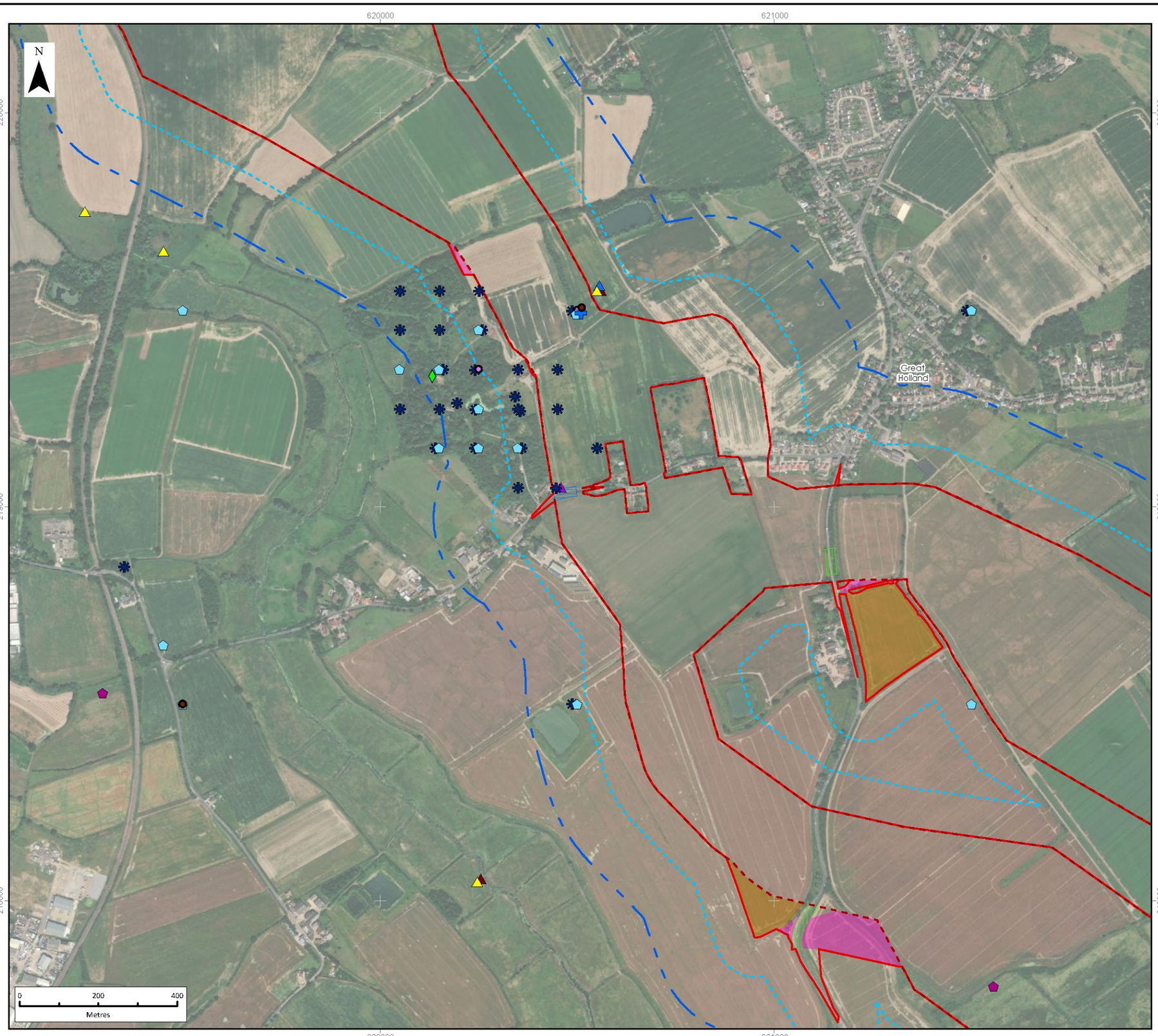
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

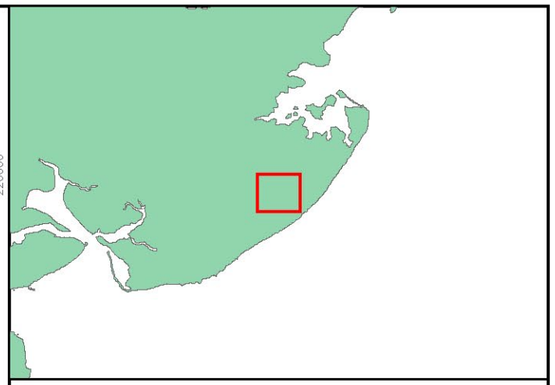
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Plant
- Hog's Fennel
- Other Plant

Amphibian
- Warty Newt / Great Crested Newt

Reptile
- Adder

Invasive and Non-Native Species
- New Zealand Pigmyweed
- Water Fern

Invertebrate
- Other Invertebrate

Other Mammal
- Brown Hare
- Northern Water Vole
- Harvest Mouse
- Hazel Dormouse

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

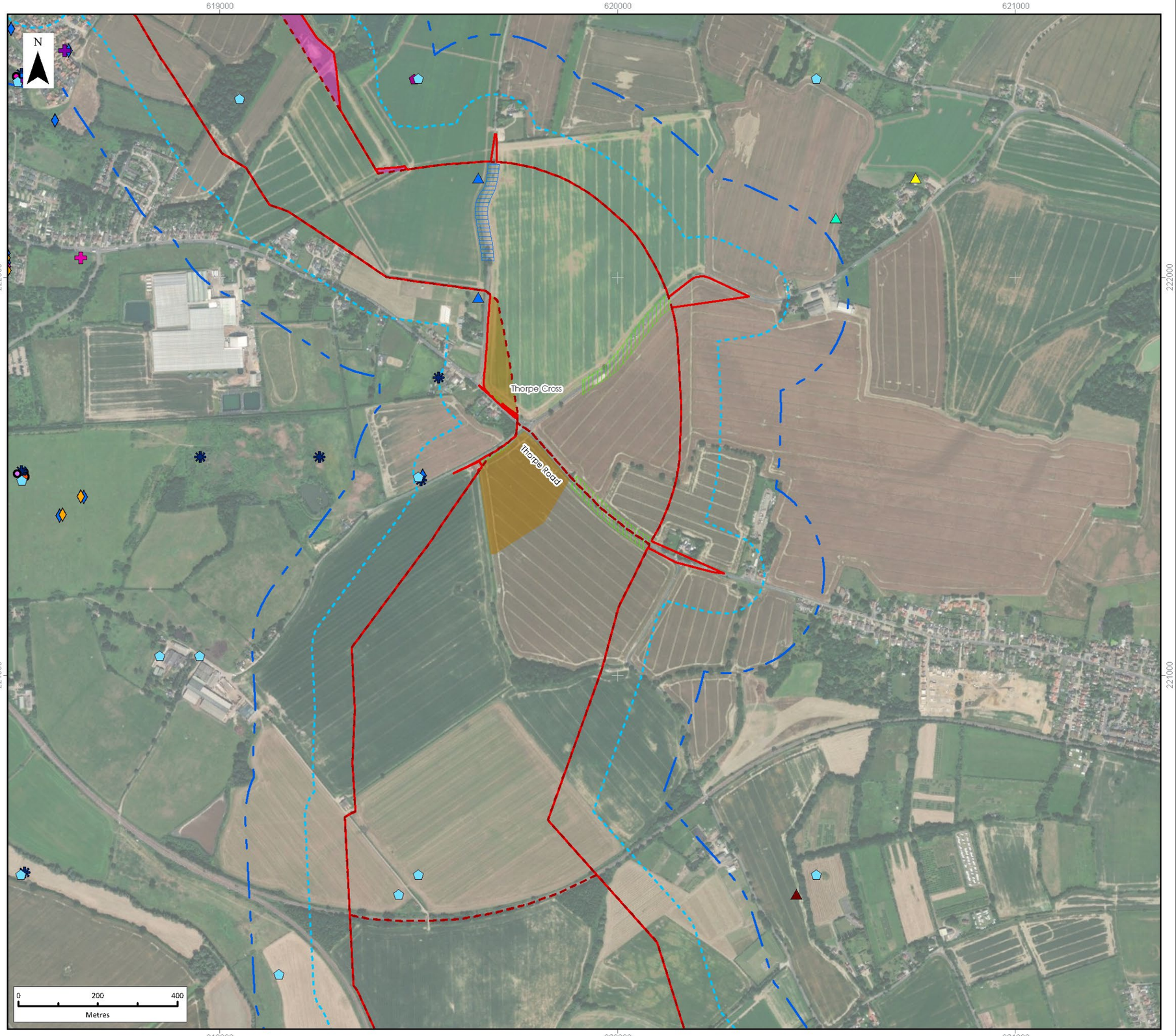
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

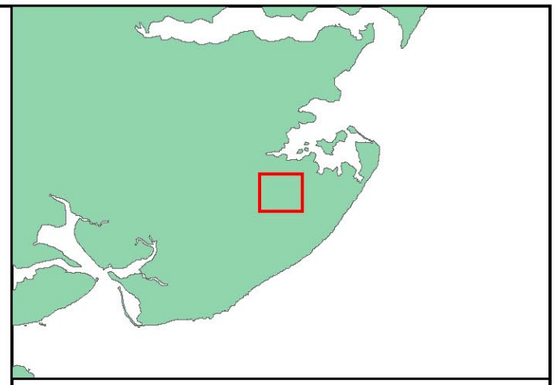
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Plant
- Hog's Fennel
- Other Plant

Amphibian
- Common Frog
- Smooth Newt
- Warty Newt / Great Crested Newt

Reptile
- Common Lizard
- Grass Snake
- Slow-worm

Invasive and Non-Native Species
- Giant Hogweed
- Giant Rhubarb
- Japanese Knotweed
- New Zealand Pigmyweed

Invertebrate
- Fisher's Estuarine Moth
- Other Invertebrate

Other Mammal
- Brown Hare
- Northern Water Vole
- Harvest Mouse
- Western Hedgehog

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

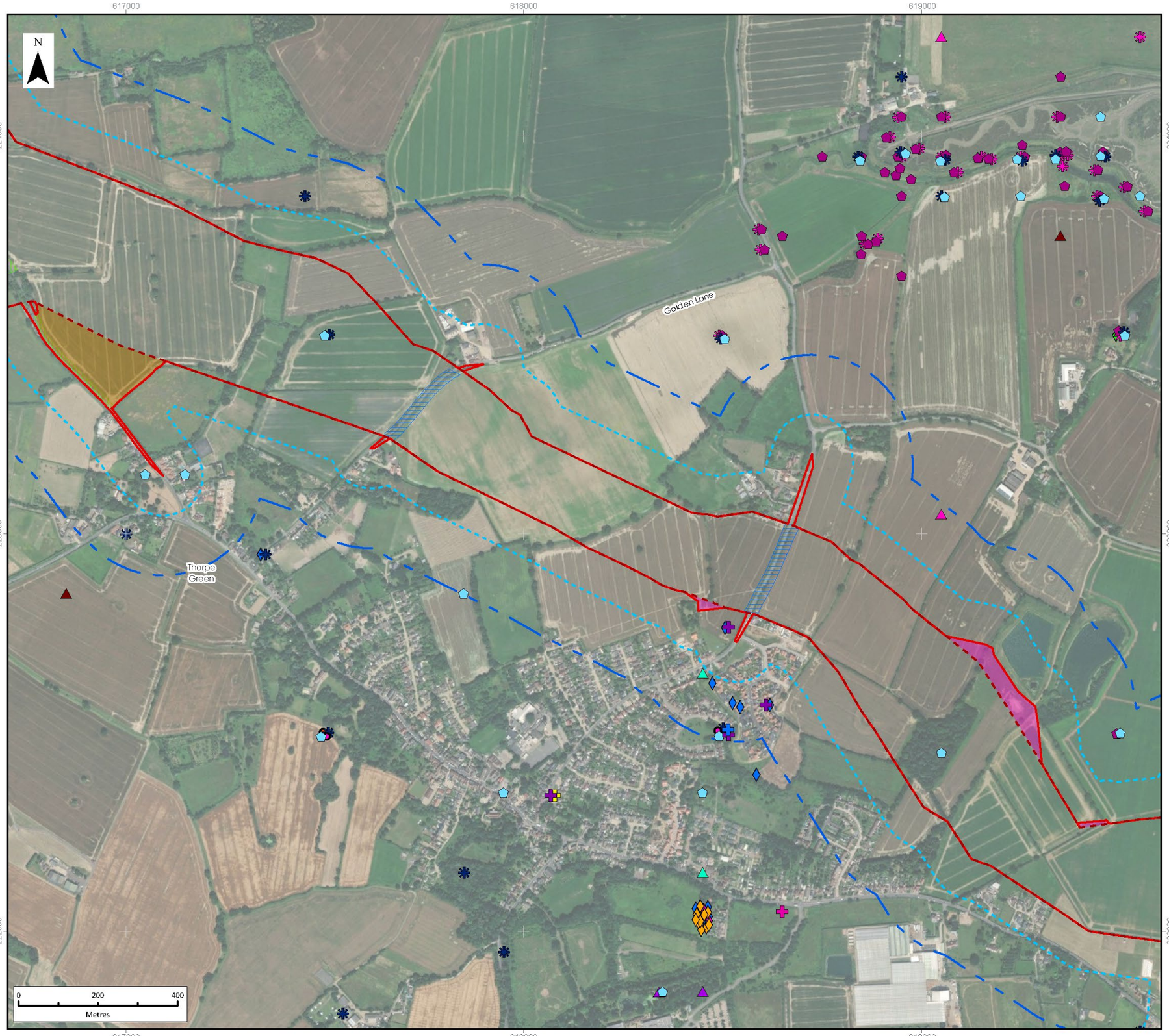
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

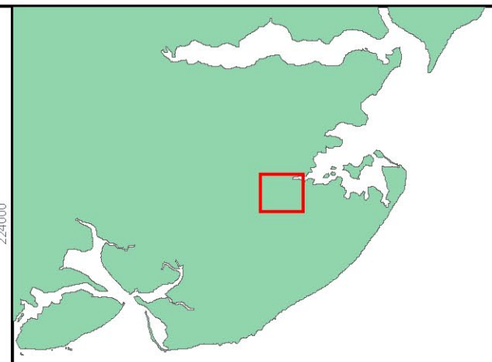
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Plant
- Hog's Fennel
- Other Plant

Amphibian
- Common Frog
- Palmate Newt
- Smooth Newt
- Warty Newt / Great Crested Newt

Reptile
- Adder
- Common Lizard
- Grass Snake
- Slow-worm

Invasive and Non-Native Species
- Giant Hogweed
- Japanese Knotweed

Invertebrate
- Fisher's Estuarine Moth
- Other Invertebrate

Other Mammal
- Brown Hare
- Otter
- Hazel Dormouse
- Western Hedgehog

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

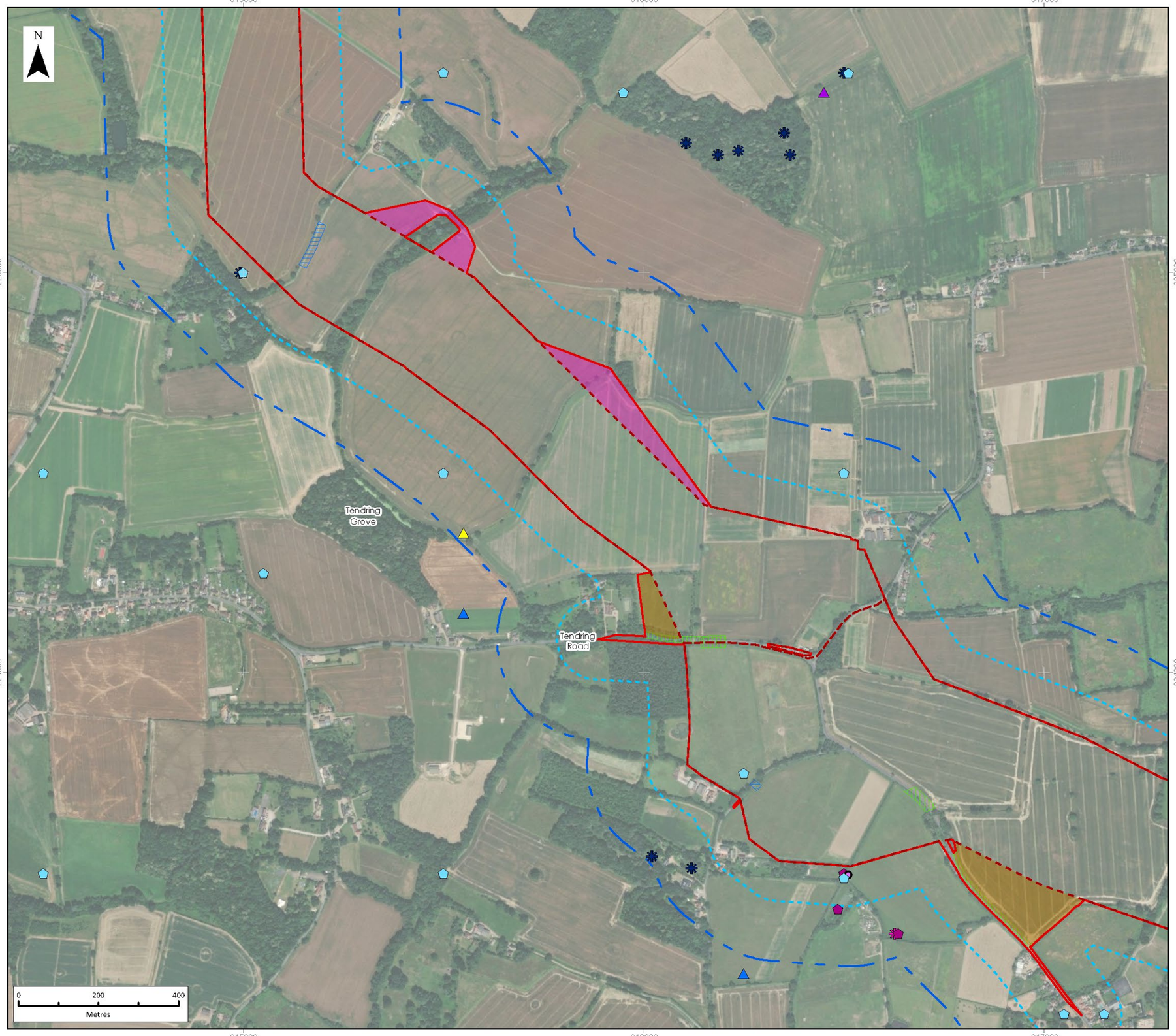
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

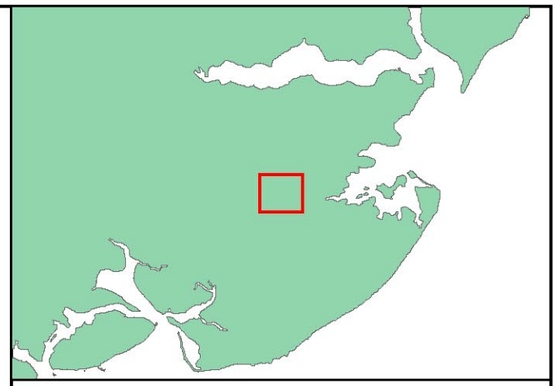
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Plant
- Hog's Fennel
- Other Plant

Invasive and Non-Native Species
- New Zealand Pigmyweed

Invertebrate
- Fisher's Estuarine Moth
- Other Invertebrate

Other Mammal
- Northern Water Vole
- Harvest Mouse
- Hazel Dormouse

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

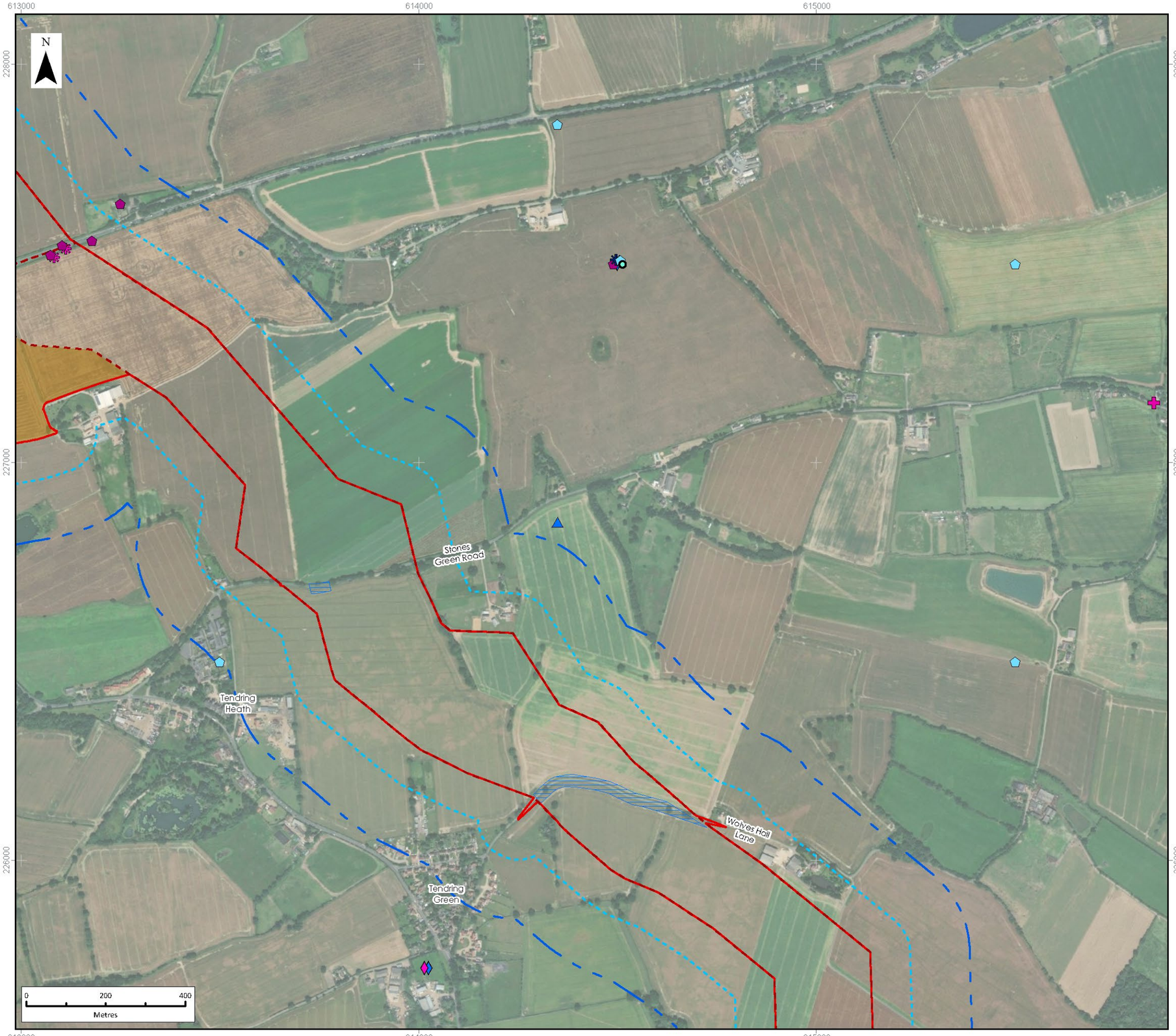
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

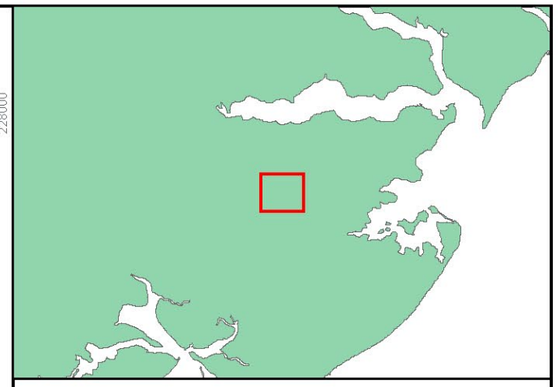
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Haul Road Crossings

Plant
- Hog's Fennel
- Other Plant

Amphibian
- Common Frog

Reptile
- Common Lizard
- Grass Snake

Invasive and Non-Native Species
- Three-Cornered Garlic

Invertebrate
- Fisher's Estuarine Moth
- Other Invertebrate

Other Mammal
- Harvest Mouse

Data Source:
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Aerial Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Species data provided by Essex Field Club.

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

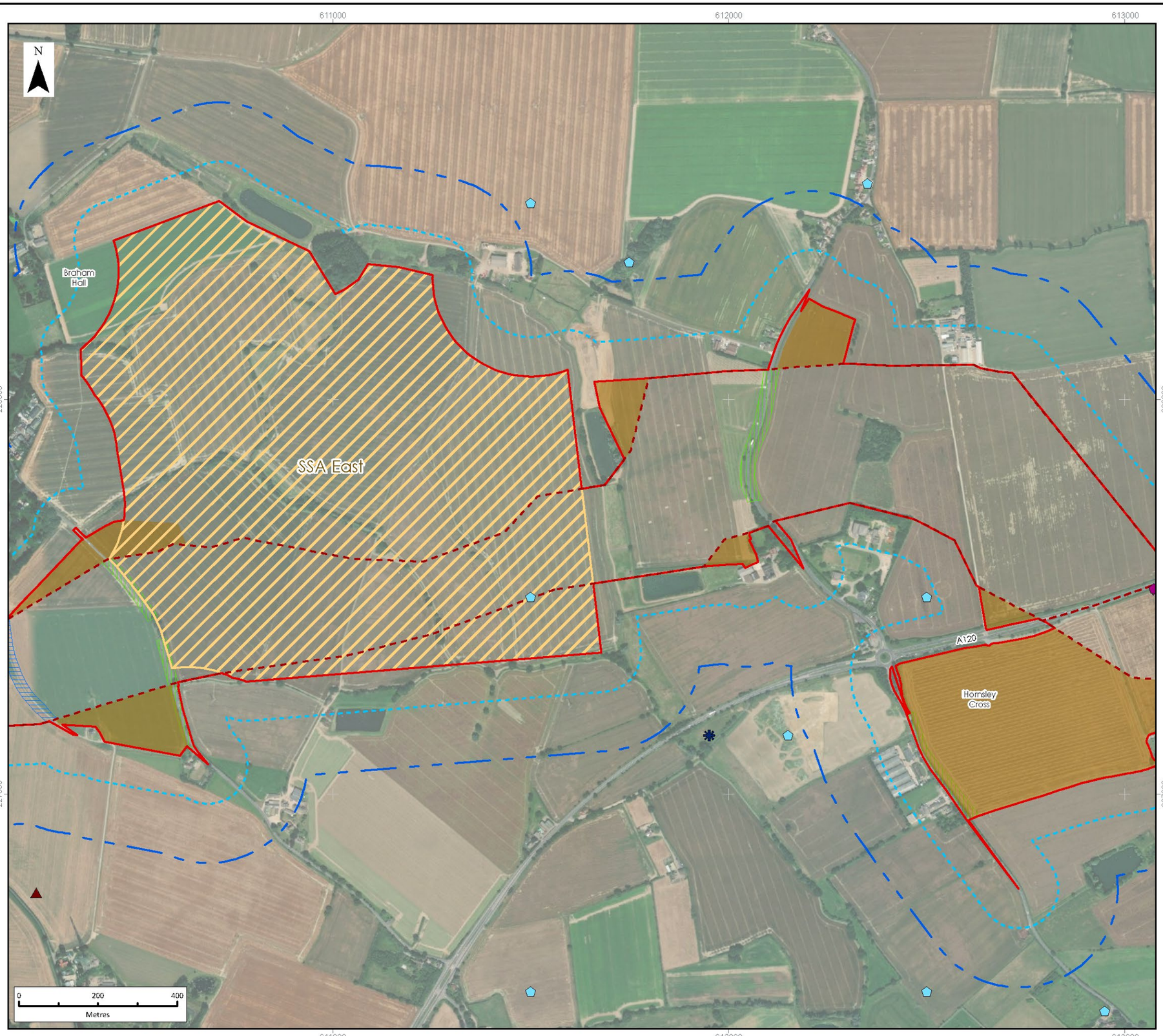
DRAWING NUMBER:

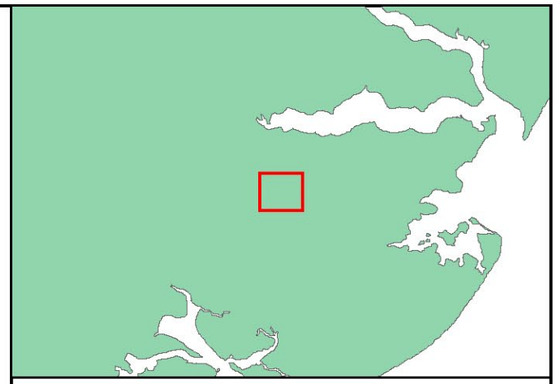
FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

P:\05366 - GoBe Consultants Ltd\00010 Five Estuaries\Tech\GIS\Dwge\Wking\2022 09 PIER\Chapters\Onshore Biodiversity\05366_00010_0171_0 Important Species Desktop.mxd





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access

Plant
- Hog's Fennel
- Other Plant

Invertebrate
- Fisher's Estuarine Moth
- Other Invertebrate

Other Mammal
- Brown Hare

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

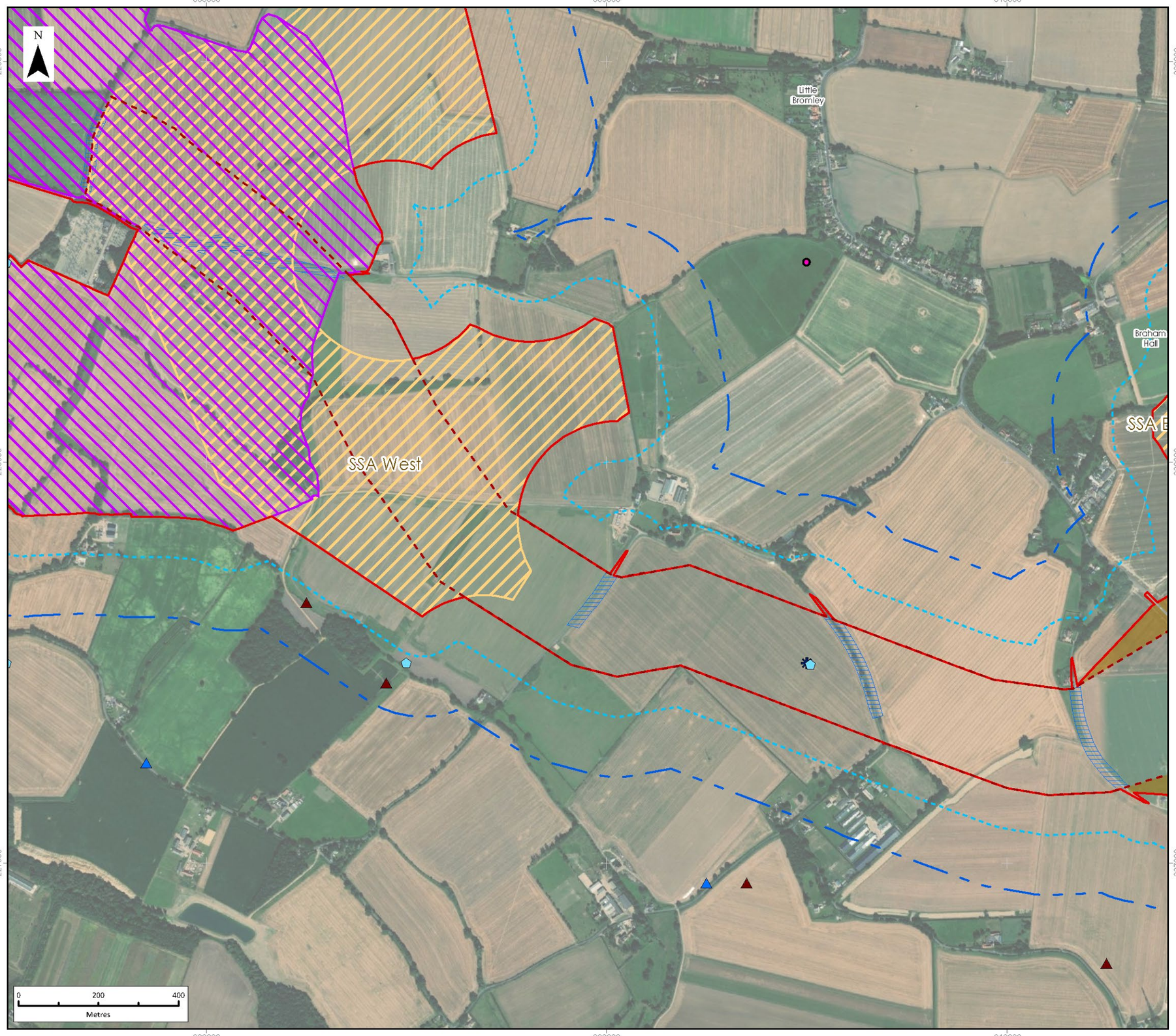
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

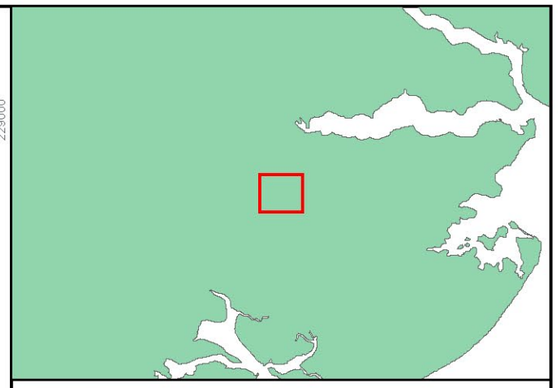
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings

Plant
- Other Plant

Invasive and Non-Native Species
- Japanese Knotweed

Invertebrate
- Other Invertebrate

Other Mammal
- Brown Hare
- Harvest Mouse

Data Source:
© Crown copyright [and database rights] (2022) 0100031673 OS OpenData.
Aerial Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Species data provided by Essex Field Club.

