Hornsea Project Four: Preliminary Environmental Information Report (PEIR)

Volume 3, Chapter 5: Historic Environment

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Glossary

Term	Definition
Commitment	A term used interchangeably with mitigation. Commitments are Embedded Mitigation Measures. Commitments are either Primary (Design) or Tertiary (Inherent) and embedded within the assessment at the relevant point in the EIA (e.g. at Scoping or PEIR). The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSE's), in EIA terms.
Cumulative effects	The combined effect of Hornsea Four in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Project Four.
Design Envelope	A description of the range of possible elements that make up the Hornsea Project Four design options under consideration, as set out in detail in the project description. This envelope is used to define Hornsea Project Four for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement.
EIA Directive	European Union Directive 85/337/EEC, as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and then codified by Directive 2011/92/EU of 13 December 2011 (as amended in 2014 by Directive 2014/52/EU).
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
Haul Road	The track along the onshore ECC which the construction traffic would use to access work fronts.

Term	Definition
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four offshore wind farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Key Heritage Asset	These are heritage assets identified through the baseline data collation which are considered sensitive to an impact arising from the construction, operation and maintenance or decommissioning of Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound.
Locally listed building	These are buildings which are considered of local heritage significance, but do not meet the criteria for being nationally listed. They are taken account of during any planning process.
Maximum design scenario	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
Mitigation	A term used interchangeably with Commitment(s) by Hornsea Four. Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping or PEIR).
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.
Onshore export cables	Cables connecting the landfall first to the onshore substation and then on to the NGET substation at Creyke Beck.
Onshore substation (OnSS)	Located as close as practical to the NGET substation at Creyke Beck and will include all necessary electrical plant to meet the requirements of the National Grid.
Orsted Hornsea Project Four Ltd.	The Applicant of proposed Hornsea Project Four offshore wind farm.
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Trenchless Techniques	Also referred to as trenchless crossing techniques or trenchless methods. These techniques include HDD, thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

Acronyms

Acronym	Definition
CITiZAN	Coastal and Intertidal Zone Archaeological Network
DBA	Desk-Based Assessment
DCO	Development Consent Order
ERYC	East Riding of Yorkshire Council
EIA	Environmental Impact Assessment
ES	Environmental Statement
HAP	Humber Archaeological Partnership
HHER	Humber Historic Environment Record
HLC	Historic Landscape Characterisation
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NE	Natural England
NHLE	National Heritage List for England
NGET	National Grid Electricity Transmission
NMP	National Mapping Programme
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OnSS	Onshore Substation
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
SoCC	Statement of Community Consultation
SoS	Secretary of State
TCE	The Crown Estate
TJB	Transition Joint Bay
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

5.1 Introduction

5.1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the results of the Environmental Impact Assessment (EIA) undertaken to date for the potential impacts of the Hornsea Project Four offshore wind farm (hereafter Hornsea Four) on the historic environment. Specifically, this chapter considers the potential impact of Hornsea Four landward of Mean Low Water Springs (MLWS) during its construction, operation and maintenance, and decommissioning phases. **Volume 2, Chapter 10: Marine Archaeology** presents the potential impacts on the offshore heritage resource seaward of Mean High Water Springs (MHWS).

5.1.1.2 Orsted Hornsea Project Four Limited (the Applicant) is proposing to develop Hornsea Four which will be located approximately 65 km from the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone (please see **Volume 1, Chapter 1: Introduction** for further details on the former Hornsea Zone). Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network (please see **Volume 1, Chapter 4: Project Description** for full details on the Project Design).

5.1.1.3 This chapter summarises information contained within **Volume 6, Annex 5.1: Historic Environment Desk Based Assessment** (DBA) and further baseline data from an interim Aerial Photographic and Lidar Assessment, initial results of a Priority Archaeological Geophysical Survey and a Geoarchaeological DBA (**Volume 6, Annexes 5.2, 5.3** and **5.4**, respectively).

5.2 Purpose

5.2.1.1 This PEIR presents the preliminary environmental information for Hornsea Four and sets out the findings of the EIA to date to support the pre- Development Consent Order (DCO) application consultation activities required under the Planning Act 2008.