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

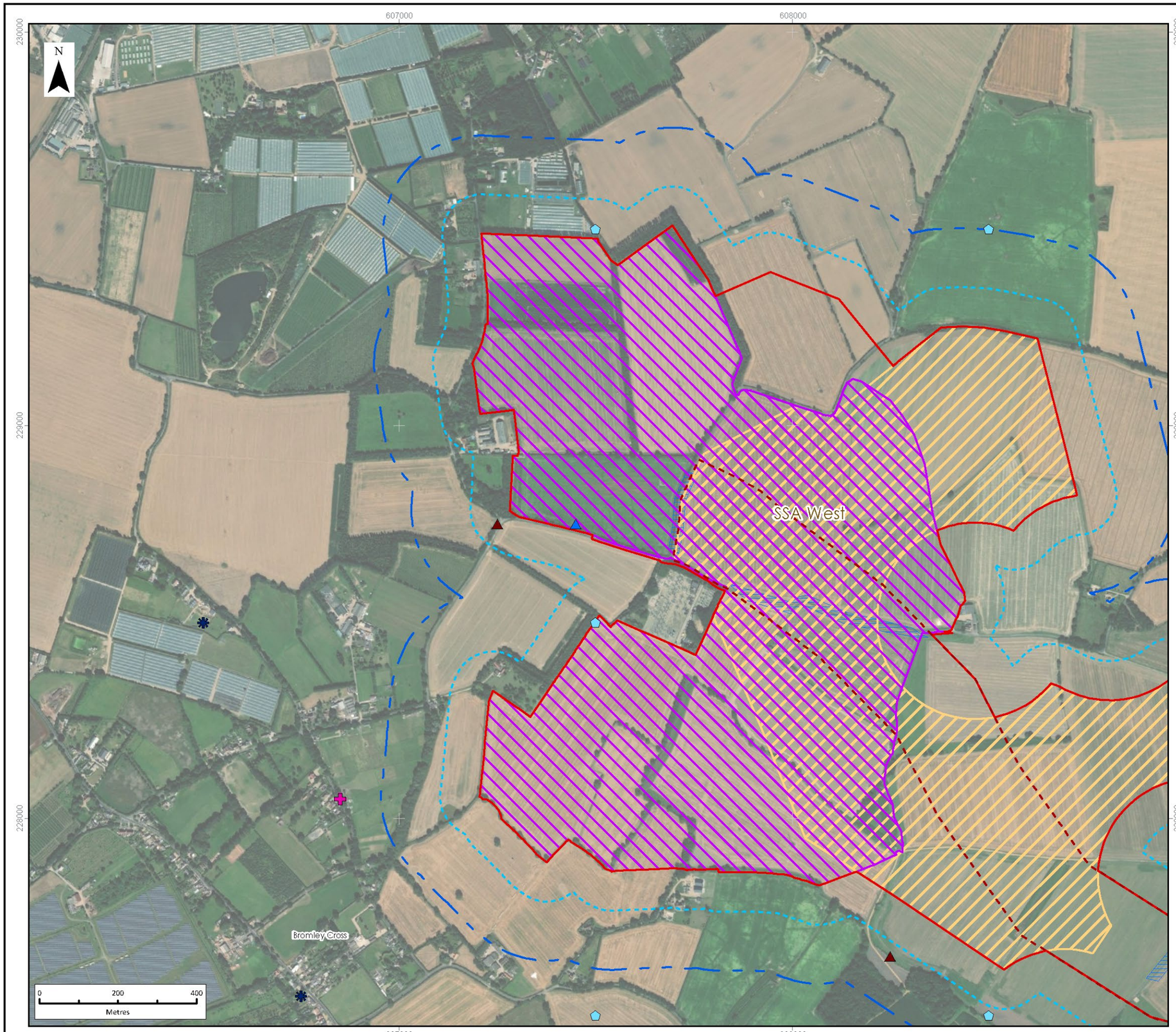
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

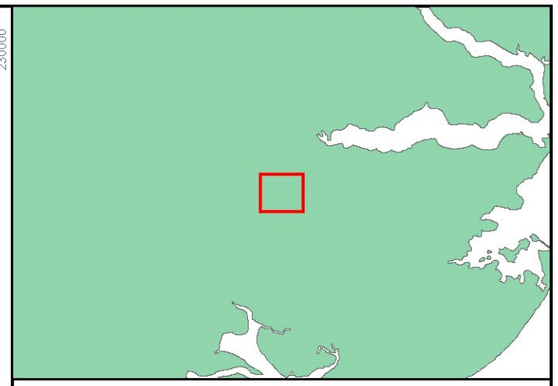
DRAWING NUMBER:

FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 100 m Buffer
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Haul Road Crossings

Plant
- Other Plant

Amphibian
- Common Frog

Invertebrate
- Other Invertebrate

Other Mammal
- Brown Hare
- Harvest Mouse

Data Source:

Aerial Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Species data provided by Essex Field Club.

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Important Non-Avian Species (EFC Records)

VER	DATE	REMARKS	Drawn	Checked
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FIGURE 4.5

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

P:\05356 - GoBe Consultants Ltd\00010 Five Estuaries\Tech\GIS\Dwgs\Wking\2022 09 PIER\Chapters\Onshore Biodiversity\05356.00010.0171.0 Important Species Desktop.mxd

PLANTS

4.8.13 The desk study data provided confirms that 133 notable, scarce and rare plant species may occur within the study area; this includes two species; chamomile *Chamaemelum nobile* and annual knawel *Scleranthus annuus* listed on S41 and numerous species listed on the Great Britain (GB), England and/ or Essex Red Data Lists. Most of the records have been provided at 1 km resolution such that it is not possible to accurately determine their location in relation to the RLB. However, the bulk of the records are confined to priority habitats, which are sparsely distributed in the Survey Area and are mostly within designated sites such as Holland Haven Marshes SSSI and the head waters of Hamford Water SSSI. The coastal habitats support the most notable or rare plant species, with wetland, woodland and other semi-natural habitats also supporting such species. A limited number of scarce plants are also associated with arable margin habitats. Figure 4.5 shows the location for notable plant species records from EFC, with further detail included in the PEA report at Volume 5, Annex 4.1 Preliminary Ecological Appraisal (Onshore) Report. With the exception of hog's fennel (see below) Figure 4.5 does not discriminate between species as many locations relate to more than one record (i.e., they are the entry for all species records for the monad (i.e. a single square km based on the OS Grid).

4.8.14 During the habitat survey, notable plant species were recorded at several locations north of the A120, as set out in Volume 5, Annex 4.2: Habitat and Hedgerow Survey Report: North of A120 and shown on Figure 4.4. These mainly comprised species associated with dry or disturbed areas within arable fields, but also two associated with grassland as follows:

- Common cudweed *Filago vulgaris*; GB Red listing based on 2001 IUCN guidelines (from 2018): Near Threatened, England Red listing based on 2001 IUCN guidelines (from 2014): Near Threatened;
- Corn spurrey *Spergula arvensis*; GB Red listing based on 2001 IUCN guidelines (from 2018): Vulnerable, England Red listing based on 2001 IUCN guidelines (from 2014): Vulnerable;
- Sea holly *Eryngium maritimum*; England Red listing based on 2001 IUCN guidelines (from 2014): Near Threatened, Essex Red List;
- Chicory *Cichorium intybus*; England Red listing based on 2001 IUCN guidelines (from 2014): Vulnerable;
- Field scabious *Knautia arvensis*; England Red listing based on 2001 IUCN guidelines (from 2014): Near Threatened; and
- Pyramidal orchid *Anacamptis pyramidalis*. Essex Red List.

4.8.15 Except for within Holland Haven Marshes SSSI, no evidence of notable species was recorded for surveys undertaken south of the A120 (refer to the report at Volume 5, Annex 4.3: Habitat and Hedgerow Survey Report: South of A120 for details). Given the survey constraint related to this area (i.e. the extended period of hot dry weather may have resulted in inaccurate species assemblage or abundance information), it is considered possible notable arable species, such as but not limited to those listed above, may also occur within cropland margins south of the A120.

4.8.16 Special effort was made to locate hog's fennel (the food plant of Fisher's Estuarine moth – see following section) during the habitat surveys; but no specimens were recorded. During the invertebrate survey at Holland Haven Marshes in 2021 (Volume 5, Annex 4.9: North Falls Offshore Wind Farm Holland Haven Marshes SSSI: Survey and Assessment of Aquatic and Terrestrial Invertebrates 2021), hog's fennel was confirmed present within maritime grassland within the SSSI. The EFC data includes 102 records for this species at coastal locations at Hamford Water and Holland Haven Marshes, but also at Kents Hill Farm on Walton Rd east of Thorpe le Soken, at Bradley Hall Farm northwest of Thorpe Green, and at the eastern side of the onshore RLB adjacent to the A120.

4.8.17 In July and August 2021, Wild Frontier Ecology Ltd on behalf of North Falls OWF conducted an NVC survey of Holland Haven Marshes SSSI and adjacent land. The survey recorded 21 species of elevated conservation status[1], of which six are mentioned on the SSSI citation (refer to Volume 5, Annex 4.7: North Falls Offshore Wind Farm Holland Haven Marshes SSSI and Adjacent Land NVC Survey 2021).

4.8.18 The EFC data also provided records of invasive non-native species within the study area. This includes 11 species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended); three-cornered garlic *Allium triquetrum*, **water fern *Azolla filiculoides***, Hottentot-fig *Carpobrotus edulis*, **New Zealand pigmyweed *Crassula helmsii***, Japanese Knotweed *Fallopia japonica*, giant-rhubarb *Gunnera tinctoria*, giant hogweed *Heracleum mantegazzianum*, Himalayan balsam *Impatiens glandulifera*, parrot's-feather *Myriophyllum aquaticum*, Rhododendron *Rhododendron ponticum* and Japanese rose *Rosa rugosa*. Those in bold occur within the survey area.

4.8.19 During the habitat surveys, water fern and a species of Rhododendron were recorded at two separate locations north of the A120 (refer to Volume 5, Annex 4.2: Habitat and Hedgerow Survey Report: North of A120) and New Zealand pigmyweed was also recorded present in a single pond during survey for GCN in May 2022. Refer to Figure 4.4 for locations. No evidence of invasive species was reported for areas south of the A120.

4.8.20 It should be borne in mind that exhaustive searching for particular species has not been undertaken, and as plants may only be evident at certain times of year the presence of additional species remains a possibility. This has been accounted for in the evaluation and assessment of impacts; the field survey and desk study information is considered adequate for the purpose of EIA.

INVERTEBRATES

4.8.21 EFC provided details for 161 notable, scarce and rare invertebrate species that have been recorded from the study area (refer to the EFC data in the PEA report at Volume 5, Annex 4.1: Preliminary Ecological Appraisal (Onshore) Report) and Figure 4.5. 121 of these are moth species, with records concentrated at Beaumont Quay and Great Holland Pits Nature Reserve.

[1] Elevated conservation status in the report refers to: Red Data Book species, Essex Red Data Book species and species mentioned in the SSSI citation.

4.8.22 67 of these records are for Fisher's estuarine moth *Gortyna borelii lunata*, which is included in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended) and Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) in respect of section 9(4)(b) and (c) and (5) only). It has been recorded at broadly the same locations as its food plant, hog's fennel, mentioned in Paragraph 4.8.15 above. It is a qualifying feature of Hamford Water SAC; this being one of two SACs designated for the species in the UK (the other is in Kent).

4.8.23 Records of other notable invertebrates including beetles, butterflies and flies are also present around Thorpe le Soken and Great Holland Pits nature reserve. Other places where such species have been recorded include roadsides, golf courses, parks and gardens.

4.8.24 Survey work undertaken on behalf of North Falls OWF at Holland Haven Marshes SSSI (refer to Volume 5, Annex 4.9: North Falls Offshore Wind Farm Holland Haven Marshes SSSI: Survey and Assessment of Aquatic and Terrestrial Invertebrates 2021) has confirmed the presence of six terrestrial invertebrate species of conservation concern, including a Nationally Scarce rove beetle and two S41 species – small heath butterfly *Coenonympha pamphilus* and cinnabar moth *Tyria jacobaeae*. Aquatic species were also surveyed and the survey identified three species of Nationally Scarce water beetle. Whilst Fisher's estuarine moth was not recorded, its larval host plant, hog's fennel, was noted to occur within the maritime grassland such that the species should be assumed to be present. The report at Volume 5, Annex 4.9 also considers it likely that the population at Holland Haven Marshes SSSI is isolated from that at Hamford Water SAC but is of at least National importance.

4.8.25 Habitats within the study area that are considered to be most valuable to invertebrate species broadly match those listed for important plant species, namely habitats adjacent to the coast or to the Holland Brook, hedgerows and ancient or semi-natural woodland. Unlike for notable plants, the arable habitats are unlikely to support scarce or rare species of invertebrates.

AMPHIBIANS

4.8.26 GCN, common toad *Bufo bufo*, smooth newt *Lissotriton vulgaris* and common frog *Rana temporaria* have been recorded at ponds within the study area; EFC data includes 24 records for amphibians in total (refer to the EFC data in Volume 5, Annex 4.1: Annex 4.1: Preliminary Ecological Appraisal (Onshore) Report, GCN reports in Volume 5, Annex 4.4: Great Crested Newt Survey Report: North of A120 and 4.5: Great Crested Newt Survey Report: South of A120, which includes raw data as well as figures showing pond numbers and locations) andFigure 4.5. GCN is protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act and in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended), it is also a S41 species. Common toad is a S41 species.

4.8.27 The EFC desk study data (refer to PEA at Volume 5, Annex 4.1: Preliminary Ecological Appraisal (Onshore) Report) confirms that GCN has been recorded at five locations within the study area, two of which are within 250 m of the onshore RLB; one in the village of Thorpe le Soken, and one at Great Holland Pits Nature Reserve. The Magic website shows a record for a European Protected Species Licence (EPSL) at Thorpe le Soken (believed to be the same record as in EFC data), with all other GCN EPSL records more than 1 km distant. The Magic website also confirms that 83% of the RLB is within a green GCN Risk Zone, with the remainder being in an amber zone[2].

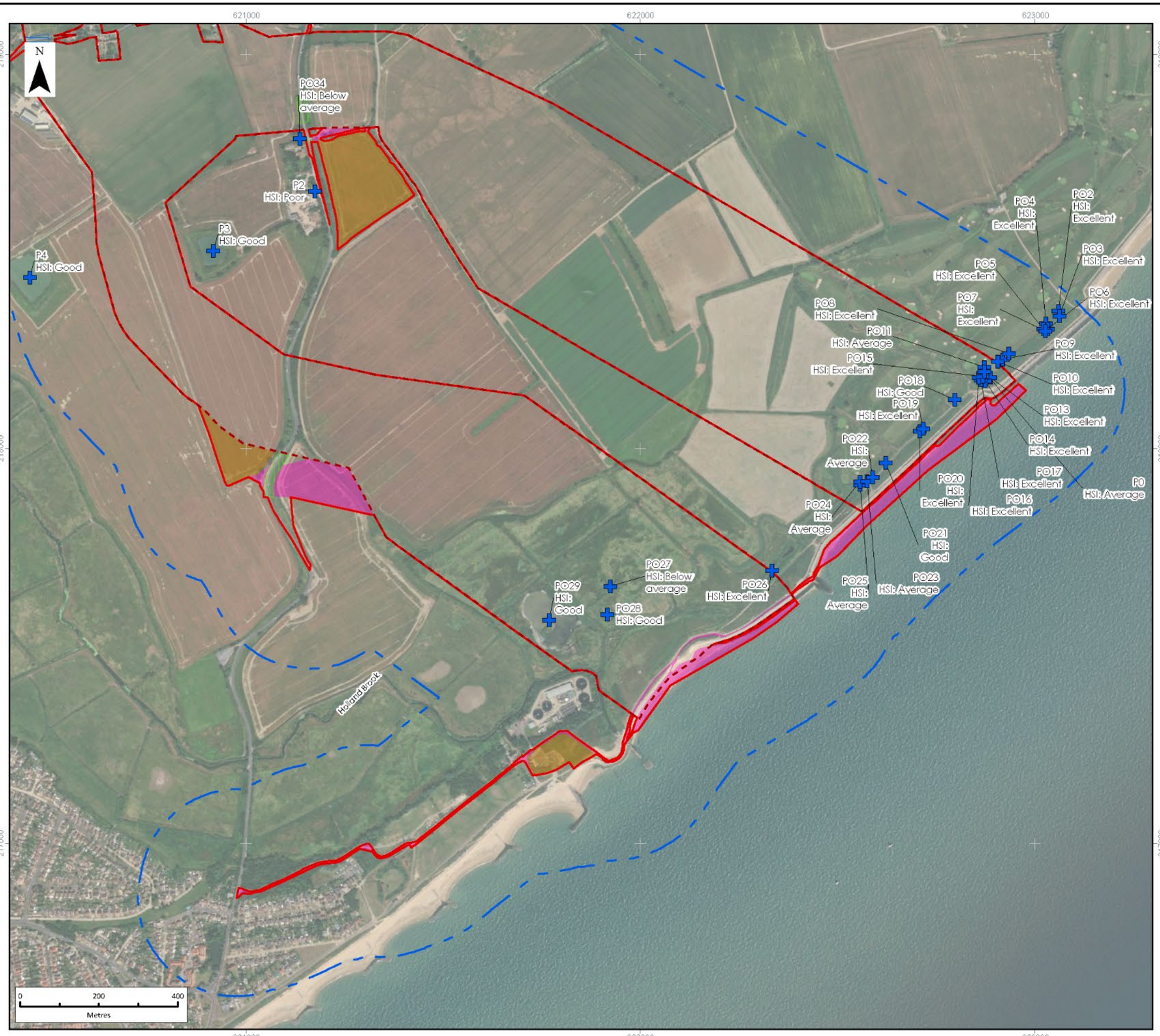
4.8.28 The field survey results for GCN are summarised in Figure 4.6. During the field survey, no evidence of GCN was recorded at ponds north of the A120. GCN presence was confirmed in a total of 13 ponds across the remainder of the GCN survey area south of the A120, at four broad locations: Great Holland Pits (5 ponds), north-west of Thorpe Green (4 ponds), east of the corridor north of Tendring Brook (2 ponds), and either side of the corridor north of Thorpe Cross (2 ponds).

4.8.29 Access constraints prevented survey at a number of ponds. As a result of this, and as set out in Section 4.7.3, GCN absence has been assumed at ponds north of the A120, and presence has been assumed at pond numbers 21, PO80, 31, 32, 35, 58, 59 and 69.

4.8.30 GCN populations typically occur as a metapopulation, i.e., a group of spatially separated populations which interact at some level across a landscape of breeding ponds and terrestrial habitat. This PEIR has identified seven metapopulations (based on 500 m dispersal distance[3]), as shown on Figure 4.5.

[2] These zones have been identified by NE as part of the District Licensing Scheme; Amber zones contain main population centres for GCN and comprise important connecting habitat that aids natural dispersal. Green zones contain sparsely distributed GCN and are less likely to contain important pathways of connecting habitat for this species. White zones contain no GCN. More details here: https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::gcn-risk-zones-essex/about .

[3] Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001), Great Crested Newt Conservation Handbook, Froglife, Halesworth. *At most sites, the majority of adults probably stay within around 250m of the breeding pond, so the density of individuals gradually decreases away from the pond. However, newts may well travel further if there are areas of high quality foraging and refuge habitat extending beyond this range.*



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Absent

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

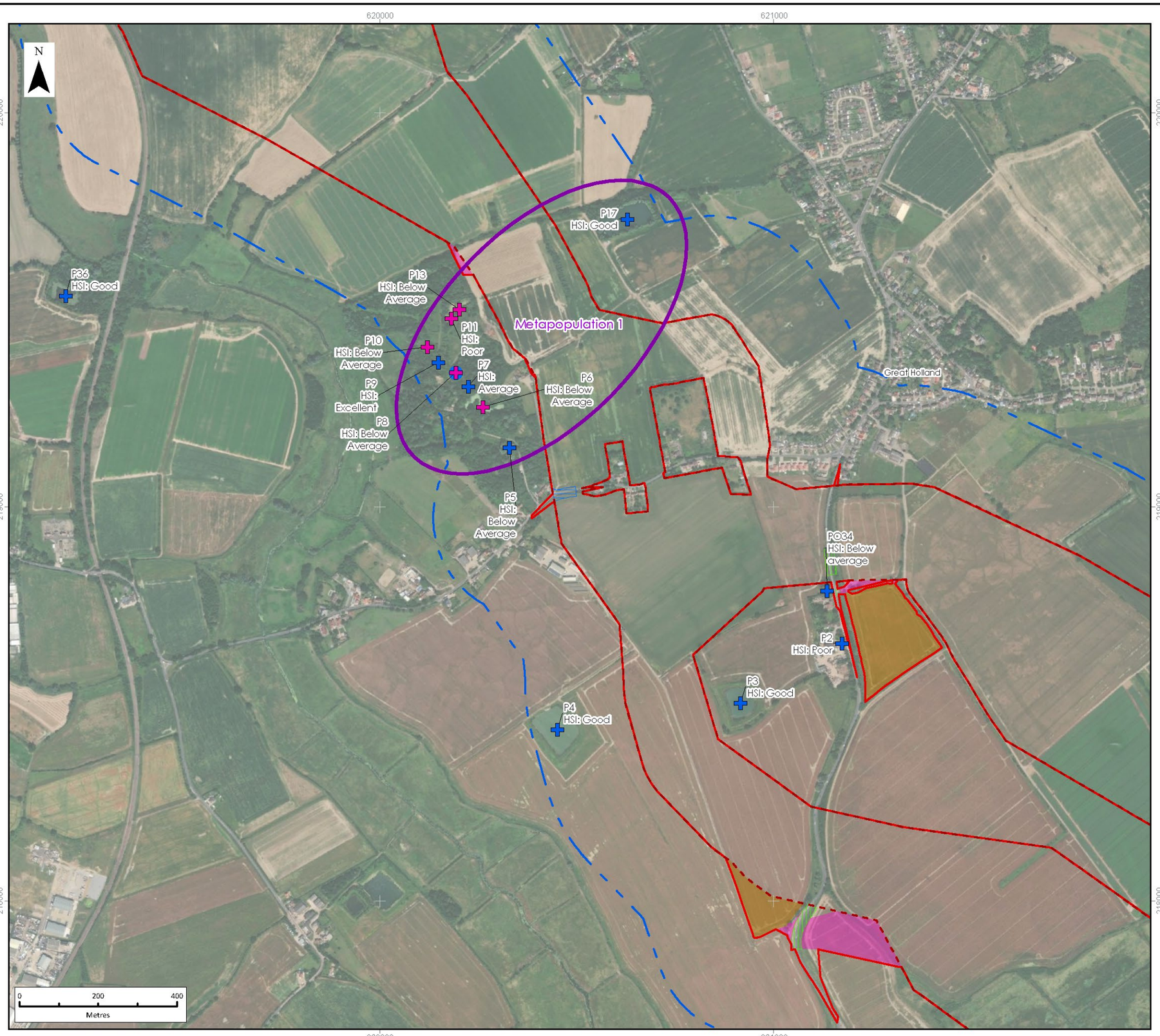
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

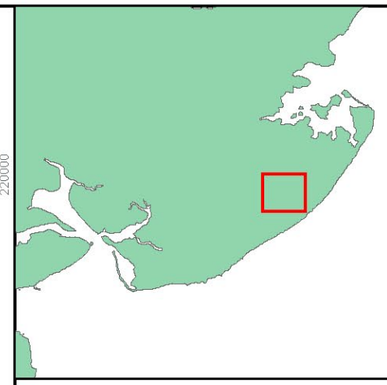
DRAWING NUMBER:

FIGURE 4.6
Page 1 of 9

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Present
- Great Crested Newt Absent
- Great Crested Newt Metapopulation

Great Crested Newt Pond Surveys 2017 - 2019 (Natural England)

- Great Crested Newt Absent

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

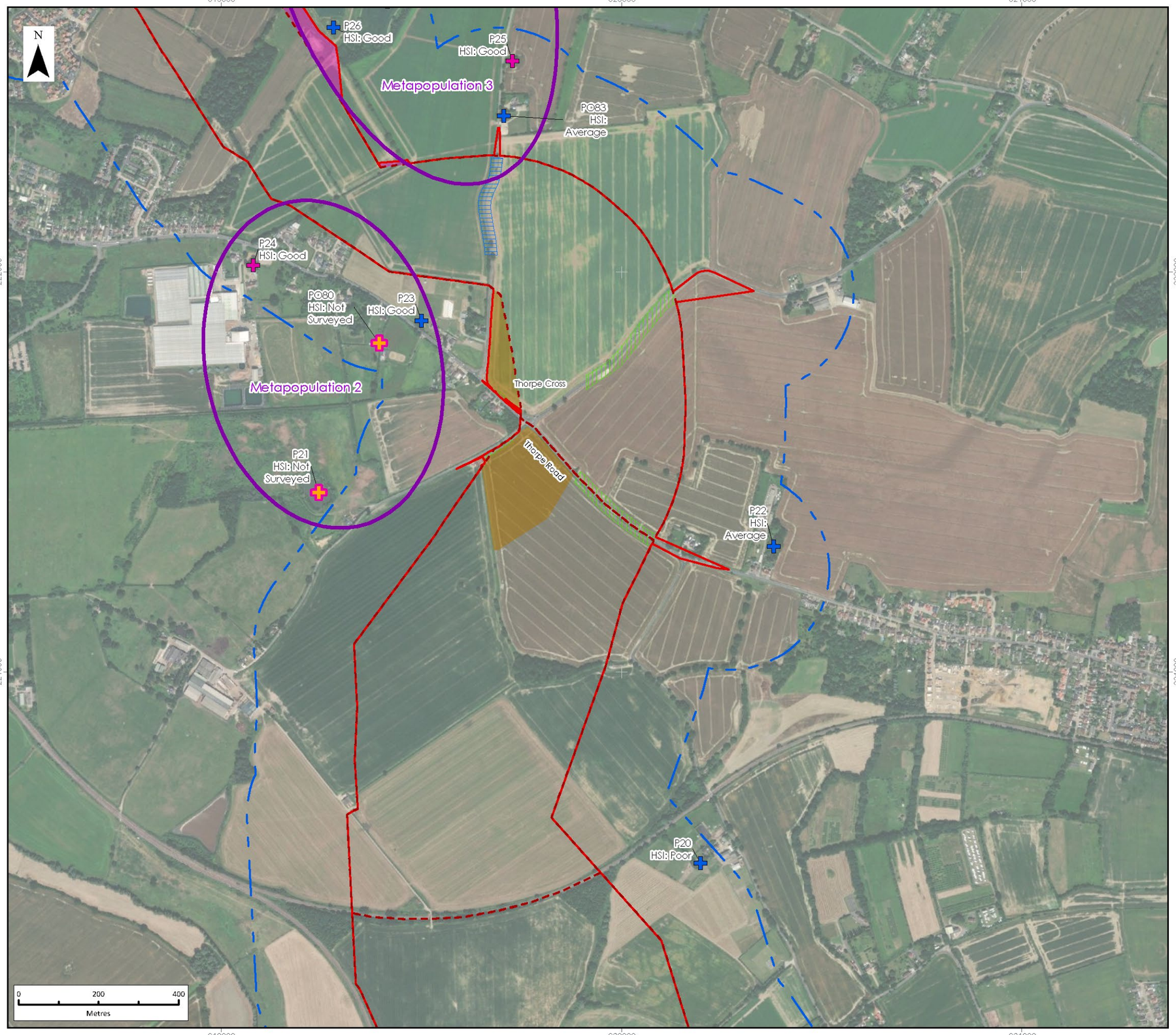
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

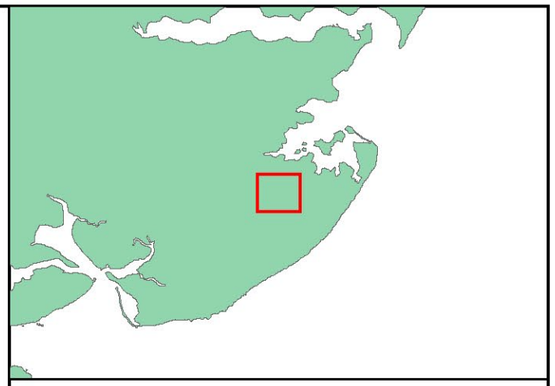
DRAWING NUMBER:

FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Present
- Great Crested Newt Absent
- Pond Not Accessible for Survey - Assumed GCN Present
- Great Crested Newt Metapopulation

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

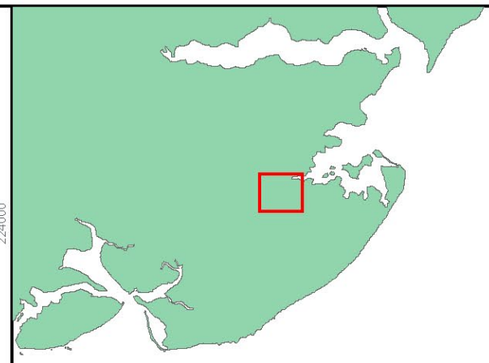
FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

P:\05356 - GoBe Consultants Ltd\00010 Five Estuaries\Tech\GIS\Dwgs\Wking\2022 09 PEIR\Chapters\Onshore Biodiversity\05356.00010.0201.0 GCN Summary.mxd

617000
618000
619000
224000
223000
222000
N
PO176
HSI: Good
Golden Lane
P35
HSI: Not Surveyed
P49
HSI: Excellent
P34
HSI: Poor
P33
HSI: Not Surveyed
P32
HSI: Not Surveyed
Metapopulation 4
P31
HSI: Not Surveyed
Thorpe Green
P30
HSI: Good
Metapopulation 3
P29
HSI: Average
PO196
HSI: Not Surveyed
P28
HSI: Excellent
P27
HSI: Excellen
P26
HSI: Good
P46
HSI: Excellent
P24
HSI: Good
Metapopulation 2
PO80
HSI: Not Surveyed
P23
HSI: Good
0
200
400
Metres



LEGEND

- Onshore Red Line Boundary
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- Works Access Required
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- Haul Road Access

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Present
- Great Crested Newt Absent
- Pond Not Accessible for Survey - Assumed GCN Absent
- Pond Not Accessible for Survey - Assumed GCN Present
- Great Crested Newt Metapopulation

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

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Great Crested Newt Summary

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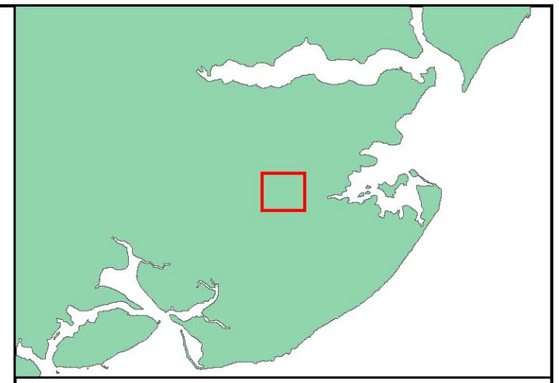
FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

615000
616000
617000
225000
224000
N
P64 HSI: Below Average
P65 HSI: Average
P63 HSI: Good
P62 HSI: Average
P61 HSI: Average
P60 HSI: Good
PO115 HSI: Average
PINC01 HSI: Average
Metapopulation 5
P59 HSI: Not Surveyed
P58 HSI: Not Surveyed
P75 HSI: N/A - pond not surveyed
P57 HSI: Average
Tendring Road
P56 HSI: Average
Metapopulation 4
PO105 HSI: Below Average
P55 HSI: Good
P54 HSI: Average
PO102 HSI: Excellent
P53 HSI: Average
P52 HSI: Good
P51 HSI: Below Average
P50 HSI: Excellent
P49 HSI: Excellent
P35 HSI: Not Surveyed
P16 HSI: Average
0 200 400
Metres



LEGEND

- Onshore Red Line Boundary
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- Onshore Export Cable Corridor
- Temporary Construction Compounds
- Works Access Required
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- Haul Road Access

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Present
- Great Crested Newt Absent
- Pond Not Accessible for Survey - Assumed GCN Present
- Great Crested Newt Metapopulation

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

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Great Crested Newt Summary

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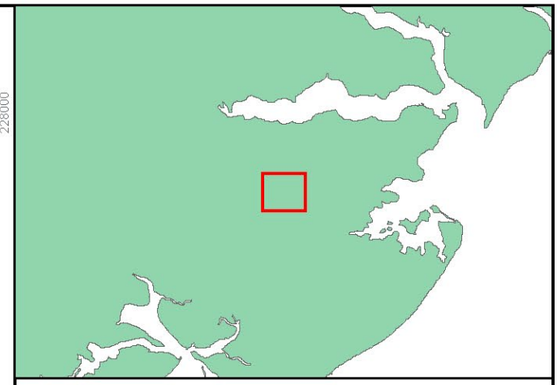
DRAWING NUMBER:

FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM

613000
614000
615000
228000
227000
226000
N
P73
HSI: Good
Metapopulation 7
Stones Green Road
P70
HSI: Average
P69
HSI: Below Average
Tendring Heath
P68
HSI: Not Surveyed
Wolves Hall Lane
PO193
HSI: Below average
Metapopulation 6
PO192
HSI: Good
P66
HSI: Good
Tendring Green
Metapopulation 5
0
200
400
Metres



LEGEND

- Onshore Red Line Boundary
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- Temporary Construction Compounds
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Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Present
- Great Crested Newt Absent
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- Great Crested Newt Metapopulation

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

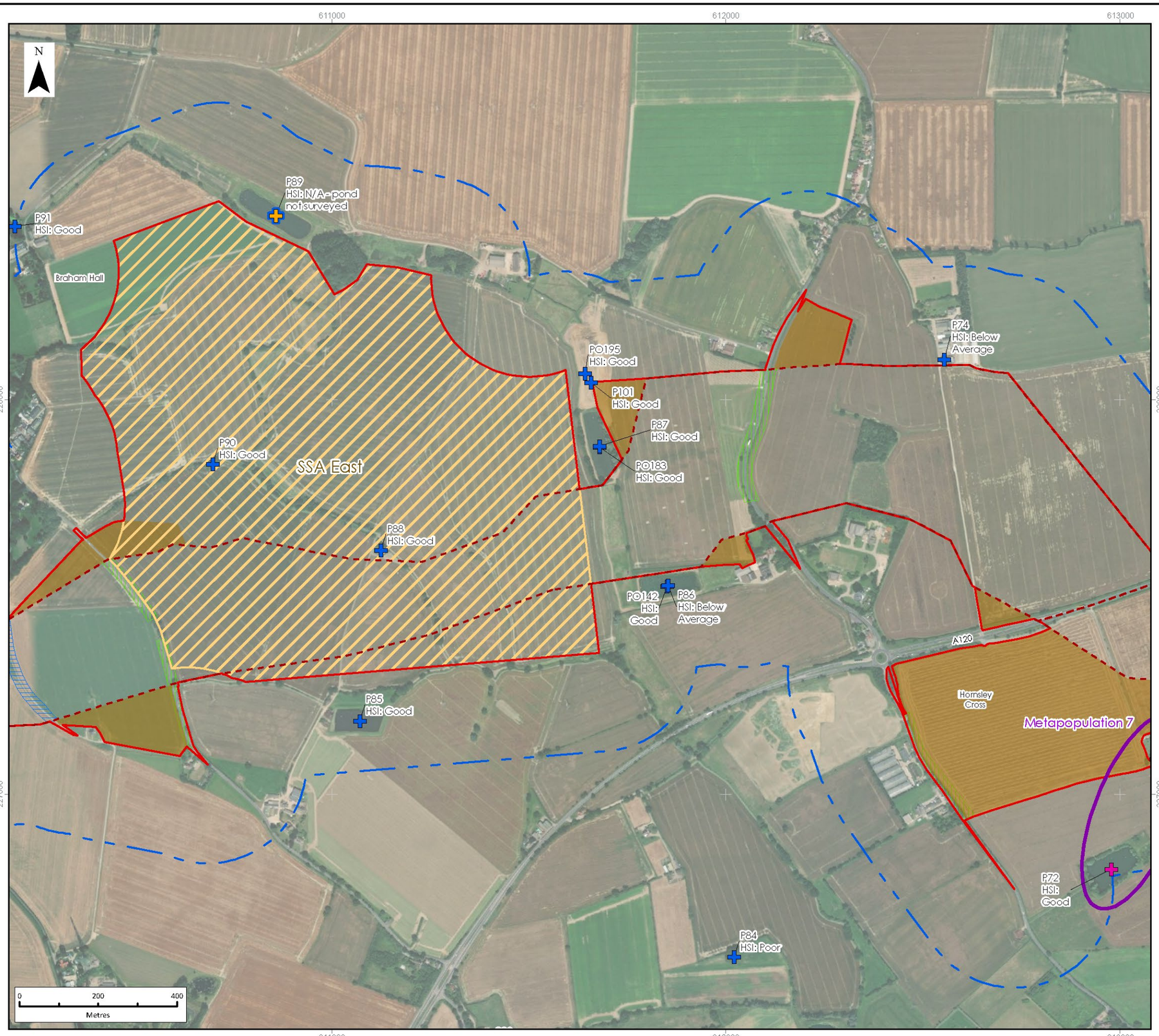
VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

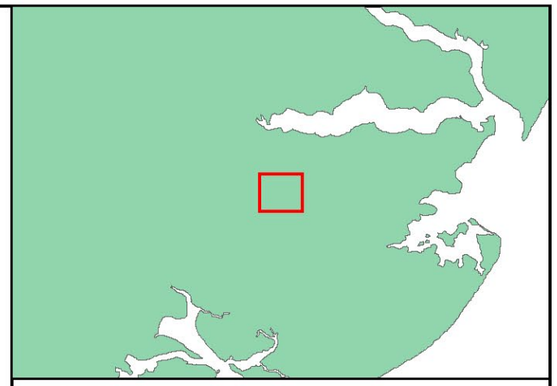
DRAWING NUMBER:

FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Present
- Great Crested Newt Absent
- Pond Not Accessible for Survey - Assumed GCN Absent
- Great Crested Newt Metapopulation

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

VER	DATE	REMARKS	Drawn	Checked
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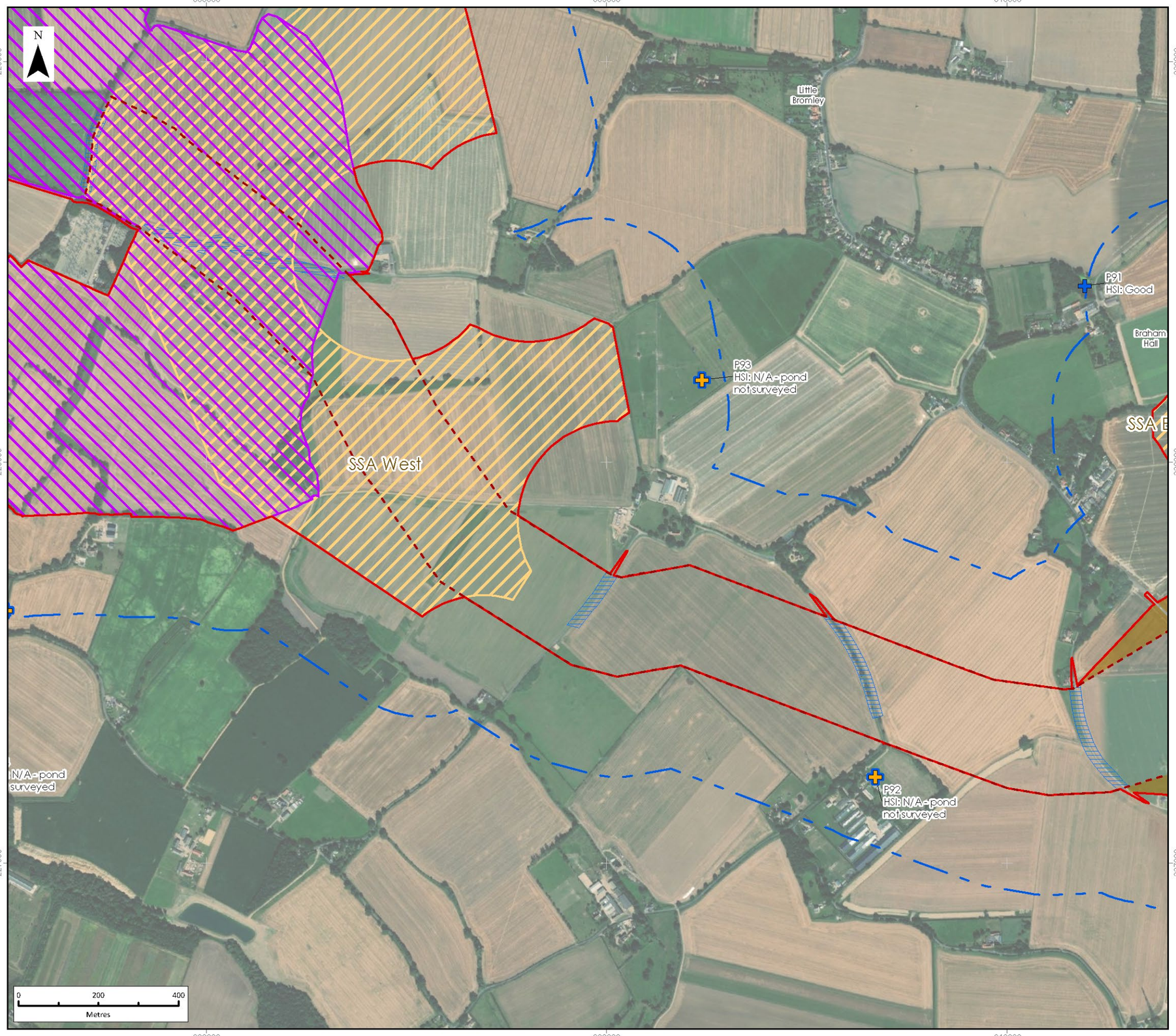
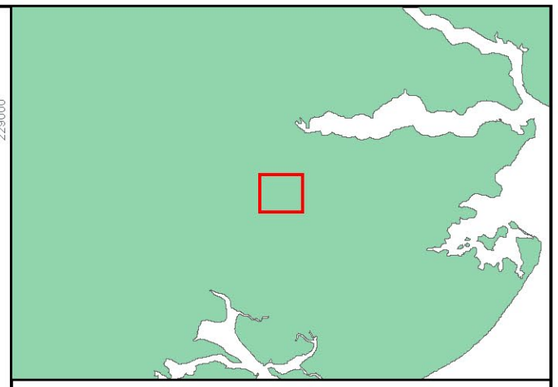
FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Absent
- Pond Not Accessible for Survey - Assumed GCN Absent

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

VER	DATE	REMARKS	Drawn	Checked
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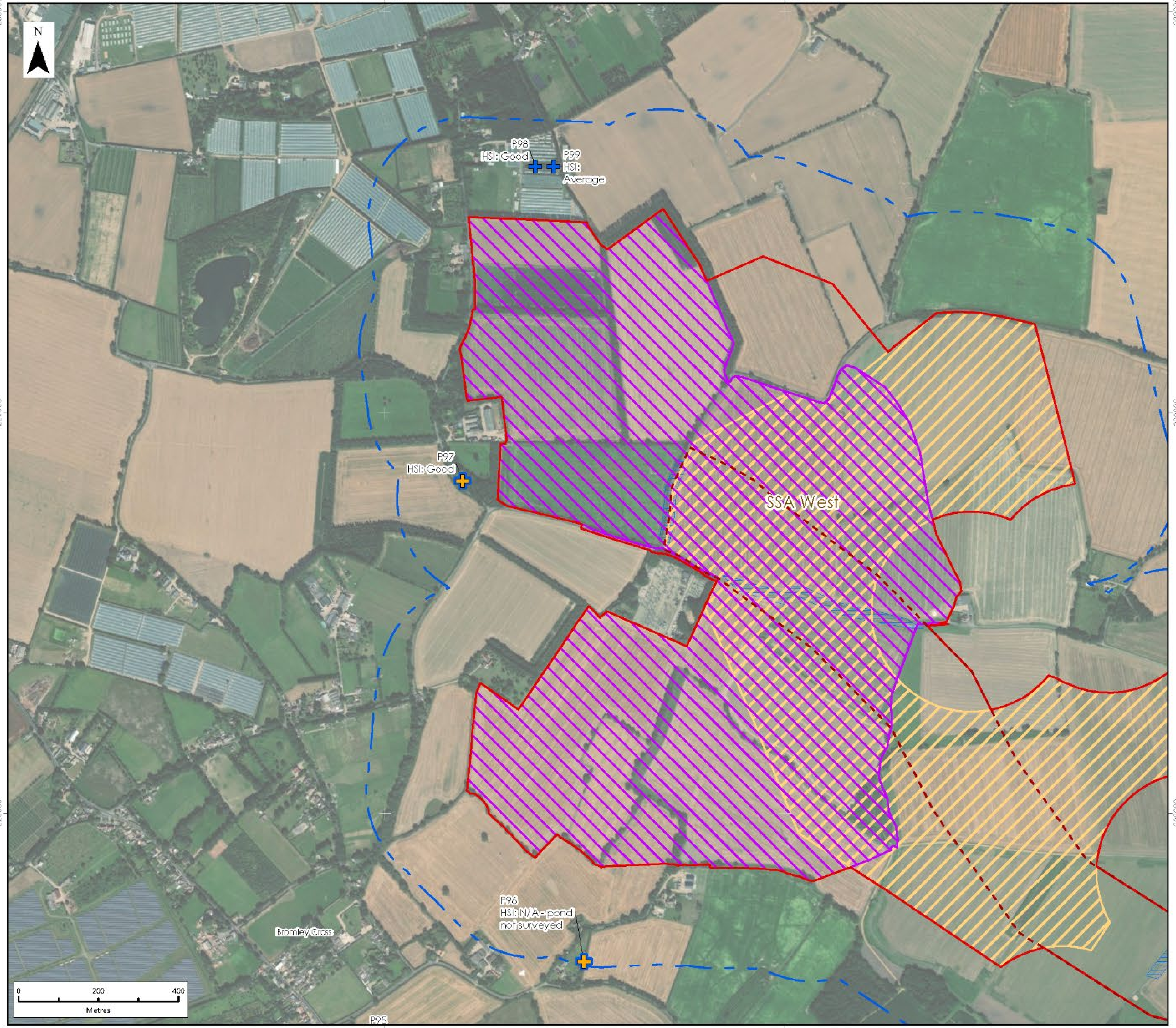
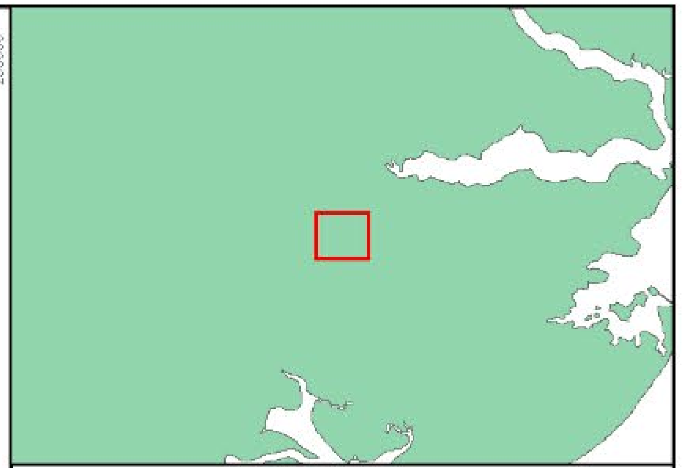
FIGURE 4.6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES OFFSHORE WIND FARM





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 250 m Buffer
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Haul Road Crossings

Great Crested Newt Pond Surveys 2022 (RHDHV/SLR)

- Great Crested Newt Absent
- Pond Not Accessible for Survey - Assumed GCN Absent

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Great Crested Newt Summary

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:

FIGURE 4.6

Page 9 of 9

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:10,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

4.8.31 Urban (with the exception of private gardens), cropland and short sward modified grassland habitats are considered to be of low value to GCN, as well as other locally occurring amphibians, at all stages of its lifecycle. All gardens, woodlands, hedgerows, scrub and wetlands within 250 m of ponds supporting GCN are considered to be of high value to sheltering, hibernating and foraging GCN, as well as providing routes between ponds and foraging areas. Grassland (excluding short sward modified grassland) and other vegetated habitat is considered to be of moderate value to sheltering and foraging GCN.

4.8.32 The remaining amphibian species were recorded in low numbers north of the A120, such that none of the ponds are considered to support a significant single-species population or multi-species assemblage. Ponds south of the A120 were not subject to torching and trapping survey such that it is not possible to determine amphibian numbers present at those locations.

REPTILES

4.8.33 EFC data includes a total of 75 records for four species of reptile within the study area. These include:

- Adder *Vipera berus*;
- Slow worm *Anguis fragilis*;
- Grass snake *Natrix natrix* and
- Common lizard *Zootoca vivipara*.

4.8.34 All the above species are protected from intentional killing, injuring and sale under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are listed under Section 41 of the NERC Act 2006.

4.8.35 The species records returned by EFC include a concentration of common lizard and slow worm at Thorpe le Soken and Weeley, with scattered records of common lizard, grass snake and adder across the wider study area, as indicated on Figure 4.5. Analysis and reporting of field survey work for reptiles is ongoing and will be reported in full within the ES.

4.8.36 Habitats that may be suitable for use by reptiles occur across the Survey Area and include rough grassland, field margins, hedgerows, scrub, woodland edges and wetlands, although the large arable fields within the Survey Area are not likely to support reptile species.

NON-BREEDING BIRDS

LANDFALL AREA

4.8.37 The results of non-breeding bird surveys at the landfall and surrounding area to date[4] are presented in detail in Volume 5, Annex 4.6: Wintering Brid Survey (Landfall Locations), Annex 4.10: North Falls Offshore Wind Farm Onshore Landfall Area: 2020/21 Non-breeding Bird Surveys and Annex 4.11: North Falls Offshore Wind Farm Onshore Landfall Area: 2021/22 Non-breeding Bird Surveys, with a summary of key findings provided below. Figures showing the distribution of target waterbird species, or target waterbird species groups, recorded during surveys carried out by MacArthur Green, on behalf of North Falls OWFL, in 2020-21 and 2021-22, are provided in Volume 5, Annex 4.10 North Falls Offshore Wind Farm Onshore Landfall Area: 2020/21 Non-breeding Bird Surveys: and Annex 4.11: North Falls Offshore Wind Farm Onshore Landfall Area: 2021/22 Non-breeding Bird Surveys. These also show the boundaries of the survey compartments referred to in the text below. A series of figures showing the distribution and relative abundance of waterbird species recorded during surveys undertaken by SLR, on behalf of VE, in 2021-22 are provided in Volume 5, Annex 4.6.

4.8.38 In total, 52 target species (wildfowl, waders, raptors and rare BoCC red-listed species) were recorded in the area surrounding the landfall during surveys carried out by MacArthur Green, on behalf of North Falls OWFL in 2020-21 with 61 target species recorded in the same area during the North Falls OWFL 2021-22 surveys. 39 waterbird species were recorded during the surveys undertaken at each landfall location, plus a minimum 500 m buffer, by SLR on behalf of VE, in 2021-22. The species recorded include several species representing qualifying features for nearby SPAs and Ramsar sites and/ or wintering species referred to in the Holland Haven Marshes SSSI citation (see Table 4.3).

4.8.39 Desk study data relating to wintering birds were summarised in the PEA report (Volume 5, Annex 4.1) and in the report on the 2021-22 surveys undertaken at the landfall on behalf of VE (Volume 5, Annex 4.6). All of the target species for which there are previous records at the landfall and surrounding area were also recorded during the surveys undertaken in 2020-21 and 2021-22.

[4] Further surveys were undertaken on behalf of North Falls OWFL in August-September 2022 but have not yet been reported at the time of writing. The summary provided here will therefore be updated in the ES.

4.8.40 Peak counts for each of the waterbird species recorded at the landfall and immediately surrounding area during each survey completed to date are shown in Table 4.6. Note that in many cases the peak counts shown include birds recorded outside the onshore RLB and 400 m buffer, so may overestimate bird numbers within the study area used in the assessment for non-breeding birds. Where relevant, Table 4.6 also provides the most recent 5-year mean peak count for the Holland Marshes Wetland Bird Survey (WeBS) count sector (Calbrade *et al*., 2021). Caution should be applied when comparing count data due to differences in the areas and time periods covered. Table 4.6 also indicates whether the relevant species represent non-breeding qualifying features for SPAs and Ramsar sites within 15 km of the landfall area[5] or are wintering species referred to in the citation for Holland Haven Marshes SSSI.

[5] Although located within 15 km of the onshore RLB, Abberton Reservoir SPA/Ramsar and Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/Ramsar are >15 km from the landfall area and are therefore excluded from Table 4.6.

Table 4.6: Peak counts of waterbird species at the landfall and immediate surrounding area

English Name	Scientific Name	Holland Marshes Peak Count – North Falls OWFL Surveys 2020-21[6]	Holland Marshes Peak Count – North Falls OWFL Surveys 2021-22[7]	Peak Count VE Landfall Surveys 2021-22[8]	Holland Haven WeBS Sector Five Year Mean Peak Count 2015/16-2019/20	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
Dark-bellied brent goose	*Branta bernicla bernicla*	110	100	1,100	821	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA/Ramsar Holland Haven Marshes SSSI
Canada goose	*Branta canadensis*	28	15	18	19	-
Greylag inali	*Anser anser*	223	238	282	258	-
Pink-footed inali	*Anser brachyrhynchus*	2	-	-	9	-
Tundra bean inali	*Anser serrirostris*	2	-	-	-	-

[6] Peak counts are shown for the Holland Haven compartment only. Peak counts for other compartments within the area surrounding the landfall are provided in Volume 5, Annex 4.10.
[7] Peak counts are shown for the Holland Haven compartment only. Peak counts for other compartments within the area surrounding the landfall are provided in Volume 5, Annex 4.11.
[8] The two landfall options were surveyed separately, and the figure shown represents the peak count at either the northern or southern landfall option (plus 500m buffer).

English Name	Scientific Name	Holland Marshes Peak Count – North Falls OWFL Surveys 2020-21[6]	Holland Marshes Peak Count – North Falls OWFL Surveys 2021-22[7]	Peak Count VE Landfall Surveys 2021-22[8]	Holland Haven WeBS Sector Five Year Mean Peak Count 2015/16-2019/20	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
European white fronted inali	*Anser albifrons albifrons*	50	40	238	12	-
Mute swan	*Cygnus olor*	7	4	4	3	Colne Estuary (Mid-Essex Coast Phase 2) SPA/Ramsar (assemblage)
Shelduck	*Tadorna tadorna*	19	13	30	33	Hamford Water SPA Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Shoveler	*Anas clypeata*	38	29	22	39	Holland Haven Marshes SSSI
Gadwall	*Anas strepera*	4	7	10	6	Stour & Orwell Estuaries SPA (assemblage)
Wigeon	*Mareca penelope*	288	370	243	537	Stour & Orwell Estuaries SPA (assemblage) Holland Haven Marshes SSSI
Mallard	*Anas platyrhynchos*	19	16	9	22	-
Pintail	*Anas acuta*	3	16	-	2	Stour & Orwell Estuaries SPA Holland Haven Marshes SSSI

English Name	Scientific Name	Holland Marshes Peak Count – North Falls OWFL Surveys 2020-21[6]	Holland Marshes Peak Count – North Falls OWFL Surveys 2021-22[7]	Peak Count VE Landfall Surveys 2021-22[8]	Holland Haven WeBS Sector Five Year Mean Peak Count 2015/16-2019/20	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
Teal	*Anas crecca*	216	324	260	398	Hamford Water SPA Holland Haven Marshes SSSI
Common scoter	*Melanitta nigra*	-	-	10	3	-
Water rail	*Rallus aquaticus*	1	1	-	-	-
Moorhen	*Gallinula chloropus*	4	8	5	9	-
Little grebe	*Tachybaptus ruficollis*	3	1	-	2	-
Great crested grebe	*Podiceps cristatus*	2	3	2	-	Stour & Orwell Estuaries SPA (assemblage)
Oystercatcher	*Haematopus ostralegus*	6	22	5	9	-
Avocet	*Recurvirostra avosetta*	42	37	45	36	Hamford Water SPA
Lapwing	*Vanellus vanellus*	137	120	325	476	Stour & Orwell Estuaries SPA (assemblage)
Golden plover	*Pluvialis apricaria*	-	-	1	110	-
Grey plover	*Pluvialis squatarola*	-	3	-	-	Hamford Water SPA Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)

English Name	Scientific Name	Holland Marshes Peak Count – North Falls OWFL Surveys 2020-21[6]	Holland Marshes Peak Count – North Falls OWFL Surveys 2021-22[7]	Peak Count VE Landfall Surveys 2021-22[8]	Holland Haven WeBS Sector Five Year Mean Peak Count 2015/16-2019/20	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
Ringed plover	*Charadrius hiaticula*	-	-	1	1	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Whimbrel	*Numenius phaeopus*	-	2	3	3	-
Curlew	*Numenius arquata*	53	54	66	28	Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Bar-tailed godwit	*Limosa lapponica*	-	1	-	2	-
Black-tailed godwit	*Limosa limosa*	5	21	15	46	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Turnstone	*Arenaria interpres*	7	8	16	7	Stour & Orwell Estuaries SPA (assemblage)

English Name	Scientific Name	Holland Marshes Peak Count – North Falls OWFL Surveys 2020-21[6]	Holland Marshes Peak Count – North Falls OWFL Surveys 2021-22[7]	Peak Count VE Landfall Surveys 2021-22[8]	Holland Haven WeBS Sector Five Year Mean Peak Count 2015/16-2019/20	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
Knot	*Calidris canutus*	-	1	-	-	Stour & Orwell Estuaries SPA/ Ramsar
Ruff	*Calidris pugnax*	1	4	3	2	Holland Haven Marshes SSSI
Sanderling	*Calidris alba*	-	1	4	-	Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Dunlin	*Calidris alpina*	2	6	1	5	Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Purple sandpiper	*Calidris maritima*	7	12	12	2	Holland Haven Marshes SSSI
Little stint	*Calidris minuta*		1	1	1	-
Snipe	*Gallinago gallinago*	22	18	7	10	Holland Haven Marshes SSSI
Common sandpiper	*Actitis hypoleucos*	-	11	1	2	-
Green sandpiper	*Tringa ochropus*	1	1	2	1	-
Redshank	*Tringa totanus*	5	3	4	7	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA/ Ramsar

English Name	Scientific Name	Holland Marshes Peak Count – North Falls OWFL Surveys 2020-21[6]	Holland Marshes Peak Count – North Falls OWFL Surveys 2021-22[7]	Peak Count VE Landfall Surveys 2021-22[8]	Holland Haven WeBS Sector Five Year Mean Peak Count 2015/16-2019/20	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
						Colne Estuary (Mid-Essex Coast Phase 2) SPA/Ramsar
Wood sandpiper	*Tringa glareola*	-	1	-	1	-
Razorbill	*Alca torda*		-	1	-	-
Red-throated diver	*Gavia stellata*		-	8	-	-
Cormorant	*Phalacrocorax carbo*	96	232	28	12	Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Shag	*Gulosus aristotelis*	1	-		-	-
Grey heron	*Ardea cinerea*	-	-	1	2	-
Great white egret	*Ardea alba*	1	-	-	-	-
Little egret	*Egretta garzetta*	2	2	1	1	-

4.8.41 Comparing the peak counts obtained during surveys undertaken at the landfall in 2020-21 and 2021-22 with WeBS data for Holland Marshes over the period 2015-16 to 2019-20 shows that peak counts are broadly comparable for most species. This indicates that the 2020-21 and 2021-22 survey data are generally representative of other recent years. Where there are differences between the 2020-21 and 2021-22 survey data and the WeBS data for 2015-16 to 2019-20, in some cases (e.g., dark-bellied brent goose and lapwing) these differences are likely to be due to differences in the area covered. For other species (e.g., European white-fronted goose, wigeon, teal, golden plover and black-tailed godwit), differences are likely to reflect regular fluctuations in numbers between years, as evidenced by the WeBS data for 2015-16 to 2019-20 (Frost *et al*., 2021). For a small number of other species, e.g., purple sandpiper, the differences may indicate an actual increase or decrease over the past two winters, compared with the previous five years.

4.8.42 Non-waterbird target species recorded at the landfall during the surveys included the following:

- Marsh harrier *Circus aeruginosus* – single bird during North Falls OWFL surveys in 2021-22;
- Hen harrier *Circus cyaneus* – single record during VE surveys in 2021-22 (non-breeding hen harrier is a qualifying feature for the Colne Estuary (Mid-Essex Coast Phase 2) SPA);
- Barn owl *Tyto alba* – single birds during North Falls OWFL surveys in 2020-21 and 2021-22;
- Short-eared owl *Asio flammeus* – single birds during North Falls OWFL surveys in 2020-21 and 2021-22;
- Kingfisher *Alcedo atthis* – single birds during North Falls OWFL surveys in 2020-21 and 2021-22;
- Merlin *Falco columbarius* – single birds during North Falls OWFL surveys in 2020-21 and VE surveys in 2021-22;
- Hobby *128inalizeb–uteo* – single bird during North Falls OWFL surveys in 2021-22;
- Peregrine *Falco peregrinus* – several records of 1-2 birds during all surveys;
- Bearded tit *Panurus biarmicus* – 2 birds during North Falls OWFL surveys in 2021-22;
- Cetti's warbler *Cettia cetti* – several records during all surveys;
- Dartford warbler *Curruca undata* – single birds during all surveys;
- Firecrest *Regulus ignicapilla* – single bird during North Falls OWFL surveys in 2020-21; and
- Corn bunting *Emberiza calandra* – single bird during North Falls OWFL surveys in 2021-22.

4.8.43 Survey data for the areas surrounding the landfall, including the Little Clacton, Holland Brook, Great Holland and Frinton Golf Course compartments that were surveyed on behalf of North Falls OWFL in 2020-21 and 2021-22, are provided in Volume 5, Annex 4.10 and Annex 4.11 respectively with a brief summary provided below.