5.2.1.2 The feedback from this consultation will be used to inform the final project design where appropriate and the associated EIA (which will be reported in an Environmental Statement (ES)) that will accompany the DCO application to PINS.

5.2.1.3 This PEIR chapter:

- Presents the existing historic environment baseline established from desk studies and non-intrusive field surveys undertaken to date, and consultation;
- Presents commitments identified for Hornsea Four which avoid or minimise harm to the historic environment;

- Presents the potential impacts and effects on the historic environment arising from the onshore elements of Hornsea Four, based on the information gathered and the analysis and assessments undertaken to date;
- Identifies any assumptions and limitations encountered in compiling the historic environment baseline information; and
- Highlights any necessary intrusive evaluation, monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible impacts and effects identified in the EIA process.

5.3 Planning and Policy Context

5.3.1.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to the historic environment, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a), the NPS for Renewable Energy Infrastructure (EN-3, DECC, 2011b) and the NPS for Electricity Networks Infrastructure (EN-5, DECC, 2011c).

5.3.1.2 The Infrastructure Planning (Decisions) Regulations 2010 (Regulation 3) also states the SoS is to hold regard to the desirability of preserving a Listed Building, Conversation Area or Scheduled Monument, its setting, or any features of special architectural or historic interest, and also for preserving or enhancing the character of the asset.

5.3.1.3 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, updated 2019) forms the basis for the Government's planning policy direction. It gives protection to designated and non-designated heritage assets. Provision for the historic environment is detailed within. Section 16: Conserving and Enhancing the Historic Environment.

5.3.1.4 The East Riding Local Plan (East Riding of Yorkshire Council (ERYC) 2016) details the direction that ERYC wish to take in their planning decisions, up to 2029. Section 8, Policy ENV3 of the local plan describes how local planning decisions will consider the historic environment and protect, preserve and enhance it.

5.3.1.5 Full details of legislation, policy and guidance (inclusive of local policy) relevant to the historic environment is included in **Volume 6, Annex 5.1: Historic Environment Desk-Based Assessment**.

5.3.1.6 NPS EN-1 and NPS EN-3 include guidance on what matters are to be considered in the assessment. These are summarised in **Table 5.1**.

Table 5.1: Summary of NPS EN-1, EN-3 and EN-5 provisions relevant to the historic environment.

Summary of NPS EN-1, NPS EN-3 and NPS EN-5 provisions	How and where considered in the PEIR
"*As part of the ES the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset*" (EN-1 paragraph 5.8.8).	A description of the significance of the heritage assets affected by the development and a detailed heritage settings assessment has been undertaken, the first stages of which are detailed in **Volume 6: Annex 5.1: Historic Environment Desk Based Assessment**. This assessment identifies heritage assets where there is potential for their heritage significance to be harmed through alteration to their setting as a result of Hornsea Four, and includes preliminary statements summarising the heritage significance of the affected heritage assets, focussing on the contribution made by their setting. This assessment is proportionate and informs the baseline presented within **Section 5.7.5** and **5.7.9**.
"*As a minimum the applicant should have consulted the relevant Historic Environment Record (or, where the development is in English or Welsh waters, English Heritage or Cadw) and assessed the heritage assets themselves using expertise where necessary according to the proposed development's impact*" (EN-1 paragraph 5.8.6).	A search of the Humber Historic Environment Record (HHER) has been undertaken, the data of which forms part of the baseline data consulted for this assessment. All HHER data is included in gazetteers in **Volume 6 Annex 5.1 Historic Environment Desk Based Assessment**. This data set has been used to inform the impact assessment, undertaken by Historic Environment experts.
"*Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation.* *Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact*". (EN-1 paragraph 5.8.9).	**Volume 6: Annex 5.1: Historic Environment Desk Based Assessment** informs this PEIR chapter and included a walkover survey to confirm the location of known heritage assets and to examine other features of possible archaeological interest (e.g. those identified as surviving earthworks in existing data). The DBA also includes a setting assessment which has been progressed using available landscape and visual impact assessment tools-kits (e.g. Zones of Theoretical Visibility (ZTVs) and visualisations). The DBA both informs and is summarised within **Section 5.7**, as relevant. In addition, a priority archaeological geophysical survey is currently underway to gather information to establish the presence / absence, character and extent of any archaeological remains within the landfall, onshore ECC and OnSS, to inform this chapter (**Section 5.7.7**) and identify any, as yet, unknown heritage assets with archaeological interest. Similarly, an Aerial Photographic and Lidar Assessment (**Volume 6: Annex 5.2**) and a geoarchaeological DBA (**Volume 6: Annex 5.4**) have been undertaken during the PEIR stage to