4.8.44 A smaller number of target species were recorded in each of the surrounding compartments than were recorded in the Holland Marshes compartment. Very few additional species were recorded that were not also recorded at Holland Marshes. Additional species records included: coot *Fulica atra* (peak count of 2 at Little Clacton); garganey *Anas querquedula* (peak count of 2 at Great Holland); red kite *Milvus milvus* (peak count of 1 at Great Holland); tufted duck *Aythya fuligula* (peak count of 7 at Holland Brook); and woodcock *Scolopax rusticola* (peak count of 1 at Frinton Golf Course). In most cases waterbird counts were lower than for the Holland Marshes compartment, with the main exceptions being: dark-bellied brent goose (peak count of 1,100 at Great Holland in 2021-22); European white-fronted goose (peak count of 101 at Great Holland in 2020-21); golden plover (peak count of 100 at Great Holland in 2020-21); and lapwing (peak count of 890 at Great Holland in 2021-22).

4.8.45 The relative abundance and distribution of regularly recorded waterbird species during the VE surveys at each landfall location in 2021-22 are shown in Drawings 3.1-3.26 and Drawings 4.1-4.17 in Volume 5, Annex 4.6. At both landfall locations, most waterbird species were most frequently associated with the pools within Holland Haven Marshes SSSI. One exception to this was dark-bellied brent goose, which was mostly recorded inland of Holland Haven Marshes, towards Lodge Farm, or in the intertidal areas or offshore (mostly in flight). The other main exceptions were oystercatcher, turnstone and purple sandpiper, which were most frequently observed within the intertidal area (primarily at lower states of the tide). Species such as red throated diver and common scoter were only observed on the sea. Cormorant was also most frequently observed offshore.

4.8.46 The North Falls OWFL surveys in 2020-21 noted that there is widespread and frequent human activity across parts of the area surveyed, including dog walkers, wildfowling, golfing, angling and metal detecting. The coastal strip was most heavily used for recreational pursuits and there was frequent potential disturbance to birds. The VE surveys in 2021-22 indicated that walkers using the track along the seawall did not usually cause noticeable disturbance to waterbirds. Excluding people using the track along the seawall, the number of disturbance events recorded during the VE surveys was relatively low and 45% of these events resulted in no evident disturbance of birds observed. These findings suggest that waterbirds using areas in proximity to the seawall are relatively habituated to regular disturbance. The North Falls OWFL surveys (both years) highlighted the use of bird scarers on some of the fields inland of Holland Marshes, particularly within the Little Clacton and Great Holland compartments. These are likely to affect the distribution and usage of these areas by waterbird species.

4.8.47 The results of wintering bird surveys of the onshore ECC and substation search areas, carried out by MacArthur Green on behalf of North Falls OWFL in 2021-22[9], are presented in detail in Volume 5, Annex 4.12, with a summary of key findings provided below. Figures showing the distribution of waterbird species, or waterbird species groups, and other target species recorded during the surveys are provided in Volume 5, Annex 4.12.

4.8.48 In total, 51 target species (wildfowl, waders, raptors and rare BoCC red-listed species) were recorded in the area surveyed. The species recorded include several species representing qualifying features for nearby SPAs and Ramsar sites and/ or wintering species referred to in the Holland Haven Marshes SSSI citation (see Table 4.3).

4.8.49 Desk study data relating to wintering birds for the area within which the onshore ECC and substation search areas are located were summarised in the PEA report (Volume 5, Annex 4.1). The desk study provided few target species records within the study area used for this assessment (i.e., within the onshore RLB and 400 m buffer). Dark-bellied brent geese have been recorded close to Thorpe-le-Soken, which may be within the study area for this assessment, although the precise location of the record is unknown. Dark-bellied brent geese have also been recorded outside this study area to the east, close to Hamford Water, and outside this study area to the north, towards the Stour Estuary. Golden plover has been recorded just outside this study area near Weeley and Wix.

4.8.50 Peak counts for each of the waterbird species recorded within the area surveyed for the onshore ECC and substation search areas during the 2021-22 surveys are shown in Table 4.7. Note that in several cases the peak counts shown include birds recorded outside the onshore RLB and 400 m buffer, so may overestimate bird numbers within the study area used for this assessment. Table 4.7 also indicates whether the relevant species represent non-breeding qualifying features for SPAs and Ramsar sites within 15 km of the onshore ECC and substation search areas or are wintering species referred to in the citation for Holland Haven Marshes SSSI.

Table 4.7: Peak counts of waterbird species during surveys of the onshore export cable corridor and substation search areas in winter 2021-22

English Name	Scientific Name	Peak Count	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
Dark-bellied brent Goose	*Branta bernicla bernicla*	124	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA/Ramsar Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/Ramsar

[9] A second year of winter surveys of the onshore ECC and substation search areas is currently in progress and the summary provided here will therefore be updated in the ES.

English Name	Scientific Name	Peak Count	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
			Holland Haven Marshes SSSI
Canada goose	*Branta canadensis*	352	-
Greylag inali	*Anser anser*	400	-
Mute swan	*Cygnus olor*	19	Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage) Abberton Reservoir SPA
Egyptian goose	*Alopochen aegyptiaca*	99	-
Shelduck	*Tadorna tadorna*	17	Hamford Water SPA Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Mandarin duck	*Aix galericulata*	1	-
Garganey	*Spatula querquedula*	3	-
Shoveler	*Anas clypeata*	24	Abberton Reservoir SPA/Ramsar Holland Haven Marshes SSSI
Gadwall	*Anas strepera*	44	Stour & Orwell Estuaries SPA (assemblage) Abberton Reservoir SPA/Ramsar
Wigeon	*Mareca penelope*	57	Stour & Orwell Estuaries SPA (assemblage) Abberton Reservoir SPA/Ramsar Holland Haven Marshes SSSI
Mallard	*Anas platyrhynchos*	103	-
Teal	*Anas crecca*	137	Hamford Water SPA Abberton Reservoir SPA/Ramsar Holland Haven Marshes SSSI
Pochard	*Aythya farina*	3	Abberton Reservoir SPA
Tufted duck	*Aythya fuligula*	35	Abberton Reservoir SPA
Water rail	*Rallus aquaticus*	1	-
Moorhen	*Gallinula chloropus*	28	-
Coot	*Fulica atra*	98	Abberton Reservoir SPA
Little grebe	*Tachybaptus ruficollis*	8	-
Great crested grebe	*Podiceps cristatus*	6	Stour & Orwell Estuaries SPA (assemblage) Abberton Reservoir SPA
Oystercatcher	*Haematopus ostralegus*	2	-
Avocet	*Recurvirostra avosetta*	1	Hamford Water SPA

English Name	Scientific Name	Peak Count	SPA/ Ramsar/ SSSI Qualifying Feature (non-breeding)?
Lapwing	*Vanellus vanellus*	1,628	Stour & Orwell Estuaries SPA (assemblage)
Golden plover	*Pluvialis apricaria*	484	-
Grey plover	*Pluvialis squatarola*	5	Hamford Water SPA Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage) Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/Ramsar
Curlew	*Numenius arquata*	84	Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Black-tailed godwit	*Limosa limosa*	1	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage) Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/Ramsar
Ruff	*Calidris pugnax*	3	Holland Haven Marshes SSSI
Woodcock	*Scolopax rusticola*	3	-
Snipe	*Gallinago gallinago*	3	Holland Haven Marshes SSSI
Green sandpiper	*Tringa ochropus*	8	-
Redshank	*Tringa totanus*	10	Hamford Water SPA/ Ramsar Stour & Orwell Estuaries SPA/ Ramsar Colne Estuary (Mid-Essex Coast Phase 2) SPA/Ramsar
Cormorant	*Phalacrocorax carbo*	41	Stour & Orwell Estuaries SPA (assemblage) Colne Estuary (Mid-Essex Coast Phase 2) SPA (assemblage)
Spoonbill	*Platalea leucorodia*	1	-
Grey heron	*Ardea cinerea*	5	-
Great white egret	*Ardea alba*	1	-
Little egret	*Egretta garzetta*	6	-

4.8.51 Non-waterbird target species recorded during the surveys of the onshore ECC and substation search areas in winter 2021-22 included the following:

- Marsh harrier – recorded on six (out of 12) survey visits, peak count of six;
- Hen harrier – single record in December 2021 (non-breeding hen harrier is a qualifying feature for the Colne Estuary (Mid-Essex Coast Phase 2) SPA and Blackwater Estuary (Mid-Essex Coast Phase 4) SPA);

- Red–kite - recorded on three (out of 12) survey visits, peak count of five;
- Barn owl – up to two birds recorded on five (out of 12) survey visits;
- Kingfisher – recorded on six (out of 12) survey visits, peak count of three;
- Kestrel *Falco tinnunculus* – recorded on all survey visits, peak count of 18;
- Merlin – up to two birds recorded on three (out of 12) survey visits;
- Peregrine – recorded on ten (out of 12) survey visits, peak count of four;
- Woodlark *Lullula arborea* – single record of two birds in October 2021;
- Cetti's warbler – single bird on one (out of 12) survey visits; and
- Corn bunting – peak count of 86, recorded on 11 (out of 12) survey visits, with the largest flocks in the north of the area surveyed near Little Bromley and New Hall and in the south of the area surveyed near Great Holland.

4.8.52 Of the species representing designated site qualifying features that were recorded in relatively large numbers (i.e., peak counts >50), dark-bellied brent geese were recorded only once during the twelve survey visits, in a field located >1.4 km from the study area used for this assessment. Lapwing numbers peaked in mid-winter, although several of the largest flocks were outside the study area. Curlew was mainly recorded in the southern part of the area surveyed, with some of the larger flocks recorded outside the study area. The main concentrations of ducks, including teal and wigeon, were close to Hamford Water SPA and just south of Lawford, both outside the study area used for this assessment. Smaller numbers of ducks were also associated with waterbodies within the study area however, including waterbodies northeast of Thorpe-le-Soken, near Tendring, and on Holland Brook in the south. Coot was only recorded in numbers greater than 50 on one date, with the main concentration along the Holland Brook, to the south of Thorpe-le-Soken.

BREEDING BIRDS

LANDFALL AREA

4.8.53 The results of breeding bird surveys at the landfall and surrounding area, carried out on behalf of North Falls OWFL in 2021[10], are presented in detail in Volume 5, Annex 4.13, with a summary of key findings provided below. The distribution of confirmed breeding records for target species is shown in Figure 2 in Volume 5, Annex 4.13.

4.8.54 Desk study data relating to breeding birds at the landfall and surrounding area were summarised in the PEA report (Volume 5, Annex 4.1). Of note were records for turtle dove and nightingale at Holland Haven and Great Holland Pits LoWS. The Holland Haven Marshes SSSI citation refers to ringed plover breeding behind the seawall, but no evidence of ringed plover was recorded during the 2021 breeding bird survey. All other notable species for which breeding records were identified by the desk study were recorded during the 2021 breeding bird survey.

[10] A second year of breeding bird surveys at the landfall area was undertaken in 2022 but has yet to be reported. The summary provided here will therefore be updated in the ES.

4.8.55 Target species recorded breeding within the area surveyed are listed in Table 4.8. Table 4.8 also shows the number of breeding pairs of each species, where known, and additional notes on breeding status, where relevant. Note that in several cases, the number of breeding pairs shown includes birds recorded outside the onshore RLB and 400 m buffer, so may overestimate bird numbers within the study area used for this assessment. Table 4.8 also indicates whether the relevant species represent breeding qualifying features for SPAs and Ramsar sites within 15 km of the landfall area or are breeding species referred to in the citation for Holland Haven Marshes SSSI.

Table 4.8: Target species recorded breeding at the landfall and surrounding area during the survey undertaken in 2021

English Name	Scientific Name	No. of Breeding Pairs (Where Known)	Notes on breeding Status	SPA/ Ramsar/ SSSI Qualifying Feature (breeding)?
Grey partridge	*Perdix perdix*	1	Not recorded during the surveys but incidental record of a breeding pair provided by a landowner. Location was outside the study area for this assessment.	-
Avocet	*Recurvirostra avosetta*	Up to 19	Up to 39 individuals within the SSSI, most, if not all, of which were considered likely to comprise breeding birds.	Stour & Orwell Estuaries SPA
Lapwing	*Vanellus vanellus*	3	Recorded in wet grassland within the SSSI and on arable land outside the SSSI. Two pairs within the study area for this assessment.	-
Redshank	*Tringa totanus*	Up to 3	Up to six individuals present with breeding confirmed at one location. All records within the SSSI.	-
Marsh harrier	*Circus aeruginosus*	1?	One unconfirmed breeding territory (single female on several dates) in arable farmland within the study area for this assessment.	-
Barn owl	*Tyto alba*	3	Two successful pairs and one further pair for which success was not confirmed. All three nest locations were recorded outside the study area for this assessment.	-
Cetti's warbler	*Cettia cetti*	26	Present in suitable marshy and large open waterbodies. Nine singing males within the study area for this assessment, all within the SSSI.	-
Yellow wagtail	*Motacilla flava*	5	All breeding activity recorded in arable farmland, outside the SSSI.	Holland Haven Marshes SSSI

English Name	Scientific Name	No. of Breeding Pairs (Where Known)	Notes on breeding Status	SPA/ Ramsar/ SSSI Qualifying Feature (breeding)?
			Only one pair was within the study area for this assessment.	
Corn bunting	*Emberiza calandra*	11	Mostly present in arable habitat, including three pairs within the SSSI. Four pairs within the study area for this assessment.	-
Yellowhammer	*Emberiza citrinella*	9	Mostly recorded in arable margins to the west of Holland Brook. All breeding pairs were recorded outside the study area for this assessment.	-

4.8.56 Other species recorded during the breeding bird surveys at the landfall and surrounding area in 2021 are listed in Volume 5, Annex 4.13. These included skylark *Alauda arvensis*, meadow pipit *Anthus pratensis* and reed warbler *Acrocephalus scirpaceus*, which are referred to in the citation for Holland Haven Marshes SSSI. All three species were common with up to 56 skylark territories recorded throughout the area surveyed, along with eight meadow pipit and 21 reed warbler territories.

4.8.57 Several other wader and wildfowl species, not included in Table 4.8, were recorded during the surveys. All of the additional wader records were considered to relate to non-breeding birds on passage. Of the wildfowl, shelduck, gadwall, shoveler and teal were all present during the surveys, but no confirmed evidence of breeding was recorded.

EXPORT CABLE CORRIDOR AND SUBSTATION SEARCH AREAS

4.8.58 Breeding bird surveys of the onshore ECC and substation search areas were carried out in spring/ summer 2022 and survey data have yet to be fully analysed and reported. Full details will be presented in the ES.

4.8.59 Based on desk study data and an assessment of habitat potential, five species included on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and/ or Annex 1 of the EC Birds Directive could potentially breed within the onshore ECC and substation search areas survey area: kingfisher, barn owl, hobby, quail *Coturnix coturnix* and Cetti's warbler. Suitable habitat for barn owl (foraging and nesting habitat) is present throughout the survey area comprising different types of grassland for foraging and buildings, mature trees and pole-mounted boxes for nesting. Suitable habitat for kingfisher within the survey area is limited to larger waterbodies and watercourses, namely the Holland Brook and Tendring Brook. Hobby typically nests in trees and open woodland close to large open waterbodies, both of which occur within the survey area. Similarly, the survey area supports numerous opportunities for foraging and nesting Cetti's warbler in and around waterbodies and watercourses with associated scrub habitats. Quail is a ground nesting bird and there is abundant suitable nesting habitat present for it; it is most likely to nest within or adjacent to agricultural habitats amongst tall vegetation.

4.8.60 Other notable species which may be present within the onshore ECC and substation search areas, based on desk study data, consultee feedback and an assessment of habitat potential include turtle dove, nightingale and corn bunting. Turtle dove typically nests in hedgerows and scrub, feeding upon seeds in agricultural fields. Corn bunting nests on the ground in cereal fields, set-aside, grass field margins or unimproved grassland and nightingale typically nests at low level within dense scrub.

BATS

4.8.61 Bat survey results obtained to date have not been fully analysed and reported. Full details of the surveys undertaken will be presented within the ES. The following section is based upon desk study data and will be updated in the ES.

4.8.62 The desk study data (extended to 6 km from the onshore RLB to account for core sustenance zones of the species likely to be present) includes records for the following species:

- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *P. pygmaeus*;
- Nathusius' pipistrelle *P. nathusii*;
- Pipistrelle sp.;
- Brown long-eared bat *Plecotue auritus*;
- Daubenton's bat *Myotis daubentonii*;
- Myotis sp.;
- Natterer's bat *Myotis nattereri*;
- Serotine *Eptesicus serotinus*;
- Noctule *Nyctalus noctula*;
- Leisler's bat *Nyctalus leisleri*;
- Barbastelle *Barbastella barbastellus*; and
- Bat sp.

4.8.63 One record for brown long-eared bat is from within 100m of the onshore RLB, but is provided at 100 m accuracy, so may be within the RLB. A further five records occur within 200 m, again with 100 m accuracy so may be within 100 m of the RLB; these include common pipistrelle, pipistrelle species and brown long-eared bat.

4.8.64 Eight known roost locations occur within 6 km of the RLB and are shown onFigure 4.5, four of which are at Church Lane, Beaumont-cum-Moze and include a brown long-eared bat maternity roost, common pipistrelle, barbastelle and Natterer's bat roosts. The remaining four include a brown long-eared maternity roost at the Church of St Mary, Ardleigh, a brown long-eared bat roost at Hamilton Lodge, a common pipistrelle roost at Clacton-on-Sea and a serotine roost at Frinton-on-Sea.

4.8.65 While the majority of these species are relatively common and/or widespread, barbastelle (2 records), Leisler's bat (2 records), Nathusius' pipistrelle (1 record) and serotine (4 records) are considered to be rare species in East Anglia.

4.8.66 All bat species in the UK are protected through inclusion in Schedule 5 of the Wildlife and Countryside Act (as amended) and in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). Noctule, common pipistrelle, soprano pipistrelle, brown long-eared bat and barbastelle are also Section 41 species.

4.8.67 Potential roost locations within the survey area include mature trees within hedgerows and woodlands, as well as occasional farm buildings (within the 100 m buffer, rather than the RLB itself). Potential roosts that may be impacted have been subject to survey and results will provided as part of the subsequent bat survey report, to be appended to the ES.

4.8.68 The survey area includes numerous habitats that are suitable for use by commuting and foraging bats, such as hedgerows, woodland edges and watercourses, although the large arable fields are unlikely to be of great value to commuting and foraging bats. These have also been subject to survey to determine potentially important flight lines and/ or presence of significant roosts. Full details will be provided in due course, in the bat report to be appended to the ES.

BADGER

4.8.69 Badger receives protection under the Protection of Badgers Act 1992. Woodland and hedgerows are particularly suitable for sett digging, and the grassland fields for foraging. EFC provided details of 58 records for badger and North East Essex Badger Group provided details for 27 setts within the study area. Evidence of badger in the form of active setts and latrines has been located in the survey area during the ongoing field survey. Survey information will be included in a subsequent badger survey report which will be appended to the ES (sett details will be provided in a separate confidential annex).

OTTER

4.8.70 Otter is fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and in Schedule 2 of The Conservation of Habitats and Species Regulations 2017 (as amended), it is also a Section 41 species.

4.8.71 EFC returned records of otter within Holland Haven Marshes SSSI, north-east of Thorpe-le-Soken at Hamford Water SSSI, at Goose Green and at the River Stour, west of Manningtree, as shown onFigure 4.5.

4.8.72 In addition to the river and streams, otte137inaliztilise the ditch and pond network present in the study area, particularly during the amphibian breeding season when frog, toad and newt prey would be abundant.

4.8.73 Analysis and reporting of field survey work for otter is ongoing and survey information will be included in a subsequent otter and water vole survey report, which will be appended to the ES.

WATER VOLE

4.8.74 Water vole is fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), it is also a Section 41 species.

4.8.75 EFC returned 18 records of water vole within the study area, all except three occur more than 250 m from the onshore RLB. The three within 250 m occur at the Kirby Brook between Holland Haven Marshes SSSI and Frinton Golf Club, between the Great Holland Pits Nature Reserve and a large waterbody to the east (the record could have come from either, the precision does not enable distinction) and at the Tendring Brook, east of Tendring; refer to Figure 4.5 for details.

4.8.76 Water courses and ponds within the survey area, particularly those linked to the above-named areas are likely to be suitable for use by this species.

4.8.77 Analysis and reporting of field survey work for water vole is ongoing and survey information will be included in a subsequent otter and water vole survey report, which will be appended to the ES.

DORMOUSE

4.8.78 Dormouse is fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act (as amended) and in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended), it is also a Section 41 species.

4.8.79 EFC returned records for dormouse at Thorpe le Soken, Great Holland Pits LoWS, Weeley Heath, Beaumont and Little Bentley, as shown on Figure 4.5. Potentially suitable habitat for dormice includes well-linked hedgerow, scrub and woodlands that support food plants such as hazel *Corylus avellana* and bramble *Rubus fruticosus*. Within the survey area, these are most abundant east of Weeley Heath, around Thorpe le Soken and northward toward the A120. North of the A120 these habitats are less common.

4.8.80 Analysis and reporting of field survey work for dormouse is ongoing and survey information will be included in a subsequent dormouse survey report, which will be appended to the ES.

OTHER MAMMALS

4.8.81 Three other Section 41 mammal species are noted to occur within the 2 km study area, based on the desk study data: hedgehog *Erinaceus europaeus*, harvest mouse *Micromys europaeus* and brown hare *Lepus europaeus*.

4.8.82 The Survey Area includes numerous habitats that are suitable for use by hedgehog such as hedgerows, woodland edges, scrub and gardens. Suitable habitat for brown hare is also present across the Survey Area, including grassland and crops for foraging and woodland and hedgerows for cover. Suitable habitat for harvest mouse includes areas of tall grassland, including agricultural fields under crop or ley, road verges, hedgerows and reed beds.

SUMMARY OF IMPORTANT ECOLOGICAL FEATURES

4.8.83 Table 4.9 outlines the important ecological features that have been identified within the study area, or which based upon desk study information, habitat suitability or via more recent survey data are considered likely to be present within the study area, and which may be affected by the project. For designated sites and their qualifying or notified features, importance reflects the geographical context of the designation. SPAs, SACs and Ramsar sites are therefore all considered to be internationally important. SSSIs are considered nationally important and LoWSs are considered important at a county (Essex) level.

4.8.84 The locations of important habitat features and relevant designated sites are shown in Figure 4.3. Note that it is not possible to evaluate the importance of some faunal species populations at this stage as surveys are either ongoing or survey data have yet to be analysed and reported. Where this is the case, this is highlighted in Table 4.9. It is also noted that some of the valuations included in Table 4.9 may be subject to change on completion of the outstanding surveys.

Table 4.9: Important ecological features that may be affected

Important ecological feature	Reason for importance	Geographical scale of importance
Hamford Water SAC SPA and Ramsar	Statutory Designated Site	International
Hamford Water SSSI and NNR	Statutory Designated Site	National
Stour and Orwell Estuaries SPA and Ramsar	Statutory Designated Site	International
Colne Estuary (Mid-Essex Coast Phase 2) SPA and Ramsar	Statutory Designated Site	International
Abberton Reservoir SPA Ramsar SSSI	Statutory Designated Site	International
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA Ramsar	Statutory Designated Site	International
Holland Haven Marshes SSSI LNR	Statutory Designated Site	UK
LoWS within the RLB, including: > Simon's Wood;	LoWS	County

Important ecological feature	Reason for importance	Geographical scale of importance
> Great Holland Pits; and > Thorpe Green		
LoWs within 200m of the RLB, including > Little Bromley Churchyard; > Manning Grove; and > Upper Holland Brook.	LoWS	County
Hedgerows (UKHab primary code h2a)	Most meet the S41 definition (Maddock. A.(ed), 2011), which is: "*A hedgerow is defined as any boundary line of trees or shrubs over 20 m long and less than 5 m wide, and where any gaps between the trees or shrub species are less than 20 m wide. Any bank, wall, ditch or tree within 2 m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is the herbaceous vegetation within 2 m of the centre of the hedgerow. All hedgerows consisting predominantly (i.e., 80% or more cover) of at least one woody UK native species are covered by this priority habitat, where each UK country can define the list of woody species native to their respective country*" Most hedgerows within the survey area are relatively species-poor but some are more species-rich and at least four are "Important" under the Hedgerow Regulations 1997. Additional important hedgerows may be identified following analysis of protected species survey results.	County

Important ecological feature	Reason for importance	Geographical scale of importance
	Due to the large number of hedgerows within the survey area the resource is assessed as being greater than local value.	
Arable margins (UKHab primary codes c1a6 and c1a8)	Small areas within the survey area are considered to meet the S41 definition which is: "*Arable field margins are herbaceous strips or blocks around arable fields that are managed specifically to provide benefits for wildlife. The arable field must be in a crop rotation which includes an arable crop, even if in certain years the field is in temporary grass, set-aside or fallow. Arable field margins are usually sited on the outer 2-12m margin of the arable field, although when planted as blocks they occasionally extend further into the field centre*".	Local
Lowland meadow (UKHab primary code g3a)	Small areas within the survey area meet the S41 definition which is: "*They are taken to include most forms of unimproved neutral grassland across the enclosed lowland landscapes of the UK. In terms of National Vegetation Classification plant communities, they primarily embrace each type of Cynosurus cris–atus - Centaurea nigra grassland, Alopecurus prat–nsis - Sanguisorba officinalis floodplain meadow and Cynosurus cris–atus - Caltha palustris flood-pasture.*"	Local
ASNW and PAWS (UKHab primary codes starting "w" with secondary code 33)	A single area of woodland (Simon's Wood LoWS) listed in the Ancient Woodland Inventory occurs within the survey area, directly adjacent to the RLB.	UK

Important ecological feature	Reason for importance	Geographical scale of importance
	Ancient woodland is an irreplaceable resource, protected under local, national and UK planning policies. Likely to support other important invertebrate, amphibian, bird, mammal and plant species.	
Woodland (excluding ASNW and PAWS) and mature trees (UKHab primary codes starting "w")	Small woodland blocks and linear areas form an important part of the wider network of woods, trees, hedges and scrub and may support important invertebrate, amphibian, bird, mammal and/ or plant species. Limited amounts of woodland in the survey area meet the S41 definition for lowland mixed deciduous woodland which is: "*Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland*"	Local
Reedbeds (UKHab primary code f2e)	The largest linear reedbeds within Holland Haven Marshes SSSI and two further areas associated with irrigation reservoirs north of the A120 are considered to meet the S41 description: "*Reedbeds are wetlands dominated by stands of the common reed Phragmites australis, wherein the water table is at or above ground level for most of the year. They tend to incorporate areas of open water and ditches, and small areas of wet grassland and carr woodland may be associated with them*." The reedbeds within the survey area are unlikely to comprise a significant proportion of the total resource of this habitat type within Essex.	Local

Important ecological feature	Reason for importance	Geographical scale of importance
Coastal and floodplain grazing marsh (UKHab secondary code 25)	Many of the fields associated with the Holland Brook drainage network within and adjacent to the Holland Haven Marshes SSSI and Upper Holland Brook LoWS are considered to meet to the S41 description of Coastal and Floodplain Grazing Marsh, including those that have been agriculturally improved, which is: "*Grazing marsh is defined as periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Almost all areas are grazed and some are cut for hay or silage. Sites may contain seasonal water-filled hollows and permanent ponds with emergent swamp communities, but not extensive areas of tall fen species like reeds; although they may abut with fen and reed swamp communities*." The coastal and floodplain grazing marsh within the survey area comprises a small proportion of the total resource of this habitat type within Essex, but supports other important invertebrate and plant species.	National (where present within Holland Haven Marshes SSSI) and County (where present within LoWS).
Coastal saltmarsh (UKHab code t2a)	Areas within Holland Haven Marshes SSSI meet the S41 description, and are a notified feature of the SSSI. The coastal saltmarsh within the survey area comprises a small proportion of the total resource of this habitat type within Essex but supports other important invertebrate and plant species.	National (as it is present within Holland Haven Marshes SSSI and is a notified feature of the SSSI)
Ponds (UKHab primary code r1a)	Many ponds in the area are likely to meet the S41 definition by supporting GCN and/ or other S41 or Red Data	Local

Important ecological feature	Reason for importance	Geographical scale of importance
	Book species. The number of ponds within the survey area is relatively small and together they are therefore considered to be of up to Local value. The value of relevant species populations (e.g., GCN) within these ponds is assessed separately below.	
Rivers (UKHab code r2a)	The Holland Brook and Tendring Brook may meet the S41 definition by virtue of supporting protected and/ or S41 species such as water vole and potentially invertebrates and bird species, rather than for habitat type/quality *per se*. Remaining water courses within the survey area are not considered to meet the definition.	County (where part of LoWS) and Local in other locations.
Notable plant species	Populations of national importance present at Holland Haven Marshes SSSI. Additional S41 and/ or red data book species associated with the coastal habitats and arable margins. Numerous locally important species also present, primarily at S41 habitats.	National within the SSSI, County within S41 habitats and LoWS and Local elsewhere.
Invasive non-native plant species	Three species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) recorded within the survey area.	N/A
Invertebrates	Populations of S41 species and/or Red Data Book (RDB) species primarily associated with coastal habitats, including Holland Haven Marshes SSSI, but also the Holland Brook. Other S41 habitats are also potentially important for this group.	National within the SSSI, County within S41 habitats and LoWS and Local elsewhere.
GCN and common toad	GCN is protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended), it is also a S41	Up to County

Important ecological feature	Reason for importance	Geographical scale of importance
	species. Common toad is also a S41 species. Seven metapopulations of GCN are present at ponds within 250m of the RLB; the size of these is currently unknown but is considered unlikely to be of regional importance, based upon desk study information available which indicate very large and more contiguous populations elsewhere within East Anglia.	
Reptiles	Adder, slow worm, grass snake and common lizard are protected from intentional killing, injuring and sale under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are listed on Section 41. Potential for populations of reptile species present at areas of suitable habitat. The presence of large populations of any reptile species is considered unlikely based upon desk study data.	Not yet assessed. Survey reporting ongoing. Considered unlikely to be more than locally important.
Non-breeding Birds (Landfall Area)	Based on 2020-21 and 2021-22 survey data: Presence of ten species within the study area for non-breeding birds which, adopting a precautionary approach, could form a significant proportion of nearby SPA/ Ramsar non-breeding populations[11]: dark-bellied brent goose, shelduck, wigeon, teal, avocet, lapwing, curlew, black-tailed godwit, turnstone and cormorant. Assuming these species were to form part of one of the nearby SPA populations, their populations would be considered internationally important.	Local to International

[11] Species which were only recorded occasionally and/ or were only recorded in very low numbers (10 or less) are not likely to form a significant proportion of any nearby SPA/ Ramsar population so are excluded.

Important ecological feature	Reason for importance	Geographical scale of importance
	Regular presence within the study area for non-breeding birds of four additional wintering species referred to in the citation for Holland Haven Marshes SSSI: shoveler, ruff, snipe and purple sandpiper. Assuming these species form part of the SSSI population their populations would be considered nationally important. Presence of other waterbird species or other species of high conservation concern within the study area for non-breeding birds. Most of these species were recorded in low numbers only and most populations are unlikely to be of greater than local importance. The peak counts of European white-fronted geese regularly exceeded 1% of the national wintering population (Woodward *et al*., 2020) and the birds recorded are therefore considered to be nationally important. The counts of three other species, whimbrel, little stint and common sandpiper, exceeded 1% of the national wintering population, although in all cases birds were recorded only on autumn passage and it is not appropriate to compare their numbers with the national wintering population, which is very small. None of these populations are therefore considered to be of greater than local importance.	
Non-breeding Birds (Onshore ECC and Substation Search Areas)	Based on 2021-22 survey data only: Presence of nine species within the study area for non-breeding birds which, adopting a precautionary approach, could form a significant proportion of nearby SPA/ Ramsar non-breeding populations[12]: mute	Local to International

[12] Species which were only recorded in very low numbers (10 or less) are not likely to form a significant proportion of any nearby SPA/ Ramsar population so are excluded.

Important ecological feature	Reason for importance	Geographical scale of importance
	swan, shelduck, gadwall, wigeon, teal, tufted duck, coot, lapwing and curlew. Assuming these species were to form part of one of the nearby SPA populations, their populations would be considered internationally important. Presence of other waterbird species or other species of high conservation concern within the study area for non-breeding birds. Many of these species' populations are likely to be of local importance. None of the peak counts exceeded 1% of the national wintering population (Woodward *et al*., 2020) and therefore none of the populations recorded are considered to be nationally important. Species such as golden plover, marsh harrier, peregrine and corn bunting may be of county importance.	
Breeding Birds (Landfall Area)	Based on 2021 survey data only: Presence of one breeding species, yellow wagtail, referred to in the citation for Holland Haven Marshes SSSI, although the survey only recorded one pair within the study area for breeding birds, outside the SSSI boundary, which is not considered to form part of the SSSI population. Presence of up to three breeding species within the study area for breeding birds that are protected through inclusion on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and/ or included on Annex 1 of the EC Birds Directive, marsh harrier, avocet and Cetti's warbler. All of the populations recorded represent less than 1% of the national breeding population (Woodward *et al*., 2020) but all are likely to be of county importance.	Local to County

Important ecological feature	Reason for importance	Geographical scale of importance
	Presence of several other species included on BoCC red and amber lists and/ or S41 species, including lapwing, redshank and corn bunting. All of the populations recorded represent considerably less than 1% of the national population (Woodward *et al*., 2020) but all are likely to be of at least local and potentially county importance. Given the separation distance (>13 km) the population of avocet breeding at Holland Haven Marshes is not considered to form part of the breeding avocet population for the Stour and Orwell Estuaries SPA.	
Breeding Birds (Onshore ECC and Substation Search Areas)	Potential presence of up to five breeding species protected through inclusion on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and/ or species included on Annex 1 of the EC Birds Directive. Potential presence of several other species included on BoCC red and amber lists and/ or S41 species.	Not yet assessed. Analysis and reporting of survey data ongoing.
Bats	All UK bat species are protected through inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). Many are also S41 species.	Not yet assessed. Survey data analysis and reporting ongoing.
Badger	Protected under the Protection of Badgers Act 1992.	Not yet assessed. Survey data analysis and reporting ongoing. Likely to be less than local based on conservation status and desk study data.
Otter	Protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation	Not yet assessed. Survey data analysis and reporting ongoing. Likely to be local or less

Important ecological feature	Reason for importance	Geographical scale of importance
	of Habitats and Species Regulations 2017 (as amended). Otter is also a S41 species.	than local based on desk study data.
Water Vole	Fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), it is also a S41 species.	Not yet assessed. Survey data analysis and reporting ongoing. Considered unlikely to be more than locally important based on desk study data.
Dormouse	Protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). Dormouse is also a S41 species.	Not yet assessed. Survey data analysis and reporting ongoing. Considered unlikely to be more than county importance based on desk study.
Hedgehog, brown hare and harvest mouse.	S41 species. Not surveyed but unusually large populations are considered unlikely to be present within the survey area based on the habitats present and desk study data.	Local

4.8.85 All remaining ecological features within the study area that are likely to be affected by the onshore elements of VE are assessed as having less than local importance due to being common and widespread at the local and national level.

EVOLUTION OF THE BASELINE

4.8.86 Baseline ecological conditions could evolve in the future as a result of land use policy, environmental improvements and development pressures. There may also be some changes to the baseline over time as a result of natural variation and weather events.

4.8.87 Climate change is also predicted to result in complex changes to biodiversity. Of most relevance at the project location is that coastal plants and wildlife that cannot respond to sea level rise or coastal erosion by moving inland (for example, due to the presence of urban land, or flood defences) may be lost. Other changes could include adverse effects on large open waterbodies due to drought or damage to woodland habitats due to increased storm events. In addition, the number and range of invasive non-native species (INNS) may increase.

4.8.88 The above events and trends have the potential to alter the baseline assessment of the EcIA over time. However, in the absence of any detailed, quantifiable information it has been assumed that the baseline conditions will remain largely as they are for the purpose of the assessment (with the exception of other developments, where known, which are considered in the assessment of cumulative effects, see Section 4.14).

4.9 KEY PARAMETERS FOR ASSESSMENT

4.9.1 The MDS criteria identified in Table 4.10 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These criteria have been selected from the details provided in the onshore project description (Volume 3, Chapter 1: Onshore Project Description). Effects of greater significance are not predicted to arise should any other development scenario, based on details within the project design envelope, to that assessed here be taken forward in the final design scheme. The MDS takes into consideration designed-in mitigation as described in Section 4.10.

4.9.2 Refer to Table 4.10 for details.

Table 4.10: MDS key parameters for EclA

Potential effect	Maximum adverse scenario assessed	Justification
Construction		
Permanent and temporary loss of habitat	**Onshore ECC** Trenching and the associated construction corridor will result in temporary habitat loss along the onshore ECC. HDD crossings, or other suitable trenchless crossing technique (HDD is referred to within this chapter to represent any trenchless crossing technique) are required for the landfall; larger surface watercourses; key roads; and some utility crossings. HDD compounds would be located at each end of the crossing, requiring an associated compound with permeable surfacing. A minimum of 40 HDD crossings have been assumed for this assessment are shown on the obstacle crossing register at Volume 7 Report 4: Crossings Register. Where there is not certainty that HDD would be used, trenched crossing has been assumed as a worst case scenario. Trenching options for smaller watercourse crossings are considered to represent the greatest potential impact to ecological receptors, either directly or indirectly through hydrological changes. For the assessment presented in the PEIR, the onshore ECC is assumed to be a maximum of 60m wide for open trench sections and approximately 120 m wide for HDD sections, and approximately 27 km in length. Five main TCCs and three minor TCCs are assumed.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to ecological receptors. It also assumes use of the technologies likely to cause most damage where the technology to be used is still uncertain, e.g., trenched crossings of smaller watercourses, and that the most ecologically sensitive habitats would be affected, where there are different routing options.

Potential effect	Maximum adverse scenario assessed	Justification
	. This EcIA is based upon assessing the worst case corridor location within the RLB, based on data obtained to date. Permanent habitat loss associated with the onshore ECC is limited to the four transition joint bays (TJB) at the landfall and would amount to a maximum of 2400 m^2 (i.e., if 4 circuits were employed and 4 TJB required 30m x 80m footprint). Temporary habitat loss during construction includes land disturbed via the worst case cable corridor route, TCCs and HDD compounds. In addition, there could be up to 0.375 ha temporary loss of intertidal habitat, if an HDD with an inter-tidal exit is used (i.e., requiring 5 pits, each 750m^2). **Substation** For PEIR, an indicative OnSS location has been shown within each SSA. For the OnSS the following has been assumed: At the substation there will be a permanent loss of 5.88 ha of habitat due to the construction footprint of this element of the project (assuming Air Insulated Switchgear (AIS) is used, which has the larger land take requirement). However, the location of the OnSS zone has yet to be defined and will potentially require “cut and fill” to create a level area. It is not yet possible to quantify the area. Temporary habitat loss as a result of potential TCC work areas are currently included and are estimated at 2.5 ha in total.	

Potential effect	Maximum adverse scenario assessed	Justification
Impacts upon protected or notable species or upon their resting or breeding sites	The potential exists for protected or notable species to be impacted by construction activities either physically, i.e., via permanent or temporary habitat loss or inadvertent injury or killing, or from disturbance via light, noise and human presence. Prior to the completion of detailed ecological field surveys all legally protected and notable species known or considered likely to occur within the study area are included. The maximum adverse scenario for this effect is based on the temporary and permanent habitat loss areas given above. Construction has been assumed to commence in 2027, the duration has been assumed as set out in Volume 3 Chapter 1: > OnSS preliminary works: 9 months; > OnSS construction: 27 months (partly concurrent with prelim works); and > Onshore ECC construction including landfalls and HDDs: 18 months (part concurrently with OnSS construction). 24-hour working has been assumed to be required occasionally at the landfall and at major HDD locations (A120, railway, landfall); otherwise it has been assumed that works would be limited to 07:00 to 19:00 from Monday to Saturday with no work where noise is audible beyond the site boundary on Sundays and Bank Holidays. The requirement for five sheet piled exit pits within the intertidal zone is currently being considered and has been assumed for the purpose of PEIR assessment. If driven piling is used this would result in 88dB percussive piling noise (based upon a	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to ecological receptors. It also assumes use of the technologies likely to cause most damage where the technology to be used is still uncertain, e.g., trenched crossings of smaller watercourses, and that the most ecologically sensitive habitats would be affected, where there are different routing options.

Potential effect	Maximum adverse scenario assessed	Justification
	stand-off distance from the piling rig of 10m), one hour duration per pile installation and 1,100 piles needed. This has been assumed to be 137 consecutive (12 hour) days noise for the purpose of this assessment. Temporary lighting has been assumed to be necessary during construction hours at the times of year when working hours would otherwise be in darkness (approximately October – April). Additional 24-hour security lighting has been assumed at all TCCs.	
Habitat fragmentation and species isolation	There is potential for permanent habitat fragmentation and species isolation as a result of OnSS construction. Temporary habitat fragmentation and species isolation may also result from construction of the cable route. Prior to the completion of detailed ecological field surveys all legally protected and notable species known or considered likely to occur within the study area are included. The assessment is based upon the habitat loss parameters and construction programme given above. However, in addition, the duration of temporary habitat fragmentation is habitat, location and species-specific. For PEIR it is considered to last for a maximum period of 5 years post construction; this being the approximate duration for recovery of a hedgerow to ecological function for use by most species.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to ecological receptors. It also assumes use of the technologies likely to cause most damage where the technology to be used is still uncertain, e.g., trenched crossings of smaller watercourses, and that the most ecologically sensitive habitats would be affected, where there are different routing options.
Spread of INNS	There is potential for the presence of INNS which could be spread by construction activities, anywhere across an area equal to the maximum habitat loss areas stated above.	The MDS includes the maximum development footprint (temporary and permanent) and therefore the

Potential effect	Maximum adverse scenario assessed	Justification
	INNS known to be present within the RLB and which are included in this assessment include: > Rhododendron; > Water fern and > New Zealand pigmyweed	largest possible area of disturbance to ecological receptors. It also assumes use of the technologies likely to cause most damage where the technology to be used is still uncertain, e.g., trenched crossings of smaller watercourses, and that the most ecologically sensitive habitats would be affected, where there are different routing options.
Operation		
OnSS: Disturbance via maintenance, noise and light.	Planned maintenance at the OnSS is likely to be highly localised with a minimal likelihood of disturbance expected to the adjacent habitats and species. Approximately one visit per week is anticipated typically involving two personnel. For unplanned major maintenance, vehicles similar to those used for construction may also be required (rigid lorries delivering materials, low loaders delivering plant and individual vehicles for personnel). In the event of a transformer replacement or failure, an abnormal indivisible load (AIL) similar to that used during construction would be required. Lighting at the OnSS would be directional for safety and security. Task-specific lighting could be used externally, if required, on a very infrequent basis. Operational noise levels of the plant associated with the OnSS would be up to 95 dB(A).	Parameters are based on those stated within the Onshore Project Description (Volume 3, Chapter 1).

Potential effect	Maximum adverse scenario assessed	Justification
Onshore ECC: as for construction but much more limited in extent and timescale.	Planned maintenance requires one visit to each cable joint pit per year by a team of two. Unplanned maintenance may involve the repair of onshore cable faults. This is extremely rare (indicatively 1-2 events per lifetime). Typically, this involves excavating the two TJB (minimum 500 m apart), pulling the cable back through the ducting and pulling a new cable through. Alternatively, the area of the fault may be excavated (with an additional 40 m in both directions) and two new joints installed within this area. Methods for excavation and reburial will be similar to the original installation. The location, extent or nature of any unplanned corrective maintenance required can't be predicted at this stage and therefore possible effects in terms of temporary habitat loss or disturbance can't be assessed. Any unplanned corrective maintenance required would be subject to any necessary consents and consultation with the relevant nature conservation bodies at the time.	The MDS includes the maximum footprint and therefore the largest possible area of disturbance to ecological receptors. It also assumes that the most ecologically sensitive habitats would be affected, where there are different routing options.
Decommissioning		
Decommissioning impacts: similar in nature to those during construction but would be more limited in geographical extent and timescale.	Removal of the OnSS including areas of hardstanding. Buried cables would be de-energized with the ends sealed and left in place to avoid ground disturbance. TJBs to be left in place.	The MDS includes the maximum footprint and therefore the largest possible area of disturbance to ecological receptors. It also assumes that the most ecologically sensitive habitats would

Potential effect	Maximum adverse scenario assessed	Justification
		be affected, where there are different routing options.
Cumulative effects		
Effects during construction	VE construction may be undertaken at the same time as, and perhaps in conjunction with the North Falls project. However, at the time of writing there is insufficient information available about the North Falls project to meaningfully include it in the cumulative assessment. Detailed cumulative impact assessment will be included in the ES (assuming North Falls project details are available at the time of writing) but is omitted from PEIR. With the exception of the North Falls project for which there is insufficient information, where overlap between the construction phase for VE and the construction of nearby developments is possible, the MDS assumes that they will overlap. It is assumed that the other developments identified will be built out to their maximum permissible extent but that any proposed mitigation and compensation measures will be implemented.	Overlapping construction phases would be the period of highest risk due to receptors being affected by more than one project. The MDS includes the maximum development footprint for both VE and the potential cumulative projects (where known) and therefore the largest possible area of disturbance to ecological receptors. It also assumes use of the technologies likely to cause most damage where the technology to be used is still uncertain, e.g., trenched crossings of smaller watercourses, and that the most ecologically sensitive habitats would be affected, where there are different routing options.
Effects during operation	It is assumed that the other developments identified will be built out to their maximum permissible extent but that any proposed mitigation and compensation measures will be implemented.	The MDS includes the maximum development footprint (permanent) and therefore the largest possible

Potential effect	Maximum adverse scenario assessed	Justification
		area of disturbance to ecological receptors. It also assumes that the most ecologically sensitive habitats would be affected, where there are different routing options.

4.10 EMBEDDED MITIGATION

4.10.1 Primary mitigation in respect of the proposed OnSS, onshore ECC and landfall has involved the sensitive siting and design of the onshore infrastructure during site selection, to ensure potential impacts are avoided or reduced.

4.10.2 The embedded mitigation contained in Table 4.11 are mitigation measures or commitments that have been identified and adopted as part of the evolution of the project design of relevance to this topic, these include project design measures, compliance with elements of good practice and use of standard protocols. General mitigation measures, which would apply to all parts of the project, are set out first. Thereafter mitigation measures that would apply specifically to onshore biodiversity and nature conservation issues associated with the landfall, onshore ECC and OnSS, are described separately. Where the assessment determined significant effects accounting for embedded mitigation, further measures may be required, which are presented as additional mitigation. Table 4.11 presents additional mitigation measures. These have typically been put forward where:

- Specific mitigation / compensation measures to reduce impacts in relation to potential habitat loss (e.g. important hedgerows, arable field margins, lowland meadow, woodland etc); and
- Specific mitigation measures to reduce impacts on protected and/or notable species (e.g. Fisher's estuarine moth, bats, badger, otter, water vole, dormouse).

Table 4.11: Embedded mitigation relating to onshore biodiversity and nature conservation

Parameter	Mitigation measures embedded into the project design
General	
Project design	Careful routing of the onshore ECC and design of key crossing points (sea defence structures, main rivers, non-main and ordinary watercourses, roads) to avoid key areas of sensitivity, including Holland Haven Marshes SSSI, Tendring Brook, important hedgerows and woodlands, wherever possible (see Volume 1, Chapter 4: Site Selection and Alternatives for further details on alternatives and site selection).
GCN, Bats and Dormouse European Protected Species Licence (EPSL)	Based on existing data it is possible that an EPSL or EPSLs from NE will be required for temporary works affecting terrestrial habitat used by GCN, bats and/ or dormouse along the route. The conditions of the EPSL(s) would be specified to ensure that construction of the project does not result in significant adverse impacts to the local populations. Further details will be provided in the ES once further design details are known, survey data have been analysed and reported and mitigation/ compensation proposals have been further developed. Draft EPSL applications will also be provided with the ES, if required.
Construction	

Parameter	Mitigation measures embedded into the project design
Vegetation Clearance and Other Construction Works	All construction work will be undertaken in accordance with a CoCP. The draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise) includes the following measures: > Pre-construction surveys for hog's fennel, S41 and/or red data book plant species associated with coastal habitats and arable margins, and other protected species whose distribution could have changed since the baseline surveys will be undertaken to update the baseline and determine potential impacts at the time of construction. Micrositing of project elements will be used to avoid important ecological features, where possible. > Protective fencing will be installed around retained habitats of importance. > An Ecological Clerk of Works (ECOW) will be employed to oversee construction work, provide toolbox talks to contractors and minimise risks to important ecological features. > All habitats will be reinstated as soon as possible after construction. Hedgerows along the onshore ECC will be reinstated using a species-rich, locally appropriate native mixture including heavy standard trees at a 3:1 ratio for any lost. > Removal of potential nesting bird habitat will take place outside of the breeding season (March – August inclusive), where possible, to avoid damage to, or destruction of active nests. Where this is not possible, a check for the presence of nesting birds by the ECOW will take place in advance of work. Where active nests are located the relevant areas of vegetation would be retained until such time as young fledge or the relevant nesting attempt has ended. > Surveys for Schedule 1 bird species and other breeding species of conservation concern which are likely to be particularly sensitive to disturbance, e.g., breeding waders, will take place prior to and during construction (as required). Avoidance of disturbance to these species whilst nesting will be achieved through the implementation of disturbance-free buffer zones around active nests. The extent of any buffer zones will be species and location-specific and will be determined by the ECOW, taking into consideration relevant guidance and experience from other sites,

Parameter	Mitigation measures embedded into the project design
	as appropriate. The ECOW will also monitor nesting attempts to check that the agreed buffer zones are successful. > Checks for the presence of GCN, dormice, badger setts, reptiles, hedgehogs, harvest mice, hares or other protected or notable species will be carried out by the ECOW prior to vegetation clearance. Additional reasonable avoidance measures will be implemented/ mitigation licences applied for as necessary (details to be provided in the ES, on completion of the relevant surveys).
Measures to reduce disturbance to non-breeding birds at the landfall	The draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise) includes measures to reduce disturbance to important populations of non-breeding birds at the landfall including: > Piling (if required at the landfall) would either take place outside the winter period (October to March) or would utilize less noisy, vibro-piling technology. > Depending on the final design, if located in areas where significant disturbance to non-breeding birds is likely, such as fencing/hoarding at HDD pits and other working areas at the landfall to provide an element of visual and acoustic screening of active working areas. Details of proposed fencing are still being developed and further details will be provided in the ES. > visual and acoustic screening of active working areas could be used at the landfall. If necessary, works at the landfall would be suspended during periods of very cold weather. Disturbance to non-breeding waterbirds is likely to be most critical during periods of prolonged cold weather, when they may be unable to feed in their usual foraging areas and may face reduced prospects for survival. A scheme has been in place since 1983 to minimise the level of disturbance from wildfowl shooting in frozen conditions (JNCC, 2019). Similar measures would be imposed here, with the works

Parameter	Mitigation measures embedded into the project design
	suspended after seven consecutive days on which the ground was frozen (as measured at a nearby weather station). Any suspension of works would last for a minimum of seven days thereafter and any lifting of the suspension will take into consideration the need for a period of recovery for waterbirds after the end of the severe weather itself. Any cold weather suspension of works, if required, would only apply at the landfall as non-breeding waterbirds are likely to move to the coast during such conditions (as the inland fields would be frozen).
Measures to reduce disturbance to non-breeding birds along the onshore ECC and at the OnSS	To reduce disturbance to important populations of non-breeding birds along the onshore ECC and at the OnSS, during the winter period (October-March inclusive), temporary screening would be used during potentially disturbing construction works within and adjacent to areas used by significant numbers of waterbirds. Further details will be provided in the ES, following completion of further surveys and the provision of more detailed information regarding construction.
Additional measures to reduce disturbance to breeding birds at the landfall	The draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise) includes measures to reduce disturbance to important populations of breeding birds at the landfall including: > Depending on the final design, if located in areas where significant disturbance to important breeding bird species is likely, such as fencing/hoarding at HDD pits and other working areas at the landfall during the bird breeding season (March to August inclusive) to provide an element of visual and acoustic screening of active working areas. The aim of the fencing would be to reduce disturbance to Schedule 1 birds and other breeding species of conservation concern, e.g., breeding waders, within Holland Haven Marshes SSSI. Details of proposed fencing are still being developed and further details will be provided in the ES. > If the southern landfall option is used, piling (if required at the landfall) would either take place outside the bird breeding season (March to August) or would utilize less noisy, vibro-piling technology. The northern landfall option is located over 500 m from

Parameter	Mitigation measures embedded into the project design
	areas occupied by SSSI breeding waders and based on current data, timing restrictions on piling are not considered necessary there.
Landscape and Ecological Management Plan (LEMP)	The LEMP will include details of proposed mitigation, compensation and biodiversity enhancement measures. It will cover the entire duration of the project (from enabling/pre-commencement onward), and work in unison with details included in the draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise) during the enabling/ pre-commencement and construction phases. An outline LEMP will be provided with the ES, once relevant surveys have been completed and proposed measures have been developed further, with a detailed LEMP prepared at the detailed design stage post consent. A Landscape and Ecology Design Principles Plan (LEDPP) is provided in Volume 7 Report 5: Landscape and Ecology Design Principles and sets out the principles that will be used in the development of the outline LEMP that will be provided with the ES. The outline LEMP, in turn, will set out the key landscape and ecology elements that will be secured in the final LEMP which VE OWFL will be required to submit to the relevant planning authority for approval as a requirement of the DCO.
Biosecurity and INNS Management	All construction work will be undertaken in accordance with the INNS control measures set out in the draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise).
Pollution Prevention and Emergency Incident Response	Construction practices will incorporate measures to prevent pollution. The draft CoCP (Volume 7, Report 3 Draft Code of Construction Practise) sets out pollution control principles, which would be implemented by the project during construction.
Best Practice	All construction work will be undertaken in accordance with draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise) and relevant good practice guidance, where applicable, including, but not limited to: > Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA 2001);

Parameter	Mitigation measures embedded into the project design
	> CIRIA – SuDS Manual (C753) (CIRIA, 2015b), including: • No discharge to main river watercourses will occur without permission from EA (SuDS Manual); • Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); and • Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual).
Operation	
General	Operational practices will incorporate measures to prevent pollution and increased flood risk, including emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff. These measures will be included within the LEMP. The LEMP would also include specific measures to avoid potential impacts to protected or notable species or sensitive habitats. Where unplanned operational or maintenance works are required, appropriate mitigation measures would be developed and agreed with relevant consultees prior to works taking place. An outline LEMP will be provided with the ES, once relevant surveys have been completed and proposed measures have been developed further, with a detailed LEMP prepared at the Detailed Design stage post consent.
Decommissioning	
General	Decommissioning practices will incorporate measures similar to the construction phase, to prevent impact to ecological receptors.

Parameter	Mitigation measures embedded into the project design
	Provision of a decommissioning plan in advance of decommissioning works will be a requirement of the DCO, to include protection of ecological features, based on up-to-date survey information and relevant guidance in place at the time of decommissioning.

4.11 ENVIRONMENTAL ASSESSMENT: CONSTRUCTION PHASE

4.11.1 This section addresses the site clearance and construction phase impacts to the important ecological features identified, through reference to the MDS presented in Table 4.10 and assuming that all of the embedded mitigation measures set out in Table 4.11 are implemented. For most receptors the assessment is preliminary only given that the design is not yet resolved.

4.11.2 Construction impacts in relation to air quality and hydrology have been assessed elsewhere within the PEIR and are summarised below in respect of ecological receptors.

- The air quality chapter (Volume 3, Chapter 10: Air Quality) considers air quality impacts during construction to sensitive ecological receptors as a result of dust (Section 10.11.16 onward) and increased road traffic (Section 10.11.51 onward).

With respect to dust, it concludes that construction dust impacts are considered to be removed or minimised via the implementation of proposed mitigation measures. As such, residual effects are concluded to be not significant in terms of the EIA Regulations.

With respect to increased road traffic, it concludes that, "road traffic impacts on all ecological designations can be considered insignificant."

- The hydrology and flood risk chapter (Volume 3, Chapter 6: Hydrology, Hydrogeology and Flood Risk) provides a description of the hydrological setting of water courses within the survey area in Section 1.8.5 onward. It includes embedded mitigation and other mitigation measures to reduce impacts to receiving waters in Sections 1.9 and 1.106.9 – 6.12. The assessment concludes that *"the likely overall effect of the onshore elements of VE on water quality and flood risk throughout the construction, operation and decommissioning of VE is not significant in EIA terms."*

4.11.3 The assessment of effects on aquatic receptors in this chapter draws heavily on the proposed mitigation measures and the assessment of effects on water quality presented in the Hydrology and Flood Risk chapter.

4.11.4 At this stage, it is only possible to assess potential impacts to ecological receptors for receptors for which survey data have been analysed and reported (i.e., designated sites, habitats, plants, invertebrates, GCN and birds). All other receptors will be included in the ES upon completion of the relevant surveys. Note also that some bird surveys are still ongoing or are yet to be reported and the assessment for birds (and the assessment for designated sites for which birds are a qualifying feature) will therefore be updated in the ES.

IMPACTS TO STATUTORY DESIGNATED SITES

4.11.5 For clarity there will be no loss of habitat within any statutory designated site as a result of VE.

HAMFORD WATER SSSI/ NNR/ SAC/ SPA/ RAMSAR

QUALIFYING BIRD SPECIES

4.11.6 At its closest point, Hamford Water SSSI/ SPA/ Ramsar is located 2.92 km from the part of the study area for non-breeding birds covered by surveys of the landfall area. Of the non-breeding bird species recorded at the landfall area during surveys in 2020-21 and 2021-22, two are SPA and Ramsar qualifying features (dark-bellied brent goose and black-tailed godwit) and three are SPA qualifying features (shelduck, teal, avocet)[13]. All of these species were recorded within the study area (i.e., within the onshore RLB and 400 m buffer). As Hamford Water is located within 2.92 km, a precautionary approach has been adopted which assumes that all of the birds of these species recorded within the study area during surveys at the landfall area could potentially represent part of the Hamford Water population.

4.11.7 Permanent habitat loss at the landfall area would be limited to the four TJBs and would amount to a maximum of 2,400 m2 (0.24 ha) located within agricultural fields to the northwest of Holland Haven Marshes. These areas could potentially be used by dark-bellied brent geese but are not likely to be used by the other qualifying species based on 2020-21 and 2021-22 survey data. The agricultural habitats present here are common and widespread and the permanent loss of 0.24 ha represents a very small proportion of the total area of similar habitat available within 5 km[14] of Hamford Water. As such, permanent habitat loss is **not likely to be significant**.

4.11.8 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA/ Ramsar qualifying species at the landfall area because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include five HDD entry/exit pits, three TCCs, a 60 m working width for the onshore ECC inland from the HDD exit pit and associated off-road haul routes. Temporary habitat loss could affect intertidal habitats at the beach and would affect agricultural fields to the northwest of Holland Haven Marshes. None of the large open waterbodies within Holland Haven Marshes SSSI would be affected. It is assumed that temporary loss would occur for a maximum of two non-breeding seasons.

[13] Excluding species which were only recorded occasionally and/or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.
[14] Dark-bellied brent geese tend to move a maximum of 5km inland from coastal SPAs (McKay *et al.*, 2001)

4.11.9 The only SPA/ Ramsar qualifying species which could be significantly affected by temporary habitat loss, based on 2020-21 and 2021-22 survey data, is dark-bellied brent goose (all other qualifying features were only regularly recorded within Holland Haven Marshes SSSI or on/ over the sea). The beach was not used by dark-bellied brent geese and therefore temporary habitat loss is limited to the agricultural fields to the northwest of Holland Haven Marshes. These fields were used by up to 1,100 dark-bellied brent geese, which represents up to 19.4% of the Hamford Water SPA population (based on most recent data (Frost *et al*., 2021). However, usage of the study area was irregular, and the fields used varied from month to month, and year to year. These habitats are common and widespread and the area subject to temporary loss is likely to represent a small proportion of the total area of similar habitat available within 5 km of Hamford Water, occurring for a maximum of two seasons. As such, temporary habitat loss is **not likely to be significant**.

4.11.10 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m[15] of construction works at the landfall area, for a maximum of two seasons. This could affect all five SPA/ Ramsar qualifying species recorded within the study area for non-breeding birds during the 2020-21 and 2021-22 surveys. The level of potential disturbance to waterbirds using large open waterbodies within Holland Haven Marshes SSSI would depend on which corridor is used, with the southern corridor, which lies closest to the large open waterbodies within Holland Haven Marshes SSSI, having the greatest potential to cause disturbance.

4.11.11 At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, disturbance to dark-bellied brent geese is considered **unlikely to be significant**. This is because the area potentially affected represents only a small proportion of the total area of similar habitat available within 5 km of Hamford Water and any residual disturbance would occur for a maximum of two seasons. For the other qualifying species which use large open waterbodies within Holland Haven Marshes SSSI, following the implementation of the embedded mitigation measures, it is also considered **unlikely that disturbance would be significant**. This assumes that HDD exit pit locations are chosen to maximise the distance from large open waterbodies within the SSSI and takes into account the regular nature of any noise disturbance (birds generally habituate quickly to regular sources of noise (Cutts *et al*., 2013). It also considers that the affected birds are already habituated to some level of visual disturbance.

[15] 400 m represents a maximum, and disturbance distances for some qualifying species are likely to be much lower, e.g., for black-tailed godwit the maximum disturbance distance is 100-200 m (Goodship & Furness, 2022).

4.11.12 At its closest point, Hamford Water SSSI/ SPA/ Ramsar is located 717 m from the part of the study area covered by surveys of the onshore ECC and OnSS search areas. Of the non-breeding bird species recorded in the onshore ECC and OnSS survey area during surveys in 2021-22, one is an SPA and Ramsar qualifying feature (dark-bellied brent goose) and two are SPA qualifying features (shelduck and teal)[16]. Of these species, only shelduck and teal were recorded within the study area for non-breeding birds (i.e., within the onshore RLB and 400 m buffer), with records limited to relatively small numbers using large open waterbodies within the study area. Dark-bellied brent goose was only recorded >1.4 km outside the study area so is not likely to be affected based on 2021-22 survey data. As Hamford Water is located within 717 m, a precautionary approach has been adopted which assumes that any shelduck and teal recorded within the study area could potentially represent part of the Hamford Water population.

4.11.13 Permanent habitat loss at the OnSS would affect up to 5.88 ha and may be slightly greater depending on cut and fill and landscaping requirements, which are yet to be determined. There were no records of shelduck or teal within any of the OnSS search areas under consideration and there is no wetland habitat used by these species within these areas. As such there will be no permanent habitat loss for Hamford Water SPA/ Ramsar qualifying features and therefore **no impact**.

4.11.14 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA/ Ramsar qualifying species along the onshore ECC and at the OnSS because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include a 60 m working width, up to 40 HDD entry / exit compounds which would be 121.5 m wide, five main TCCs and three minor TCCs, and associated off-road haul routes. Temporary habitat loss would largely affect agricultural fields and none of the large open waterbodies within the study area would be affected. There were no records of shelduck or teal away from large open waterbodies within the onshore ECC and all large open waterbodies within the onshore ECC will be avoided. As such there will be no temporary habitat loss for Hamford Water SPA/ Ramsar qualifying features and therefore **no impact**.

4.11.15 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m of construction works within the ECC and at the OnSS, for a maximum of two seasons (up to three seasons at the OnSS). This could affect both SPA/ Ramsar qualifying species recorded within the non-breeding birds study area during the 2021-22 surveys. At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance to nearby large open waterbodies, plus the relatively small numbers of shelduck and teal recorded within the study area, disturbance is **not likely to be significant**.

[16] Excluding species which were only recorded occasionally and/or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.

4.11.16 Hamford Water SPA is also designated for breeding little tern. According to the SPA citation, the closest known little tern colony is on the northeast corner of Horsey Island, which is over 6 km from the project. Breeding little tern is therefore not likely to be affected by the onshore aspects of the project.