Summary of NPS EN-1, NPS EN-3 and NPS EN-5 provisions	How and where considered in the PEIR
	identify any unrecorded non-designated heritage assets and attempt to add further detail to recorded non-designated assets within the study areas.
"*The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents.*" (EN-1 paragraph 5.8.10).	This PEIR chapter provides an account of the potential impact of the proposed Hornsea Four project upon heritage assets and their significance (**Section 5.11**). This PEIR chapter has been informed by a Historic Environment DBA (see **Volume 6: Annex 5.1**). Work to date includes Aerial Photographic and Lidar Assessment (**Volume 6: Annex 5.2**), geoarchaeological DBA (**Volume 6: Annex 5.4**), walkover survey results and setting assessment. The initial results of a priority archaeological geophysical survey (**Volume 6: Annex 5.3**) have informed this chapter and will ultimately inform the final Environmental Statement (ES) chapter.
"*Consultation with the relevant statutory consultees should be undertaken by the applicants at an early stage of the development.*" (EN-3 paragraph 2.6.140).	Regular consultation has been undertaken and will continue to be undertaken with the Historic Environment consultees through the Technical Panel meetings as part of the Evidence Plan Process (See **Section 5.4** and **Volume 1, Chapter 6: Consultation**).
"*Assessment should be undertaken as set out in Section 5.8 of EN-1. Desk-based studies should take into account any geotechnical or geophysical surveys that have been undertaken to aid the windfarm design.*" (EN-3 paragraph 2.6.141).	The assessment for this PEIR chapter has been undertaken in accordance with section 5.8 of EN-1. It has been informed by a Historic Environment DBA (**Volume 6: Annex 5.1**) and initial results of an Aerial Photographic and Lidar Assessment (**Volume 6: Annex 5.2**). A Geoarchaeological DBA has also been undertaken (**Volume 6: Annex 5.4**), which has also informed the baseline data for this chapter. Initial results of a Priority Archaeological Geophysical Survey (**Volume 6: Annex 5.3**) have also fed into this PEIR, with the remaining aerial photographic and lidar assessment and priority archaeological geophysical surveys to inform the final ES.
"*Developers will be influenced by Schedule 9 to the Electricity Act 1989, which places a duty on all generation, supply, transmission and distribution licence holders, in formulating proposals for new electricity networks infrastructure, to have regard to the desirability of protecting sites, buildings and objects of architectural, historic or archaeological interest*" (EN-5 paragraph 2.2.6).	Designated historic environment receptors have been considered (and avoided, Co2) as part of the route planning and site selection process, outlined in **Volume 1, Chapter 3: Site Selection and Consideration of Alternatives**.

5.3.1.7 NPS EN-1 also highlights several factors relating to the determination of an application and in relation to mitigation measures. These are summarised in **Table 5.2**.

Table 5.2: Summary of NPS EN-1 policy on decision making relevant to the historic environment.