4.11.17 In addition to the SPA/ Ramsar qualifying species included in the assessment above, the citation for Hamford Water SSSI refers to several additional wildfowl and wader species (in addition to coastal habitats, plant and invertebrate species, see section 4.11.18 and 4.11.27 below). The assessment provided above for relevant SPA/ Ramsar qualifying species, and the assessments provided below for other SPAs/ Ramsar sites, cover all of the additional wildfowl and wader species referred to in the SSSI citation and such species are therefore not assessed separately here.

FISHER'S ESTUARINE MOTH

4.11.18 The population of Fisher's estuarine moth present at the SAC also utilises areas beyond the site boundary where the larval food plant hog's fennel is present, along with rough grassland suitable for egg laying. Except at Holland Haven Marshes SSSI, surveys to date have found no evidence of hog's fennel within the Survey Area (i.e., within the RLB plus 100 m), though desk study data indicates it may be present northwest of Thorpe le Soken and at the A120.

4.11.19 The flying season of the moth is generally September – October, when they fly around or rest upon the food plant; however there are apparently no data on the dispersal ecology of the Fisher's estuarine moth from the UK or elsewhere in Europe.

4.11.20 Lighting from the construction phase of the project may affect nocturnal invertebrate behaviour, including that of Fisher's estuarine moth, if present close to construction areas. Lighting of the ECC and TCCs would only be during the months when construction hours are in darkness (i.e., at dawn and dusk Oct-April). Sunrise/sunset in October is 7am and 6pm approximately, such that there would be potential for around one hour of additional illumination per night for 31 of the 61 nights during the flight period. Lighting would also be required where 24-hour working is required, e.g. at major HDD locations.

4.11.21 The RLB is separated from the SAC by at least 717 m of intervening landscape such that lightspill is not anticipated to reach the SAC itself. The potential for a significant proportion of the SAC population of Fisher's estuarine moth to be present outside of the SAC boundary is low, based on the lack of desk study records, lack of suitable habitat and lack of larval food plants.

4.11.22 Therefore, whilst the period of illuminated construction partially overlaps with the flight period, there is considered very limited possibility for it to interact with the individuals that form part of the population for which the SAC is designated. It is therefore assessed as **not significant**.

4.11.23 Desk study data indicates the food plant for the moth (hog's fennel) occurs within the RLB, though no evidence was recorded during habitat surveys in 2021 and 2022. It is nevertheless considered possible (but unlikely given its rarity) that vegetation removal during construction has potential to affect hog's fennel plants and adjacent rough grassland that could be used by the moth population.

4.11.24 Mitigation measures to minimise this risk will include pre-construction checks for the presence of hog's fennel during June – September the season prior to work commencing. If a plant(s) is located and cannot be retained *in situ*, then options for translocation and/ or propagation will be explored. It is anticipated that any such exercise would be informed by/in collaboration with conservation work already ongoing, involving Natural England, Tendring District Council, Colchester Zoo, Essex Wildlife Trust, and Writtle College. Further details would be provided in the LEMP as part of the ES.

4.11.25 The risk of damage or disturbance to Fisher's estuarine moth food plants, and/or individuals outside of the designated site is considered to be very low, and the success of mitigation (if required) is considered highly likely based on reported conservation efforts to date (for example online at the Action for the Wild website and Colchester Zoo (2022). Impacts to the local population of Fisher's estuarine moth as a result of vegetation removal are therefore considered **not significant.**

COASTAL HABITATS AND PLANT SPECIES

4.11.26 The onshore parts of Hamford Water SSSI includes communities of rare coastal plants and saltmarsh, which are notified features that are not part of the SPA, SAC or Ramsar designations.

4.11.27 No direct or indirect impact pathways have been identified that would affect these features, due mainly to the separation distance between the SSSI and VE. The effect of VE on the SSSI is therefore considered **not significant**.

STOUR AND ORWELL ESTUARIES SPA AND RAMSAR

QUALIFYING BIRD SPECIES

4.11.28 At its closest point, the Stour and Orwell Estuaries SPA/ Ramsar is located 11.64 km from the part of the study area covered by surveys of the landfall area. Of the non-breeding bird species recorded at the landfall area during surveys in 2020-21 and 2021-22 two are SPA and Ramsar qualifying features (dark-bellied brent goose and black-tailed godwit) and six are SPA qualifying features, including named species forming part of the waterfowl assemblage qualifying feature (shelduck, wigeon, lapwing, curlew, turnstone and cormorant) . All of these species were recorded within the non-breeding birds study area (i.e., within the onshore RLB and 400 m buffer). Dark-bellied brent geese tend to move a maximum of 5km inland from coastal SPAs (McKay et al., 2001) and therefore dark-bellied brent geese recorded at the landfall area are not likely to form part of the Stour and Orwell Estuaries SPA/ Ramsar population so are not considered further here. Similarly, lapwing has a core foraging range of 12 km (Gillings et al., 2007) so is also not considered in relation to the landfall area because the vast majority of the landfall area, including all areas within Holland Haven Marshes SSSI and all areas in which lapwing was recorded, lie beyond 12 km from the SPA/ Ramsar site. For the other species, in the absence of relevant information regarding core foraging range, a precautionary approach has been adopted. This assumes that all of the birds recorded within the study area during surveys at the landfall area could potentially represent part of the Stour and Orwell Estuaries population, although in most cases this is unlikely given the intervening distance and the availability of similar habitat much closer to the SPA/ Ramsar site.

4.11.29 Permanent habitat loss at the landfall area would be limited to the four TJBs and would amount to a maximum of 2,400 m^2 (0.24 ha) located within agricultural fields to the northwest of Holland Haven Marshes. These areas are not likely to be used by significant numbers of the relevant qualifying species based on 2020-21 and 2021-22 survey data. As such, permanent habitat loss is **not likely to be significant**.

4.11.30 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA/ Ramsar qualifying species at the landfall area because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include five HDD entry/exit pits, three TCCs, a 60 m working width for the onshore ECC inland from the HDD exit pit and associated off-road haul routes. Temporary habitat loss could affect intertidal habitats at the beach and would affect agricultural fields to the northwest of Holland Haven Marshes. None of the large open waterbodies within Holland Haven Marshes SSSI would be affected. It is assumed that temporary loss would occur for a maximum of two non-breeding seasons.

4.11.31 The only SPA/ Ramsar qualifying species which could be affected by temporary loss of agricultural habitat, based on 2020-21 and 2021-22 survey data, are shelduck and curlew. The maximum number of birds affected is very small (peak count of 3, on a single date only, in both cases) and temporary habitat loss for these species is **not likely to be significant**. Turnstone is the only species which could be affected by temporary loss of habitat at the beach. The peak count of turnstone during the 2020-21 and 2021-22 surveys was 16, which represents up to 2.3% of the Stour and Orwell Estuaries SPA population (based on the SPA data form). However, a count of greater than 10 was recorded on only one date with smaller numbers usually present. In addition, the largest counts were recorded outside the onshore RLB to the southwest. As such, temporary habitat loss is **not likely to be significant**. All other qualifying features were only regularly recorded using large open waterbodies, primarily within Holland Haven Marshes SSSI, or on/ over the sea and will therefore not be affected by temporary habitat loss.

4.11.32 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m[17] of construction works at the landfall area, for a maximum of two seasons. This could affect all eight SPA/ Ramsar qualifying species recorded within the non-breeding birds study area during the 2020-21 and 2021-22 surveys. The level of potential disturbance to waterbirds using large open waterbodies within Holland Haven Marshes SSSI would depend on which corridor is used, with the southern corridor, which lies closest to the large open waterbodies within Holland Haven Marshes SSSI, having the greatest potential to cause disturbance.

[17] 400 m represents a maximum, and disturbance distances for some qualifying species are likely to be much lower, e.g., for black-tailed godwit the maximum disturbance distance is 100-200 m (Goodship & Furness, 2022).

4.11.33 At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, disturbance to any of the relevant qualifying species is considered **unlikely to be significant**. As noted above, the only SPA/ Ramsar qualifying species recorded using agricultural habitats, based on 2020-21 and 2021-22 survey data, are shelduck and curlew and the maximum number of birds affected is very small. For turnstone, which were exclusively recorded on the beach, the number of birds potentially affected will depend on the location of the HDD entry pits but wherever those are located the area affected by disturbance would be relatively small and there is similar habitat available further along the beach for any displaced birds to move into. It is also noted that birds using the beach are already habituated to relatively high levels of visual disturbance from human activity along the seawall. For cormorant, most of which were recorded on the sea, there is plentiful alternative habitat for any displaced birds to move into. The other qualifying species were recorded using large open waterbodies within Holland Haven Marshes SSSI. For these species it is assumed that HDD exit pit locations will be chosen to maximise the distance from large open waterbodies within the SSSI and that any noise disturbance will be regular in nature (birds generally habituate quickly to regular sources of noise (Cutts *et al*., 2013)). It also noted that the affected birds are already habituated to some level of visual disturbance.

4.11.34 At its closest point, the Stour and Orwell Estuaries SPA/ Ramsar is located 3.15 km from the part of the study area covered by surveys of the onshore ECC and OnSS search areas. Of the non-breeding bird species recorded in the onshore ECC and OnSS survey area during surveys in 2021-22, one is an SPA and Ramsar qualifying feature (dark-bellied brent goose) and six are SPA qualifying features, including named species forming part of the waterfowl assemblage qualifying feature, (shelduck, gadwall, wigeon, lapwing, curlew and cormorant)[18]. Of these species, dark-bellied brent goose was only recorded >1.4 km outside the non-breeding birds study area (i.e., within the onshore RLB and 400 m buffer) so is not likely to be affected based on 2021-22 survey data. The remaining species were recorded within the study area, with lapwing and curlew recorded using agricultural fields but records of the other species were limited to relatively small numbers using large open waterbodies. As the Stour and Orwell Estuaries SPA is located within 3.15 km, a precautionary approach has been adopted which assumes that any of these species recorded within the study area could potentially represent part of the SPA population.

[18] Excluding species which were only recorded occasionally and/or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.

4.11.35 Permanent habitat loss at the OnSS would affect up to 5.88 ha and may be slightly greater depending on cut and fill and landscaping requirements, which are yet to be determined. The only SPA qualifying species recorded within any of the OnSS search areas under consideration was lapwing, for which flocks were recorded on two dates (peak count 125) during surveys in 2021-22. The agricultural habitats present here are common and widespread and the permanent loss of 5.88 ha represents a very small proportion of the total area of similar habitat available within 12 km[19] of the SPA. Given the sporadic usage of the OnSS search areas by lapwing permanent habitat loss for non-breeding lapwing is **not likely to be significant**. There will be no permanent habitat loss for any other Stour and Orwell Estuaries SPA qualifying features.

4.11.36 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA/ Ramsar qualifying species along the onshore ECC and at the OnSS because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include a 60 m working width, up to 40 HDD entry / exit compounds which would be 121.5 m wide, five main TCCs and three minor TCCs, and associated off-road haul routes. Temporary habitat loss would largely affect agricultural fields and could therefore affect lapwing and curlew. However, the agricultural habitats used by these species are common and widespread and the temporary loss of some of these areas, over a maximum of two seasons (up to three seasons at the OnSS), is **not likely to be significant**. None of the large open waterbodies within the study area would be affected. There were no records of shelduck, gadwall, wigeon or cormorant away from large open waterbodies within the onshore ECC and all large open waterbodies within the onshore ECC will be avoided. As such there will be no temporary habitat loss for any of these SPA qualifying features.

4.11.37 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m of construction works within the ECC and OnSS search areas, for a maximum of two seasons (up to three seasons at the OnSS). This could affect all SPA qualifying species recorded within the non-breeding birds study area during the 2021-22 surveys. At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, it is considered that disturbance is **unlikely to be significant**. Lapwing and curlew could be affected by disturbance in agricultural habitats, however the agricultural habitats used by these species are common and widespread and there is plentiful alternative habitat for any displaced birds to move into. Shelduck, gadwall, wigeon and cormorant could be affected by disturbance of nearby large open waterbodies, although usage of these small wetlands is sporadic and the numbers recorded are relatively small.

[19] 12km is the core foraging area for non-breeding lapwing (Gillings *et al*., 2007)

4.11.38 The Stour and Orwell Estuaries SPA is also designated for breeding avocet. There is no suitable habitat for breeding avocet within the ECC and OnSS search areas study area. Whilst avocet breeds within the study area at Holland Haven Marshes, the breeding location is approximately 14 km from the Stour and Orwell Estuaries SPA and these birds are not likely to form part of the SPA population. The Stour and Orwell Estuaries SPA breeding avocet population is therefore not likely to be affected by the project.

COLNE ESTUARY (MID-ESSEX COAST PHASE 2) SPA AND RAMSAR

QUALIFYING BIRD SPECIES

4.11.39 At its closest point, the Colne Estuary (Mid-Essex Coast Phase 2) SPA/ Ramsar is located 6.42 km from the part of the study area covered by surveys of the landfall area. Of the non-breeding bird species recorded at the landfall area during surveys in 2020-21 and 2021-22 one is an SPA and Ramsar qualifying feature (dark-bellied brent goose) and four are SPA qualifying features, including named species forming part of the waterfowl assemblage qualifying feature (shelduck, curlew, black-tailed godwit and cormorant)[20]. All of these species were recorded within the study area for non-breeding birds (i.e., within the onshore RLB and 400 m buffer). Dark-bellied brent geese tend to move a maximum of 5 km inland from coastal SPAs (McKay *et al.*, 2001) and therefore dark-bellied brent geese recorded at the landfall area are not likely to form part of the Colne Estuary (Mid-Essex Coast Phase 2) SPA/ Ramsar population so are not considered further here. For the other species, in the absence of relevant information regarding core foraging range, a precautionary approach has been adopted. This assumes that all of the birds recorded within the study area during surveys at the landfall area could potentially represent part of the Colne Estuary (Mid-Essex Coast Phase 2) SPA population, although in most cases this is unlikely given the intervening distance and the availability of similar habitat much closer to the SPA.

4.11.40 Permanent habitat loss at the landfall area would be limited to the four TJBs and would amount to a maximum of 2,400 m^2 (0.24 ha) located within agricultural fields to the northwest of Holland Haven Marshes. These areas are not likely to be used by significant numbers of the relevant qualifying species based on 2020-21 and 2021-22 survey data. As such, permanent habitat loss is **not likely to be significant**.

4.11.41 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA qualifying species at the landfall area because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include five HDD entry/exit pits, three TCCs, a 60 m working width for the onshore ECC inland from the HDD exit pit and associated off-road haul routes. Temporary habitat loss could affect intertidal habitats at the beach and would affect agricultural fields to the northwest of Holland Haven Marshes. None of the large open waterbodies within Holland Haven Marshes SSSI would be affected. It is assumed that temporary loss would occur for a maximum of two non-breeding seasons.

[20] Excluding species which were only recorded occasionally and/ or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.

4.11.42 The only SPA qualifying species which could be affected by temporary loss of agricultural and intertidal habitat, based on 2020-21 and 2021-22 survey data, are shelduck and curlew. The maximum number of birds affected is very small (peak count of 3, on a single date only, in both cases) and temporary habitat loss for these species is **not likely to be significant**. All other qualifying features were only regularly recorded using large open waterbodies, primarily within Holland Haven Marshes SSSI, or on/ over the sea and will therefore not be affected by temporary habitat loss.

4.11.43 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m[21] of construction works at the landfall area, for a maximum of two seasons. This could affect all four SPA qualifying species recorded within the non-breeding birds study area during the 2020-21 and 2021-22 surveys. The level of potential disturbance to waterbirds using large open waterbodies within Holland Haven Marshes SSSI would depend on which corridor is used, with the southern corridor, which lies closest to the large open waterbodies within Holland Haven Marshes SSSI, having the greatest potential to cause disturbance.

4.11.44 At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, it is considered that disturbance to any of the relevant qualifying species is **unlikely to be significant**. As noted above, the only SPA qualifying species recorded using agricultural habitats, based on 2020-21 and 2021-22 survey data, are shelduck and curlew and the maximum number of birds affected is very small. For cormorant, most of which were recorded on the sea, there is plentiful alternative habitat for any displaced birds to move into. The other qualifying species were recorded using large open waterbodies within Holland Haven Marshes SSSI. For these species it is assumed that HDD exit pit locations will be chosen to maximise the distance from large open waterbodies within the SSSI and that any noise disturbance will be regular in nature (birds generally habituate quickly to regular sources of noise (Cutts *et al*., 2013)). It is also noted that the affected birds are already habituated to some level of visual disturbance.

[21] 400 m represents a maximum, and disturbance distances for some qualifying species are likely to be much lower, e.g., for black-tailed godwit the maximum disturbance distance is 100-200 m (Goodship & Furness, 2022).

4.11.45 At its closest point, the Colne Estuary (Mid-Essex Coast Phase 2) SPA/ Ramsar is located 7.26 km from the part of the non-breeding birds study area covered by surveys of the onshore ECC and OnSS search areas. Of the non-breeding bird species recorded in the onshore ECC and OnSS survey area during surveys in 2021-22, one is an SPA and Ramsar qualifying feature (dark-bellied brent goose) and four are SPA qualifying features, including named species forming part of the waterfowl assemblage qualifying feature, (mute swan, shelduck, curlew and cormorant)[22]. Of these species, dark-bellied brent goose was only recorded >1.4 km outside the study area (i.e., within the onshore RLB and 400 m buffer) so is not likely to be affected based on 2021-22 survey data. In addition, dark-bellied brent geese recorded in the study area are not likely to form part of the Colne Estuary (Mid-Essex Coast Phase 2) SPA/ Ramsar population due to the intervening distance being greater than 5 km (McKay *et al.*, 2001). The remaining species were recorded within the study area, with curlew recorded using agricultural fields but records of the other species were limited to relatively small numbers using large open waterbodies within the study area. As the Colne Estuary (Mid-Essex Coast Phase 2) SPA is located within 7.26 km, a precautionary approach has been adopted which assumes that any of these species recorded within the study area could potentially represent part of the SPA population.

4.11.46 None of the SPA qualifying species were recorded within any of the OnSS search areas under consideration and there will therefore be no permanent habitat loss for any Colne Estuary (Mid-Essex Coast Phase 2) SPA qualifying features.

4.11.47 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA qualifying species along the onshore ECC and at the OnSS because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include a 60 m working width, up to 40 HDD entry / exit compounds which would be 121.5 m wide, five main TCCs and three minor TCCs, and associated off-road haul routes. Temporary habitat loss would largely affect agricultural fields and could therefore affect curlew. However, the agricultural habitats used by this species are common and widespread and the temporary loss of some of these areas, over a maximum of two seasons (up to three seasons at the OnSS), is **not likely to be significant**. None of the large open waterbodies within the study area would be affected. There were no records of mute swan, shelduck or cormorant away from large open waterbodies within the onshore ECC and all large open waterbodies within the onshore ECC will be avoided. As such there will be no temporary habitat loss for any of these SPA qualifying features.

[22] Excluding species which were only recorded occasionally and/ or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.

4.11.48 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m of construction works within the ECC and OnSS search areas, for a maximum of two seasons (up to three seasons at the OnSS). This could affect all SPA qualifying species recorded within the study area for non-breeding birds during the 2021-22 surveys. At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, it is considered that disturbance is **unlikely to be significant**. Curlew could be affected by disturbance in agricultural habitats, however the agricultural habitats used by these species are common and widespread and there is plentiful alternative habitat for any displaced birds to move into. Mute swan, shelduck and cormorant could be affected by disturbance of nearby large open waterbodies, although usage of these small wetlands is sporadic and the numbers recorded are relatively small.

4.11.49 The Colne Estuary (Mid-Essex Coast Phase 2) SPA is also designated for breeding little tern, pochard and ringed plover. The closest known little tern colony is at Colne Point, which is over 9 km from the project. Breeding little tern is therefore not likely to be affected by the onshore aspects of the project. Similarly, breeding pochard and ringed plover within the SPA are not likely to be affected by the project and neither species has been recorded breeding within the study area during surveys carried out to date.

4.11.50 The Colne Estuary (Mid-Essex Coast Phase 2) SPA is also designated for wintering hen harrier. Hen harrier was recorded once during the surveys at the landfall in 2020-21 and 2021-22 and once during surveys of the ECC and OnSS search areas in 2021-22. Given the relative lack of records within the study area no significant effects on wintering hen harrier are likely.

ABBERTON RESERVOIR SPA AND RAMSAR

QUALIFYING BIRD SPECIES

4.11.51 At its closest point, Abberton Reservoir SPA/ Ramsar is located 18.22 km from the part of the non-breeding birds study area covered by surveys of the landfall area. Given the intervening distance, no significant effects on SPA/ Ramsar qualifying features are likely in relation to construction works at the landfall area.

4.11.52 At its closest point, Abberton Reservoir SPA/ Ramsar is located 11.47 km from the part of the non-breeding birds study area covered by surveys of the onshore ECC and OnSS search areas. Of the non-breeding bird species recorded in the onshore ECC and OnSS survey area during surveys in 2021-22, four are SPA and Ramsar qualifying features (shoveler, gadwall, wigeon and teal) and three are SPA qualifying features (mute swan, tufted duck and coot)[23]. Within the study area, records of these species were limited to relatively small numbers using large open waterbodies. As Abberton Reservoir SPA is located within 11.47 km, a precautionary approach has been adopted which assumes that any of these species recorded within the study area could potentially represent part of the SPA population. However, in practice much of the study area is located >15 km from the SPA and connectivity with the SPA is unlikely.

4.11.53 None of the SPA/ Ramsar qualifying species were recorded within any of the OnSS search areas under consideration and there will therefore be no permanent habitat loss for any Abberton Reservoir SPA qualifying features.

4.11.54 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss for SPA qualifying species along the onshore ECC and at the OnSS because the design is not yet resolved, and a more detailed assessment will be provided in the ES. However, none of the large open waterbodies within the study area would be affected and there will therefore be no temporary habitat loss for any of the SPA qualifying features.

4.11.55 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m of construction works within the ECC and OnSS search areas, for a maximum of two seasons (up to three seasons at the OnSS). This could affect SPA qualifying species recorded within the study area. At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, it is considered that disturbance is **unlikely to be significant**. SPA birds could be affected by disturbance of nearby large open waterbodies, although usage of these small wetlands is sporadic and the numbers recorded are relatively small.

4.11.56 Abberton Reservoir SPA is also designated for breeding cormorant. Given the intervening distance breeding cormorant is unlikely to be affected by the project, although this can only be confirmed following the completion of breeding bird surveys for the onshore ECC and OnSS search areas, which will be reported in the ES.

BLACKWATER ESTUARY (MID-ESSEX COAST PHASE 4) SPA AND RAMSAR

QUALIFYING BIRD SPECIES

[23] Excluding species which were only recorded occasionally and/or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.

4.11.57 At its closest point, the Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/ Ramsar is located 16.76 km from the part of the study area covered by surveys of the landfall area. Given the intervening distance, no significant effects on SPA/ Ramsar qualifying features are likely in relation to construction works at the landfall area.

4.11.58 At its closest point, the Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/ Ramsar and Colne Estuary SSSI is located 13.92 km from the part of the study area covered by surveys of the onshore ECC and OnSS search areas. Of the non-breeding bird species recorded in the onshore ECC and OnSS survey area during surveys in 2021-22, only one is an SPA and Ramsar qualifying feature (dark-bellied brent goose)[24]. Dark-bellied brent goose was only recorded >1.4 km outside the study area for non-breeding birds (i.e., within the onshore RLB and 400 m buffer) so is not likely to be affected based on 2021-22 survey data. In addition, dark-bellied brent geese recorded in the study area are not likely to form part of the Blackwater Estuary (Mid-Essex Coast Phase 4) SPA/ Ramsar population due to the intervening distance being greater than 5 km (McKay *et al.*, 2001). **No significant effects** on the Blackwater Estuary SPA/ Ramsar are therefore likely.

HOLLAND HAVEN MARSHES SSSI

NON-BREEDING BIRDS

4.11.59 Holland Haven Marshes SSSI lies within and close to the area covered by surveys of the landfall area. Of the non-breeding bird species recorded at the landfall area during surveys in 2020-21 and 2021-22 eight are referred to in the SSSI citation (dark-bellied brent goose, shoveler, wigeon, pintail, teal, ruff, purple sandpiper and snipe). All of these species were recorded within the study area for non-breeding birds (i.e., within the onshore RLB and 400 m buffer), although pintail and ruff were only recorded occasionally and/ or in low numbers.

4.11.60 Permanent habitat loss at the landfall area would be limited to the four TJBs and would amount to a maximum of 2,400 m^2 (0.24 ha) located within agricultural fields to the northwest of Holland Haven Marshes. There will no permanent habitat loss within the SSSI. The areas in which the TJBs would be located may sometimes be used by dark-bellied brent geese but are not likely to be used by the other species referred to in the SSSI citation, based on 2020-21 and 2021-22 survey data. The agricultural habitats present here are common and widespread and the permanent loss of 0.24 ha represents a very small proportion of the total area of similar habitat available within the wider area. As such, permanent habitat loss is **not likely to have a significant effect** on the SSSI populations of any of the species referred to in the citation.

[24] Excluding species which were only recorded occasionally and/or were only recorded in very low numbers (10 or less) so are not likely to form a significant proportion of the SPA/ Ramsar population.

4.11.61 At this stage of the project, it is not possible to accurately estimate the extent of temporary habitat loss at the landfall area because the design is not yet resolved, and a more detailed assessment will be provided in the ES. It is assumed however that temporary habitat loss would include five HDD entry/exit pits, three TCCs, a 60 m working width for the onshore ECC inland from the HDD exit pit and associated off-road haul routes. Temporary habitat loss could affect intertidal habitats at the beach and would affect agricultural fields to the northwest of Holland Haven Marshes. There would be no temporary habitat loss within the SSSI due to the use of HDD. It is assumed that temporary loss would occur for a maximum of two non-breeding seasons.

4.11.62 The only species referred to in the SSSI citation which could be affected by temporary loss of agricultural and intertidal habitat, based on 2020-21 and 2021-22 survey data, are dark-bellied brent goose and purple sandpiper. All other species referred to in the SSSI citation were only recorded using large open waterbodies within the SSSI and will therefore not be affected by temporary habitat loss.

4.11.63 The agricultural fields to the northwest of Holland Haven Marshes were used by up to 1,100 dark-bellied brent geese. However, usage of the study area was irregular, and the fields used varied from month to month, and year to year. These habitats are common and widespread and the area subject to temporary loss is likely to represent a small proportion of the total area of similar habitat available within 5 km (dark-bellied brent geese tend to move a maximum of 5km inland from coastal SPAs (McKay *et al*., 2001)). As such, temporary habitat loss for the SSSI population of dark-bellied brent goose is **not likely to be significant**.

4.11.64 Purple sandpiper is the only species which could be affected by temporary loss of habitat at the beach. The peak count of purple sandpiper during the 2021-22 surveys was 12, although the peak count in 2020-21 was lower (seven) and the WeBS five-year mean peak count 2015/16-2019/20 was only two. The effect of temporary habitat loss on purple sandpiper would depend on which corridor is used, with most purple sandpiper records within the southern corridor, or outside the RLB to the southwest. Whichever corridor is used, the extent of temporary habitat loss is anticipated to be relatively small with plentiful alternative habitat available to support the relatively low number of birds recorded. As such, temporary habitat loss for the SSSI population of purple sandpiper is **not likely to be significant**.

4.11.65 Disturbance, both from noise and visual sources could displace waterbirds using areas within up to 400 m of construction works at the landfall area, for a maximum of two seasons. This could affect all eight species referred to in the SSSI citation that were recorded within the non-breeding birds study area during the 2020-21 and 2021-22 surveys. The level of potential disturbance would depend on which corridor is used, with the southern corridor, which lies closest to the large open waterbodies within Holland Haven Marshes SSSI, having the greatest potential to cause disturbance.

4.11.66 At this time, in the absence of more detailed design information, it is not possible to quantify the number of birds that could potentially be affected, and a more detailed assessment of potential disturbance will be provided in the ES. However, at this stage, following the implementation of the embedded mitigation measures, which would substantially reduce noise and visual disturbance, it is considered that disturbance to the SSSI populations of any of the relevant species is **unlikely to be significant**. As noted above, the only species recorded using agricultural habitats, based on 2020-21 and 2021-22 survey data, was dark-bellied brent goose. The area of agricultural land potentially affected by disturbance represents only a small proportion of the total area of similar habitat available within 5 km and any residual disturbance would occur for a maximum of two seasons. For purple sandpiper, which were exclusively recorded on the beach, the number of birds potentially affected will depend on the location of the HDD entry pits but wherever those are located the area affected by disturbance would be relatively small and there is similar habitat available further along the beach for any displaced birds to move into. It is also noted that birds using the beach are already habituated to relatively high levels of visual disturbance from human activity along the seawall.

4.11.67 The other species referred to within the SSSI citation were recorded using large open waterbodies within the SSSI. For these species it is assumed that HDD exit pit locations will be chosen to maximise the distance from large open waterbodies within the SSSI and that any noise disturbance will be regular in nature (birds generally habituate quickly to regular sources of noise (Cutts *et al*., 2013)). It is also noted that the affected birds are already habituated to some level of visual disturbance.

BREEDING BIRDS

4.11.68 Four bird species recorded at the landfall area during breeding bird surveys in 2021 are referred to in the SSSI citation (yellow wagtail, skylark, meadow pipit and reed warbler), although yellow wagtail was only recorded outside the SSSI. Given the avoidance of direct impacts on the SSSI, by use of HDD, and following the implementation of the embedded mitigation measures, **no significant effects are likely** on the SSSI populations of any of these species.

HABITATS AND OTHER SPECIES

4.11.69 HDD will be used such that there will be no direct impacts to habitats or their associated plant and invertebrate communities, at Holland Haven Marshes SSSI. Effects on water quality/quantity and other potential hydrological impacts are assessed in Volume 3 Chapter 6, which concludes that "the likely overall effect of the onshore elements of VE on water quality and flood risk throughout the construction, operation and decommissioning of VE is not significant in EIA terms".

4.11.70 Additional indirect impacts may arise as a result of lighting associated with construction, in particular the HDD compounds which may be subject to 24 hour working. Depending on the time of year at which the works take place, this could affect invertebrate populations for which the SSSI is designated[25]. Species listed on the citation include soldier fly *Stratiomys singularior*, ruddy darter dragonfly *Sympetrum sanguineum*, Roesel's Bush-cricket *Metrioptera roeselii*, a bumble bee *Bombus muscorum* and brown argus butterfly *Aricia agestis*. The ecology of the weevil *Stenopelmus rufinasus* – the final species listed on the citation - has been difficult to determine, but since it is associated with an INNS (water fern) and first appeared in the UK in the 20th century its relevance to the SSSI designation is unclear.

4.11.71 Lighting for construction will be the minimised to the lowest safe level, and designed such that there will be no significant increase in illumination levels at the SSSI above current levels and therefore no significant effect on SSSI invertebrate populations.

4.11.72 Potential air quality impacts to the SSSI are assessed in Volume3, Chapter 11: Human Health & Climate Change, which concludes that residual effects are not significant in terms of the EIA Regulations.

IMPACTS TO LOCAL WILDLIFE SITES

4.11.73 There is no anticipated loss of habitat at areas within Great Holland Pits and Thorpe Green LoWS as they are adjacent but outside of the RLB. The northern edge of Simon's Wood LoWS (also ASNW) is adjacent to Thorpe Road and is partially within the RLB, in an area where visibility splays may be necessary during construction. Habitat loss impacts to Simon's Wood LoWS will be avoided via micrositing and/or alternative means of traffic management controls during construction.

4.11.74 Indirect impacts to these and other LoWS within 200 m via changes to air quality or hydrology are assessed in Volume 3, Chapters 6: Hydrology, Hydrogeology and Flood Risk and 11: Human Health & Climate Change, both of which conclude that there will be no significant impacts.

4.11.75 No other potential indirect impacts on LoWS have been identified.

PERMANENT AND TEMPORARY LOSS OF IMPORTANT HABITAT

4.11.76 At this stage of the project, it is not possible to accurately estimate the extent of temporary or permanent important habitat loss (refer to Table 4.9 for rationale for important habitat selection) for the entire onshore element of the project since a) the design is not yet resolved and b) the presence of protected species can have a determining role identifying such habitat and many of the species surveys have yet to be completed and/ or reported. An initial qualitative assessment is therefore presented in Table 4.12 for each of the important habitat features listed in Table 4.9 for which habitat loss is possible. Table 4.12 references short-, mid- and long-term timescales. These are assumed to be <5 years, 5-10 years and >10 years respectively. A quantitative assessment of permanent and temporary habitat loss will be provided within the ES.

4.11.77 For clarity;

[25] Bruce-White, C. and Shardlow, M. (2011) A Review of the Impact of Artificial Light on Invertebrates. Buglife.

- there is no anticipated loss of habitat at areas within Holland Haven Marshes SSSI, any LoWS, or within any areas of ASNW or PAWS. The S41 habitats reedbeds and rivers would not be directly affected;
- Habitat loss and other impacts at the proposed East Anglia Connection Node Substation area as a result of National Grid's scheme are not included here, but are considered as part of the cumulative effects assessment at Section 4.14.
- Temporary loss of intertidal habitat, below MHWS, is covered in the offshore assessment (see Volume 2, Chapter 5: Benthic and Intertidal Ecology in particular).

Table 4.12: Initial assessment of significance of important habitat loss

Important habitat subject to loss	Proposed mitigation	Significance of residual effect
Hedgerows (h2a, S41 habitat and including two Important Hedgerows under the Hedgerow Regulations 1997)	**Onshore ECC (temporary loss)** Replanting/ reinstatement with a species-rich, locally appropriate native mixture including heavy standard trees at a 3:1 ratio for any lost. **OnSS (temporary and permanent loss)** Compensation via replanting of at least an equivalent amount and including heavy standard trees at a 3:1 ratio for any lost. New hedgerows to be created at historic field boundaries or along new ones, as close as possible to the site of the original. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles). This is necessarily indicative at this stage, as the location for the OnSS is not yet known. Full details will be provide in the OLEMP to be provided with the ES.	Since only a proportion of the hedgerows within the RLB would be impacted, a **significant adverse effect is anticipated** at a local level (rather than County level) in the short term until the proposed mitigation/ compensation is sufficiently mature and becomes established. **Not significant in mid-long term** once proposed mitigation has matured and become established as this allows time for new/ replacement hedgerows to establish (to be confirmed following further development of mitigation/ compensation measures).
Arable Field Margin (c1a6 and c1a8, S41 habitat)	**Onshore ECC (temporary loss)** Creation and maintenance of equivalent areas within the RLB during construction, via changes to existing cropping regime/ management and/ or sowing of appropriate seed mixture. **OnSS (permanent loss)** Compensation via creation and maintenance of at least an equivalent amount via changes to existing cropping regime/	**Not significant in the short term** (to be confirmed following further development of mitigation/ compensation measures).

Important habitat subject to loss	Proposed mitigation	Significance of residual effect
	management and/ or sowing of appropriate seed mixture. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles). This is necessarily indicative at this stage, as the location for the OnSS is not yet known. Full details will be provided in the OLEMP to be provided with the ES.	
Lowland meadow (g3a, S41 habitat)	**Onshore ECC (temporary loss)** Salvage of turves and reinstatement following construction. Additional seeding with a species-rich, locally appropriate native mixture (only if required for successful re-establishment). **OnSS (permanent loss)** Compensation via creation of at least an equivalent amount using turves salvaged from the area affected. Additional seeding with a species-rich, locally appropriate native mixture (only if required for successful re-establishment). Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles). This is necessarily indicative at this stage, as the location for the OnSS is not yet known. Full details will be provided in the OLEMP to be provided with the ES.	**Significant adverse effect at a local level** in the medium term until the proposed mitigation/ compensation is sufficiently mature and become established. **Not significant in long term** once proposed mitigation/ compensation has matured and become established (to be confirmed following further development of mitigation/ compensation measures).

Important habitat subject to loss	Proposed mitigation	Significance of residual effect
Woodland (excluding ASNW and PAWS) and mature trees (UKHab primary codes starting "w", including small areas of S41 habitat)	**Onshore ECC (temporary loss)** Replanting/ reinstatement with a locally appropriate native mixture. **OnSS (temporary and permanent loss)** Compensation via replanting of at least an equivalent amount, at locations aimed to link in and widen existing woodland, hedgerow and scrub network. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles). This is necessarily indicative at this stage, as the location for the OnSS is not yet known. Full details will be provided in the OLEMP to be provided with the ES.	**Significant adverse effect at a local level** in the medium term until the proposed mitigation is sufficiently mature and become established. **Not significant in long term** once proposed mitigation/ compensation has matured and become established (to be confirmed following further development of mitigation/ compensation measures).
Coastal and floodplain grazing marsh (S41 habitat) inland from Holland Haven Marshes SSSI	**Onshore ECC (temporary loss)** The area that may be affected is subject to periodic agricultural disturbance via ploughing or reseeding as part of normal farming practice. Vegetation within several ditches will also be subject to temporary loss, however all ditches are likely to be subject to similar disturbance already during regular maintenance. Reinstatement would occur following construction. A range of measures relating to vegetation clearance and other construction works are proposed in Section 4.10, with further details provided in the draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise) and	**Not significant in short term.**

Important habitat subject to loss	Proposed mitigation	Significance of residual effect
	OLEMP, to be submitted with the ES.	
Two ponds (r1a, S41 habitat)	**Onshore ECC (temporary loss)** Reinstatement following construction. Additional planting only if required for successful re-establishment of aquatic species (to minimise biosecurity risks).	**Not significant in short term.**

IMPACTS UPON PROTECTED OR NOTABLE SPECIES OR UPON THEIR RESTING OR BREEDING SITES, INCLUDING HABITAT FRAGMENTATION AND ISOLATION

4.11.78 At the time of writing, analysis and reporting of survey data collected in 2022 is ongoing in respect of several protected and notable species and in some cases further surveys are planned in 2023. Table 4.13 provides an interim assessment of potential impacts based upon available data at the time of writing and sets out preliminary details of mitigation measures that may be appropriate.

Table 4.13: Preliminary assessment of significance of effects on protected and notable species

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
S41 and/or red data book plant species associated with coastal habitats and arable margins. Other locally important plant species, primarily within S41 habitats.	Temporary loss of arable margin, lowland meadow, hedgerow, woodland, coastal and floodplain grazing marsh habitats supporting important plant species. Permanent loss of arable margin, lowland meadow, hedgerow and woodland habitats supporting important plant species at the OnSS.	Salvage of populations and reinstatement following construction. Exact method dependent on the species and habitat concerned, but may include seed saving and propagation, turf translocation, or translocation of individual plants. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles). This is necessarily indicative at this stage, as the location for the OnSS is not yet known. Full details will be provided	Since only a proportion of the RLB would be impacted, a **potentially significant, adverse effect is anticipated at a local level** (rather than County or National level) in the short term. **Not significant in mid - term** once habitats are reinstated and ecologically functioning as previously (to be confirmed following further development of mitigation/ compensation measures).

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
		in the OLEMP to be provided with the ES.	
Invertebrates (using coastal habitat but also the Holland Brook. Other S41 habitats are also potentially important for this group.)	Temporary loss of lowland meadow, hedgerow, woodland, coastal and floodplain grazing marsh habitats potentially supporting important invertebrate species. Permanent loss of lowland meadow, hedgerow and woodland habitats potentially supporting important invertebrate species at the OnSS. Disturbance due to lighting or changes to hydrology during construction.	Reinstatement of habitat after construction, and creation of compensatory habitat for permanent habitat loss at the OnSS (as described in Table 4.12) Paragraph 4.11.71 describes methods to minimise construction lighting impacts to invertebrate populations at the landfall HDD locations. Construction lighting at other HDD locations would be at the lowest, safest permissible level and with lightspill minimised. Mitigation measures to prevent hydrological impacts are included in Volume 3 Chapter 6: Hydrology,	Since only a proportion of the RLB would be impacted, a **potentially significant, temporary adverse effect is anticipated at a local level** (rather than County or National level) in the short term until the proposed mitigation is sufficiently mature and become established. **Not significant in mid-term** once proposed mitigation has matured and become established (to be confirmed following further development of mitigation/ compensation measures).

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
		Hydrogeology and Flood Risk.	
GCN and common toad	There are no GCN populations within 250 m of the OnSS therefore no anticipated impacts as a result of permanent habitat loss. Temporary loss of one pond which is within the theoretical range of one GCN metapopulation, but which has no record of GCN presence. Temporary loss of terrestrial habitats directly adjacent to GCN breeding ponds also potentially used by common toad and other amphibians. Temporary habitat fragmentation/isolation, resulting in functional loss of terrestrial habitat and breeding ponds. Accidental killing and injury. Accidental pollution to breeding ponds from diffuse or point sources associated with construction.	GCN EPSL may be required from NE ("standard" or DLL may be considered). Compensation for temporary pond loss and terrestrial habitat loss in advance. Scheduling of certain work to avoid sensitive periods of the GCN and common toad life cycle. Removal of GCN and common toads from areas where there is risk of injury or death in advance, plus other precautionary measures. Refer to embedded mitigation at Section 4.10 for measures to reduce pollution risks.	**No significant effect** on the local conservation status is likely following the implementation of mitigation and compensation measures (to be confirmed following further development of mitigation/ compensation measures).

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
Reptiles	Permanent habitat loss at the OnSS, temporary habitat loss and temporary habitat fragmentation/ isolation elsewhere. Accidental killing and injury. The project is not predicted to significantly adversely affect the local population due to the relatively poor quality of the majority of habitat affected and the low population anticipated to be present. However, in view of the species' legal protection mitigation measures are proposed.	Mitigation for GCN will also reduce risks to reptiles. Reasonable avoidance measures would be used, where necessary, to reduce the risk of committing an offence under the protecting legislation.	**No significant effect** is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures, if required).
Breeding Birds (excluding qualifying or notified features for designated sites) – landfall area	Important species recorded breeding (or possibly breeding) within the study area at the landfall area during surveys in 2021 included: avocet, lapwing, redshank, marsh harrier, Cetti's warbler, yellow wagtail and corn bunting. Permanent habitat loss at the landfall area would be limited to the four TJBs and would amount to a maximum of 0.24 ha located within agricultural fields to the northwest of Holland Haven Marshes and is not likely to significantly affect any important species. Temporary habitat loss could affect intertidal habitats at the beach and would	A range of embedded mitigation measures relating to breeding birds at the landfall area are proposed in Table 4.11. These include: employment of an ECOW; measures to avoid damage to active nests; surveys for important species prior to and during construction; disturbance-free buffer zones around active	**No significant effect on the local conservation status of important species recorded within the study area at the landfall area is likely following the implementation of embedded mitigation measures.** This conclusion will be confirmed in the ES following reporting of further surveys and provision of more

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
	affect agricultural fields to the northwest of Holland Haven Marshes. There would be no temporary habitat loss within the SSSI due to the use of HDD. Based on 2021 survey data this could potentially affect one lapwing territory, one possible marsh harrier territory, one yellow wagtail territory and one corn bunting territory, depending which corridor is used. Temporary loss would occur for a maximum of two breeding seasons. Disturbance could affect birds using intertidal habitats at the beach, large open waterbodies within the SSSI (where located close to working areas outside the SSSI) and agricultural habitats to the northwest of Holland Haven Marshes. All of the important species could potentially be affected depending which corridor is used, with the southern corridor, which lies closest to the large open waterbodies within Holland Haven Marshes SSSI, having the greatest potential to cause disturbance. Disturbance would occur for a maximum of two breeding seasons. Inadvertent destruction or damage to active nests is possible during construction (all wild bird species).	nests of important species; screening/ fencing of HDD pits and other working areas during the bird breeding season (if required, depending on the final design); and restrictions on piling during the breeding season if the southern landfall option is used. Further details are provided in Table 4.11.	detailed design information.

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
Breeding Birds (excluding qualifying or notified features for designated sites) – onshore ECC and OnSS	Subject to analysis of survey results which are not yet available, potential impacts include: Permanent loss of up to 5.88 ha of agricultural habitat at the OnSS that may be used by important bird species. Temporary loss of habitat for important bird species along the onshore ECC. Disturbance to important bird species along the onshore ECC and at the OnSS during construction. Inadvertent destruction or damage to active nests during construction (all wild bird species).	A range of embedded mitigation measures relating to breeding birds along the onshore ECC and at the OnSS are proposed in Table 4.11. These include: employment of an ECOW; measures to avoid damage to active nests; surveys for important species prior to and during construction; and disturbance-free buffer zones around active nests of important species. Further details are provided in Table 4.11.	**No significant effect on the local conservation status of important species is anticipated following the implementation of embedded mitigation measures.** This conclusion will be confirmed in the ES following analysis and reporting of breeding bird survey data and provision of more detailed design information.
Non-Breeding Birds (excluding qualifying or notified features for designated sites) – landfall area	Important species recorded within the study area at the landfall area during non-breeding bird surveys in 2020-21 and 2021-22 included nationally important numbers of European white-fronted goose and locally important numbers of several	A range of embedded mitigation measures relating to non-breeding birds at the landfall area are proposed in Table 4.11.	**No significant effect on the local conservation status of important species recorded at the landfall area is likely**

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
	waterbird, raptor, owl and passerine species. Permanent habitat loss at the landfall area would be limited to the four TJBs and would amount to a maximum of 0.24 ha located within agricultural fields to the northwest of Holland Haven Marshes. This is not likely to significantly affect any important bird species. Temporary habitat loss could affect intertidal habitats at the beach and would affect agricultural fields to the northwest of Holland Haven Marshes. There would be no temporary habitat loss within the SSSI due to the use of HDD. Temporary habitat loss could potentially affect European white-fronted goose and other species that use the agricultural or intertidal habitats. Usage of the study area by European white-fronted geese was irregular, and the fields used varied from month to month, and year to year. Similar agricultural habitats are common and widespread and the area subject to temporary loss is likely to represent a small proportion of the total area of similar habitat available within the wider area. The effect of temporary habitat loss on other important species would	These include: employment of an ECOW; screening/ fencing of HDD pits and other working areas during the winter period (if required, depending on the final design); restrictions on piling during the winter period; and, if necessary, suspension of works during periods of prolonged cold weather. Further details are provided in Table 4.11.	**following the implementation of embedded mitigation measures.** This conclusion will be confirmed in the ES following provision of more detailed design information.

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
	depend on which corridor is used. Whichever corridor is used, the extent of temporary habitat loss is anticipated to be relatively small with plentiful similar habitat available for birds to move into. Temporary habitat loss would occur for a maximum of two non-breeding seasons. Disturbance could affect birds using intertidal habitats at the beach, large open waterbodies within the SSSI (where located close to working areas outside the SSSI) and agricultural habitats to the northwest of Holland Haven Marshes. All target species could potentially be affected depending which corridor is used, with the southern corridor, which lies closest to the large open waterbodies within Holland Haven Marshes SSSI, having the greatest potential to cause disturbance. Disturbance would occur for a maximum of two non-breeding seasons. With respect to European white-fronted goose using agricultural habitats, the area potentially affected by disturbance represents only a small proportion of the total area of similar habitat available within the wider area.		

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
Non-Breeding Birds (excluding qualifying or notified features for designated sites) – onshore ECC and OnSS	Notable species recorded within the survey area for the onshore ECC and OnSS search areas in 2021-22 included populations of golden plover, marsh harrier, peregrine and corn bunting that are potentially of county importance, plus locally important numbers of other waterbird, raptor and passerine species. Permanent loss of up to 5.88 ha of agricultural habitat would occur at the OnSS, that may be used by notable bird species including peregrine and corn bunting. However, similar habitats are widespread within the surrounding area. Temporary habitat loss would primarily affect agricultural habitats, which may be used by notable bird species including golden plover, marsh harrier, peregrine and corn bunting. Similar agricultural habitats are common and widespread and the area subject to temporary loss is likely to represent a very small proportion of the total area of similar habitat available within the wider area. Temporary habitat loss would occur for a maximum of two non-breeding seasons (up to three seasons at the OnSS).	A range of embedded mitigation measures relating to non-breeding birds along the onshore ECC and at the OnSS are proposed in Table 4.11. These include: employment of an ECOW; and use of temporary screening during potentially disturbing construction works in the winter within and adjacent to areas used by significant numbers of waterbirds. Further details are provided in Table 4.11.	**No significant effect on the local conservation status of important species recorded along the onshore ECC and at the OnSS search areas is likely following the implementation of embedded mitigation measures.** This conclusion will be confirmed in the ES following completion of further surveys and provision of more detailed design information.

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
	Disturbance could affect birds using agricultural and large open waterbodies and could potentially affect all of the species listed above. Similar agricultural habitats are common and widespread and the area potentially subject to disturbance is likely to represent a very small proportion of the total area of similar habitat available within the wider area. Disturbance would occur for a maximum of two non-breeding seasons (up to three seasons at the OnSS).		
Bats	Loss of potential roost features at trees along the onshore ECC and at the OnSS. Permanent loss of flight lines and foraging habitat at the OnSS. Temporary fragmentation of hedgerow flight lines and temporary loss of foraging habitat elsewhere along the onshore ECC.	Compensation installed for every moderate or high potential or confirmed roost feature prior to loss; to include bat boxes on retained trees or installed poles, re-use of whole felled trunks by setting vertically as monoliths and/ or veteranisation (cutting and carving into healthy trees to mimic nature, to speed the process of decay and rot holes) as appropriate.	**No significant effect is likely** (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures).

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
		NE EPSL obtained in advance if any roost trees are affected. Temporary hedgerow gaps to be filled with “dead hedge” until such time as reinstated vegetation has established and is at least 1 m tall. Permanent hedgerow/ tree loss to be compensated as described in Table 4.12. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5). This is necessarily indicative at this stage, as the location for the OnSS is not yet known. Full details will be provided in the OLEMP	

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
		to be provided with the ES.	
Badger	Temporary loss and fragmentation of foraging habitat along the onshore ECC, permanent loss of foraging habitat at the OnSS. Accidental killing and injury. The project is not predicted to significantly adversely affect the local population due to the abundance of adjacent unaffected agricultural land. However, in view of the species legal protection mitigation measures are proposed.	Reasonable avoidance measures would be used to reduce the risk of committing an offence under the protecting legislation. These may include micrositing certain elements and/or installing protective fencing to minimize disturbance to retained setts, ensuring excavations remain closed overnight or contain ramps such that badgers cannot become trapped and ensuring stockpiled soil is fenced or regularly disturbed so as to deter badger sett creation within it.	**Not likely to be significant**
Otter	Based on desk study data and the lack of suitable habitat likely to be affected, it is	Reasonable avoidance measures would be used to reduce the risk of committing an offence	**Not likely to be significant**

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
	considered possible but unlikely for the project to directly impact otter holt(s). Temporary loss and fragmentation of foraging habitat/routes. Accidental killing and injury.	under the protecting legislation. These would be broadly similar to those described for badger (above).	
Water Vole (if present in water courses to be crossed)	Based on desk study data and the lack of suitable habitat likely to be affected, it is considered possible but unlikely for the project to directly impact water vole burrows(s). Temporary loss and fragmentation of foraging habitat/routes. Accidental killing and injury.	Micrositing to avoid burrows. Mitigation for habitat loss in advance; this may involve relaxation of bankside cutting/ grazing regimes or alterations to main river maintenance schedules. Scheduling of work to avoid sensitive periods of the water vole life cycle. Deterrence, or if necessary, removal of water vole from areas where there is risk of injury or death in advance.	**No significant effect** on the local conservation status is likely following the implementation of mitigation and compensation measures, if required (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures, if required).

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
		Reinstatement of bankside habitats immediately after work, to include sowing with species rich locally appropriate sward and fencing to prevent stock access.	
Dormouse (if present in hedges to be breached)	Potential for the project to directly impact dormouse nests. Temporary loss of foraging and sheltering habitat, permanent loss if dormice are present at the OnSS area. Temporary fragmentation of foraging areas/ routes. Accidental killing and injury.	An NE EPSL may be necessary depending on the nature of any impact. Mitigation for temporary or permanent habitat loss in advance; this would involve advance planting of food source species and would be combined with hedgerow mitigation already described. Scheduling of work to avoid sensitive periods of the dormouse life cycle (i.e. hibernation and breeding).	**No significant effect** on the local conservation status is likely following the implementation of mitigation and compensation measures, if required (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures, if required).

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
		Deterrence, or if necessary, removal of dormouse from areas where there is risk of injury or death in advance. Reinstatement of hedgerow habitats immediately after work, as already described.	
Other S41 Mammal Species: hedgehog, harvest mouse and brown hare.	Temporary loss of foraging and sheltering habitat, permanent loss if present at the OnSS. Temporary fragmentation of foraging areas/ routes. Accidental killing and injury.	Reasonable avoidance measures would be used to minimize impacts. Refer to embedded mitigation at Section 4.10.	**Not likely to be significant**

SPREAD OF INVASIVE NON-NATIVE SPECIES

4.11.79 The primary ways the project could increase the spread of INNS is via;

- disturbance to existing INNS populations within the construction footprint;
- inadvertently importing INNS from elsewhere, primarily on vehicles, but also other equipment or personnel; and
- via seeds, planting stock or planting substrate.

4.11.80 Mitigation measures beyond those listed in Table 4.11: i.e., the implementation of INNS control measures detailed in the draft CoCP (Volume 7, Report 3: Draft Code of Construction Practise), are not considered necessary. Provided the mitigation measures are implemented as proposed, no significant effects are predicted over any timescale.

ACCIDENTAL POLLUTION

4.11.81 Measures to minimise the risk of a pollution event will be contained within the CoCP, a draft version of which is provided in Volume 7, Report 3: Draft Code of Construction Practise. Further detail in this respect is also provided within the Hydrology, Hydrogeology and Flood Risk, Volume 3, Chapter 6. To summarise, it concludes that with embedded mitigation measures in place, the effect on water quality as a result of construction would be **not significant** in EIA terms.

4.11.82 The risk of a pollution incident overwhelming the embedded mitigation measures and large enough to significantly affect any of the important ecological features identified in Table 4.9 is considered so remote as to be disregarded for the purpose of assessment.

4.12 ENVIRONMENTAL ASSESSMENT: OPERATIONAL PHASE

DISTURBANCE OR DAMAGE TO IMPORTANT ECOLOGICAL FEATURES VIA MAINTENANCE, NOISE AND LIGHT AT THE ONSS

4.12.1 Once operational, maintenance activities will be limited to weekly inspections plus regular maintenance over a two-week period, once per year. This would be highly localised within the OnSS, with a minimal likelihood of disturbance expected to the adjacent habitats and species. Any such maintenance would be subject to the requirements of the LEMP (as mentioned in Table 4.11), which would include specific measures to avoid potential impacts to protected/ notable species or sensitive habitats (precise contents dependent on survey results, which are yet to be fully analysed and reported). The LEMP would also include measures to minimise the risk of a pollution event. Following the implementation of the measures to be described in the LEMP **no significant adverse effects are anticipated** for any important ecological feature as a result of regular maintenance at the OnSS.

4.12.2 Details in respect of sound levels generated by the operation of the OnSS are included in Volume 3, Chapter 9: Airborne Noise and Vibration. With reference to nearby residential receptors, mitigated impacts of operational noise has been assessed as minor adverse. There are no statutory designated sites within this area and **at this stage it is considered unlikely that operational noise will significantly affect important ecological features**, although this will need to be confirmed following completion of survey data analysis and reporting and provision of more detailed design information. Ecological receptors that could be affected by operational noise at the OnSS include bats and breeding birds. Surveys in the area have yet to be completed and should a significant roost or important bird populations be identified in close proximity to the OnSS there may be potential for adverse effects. Should mitigation be necessary this would be detailed in the ES.

4.12.3 The lighting scheme for the OnSS has not yet been decided but will be directional for safety and security only. It is anticipated that there would be no light spill beyond the OnSS site boundary and the lighting scheme would follow current guidance to minimise impacts to bat species, e.g., Bat Conservation Trust (2018). As such, **no significant effects are likely** due to operational lighting.

DISTURBANCE OR DAMAGE TO IMPORTANT ECOLOGICAL FEATURES VIA MAINTENANCE

4.12.4 Planned maintenance of the cable route involves an annual visit to each cable joint pit and TJB by a team of two. As at the OnSS, all such maintenance would be subject to the requirements of the LEMP, which would include specific measures to avoid potential impacts to protected/ notable species or sensitive habitats. Following the implementation of the measures to be described in the LEMP, **no significant adverse effects are anticipated** for any important ecological feature as a result of regular maintenance.

4.12.5 The extent or nature of any unplanned corrective maintenance required can't be predicted at this stage and therefore possible effects in terms of disturbance can't be assessed. However, any effect would be of a scale and duration that is no greater than that for the construction phase and so any resulting effects would be the same or lower than the effects predicted for the construction phase. Any unplanned corrective maintenance required would be subject to any necessary consents and consultation with the relevant nature conservation bodies prior to work taking place.

4.13 ENVIRONMENTAL ASSESSMENT: DECOMMISSIONING PHASE

4.13.1 Details surrounding the decommissioning phase are yet to be fully clarified. In addition, it is also recognised that policy, legislation and local sensitivities constantly evolve, which will limit the relevance of undertaking an assessment at this stage. Nevertheless, decommissioning activities are not anticipated to exceed the construction phase worst case criteria assessed; further to this in most cases impact magnitude will be much lower than during construction.

4.13.2 Decommissioning activities are expected to occur for up to three years – however this will be driven primarily by offshore works. Landfall infrastructure is expected to be left in-situ, buried cables would be de-energized with the ends sealed and left in place to avoid ground disturbance. TJBs and cable joint pits would also be left in place to abate potential future impacts. However, this will be reviewed over the design life of VE, and adapted to local sensitivities, policy, and legislation.

4.13.3 The decommissioning methodology would be finalised nearer to the end of the lifetime of VE, to be in line with current guidance, policy and legislation, as well as updated ecological survey information. Any such methodology would be agreed with the relevant authorities and statutory consultees.

4.14 ENVIRONMENTAL ASSESSMENT: CUMULATIVE EFFECTS

4.14.1 A comprehensive list of projects that have the potential to contribute to cumulative effects with the proposed OnSS, onshore ECC and Landfall has been compiled. This list, and the approach to compiling this list, are described in Volume 1, Chapter 3, Annex 3.1: Cumulative Effects Assessment Methodology which is in accordance with PINS Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects.

4.14.2 For most important ecological features, the geographical extent of sites with the potential for cumulative effects is considered to be limited to the relevant onshore biodiversity and nature conservation study areas (i.e. 2 km for most important ecological features, 6 km for bats and 15 km for internationally designated sites. No impact pathways have been identified that would extend beyond these study areas).

4.14.3 For qualifying bird species for internationally designated sites, a detailed assessment of effects in combination with other plans or projects is provided in the VE RIAA and is not repeated here. The assessment of cumulative effects on birds provided here therefore focuses on other important bird species, including notified species for nationally designated sites.

4.14.4 For the important ecological features and potential effects set out in Table 4.9 the following types of other development have the potential to result in cumulative effects:

- Other developments that could result in loss or change (permanent and/ or temporary) to important habitats, which could potentially also be affected by VE;
- Other developments that could result in loss or change (permanent and/ or temporary) to habitats used by important and/ or protected faunal species populations, which could potentially also be affected by VE; and
- Other developments that could result in disturbance to important and/ or protected faunal species populations, which could potentially also be affected by VE.

4.14.5 On the basis of the above, the other projects which are included in the cumulative effects assessment for onshore biodiversity and nature conservation are presented in Table 4.15 and shown on the Figure 4.6 in Volume 1, Chapter 3, Annex 3.1: Cumulative Effects Assessment Methodology . This list of projects remains indicative, pending the results of surveys yet to be reported and other projects potentially being added to, or removed from, the list between now and the ES being prepared. Each project, plan or activity has been considered and scoped in or out on the basis of effect-receptor pathway, data confidence and the temporal and spatial scales involved. All relevant longlist plans and projects were allocated into tiers reflecting varying levels of certainty. These are defined in Volume 1, Annex 1.3: Cumulative Effects Assessment Methodology, and outlined here in Table 4.14.

Table 4.14: Description of Tiers of other developments considered for cumulative effect assessment.

Tiers	Development Stage
Tier 1	Projects under construction.
	Permitted applications, whether under the Planning Act 2008 or other regimes, but not yet implemented.
	Submitted applications, whether under the Planning Act 2008 or other regimes, but not yet determined.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
	Projects under the Planning Act 2008 where a PEIR has been submitted for consultation.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted.
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/ approvals, where such development is reasonably likely to come forward.

4.14.6 As already highlighted in Table 4.10, VE construction may be undertaken at the same time as, and perhaps in conjunction with the North Falls project. However, at the time of writing there is insufficient information available about the North Falls project (both in terms of baseline ecological data, project description and programme) to meaningfully include it in the cumulative assessment (though with the correct mitigation and compensation in place for both projects and adequate co-ordination we would not expect the impacts to change significance). It will be possible to better understand this once the data is available and further information is available on the ECC route and OnSS location. Detailed cumulative impact assessment will be included in the ES (assuming North Falls project details are available at the time of writing) but is omitted from PEIR.

Table 4.15: Projects considered within the onshore biodiversity and nature conservation cumulative effects assessment

Development type	Project	Status	Data confidence assessment/ phase	Tier
Energy	North Falls Offshore Wind Farm. EN010119 Onshore cable route through Tendring District.	Scoping Opinion. 16 July 2021.	Low	2

Development type	Project	Status	Data confidence assessment/ phase	Tier
	Likely to impact the same range of ecological receptors as VE.	Application is expected to be submitted to the Planning Inspectorate in 2023		
Energy	National Grid (NG) East Anglia GREEN Connection Node			
Energy	21/00393/EIASCR. Request for a Screening Opinion in relation to the proposed solar energy scheme. Land East of Lodge Road, Thorpe Le Soken, Essex. No ecological data are available at this stage.	EIA Screening Request. 09 Apr 2021.	Low	3
Energy	21/02070/FUL. Construction and operation of a 50MW Battery Energy Storage System, and related infrastructure with associated access, landscaping and drainage. Nesting birds were considered as a feature in the report, which describes the site as being of low quality for nesting birds. Residual impacts on breeding birds were assessed to be negligible.	Decided - Approved (28 Sep 2022)	High	1
Residential	22/01047/FUL and 22/01042/DETAIL – Proposed erection of eight commercial units. This development is located south of the A120, west of Horsley Cross junction, opposite a proposed TCC. A population of water vole is present at the western	Granted 07/07/2022	High	1

Development type	Project	Status	Data confidence assessment/ phase	Tier
	boundary of the site on the Holland Brook and mitigation for impacts to the population is proposed. In relation to birds, it is stated that there is limited scope for nesting birds on site, although five skylark territories were identified within the survey area. With the inclusion of on-site and off-site habitat compensation for skylark, residual impacts on this species were assessed as being negligible.			
Infrastructure	CC/TEN/31/21 – New link road between the existing A120 and A133 inclusive of a grade separated dumbbell junction at the A120. This scheme is located west of Elmstead Green and east of Colchester. To the southwest of the RLB. Licensed dormouse mitigation is required prior to construction work. Barbastelle recorded. Hedgerows being removed. Three skylark territories may be lost as a result of the development. A farmland bird strategy will be developed, principally for skylark, to provide six skylark plots in nearby arable fields for ten years after construction.	Granted. 23/03/2021	High	1
Minerals	ESS/17/18/TEN – Extraction of 3.8 million tonnes of sand and gravel as an easterly extension	Granted. 14/06/2018	Medium	1

Development type	Project	Status	Data confidence assessment/ phase	Tier
	to the existing Wivenhoe Quarry. Includes erection of sand and gravel processing plant and ancillary facilities, new vehicular access onto the B1027 Brightlingsea Road, and restoration to agriculture and low-level water-based nature conservation habitats, lowland meadow, woodland planting and hedgerow enhancement using approximately 1.2 million cubic metres of imported inert waste material. This project is located to the east of Wivenhoe, to the southwest of VE. For breeding birds, the site was evaluated to be of local importance, comprising a lowland farmland bird assemblage which included skylark (up to eight territories), corn bunting (one territory) and Cetti's warbler (two individuals singing). Winter bird surveys in 2015/16 recorded a typical farmland bird assemblage including lapwing (recorded in Nov and Dec with a peak of 142 birds); skylark (small numbers); gadwall (small numbers flying over); and meadow pipit (small numbers). With the implementation of mitigation measures, adverse effects on birds were assessed to be neutral.			
Residential	22/00979/DETAIL - Reserved matters application for 280 homes, including offices, land	Awaiting decision. 24 Jun 2022	Medium	1

Development type	Project	Status	Data confidence assessment/ phase	Tier
	for a new primary school, railway footbridge, attenuation basins, open space, play equipment and associated infrastructure. Pursuant to outline planning consent 19/00524/OUT. Large development, south of Thorpe Road at Weeley, west of the VE project. Hedges retained, with some gaps. Important bird species recorded on site included song thrush (max. 3), yellowhammer (max. 2), skylark (4 territories), corn bunting (max. 2) and barn owl (nesting confirmed). The residual effects on all bird species were assessed as being negligible. 			