Summary of NPS EN-1 provisions	How and where considered in the PEIR
"*In considering the impact of a proposed development on any heritage assets, the IPC [hereafter referred to as Secretary of State] should take into account the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between conservation of that significance and proposals for development.*" (EN-1 paragraph 5.8.12).	Heritage importance (and associated significance) is identified in line with the methodology set out in **Section 5.10** based on available data. With regards to potential below ground remains (buried archaeology), this data is predominantly non-intrusive in nature and as such, heritage importance (and associated significance) is based on professional judgement and experience, rather than any fully substantiated and established levels of heritage significance, often achieved as part of intrusive ground truthing for instance. On this basis, a precautionary approach to impact assessment has been undertaken whereby heritage assets of an uncertain level of significance have been assigned a 'perceived' level of significance as a worst-case.
"*The Secretary of State should take into account the desirability of sustaining and, where appropriate, enhancing the significance of heritage assets, the contribution of their settings and the positive contribution they can make to sustainable communities and economic vitality. The Secretary of State should take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height, massing, alignment, materials and use. The Secretary of State should have regard to any relevant local authority development plans or local impact report on the proposed development in respect of the factors set out (below):* • *heritage assets having an influence on the character of the environment and an area's sense of place;* • *heritage assets having a potential to be a catalyst for regeneration in an area, particularly through leisure, tourism and economic development;*	In order to assess the positive contributions of the proposed Hornsea Four project in the context of the historic environment, the magnitude of positive impact has also been subject to consideration in this PEIR chapter. The magnitude of positive impact directly relates to the level of public value (e.g. where opportunities exist for the project to enhance the historic environment and / or public understanding by adding to the archaeological record for example). This is discussed further and assessed in **Section 5.11**. Opportunities to minimise harm to the historic environment (e.g. by means of route refinement / micro-siting which seek to avoid heritage assets) will be fully considered and developed as the proposed Hornsea Four project progresses, post-PEIR to ES, with feedback from community and stakeholder consultation taken on-board where appropriate.

Summary of NPS EN-1 provisions	How and where considered in the PEIR
• *heritage assets being a stimulus to inspire new development of imaginative and high quality design;* • *the re-use of existing fabric, minimising waste; and* • *the mixed and flexible patterns of land use in historic areas that are likely to be, and remain, sustainable."* (EN-1 paragraph 5.8.13).	
"*There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost, heritage assets cannot be replaced, and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including Scheduled Monuments; registered battlefields; grade I and II* listed buildings; grade I and II* registered parks and gardens; and World Heritage Sites, should be wholly exceptional.*" (EN-1 paragraph 5.8.14).	The onshore development area avoids physical impacts upon designated heritage assets (e.g. listed buildings / scheduled monuments) (Co2) and as such, no direct physical impacts are anticipated to occur to designated heritage assets (**Section 5.11**). Indirect (non-physical) impacts resulting in change in the setting of heritage assets, including designated and key non-designated assets, are assessed in **Section 5.11**. The heritage setting assessment will be updated between PEIR and ES, whilst findings to date are summarised and reported on in **Section 5.7.5** and **Volume 6: Annex 5.1** respectively. Results to date indicate that impacts upon heritage significance due to change in the setting of heritage assets, from the presence and operation of Hornsea Four, are within the realms of 'less than substantial harm' as a maximum and more commonly result in no material harm to heritage significance.
"*Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the greater the harm to the significance of the heritage asset the greater the justification will be needed for any loss. Where the application will lead to substantial harm to or total loss of significance of a designated heritage asset the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm to or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm.*" (EN-1 paragraph 5.8.15).	Hornsea Four will avoid physical impacts upon designated heritage assets (e.g. listed buildings / scheduled monuments) (Co2) and as such, no direct physical impacts are anticipated to occur to designated heritage assets (**Section 5.11**).
"*Not all elements of a World Heritage Site or Conservation Area will necessarily contribute to its significance. The policies set out in paragraphs*	The significance of Conservation Areas and those elements of a Conservation Area which contribute to its significance has been considered as part of the