4.14.7 All other developments included in the shortlist of other developments (Volume 1, Annex 3.1: Cumulative Effects Assessment Methodology have been scoped out of the cumulative assessment for onshore biodiversity. The primary reason for scoping out other developments is their distance from the onshore RLB. Further details are provided below:

- **Important habitats:** Other developments with the potential to have cumulative effects on important habitats would generally have to be located within very close proximity to the relevant habitats.
- **Birds:** The potential ornithological impact zone for the onshore elements of the project has been determined as being up to 400m based on the upper limit of potential disturbance to non-breeding birds. Other developments with the potential for spatial overlap (in accordance with the approach set out in the Scoping Report) are therefore taken as those being within 800m of the project, which has been rounded up to a 1km search buffer applied to the project onshore RLB. Cumulative effects on breeding birds would only occur over a shorter distance given the reduced impact zone, however the 1km search area has been applied for all bird species.
- **Bats:** the maximum core sustenance zones (CSZs) for bat species recorded at VE are 6 km (for barbastelle) and 1-4 km for all other species. Developments within 6 km which may impact build structures, trees, woodlands or hedges (i.e., potential roosting, foraging or commuting habitat) were therefore included in the cumulative effects assessment.
- **Important faunal species (other than birds and bats)**: The distances at which other developments could potentially give rise to cumulative effects on important faunal species will vary by species. Most faunal species are not likely to be affected by VE beyond 500 m from the RLB with many species only likely to be affected at much smaller distances. Other developments with the potential to have cumulative effects on important faunal species would therefore have to be located within 500 m of the relevant receptors.

4.14.8 Table 4.16 presents the scenarios whereby VE and the other projects listed in Table 4.15 could potentially result in cumulative effects for onshore biodiversity and nature conservation. The assessment of cumulative effects, for the scenarios presented in Table 4.16 is preliminary and in most cases it is not possible to provide a meaningful assessment of whether cumulative effects are likely to be significant at this stage. This will be done in the ES, once surveys have been reported, further design detail is available and mitigation/ compensation proposals have been further developed.

Table 4.16: Cumulative MDS

Potential effect	Scenario	Justification
Permanent and temporary habitat loss	Cumulative effects will potentially occur as a result of construction of all the other developments in Table 4.15.	All the other developments in Table 4.15 include areas used by important faunal species and/or include important habitats, which could potentially be affected by habitat loss as a result of construction. The other developments are close enough to VE that the same species populations or habitat types could be affected. In addition, the population of water vole present at the northern parts of

Potential effect	Scenario	Justification
		the Holland Brook could be affected by the 22/01047/FUL proposal as well as VE (to be confirmed on completion of analysis and reporting of VE water vole surveys).
Impacts upon protected or notable species or upon their resting or breeding sites	Cumulative effects are possible during construction and decommissioning.	As above.
Habitat fragmentation and species isolation	Cumulative effects are possible during construction.	As above.
Impacts upon birds, including permanent and temporary habitat loss and disturbance during construction	Cumulative effects are possible as a result of construction of all the other developments in Table 4.15. Cumulative effects are possible during construction and decommissioning. Cumulative effects are possible for breeding skylark, corn bunting, Cetti's warbler and non-breeding lapwing and gadwall. However, assuming the identified impacts on these species would be largely offset by proposed mitigation and enhancement measures and given the distance from the VE RLB, cumulative effects on birds are unlikely to be significant.	A total of five skylark territories were identified within the survey areas of those developments listed in Table 4.14 which are within 1km of the VE RLB. No corn bunting territories were identified by other developments within 1km of the RLB listed in Table 4.14, although one territory was identified for a project located >1km away. Cetti's warbler was not identified from other developments within 1km of the RLB, with two possible territories identified for those projects located >1km away. Lapwing was only assessed at development ESS/17/18/TEN, with a maximum count of 142 birds and only present on a small number of surveys. Gadwall was only recorded at development ESS/17/18/TEN, but only over-flying the site. No impacts were therefore identified in relation to this species.

Potential effect	Scenario	Justification
Spread of INNS	Cumulative effects are possible in respect of NF OWF, the East Anglia Connection Node Substation and Horsley Cross development during construction. Cumulative effects are not likely in respect of decommissioning or for the remainder of developments listed.	INNS have been recorded within the VE RLB and more widely in the study area. Simultaneous activities during construction of NF OWF, the East Anglia Connection Node Substation and Horsley Cross development, which lie adjacent to VE, could result in cumulative adverse effects. The other developments are considered sufficiently distant and separated hydrologically from VE that effects from it are unlikely to result in cumulative adverse effects.
Accidental pollution	Cumulative effects are possible in respect of NF OWF, the East Anglia Connection Node Substation and Horsley Cross development during construction. Cumulative effects are not likely in respect of decommissioning or for the remainder of developments listed.	The NF OWF, East Anglia Connection Node Substation and Horsley Cross developments are located adjacent to VE and simultaneous pollution events therefore could potentially affect the same habitats and species populations. The remaining developments are considered sufficiently distant and separated hydrologically from VE that any pollution events are unlikely to affect the same habitats and species populations. It is anticipated that other projects of significance would be constructed in accordance with a CoCP. Given the requirements to control potential detrimental effects on flood risk or water quality, appropriate mitigation would be in place for these schemes to secure approval. Therefore, no significant cumulative hydrology,

Potential effect	Scenario	Justification
		hydrogeology and flood risk effects arising during the construction phase of proposed new developments are likely.

4.15 INTER-RELATIONSHIPS

4.15.1 Table 4.17 sets out the inter-relationships between this chapter and others within the PEIR.

Table 4.17: Inter-relationships between the EcIA and other chapters within the PEIR

Topic/ Chapter	Details
LVIA (Volume 3, Chapter 2)	Both chapters consider the potential effects of hedgerow and tree removals, the LVIA considering the impact on hedgerows and trees as landscape elements, and the Onshore Biodiversity and Nature Conservation assessment considering the impact on hedgerows and trees as important ecological features. Both chapters consider mitigation and compensation for hedgerow and tree loss in respect of planting proposed within the LEDPP for the OnSS area (refer to Volume 7, Report 5: Landscape and Ecology Design Principles).
Air Quality (Volume 3, Chapter 11)	The air quality chapter considers AQ impact during construction to sensitive ecological receptors as a result of dust and increased road traffic concluding that residual effects are not significant in terms of the EIA Regulations.
Hydrology and Flood Risk (Volume 3, Chapter 6)	The Hydrology and Flood Risk chapter provides a description of the hydrological setting of water courses within the survey area and assesses impacts upon them. It concludes that there are no significant residual effects on water quality and flood as a result of VE. The assessment of effects on aquatic receptors in this chapter draws on the proposed mitigation measures and the assessment of effects on water quality presented in the Hydrology and Flood Risk chapter.

4.16 TRANSBOUNDARY EFFECTS

4.16.1 There are no national or international transboundary effects with regard to onshore biodiversity and nature conservation (i.e. no significant impacts to populations of migratory species are anticipated).

4.17 SUMMARY OF EFFECTS

4.17.1 This assessment has considered the potential biodiversity and nature conservation effects arising from onshore activities associated with the proposed VE OWF. Consideration has been given to potential worst-case effects arising from onshore construction, operational and decommissioning activities based upon available information. Worst-case parameters have been adopted to provide as robust an assessment as possible, based on available data collected to date.

4.17.2 Limitations to the assessment, which largely relate to the lack of survey data for protected and notable species, surveys for many of which have yet to be reported, or in some cases yet to be completed, have been clearly identified. These limitations will be addressed in the ES, following completion of the relevant surveys.

4.17.3 The approach undertaken was based upon the PINS Scoping Opinion (PINS, 2021) and subsequent discussions with the Onshore Ecology ETG.

4.17.4 A summary of effects on important ecological features is presented in Table 4.18, for the construction stage, and Table 4.19 for the operational and decommissioning stages and cumulative effects. Note that all important ecological features identified in Section 4.8 have been included, which includes several features which are unlikely to be affected by the onshore elements of VE.

Table 4.18: Summary of effects: construction stage

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
Hamford Water SAC, SPA, Ramsar, SSSI and NNR	Qualifying bird species – permanent loss of up to 5.88 ha of arable habitat at the OnSS outside the designated site. Qualifying bird species – temporary loss of arable and inter-tidal habitat outside the designated site. Qualifying bird species – noise and visual disturbance. Fisher's estuarine moth – habitat loss. Fisher's estuarine moth – lighting disturbance.	A range of embedded mitigation measures to reduce disturbance to non-breeding birds are proposed including: employment of an ECOW; screening/ fencing of HDD pits and other working areas at the landfall during the winter period (if required, depending on the final design); temporary screening during potentially disturbing construction works along the ECC in the winter; restrictions on piling during the winter period; and, if necessary, suspension of works at the landfall during periods of prolonged cold weather. Embedded mitigation measures for Fisher's estuarine moth include: pre-construction checks for its foodplant (hog's fennel) during the season prior to work commencing; and if a plant(s) is located and cannot	Unlikely to be significant.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		be retained in situ, translocation and/ or propagation.	
Stour and Orwell Estuaries SPA and Ramsar	Qualifying bird species – permanent loss of up to 5.88 ha of arable habitat at the OnSS outside the designated site. Qualifying bird species – temporary loss of arable and inter-tidal habitat outside the designated site. Qualifying bird species – noise and visual disturbance.	A range of embedded mitigation measures to reduce disturbance to non-breeding birds are proposed including: employment of an ECOW; screening/ fencing of HDD pits and other working areas at the landfall during the winter period (if required, depending on the final design); temporary screening during potentially disturbing construction works along the ECC in the winter; restrictions on piling during the winter period; and, if necessary, suspension of works at the landfall during periods of prolonged cold weather.	Unlikely to be significant.
Colne Estuary (Mid-Essex Coast Phase 2) SPA and Ramsar	Qualifying bird species – permanent loss of up to 5.88 ha of arable habitat at the OnSS outside the designated site.	A range of embedded mitigation measures to reduce disturbance to non-breeding birds are proposed including: employment of an ECOW; screening/ fencing of HDD pits and other working areas at the	Unlikely to be significant.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
	Qualifying bird species – temporary loss of arable and inter-tidal habitat outside the designated site. Qualifying bird species – noise and visual disturbance.	landfall during the winter period (if required, depending on the final design); temporary screening during potentially disturbing construction works along the ECC in the winter; restrictions on piling during the winter period; and, if necessary, suspension of works at the landfall during periods of prolonged cold weather.	
Abberton Reservoir SPA Ramsar SSSI	Qualifying bird species – habitat loss. No significant effects likely due to avoidance of habitats used by qualifying species (i.e. waterbodies). Qualifying bird species – noise and visual disturbance.	A range of embedded mitigation measures to reduce disturbance to non-breeding birds are proposed including: employment of an ECOW; screening/ fencing of HDD pits and other working areas at the landfall during the winter period (if required, depending on the final design); temporary screening during potentially disturbing construction works along the ECC in the winter; restrictions on piling during the winter period; and, if necessary, suspension of works at the	Unlikely to be significant.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		landfall during periods of prolonged cold weather.	
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA Ramsar	Qualifying bird species – no significant effects likely due to intervening distance and lack of records of qualifying species within relevant parts of the study area.	n/a	Unlikely to be significant.
Holland Haven Marshes SSSI LNR	Qualifying bird species – permanent loss of 0.24 ha of arable habitat outside the designated site. Qualifying bird species – temporary loss of arable and inter-tidal habitat outside the designated site. Qualifying bird species – noise and visual disturbance. Habitat and other species – effects on water quality/ quantity. Habitats and other species – Lighting disturbance. Habitats and other species – air quality changes.	Direct impacts will be avoided by use of HDD. A range of embedded mitigation measures to reduce disturbance to breeding and non-breeding birds are proposed including: employment of an ECOW; surveys for sensitive species prior to and during construction (as required) and implementation of disturbance-free buffer zones around active nests; screening/ fencing of HDD pits and other working areas at the landfall (if required, depending on the final design); temporary screening during potentially disturbing construction works along the	Unlikely to be significant.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		ECC in the winter; restrictions on piling during the winter period (and during the breeding season, if required, depending on the final design); and, if necessary, suspension of works at the landfall during periods of prolonged cold weather. The draft CoCP (Volume 7, Report 3) sets out pollution control principles which would be implemented by the project during construction.	
LoWS within or directly adjacent to the RLB, including: > Simon's Wood; > Great Holland Pits; and > Thorpe Green	Habitat loss (Simon's Wood LoWS only). Changes to air quality or hydrology.	Habitat loss impacts to Simon's Wood LoWS will be avoided via micrositing and/ or alternative means of traffic management during construction The draft CoCP (Volume 7, Report 3) sets out pollution control principles which would be implemented by the project during construction.	No significant impacts.
LoWs within 200m of the RLB, including	Changes to air quality or hydrology.	The draft CoCP (Volume 7, Report 3) sets out pollution control principles which would	No significant impacts.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
> Little Bromley Churchyard; > Manning Grove; and > Upper Holland Brook.		be implemented by the project during construction.	
Hedgerows	Permanent habitat loss (OnSS), depending on detailed design. Temporary habitat loss (onshore ECC).	Replanting/ reinstatement with a species-rich, locally appropriate native mixture including heavy standard trees at a 3:1 ratio for any lost. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5).	Likely to be significant at a local level in short term. Not significant in mid-long term once proposed mitigation has matured.
Arable margins	Permanent habitat loss (OnSS), depending on detailed design. Temporary habitat loss (onshore ECC).	Creation and maintenance of equivalent areas within the RLB during construction, via changes to existing cropping regime/ management and/ or sowing of appropriate seed mixture.	Not significant.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles).	
Lowland meadow	Permanent habitat loss (OnSS), depending on detailed design. Temporary habitat loss (onshore ECC).	Salvage of turves and reinstatement following construction. Additional seeding with a species-rich, locally appropriate native mixture (only if required for successful re-establishment). Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles).	Potentially significant at a local level in the medium term. Not significant in mid-long term once proposed mitigation/ compensation has matured.
ASNW and PAWS	No impacts anticipated.	n/a	No impacts anticipated.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
Woodland (excluding ASNW and PAWS) and mature trees	Permanent habitat loss (OnSS), depending on detailed design. Temporary habitat loss (onshore ECC).	Replanting/ reinstatement with a locally appropriate native mixture. Compensation via replanting of at least an equivalent amount, at locations aimed to link in and widen existing woodland, hedgerow and scrub network. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles).	Potentially significant at a local level in the medium term. Not significant in long term once proposed mitigation/ compensation has matured and become established.
Reedbeds	No impacts anticipated	n/a	No impacts anticipated
Coastal and floodplain grazing marsh	Temporary habitat loss (onshore ECC).	The area that may be affected is subject to periodic agricultural disturbance via ploughing or reseeding as part of normal farming practice. Vegetation within several ditches will also be subject to temporary loss, however all ditches are likely to be subject	Not significant.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		to similar disturbance already during regular maintenance. Reinstatement would occur following construction.	
Coastal saltmarsh	No impacts anticipated.	m/a	No impacts anticipated.
Ponds	Temporary habitat loss affecting two ponds (onshore ECC).	Reinstatement following construction. Additional planting only if required for successful re-establishment of aquatic species (to minimise biosecurity risks).	Not significant.
Rivers	No impacts anticipated.	n/a	No impacts anticipated.
Notable plant species (S41 and/ or red data book plant species associated with coastal habitats, arable margins and other S41 habitats).	Temporary loss of arable margin, lowland meadow, hedgerow, woodland, coastal and floodplain grazing marsh habitats supporting important plant species. Permanent loss of arable margin, lowland meadow, hedgerow and	Salvage of populations and reinstatement following construction. Exact method dependent on the species and habitat concerned, but may include seed saving and propagation, turf translocation, or	Potentially significant at a local level in the short term. Not significant in medium to long term once habitats and species are reinstated and mitigation/

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
	woodland habitats supporting important plant species at the OnSS.	translocation of individual plants. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles).	compensation has established.
Invasive non-native plant species	Possible spread of INNS via disturbance to existing INNS populations within the construction footprint, inadvertently importing INNS from elsewhere, primarily on vehicles, but also other equipment or personnel and via seeds, planting stock or planting substrate.	Implementation of INNS control measures as detailed in the draft CoCP (Volume 7, Report 3: Draft Code of Construction Practice).	Not significant.
Invertebrates (using coastal habitat but also the Holland Brook and other S41 habitats).	Temporary loss of lowland meadow, hedgerow, woodland, coastal and floodplain grazing marsh habitats potentially supporting important invertebrate species. Permanent loss of habitat associated with construction of the OnSS, potentially including lowland meadow, hedgerow and woodland habitats	Reinstatement of habitat after construction, and creation of compensatory habitat for permanent habitat loss at the OnSS. Lighting for construction will be the minimised to the lowest safe level, and designed such that there will be no significant	Potentially significant at a local level in the short term. Not significant in medium to long term once habitats are reinstated and mitigation/ compensation has established.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
	supporting important invertebrate species. Disturbance due to lighting or changes to hydrology during construction.	increase in illumination levels above current levels. The draft CoCP (Volume 7, Report 3: Draft Code of Construction Practice) sets out pollution control principles which would be implemented by the project during construction. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5).	
GCN and common toad	There are no GCN populations within 250m of the substation search areas therefore no anticipated impacts as a result of permanent habitat loss. Temporary loss of one pond which is within the theoretical range of one GCN metapopulation, but which has no record of GCN presence. Temporary loss of terrestrial habitats directly adjacent to GCN breeding ponds also potentially used by common toad and other amphibians.	GCN EPSL may be required from NE (“standard” or DLL may be considered). Compensation for temporary pond loss and terrestrial habitat loss in advance. Scheduling of certain work to avoid sensitive periods of the GCN and common toad life cycle. Removal of GCN and common toads from areas where there is	No significant effect is likely following the implementation of mitigation and compensation measures.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
	Temporary habitat fragmentation/isolation, resulting in functional loss of terrestrial habitat and breeding ponds. Accidental killing and injury. Accidental pollution to breeding ponds from diffuse or point sources associated with construction.	risk of injury or death in advance, plus other precautionary measures. The draft CoCP (Volume 7, Report 3: Draft Code of Construction Practice) sets out pollution control principles which would be implemented by the project during construction.	
Reptiles	Permanent habitat loss for the OnSS, temporary habitat loss and temporary habitat fragmentation/ isolation elsewhere. Accidental killing and injury. The project is not predicted to significantly adversely affect the local population due to the relatively poor quality of the majority of habitat affected and the low population anticipated to be present. However, in view of the species' legal protection mitigation measures are proposed.	Mitigation for GCN will also reduce risks to reptiles. Reasonable avoidance measures would be used, where necessary, to reduce the risk of committing an offence under the protecting legislation.	No significant effect is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures, if required).
Breeding Birds (excluding qualifying or notified features for designated sites)	Permanent loss of up to 5.88 ha of arable, hedgerow and possibly woodland and lowland meadow	A range of embedded mitigation measures relating to breeding birds are proposed including: employment of an	No significant effect is likely. This conclusion will be confirmed in the ES following reporting of

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
	habitat at the OnSS and 0.24 ha of arable habitat at the landfall. Temporary loss of arable, grassland, hedgerow, woodland and intertidal habitats. Noise and visual disturbance. Inadvertent destruction or damage to active nests.	ECOW; measures to avoid damage to active nests; surveys for important species prior to and during construction; disturbance-free buffer zones around active nests of important species; screening/ fencing of HDD pits and other working areas at the landfall during the bird breeding season (if required, depending on the final design); and restrictions on piling during the breeding season if the southern landfall option is used.	further surveys and provision of more detailed design information.
Non-Breeding Birds (excluding qualifying or notified features for designated sites)	Permanent loss of up to 5.88 ha of agricultural habitat at the OnSS and 0.24 ha of agricultural habitat at the landfall potentially used by peregrine and corn bunting. Temporary loss of arable, grassland, hedgerow, woodland and intertidal habitats potentially used by European white-fronted goose, golden plover, marsh harrier, peregrine and corn bunting.	A range of embedded mitigation measures relating to non-breeding birds are proposed including: employment of an ECOW; screening/ fencing of HDD pits and other working areas at the landfall during the winter period (if required, depending on the final design); temporary screening during potentially disturbing construction works	No significant effect is likely. This conclusion will be confirmed in the ES following completion of further surveys and provision of more detailed design information.

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
	Noise and visual disturbance.	along the ECC in the winter restrictions on piling during the winter period; and, if necessary, suspension of works during periods of prolonged cold weather. Further details are provided in Table 4.11 and in Volume 7, Chapter 3: Draft Code of Construction Practice.	
Bats	Loss of potential roost features in trees along the onshore ECC and at the OnSS. Permanent loss of flight lines and foraging habitat at the OnSS. Temporary fragmentation of hedgerow flight lines and temporary loss of foraging habitat elsewhere along the onshore ECC.	Compensation installed for every moderate or high potential or confirmed roost feature prior to loss; to include bat boxes on retained trees or installed poles, re-use of whole felled trunks by setting vertically as monoliths and/ or veteranisation, as appropriate. NE EPSL obtained in advance if any roost trees are affected. Temporary hedgerow gaps to be filled with “dead hedge” until such time as reinstated vegetation has established and is at least 1 m tall.	No significant effect is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures).

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		Replanting/ reinstatement of hedgerows and trees with a species-rich, locally appropriate native mixture including heavy standard trees at a 3:1 ratio for any lost. Indicative details illustrating how compensation habitat could be incorporated in the vicinity of the OnSS are shown in the LEDPP (Volume 7, Report 5: Landscape and Ecology Design Principles).	
Badger	Temporary loss and fragmentation of foraging habitat along the onshore ECC, permanent loss of foraging habitat at the OnSS. Accidental killing and injury.	Reasonable avoidance measures would be used to reduce the risk of committing an offence under the protecting legislation. These may include micrositing certain elements and/ or installing protective fencing to minimize disturbance to retained setts, ensuring excavations remain closed overnight or contain ramps such that badgers cannot become trapped and ensuring	No significant effect is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures).

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		stockpiled soil is fenced or regularly disturbed so as to deter badger sett creation within it.	
Otter	Based on desk study data and the lack of suitable habitat likely to be affected, it is considered possible but unlikely for the project to directly impact otter holt(s). Temporary loss and fragmentation of foraging habitat/ routes. Accidental killing and injury.	Reasonable avoidance measures would be used to reduce the risk of committing an offence under the protecting legislation. These would be broadly similar to those described for badger (above).	No significant effect is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures).
Water Vole (if present in water courses to be crossed)	Based on desk study data and the lack of suitable habitat likely to be affected, it is considered possible but unlikely for the project to directly impact water vole burrows(s). Temporary loss and fragmentation of foraging habitat/routes. Accidental killing and injury.	Micrositing to avoid burrows. Mitigation for habitat loss in advance; this may involve relaxation of bankside cutting/ grazing regimes or alterations to main river maintenance schedules. Scheduling of work to avoid sensitive periods of the water vole life cycle.	No significant effect is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures, if required).

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		Deterrence, or if necessary, removal of water vole from areas where there is risk of injury or death in advance. Reinstatement of bankside habitats immediately after work, to include sowing with species rich locally appropriate sward and fencing to prevent stock access.	
Dormouse (if present in hedges to be breached)	Potential for the project to directly impact dormouse nests. Temporary loss of foraging and sheltering habitat, permanent loss if dormice are present at the OnSS area. Temporary fragmentation of foraging areas/ routes. Accidental killing and injury.	An NE EPSL may be necessary depending on the nature of any impact. Mitigation for temporary or permanent habitat loss in advance; this would involve advance planting of food source species and would be combined with hedgerow mitigation already described. Scheduling of work to avoid sensitive periods of the dormouse life cycle (i.e. hibernation and breeding). Deterrence, or if necessary, removal of dormouse from	No significant effect is likely (to be confirmed following analysis and reporting of surveys, provision of more detailed design information and further development of mitigation/ compensation measures, if required).

Description of impact	Effect	Additional Mitigation Measures	Residual Effect
		areas where there is risk of injury or death in advance. Reinstatement of hedgerow habitats immediately after work, as already described.	
Other S41 Mammal Species: hedgehog, harvest mouse and brown hare.	Temporary loss of foraging and sheltering habitat, permanent loss if present at the OnSS. Temporary fragmentation of foraging areas/ routes. Accidental killing and injury.	Reasonable avoidance measures would be used to minimize impacts.	Not likely to be significant.

Table 4.19 Summary of effects: operation, decommissioning and cumulative

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
Operation			
All important ecological features	Disturbance or damage to features due to planned maintenance at the OnSS and along the ECC. Disturbance or damage to features due to operational noise and lighting at the OnSS.	Preparation of a LEMP which would include specific measures to avoid potential impacts to protected/ notable	Not likely to be significant (to be confirmed following completion of surveys and development of any necessary

Important ecological feature	Potential impacts	Preliminary mitigation/ compensation	Significance of residual effect
	Disturbance or damage to features due to unplanned maintenance on the ECC.	species or sensitive habitats. Unplanned maintenance would be subject to any necessary consents and consultation with the relevant nature conservation bodies prior to work taking place.	mitigation/ compensation measures).
Decommissioning			
All important ecological features	Similar to construction, but in most cases impact magnitude will be much lower than during construction.	Similar to construction, where necessary.	Not likely to be significant.
Cumulative			
All important ecological features	Permanent and temporary habitat loss, Impacts upon protected or notable species or upon their resting or breeding sites. Habitat fragmentation and species isolation. Spread of INNS. Accidental pollution.	n/a	Not considered significant on the basis of baseline surveys completed to date and identified cumulative sites. To be reviewed and confirmed in the ES.

4.18 NEXT STEPS

4.18.1 The following steps will be undertaken to progress the onshore biodiversity and nature conservation assessment from PEIR stage to DCO Application stage:

- Ongoing ecological baseline surveys will be completed, analysed and reported in the ES that will accompany the DCO application;
- Once ongoing baseline surveys have been completed and more detailed project design information is available, the assessment undertaken in this chapter will be reviewed and updated as necessary. Updated proposals for mitigation and compensation, along with proposals for biodiversity enhancement, will be developed based on the results of the assessment and will be presented within the ES that will accompany the DCO application. These will include woodland and hedgerow planting proposals and will seek to address the requirement to promote coherent, resilient ecological networks that form part of the wider green infrastructure network;
- The outline principles for mitigation and compensation, along with proposals for biodiversity enhancement presented at Volume 7, Report 5: Landscape and Ecology Design Principles in the LEDPP will be developed into an Outline LEMP that will be presented within the ES that will accompany the DCO application;
- Consultation with relevant consultees (including those that have not yet been contacted) will continue through the evidence plan process; and
- A BNG assessment will be undertaken and will be presented within the ES that will accompany the DCO application. A BNG approach note has been prepared for PEIR Volume 5, Annex 4.14: Delivering Onshore Biodiversity Net Gain: Proposed Approach.

4.19 REFERENCES

Action for the Wild website https://www.actionforthewild.org/fishers-estuarine-moth/ accessed on 12 2022.

Baker, J. Hoskin, R. and Butterworth, T (2019) Biodiversity net gain. Good practice principles for development. CIRIA.

Bat Conservation Trust and Institute of Lighting Professionals (2018). Guidance Note 08/18 Bats and artificial lighting in the UK.

Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

Bright, P., Morris, P. and Mitchell-Jones, T (2006) The Dormouse Conservation Handbook Second Edition. English Nature.

British Standard (BS) (2013) BS42020:2013 'Biodiversity: Code of practice for planning and development'

Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). 'The UK Habitat Classification User Manual Version 1.1' at http://www.ukhab.org/

Chartered Institute of Ecology and Environmental Management (CIEEM) (2017). 'Guidelines for Preliminary Ecological Appraisal', 2nd edition, Winchester.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2022). 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2'. Chartered Institute of Ecology and Environmental Management, Winchester.

CIRIA (2001) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532)

CIRIA (2015) SuDS Manual (C753)

Colchester Zoo (2022) Zoolife Magazine Issue 3 online at https://issuu.com/colchesterzoo1/docs/zoolife_issue3 accessed 12 2022.

Cutts, N., Hemingway, K. and Spencer, J. (2013). Waterbird Disturbance Mitigation Toolkit. Information for Estuarine Planning and Coastal Projects. Produced by Institute of Estuarine and Coastal Studies (IECS), University of Hull. Available at: https://tide-toolbox.eu/tidetools/waterbird_disturbance_mitigation_toolkit/

DBEIS (2021a) Draft Overarching National Policy Statement for Energy (EN-1)

DBEIS (2021b) Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)

DBEIS (2021c) Draft National Policy Statement for Electricity Networks Infrastructure (EN5)

Drewitt, A.L., Whitehead, S. and Cohen, S. 2020. Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 17 Birds (version 1.1). Joint Nature Conservation Committee, Peterborough.

Eaton, M. Aebischer, N. Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. & Gregor, R. (2015) Birds of conservation concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108: 708-746

English Nature (2001) Great Crested Newt Mitigation Guidelines, English Nature.

Frost, T.M., Calbrade, N.A., Birtles, G.A., Hall, C., Robinson, A.E., Wotton, S.R., Balmer, D.E. and Austin, G.E. 2021. Waterbirds in the UK 2019/20: The Wetland Bird Survey. BTO/RSPB/JNCC. Thetford.

Gillings, S., Fuller, R.J. and Sutherland, W.J. (2007). Winter field use and habitat selection by Eurasian Golden Plovers *Pluvialis apricaria* and Northern Lapwings *Vanellus vanellus* on arable farmland. Ibis. 149: 509-520.

Goodship, N.M. and Furness, R.W. 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from MacArthur Green to NatureScot.

IUCN (2012a) Guidelines for Application of IUCN Red List Criteria at Regional and National Levels. Version 4.0. IUCN, Gland.

IUCN (2012b) IUCN Red List Categories and Criteria. Version 3.1. Second edition. IUCN, Gland.

IUCN (2016) Guidelines for Appropriate Uses of IUCN Red List Data. Version 3.0. Adopted by the IUCN Red List Committee.

IUCN (2019) Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Subcommittee.

Joint Nature Conservation Committee (2019) Scheme to reduce disturbance to waterfowl during severe winter weather. https://jncc.gov.uk/our-work/severe-weather-scheme/

Maddock, A. (ed) (2011) UK Biodiversity Action Plan Priority Habitat Descriptions available on the JNCC website at https://data.jncc.gov.uk/data/2728792c-c8c6-4b8c-9ccd-a908cb0f1432/UKBAP-PriorityHabitatDescriptions-Rev-2011.pdf

McKay, H. V., Milsom, T. P., Feare, C. J., Ennis, D. C., O'Connell, D. P. & Haskell, D. J. (2001). Selection of forage species and the creation of alternative feeding areas for Dark-bellied Brent Geese *Branta bernicla bernicla* in southern UK coastal areas. Agriculture, Ecosystems and Environment 84: 99-113.

Natural England (2001) Great Crested Newt Mitigation Guidelines.

PINS (2021) Scoping Opinion: Proposed Five Estuaries Offshore Wind Farm Case Reference EN010115

Stanbury A., Eaton M.A., Aebischer N.J., Balmer D., Brown A., Douse A., Lindley P., McCulloch N. and Win I. (2021). The Status of our Bird Populations: the Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and Second IUCN Red List Assessment of Extinction Risk for Great Britain. British Birds 114, 723–747.

Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. British Birds 113: 69–104.

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