Summary of NPS EN-1 provisions	How and where considered in the PEIR
5.8.11 to 5.8.15 (see above) apply to those elements that do contribute to the significance. When considering proposals, the decisionmaker should take into account the relative significance of the element affected and its contribution to the significance of the World Heritage Site or Conservation Area as a whole" (EN-1 paragraph 5.8.16)	setting assessment (**Volume 6, Annex 5.1: Historic Environment DBA**). This information has then been used to inform the impact assessment in **Section 5.11** to identify how the significance may be affected.
"*Where loss of significance of any heritage asset is justified on the merits of the new development, the IPC [now the Secretary of State] should consider imposing a condition on the consent or requiring the applicant to enter into an obligation that will prevent the loss occurring until it is reasonably certain that the relevant part of the development is to proceed.*" (EN-1 paragraph 5.8.17).	This PEIR chapter has concluded, based on assessments undertaken to date and the Hornsea Four boundary, that Hornsea Four will not result in the loss of significance of (or harm to) any designated heritage assets identified in this chapter (**Section 5.11**). This conclusion has been based on the results of a Historic Environment DBA (**Volume 6: Annex 5.1**) which included site visits and the incorporation and use of landscape and visual impact assessment tool-kits (e.g. ZTVs), to inform the heritage setting assessment. The significance of non-designated heritage assets has to date been established through the Historic Environment DBA (see **Volume 6: Annex 5.1** – including walkover survey results and heritage setting assessment), the interim results of an Aerial Photographic and Lidar Assessment (see **Volume 6: Annex 5.2**), assessment of initial priority archaeological geophysical survey data (see **Volume 6: Annex 5.3**) and a Geoarchaeological DBA (see **Volume 6: Annex 5.4**).
"*When considering applications for development affecting the setting of a designated heritage asset, the IPC [now the Planning Inspectorate and the Secretary of State] should treat favourably applications that preserve those elements of the setting that make a positive contribution to, or better reveal the significance of, the asset. When considering applications that do not do this, the IPC [now the Planning Inspectorate and the Secretary of State] should weigh any negative effects against the wider benefits of the application. The greater the negative impact on the significance of the designated heritage asset, the greater the benefits that will be needed to justify approval.*" (EN-1 paragraph 5.8.18).	Findings to date (and summarised / reported on in **Section 5.7** and detailed in **Volume 6: Annex 5.1**) indicate that impacts upon heritage significance resulting from change in the setting of heritage assets, as a result of Hornsea Four, are within the realms of 'less than substantial harm' as a maximum and more commonly result in no material harm to heritage significance.

5.4 Consultation

5.4.1.1 Consultation is a key part of the DCO application process. Consultation regarding the Historic Environment to date has been conducted through Technical Panel meetings, email correspondence and the Scoping Report (Ørsted, 2018). An overview of the project consultation process is presented within **Chapter 6: Consultation**.

5.4.1.2 The Technical Panel for the historic environment onshore consists of representatives from Hornsea Four, the heritage specialist from Royal HaskoningDHV, Historic England's Inspector of Ancient Monuments for Hull and East Riding of Yorkshire, the Principal Archaeologist at Humber Archaeological Partnership (HAP) (archaeological advisors to East Riding of Yorkshire Council), the East Riding of Yorkshire Council's Conservation Officer and Planning Officer.

5.4.1.3 A summary of the key issues raised during consultation specific to the historic environment is outlined below in **Table 5.3** together with how these issues have been considered in the production of this PEIR.

Table 5.3: Consultation Responses.

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
Technical Panel (Mr K. Emerick, Historic England)	11/09/18 Historic Environment Technical Panel Meeting 1	Many prehistoric non-designated heritage assets are within the region which are considered of national significance. Prehistoric land surfaces have been identified underneath medieval layers within Holderness.	Desk-based review of geotechnical and geoarchaeological data has been undertaken to inform this PEIR, in the form of the Geoarchaeological DBA (**Volume 6: Annex 5.4**). Known non-designated heritage assets have also been identified through baseline data collation and walkover survey, whilst priority archaeological geophysical survey is ongoing.
Technical Panel (Mr K. Emerick, Historic England)	11/09/18 Historic Environment Technical Panel Meeting 1	Relevance of geoarchaeological studies: Work in this area is important in determining potential for as-yet unknown buried archaeology and geoarchaeology along the route. Understanding of geology and soils along the route is of importance.	Desk-based review of geotechnical and geoarchaeological data has been undertaken to inform this PEIR, in the form of the Geoarchaeological DBA (**Volume 6: Annex 5.4**). The assessment has identified areas of geoarchaeological potential.
Technical Panel (Mr K. Emerick, Historic England)	11/09/18 Historic Environment	World War II anti-invasion defences along the coast should be	World War II heritage assets were recorded as part of the baseline collation and considered as part of

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
	Technical Panel Meeting 1	considered for direct or indirect impacts.	the setting assessment and brought through to impact assessment (Section 5.11).
PINS	November 2018 Scoping Opinion	Direct impacts on designated heritage assets: Construction & Decommissioning phase. "*From the information in the Scoping Report and Annex I it remains uncertain that all designated assets have been identified and can be avoided. In light of this, the Inspectorate considers that significant effects could arise, and therefore cannot agree to scope this matter out. Impacts on designated heritage assets must be assessed in the ES where significant impacts could occur.*"	All designated heritage assets located within the defined Study Areas are presented in the Historic Environment DBA (Volume 6: Annex 5.1). Their locations have informed the project design with the route positioned to ensure designated heritage assets are not directly physically impacted (Co2, see Section 5.8.3 for further details)
PINS	November 2018 Scoping Opinion	Study area - effects on setting. "*It is not clear from Scoping Report why the distances have been chosen. The ES should clearly explain the rationale behind the study areas chosen.*"	Section 5.5 details the Study Areas used for PEIR, as agreed with the Heritage Stakeholders during the Technical Panel meetings. The Study Areas chosen allow for a bespoke approach to assessment, with other heritage assets being drawn in from outside the study areas where necessary to ensure a thorough assessment of potential impacts can be undertaken.
Historic England	November 2018 Scoping Opinion	"*We expect the Environmental Statement to describe the significance of any heritage assets affected, including any contribution made by their setting.*"	Heritage significance and the contribution made by setting is assessed within the Historic Environment DBA (see Volume 6: Annex 5.1). Where impacts are identified, the affected heritage assets have been brought forward for impact assessment in the PEIR (Section 5.11). The heritage setting assessment will be updated between PEIR and ES.
Historic England	November 2018	*"We draw your attention in particular to: Risby Hall Scheduled*	These heritage assets are discussed within the Historic Environment DBA

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
	Scoping Opinion	*Monument, Listed Building and Registered Park and Garden."*	(**Volume 6: Annex 5.1**), including their heritage significance and contribution made by setting, and have been brought through for impact assessment (**Section 5.11**).
Historic England	November 2018 Scoping Opinion	*"Methodologies that can inform the extent of the study area include Visual Impact Assessment and ZTV."*	A ZTV has been produced for the OnSS (**Chapter 4: Landscape and Visual**) and reviewed by the heritage team to ensure heritage assets that may be affected are appropriately considered.
Historic England	November 2018 Scoping Opinion	*"We would also expect the Environmental Statement to consider the potential impacts which the proposals might have upon those heritage assets which are not designated."*	All known non-designated heritage assets are summarised below in **Section 5.7.4**, with potential impacts to non-designated assets presented in the impact assessment (**Section 5.11**).
Historic England	November 2018 Scoping Opinion	*"Consideration should be given to undertaking a practical exercise with either a crane or balloons erected at the height of the proposed structures so that all parties are to better able to understand the landscape impact of the proposals."*	The ZTV and the approach to identifying key heritage assets within the defined Study Areas is considered to be of suitable detail for assessment and a standard approach to assessment of the historic environment (**Section 5.5**).
Historic England	November 2018 Scoping Opinion	*"The assessment should also take account of the potential impact which associated activities (such as construction, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of the heritage assets in the area."*	**Section 5.11** presents assessment of impacts resulting from change in the setting of designated and non-designated heritage assets.
Historic England	November 2018 Scoping Opinion	*"Historic England is generally content with this aspect [onshore historic environment] of the proposed development and considers that the provisions made in the Historic Environment section of the supporting documentation [Scoping Report Section 7.5] are appropriate."*	Noted.
Historic England	November 2018	*"The presence of World War One and World War II archaeology*	This was a principal factor taken into account during the walkover survey

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
	Scoping Opinion	*(specifically anti-invasion remains) is poorly represented in the HER and is likely to survive in greater quantity than is currently anticipated."*	(see **Volume 6: Annex 5.1**). The HER data was found to be quite detailed due to the CITiZAN project which has recorded coastal heritage assets. A summary of these heritage assets is presented in **Section 5.7**.
Historic England	November 2018 Scoping Opinion	*"Recent research has indicated that large areas of the Vale of Holderness are covered by deposits of medieval and modern 'warp' material. The implication of this is that extensive prehistoric land surfaces are likely to remain intact and could be at risk from interventions associated with the insertion of cabling. It would be of benefit to the project that contact was made with Professor Nicky Milner, University of York to discuss the potential for Mesolithic period remains along the route, and to contact Dr Jim Leary, University of Reading, Skipsea Project to discuss the presence of warp deposits along the cable route."*	A Geoarchaeological DBA has been produced (**Volume 6: Annex 5.4**) which has identified areas of high geoarchaeological potential which may require further investigation prior to, or during, construction. These results are summarised in **Section 5.7**. Correspondence was sent to both recommended specialists, however, as yet no response has been received. Any response received post-PEIR will be included as part of the final ES.
Historic England	November 2018 Scoping Opinion	*"The impact of changes in hydrology, which may then have an impact on the significance of designated and non-designated heritage assets has not been given an appropriate level of assessment."*	**Section 5.11** presents the potential direct and indirect impacts to known and potential buried archaeological remains and deposits including the potential for hydrological changes (**paragraph 5.11.2.23**). This is also considered in the Geoarchaeological DBA (**Volume 6, Annex 5.4**).
Historic England	November 2018 Scoping Opinion	*"A greater amount of archaeological evaluation will be required to 'ground truth' the geophysical survey results."*	A programme of Priority Archaeological Geophysical Survey has commenced as part of the pre-application works. Consideration of intrusive archaeological evaluation will be made following the results of the priority archaeological geophysical survey in areas of permanent fixed infrastructure (e.g. OnSS) and engineering 'pinch-points'

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
			along the onshore ECC, post-application.
East Riding of Yorkshire Council (ERYC) (Conservation Officer)	November 2018 Scoping Opinion	*"I have concerns firstly about the lack of identification of non-designated built heritage structures and secondly about the creation of the compound areas referred to in the last bullet of 7.5.4.1 and feel the latter need to be assessed the same as any other affected area and any underlying features avoided or further investigation / recovery archaeology carried out."*	Identification of unrecorded non-designated heritage assets has been undertaken as part of the Historic Environment DBA (**Volume 6: Annex 5.1**). Compounds have been assessed as forming part of the onshore ECC, ensuring they receive the same level of assessment as any other part of the project footprint (**Section 5.11**).
ERYC (Conservation Officer)	November 2018 Scoping Opinion	*"The information on non-designated heritage assets in the form of buildings or standing structures, (see 1 above), is limited and not generally included in the HER within the East Riding. We rely on identification of these at the application stage. Whilst such structures, unless lost or damaged, are unlikely to be impacted on by the cable route, they may be affected by the land fall or sub-station work, along with their settings."*	Identification of unrecorded non-designated heritage assets has been undertaken as part of the Historic Environment DBA (**Volume 6: Annex 5.1**). How Hornsea Four may affect heritage significance as a result of changes to setting has also been considered within the DBA and as part of the impact assessment (**Section 5.11**).
ERYC (Conservation Officer)	November 2018 Scoping Opinion	*"Impact on setting will be limited other than short term, except potentially for the sub-station and possible landfall point. Listed Buildings, Parks and gardens or SAM's with a wider setting or inter-related setting, (such as church towers) are most likely to be affected by above ground structures."*	A setting assessment has been undertaken as part of the Historic Environment DBA (**Volume 6: Annex 5.1**) and potential impacts to heritage significance caused as a result of change in the setting of heritage assets are considered as part of the impact assessment (**Section 5.11**).
ERYC (Conservation Officer)	November 2018 Scoping Opinion	*"Historic mapping can identify the presence of older structures which may be non-designated heritage assets as well as clues to the landscape use and changes over time. Access to the Historic landscape Characterisation Study*	Historic Mapping (map regression) and consideration of other non-designated assets which could be within the study area which hold heritage interest has been undertaken as part of the DBA (**Volume 6: Annex 5.1**).

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
		(HLC) through Humber Archaeology will help with this. Thematic consideration can identify later structures, which may be non-designated heritage assets, WW1 and WW2 assets have been identified and flagged up already, as areas for further investigation. Other examples could be, for example and not exhaustive, Millennium Beacons, War or other memorials not within settlements and not listed, early examples of technological solutions (e.g. concrete bridges, water towers etc).”	
HAP	3 January 2019 Scoping Opinion	*“Recommend that Historic Landscape Characterisation (HLC) data be obtained and incorporated into the Key Sources of Historic Environment Data.”*	The HLC data was obtained and reviewed as part of the Historic Environment DBA (**Volume 6: Annex 5.1**).
HAP	3 January 2019 Scoping Opinion	*“A number of national mapping programmes (NMP) have taken place in East Yorkshire (Hull Valley, RCZA, Yorkshire Wolds, Vale of York and Humberside Aggregates); the data from these will largely have been incorporated into the HER, however, there are instances where sites/crop-marks will not have been assigned an HER record. Therefore, I would recommend that the NMP data be obtained and incorporated.”*	NMP data was reviewed and forms part of the baseline data within the Historic Environment DBA (**Volume 6: Annex 5.1**), and in more detail within the Aerial Photographic and Lidar Assessment (**Volume 6: Annex 5.2**).
Technical Panel (Mr K. Emerick, Historic England)	16/01/19 Historic Environment Technical Panel Meeting 2	The largest area of concern was that surrounding the decision not to undertake any pre-submission archaeological evaluation. The rationale behind this is broadly accepted however, of particular concern is the application of this approach to the OnSS. In reality you have much less 'wiggle room' for this structure and I would recommend that you revise the	Hornsea Four has identified the need for a programme of pre-submission evaluation surveys; a Priority Archaeological Geophysical Survey has commenced (**Volume 6: Annex 5.3**) and will include the OnSS. Following the results of this survey and in combination with the results of the Aerial Photographic and Lidar Assessment (**Volume 6: Annex 5.2**), trial trenching will be considered

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
		approach here to include geophysical survey and archaeological evaluation.	post-application for the OnSS and any other 'pinch-points' along the onshore ECC, if appropriate. The results of the remaining Priority Archaeological Geophysical Survey will inform the ES and ongoing stakeholder consultation.
Technical Panel (Mr S. Devey, ERYC Conservation Officer)	16/01/19 Historic Environment Technical Panel Meeting 2	The council would not have any issues with temporary effects resulting from the onshore ECC but the OnSS area is of greater interest to them, particularly the presence of unlisted historic farmsteads in this area.	Assessment of previously unrecorded historic farmsteads is presented within the Historic Environment DBA (**Volume 6: Annex 5.1**), with cartographic sources consulted and consideration given to historic farmsteads within the OnSS study area during walkover surveys.
Technical Panel (Ms S. Hunt, ERYC Planning Officer)	16/01/19 Historic Environment Technical Panel Meeting 2	A setting assessment from St Mary's Church in Cottingham should be considered.	Setting assessment for St Mary's Church and Cottingham Conservation Area has been undertaken as part of the baseline data collation and assessment of photomontages produced by Landscape Visual Impact Assessment (LVIA) specialists from this location. This can be found in **Chapter 4: Landscape and Visual**.
Email correspondence (Mr K. Emerick, Historic England)	15/03/19 Email correspondence	Historic England confirmed acceptance of the proposed scope of the Priority Archaeological Geophysical Survey.	The results of the Priority Archaeological Geophysical Survey are presented in **Volume 6, Annex 5.3.** Survey work is ongoing.
Technical Panel (Mr J. Goodyear, HAP and Mr S. Devey, ERYC Conservation Officer)	02/04/19 Historic Environment Technical Panel Meeting 3	Stakeholders confirmed the scope of the walkover surveys and Priority Archaeological Geophysical surveys (as presented at the meeting) is agreeable and accepted. No additional specific heritage assets or areas were identified for inclusion in the walkover surveys or priority archaeological geophysical survey.	The scope of the baseline surveys has been addressed throughout this PEIR Chapter, with bespoke inclusion of individual heritage assets where a potential impact has been identified during baseline data procurement and collation.
Technical Panel (Mr S. Devey, ERYC	02/04/19 Historic Environment Technical	It was highlighted that there is a challenge within the local area to identify and map non-designated heritage assets. Specific reference	This was considered as part of the Historic Environment DBA and associated walkovers (**Volume 6: Annex 5.1**), and where necessary,

Consultee	Date, Document, Forum	Comment	Where addressed in the PEIR
Conservation Officer)	Panel Meeting 3	was made to war memorials in villages, concrete bridges, telephone boxes, early garages. There is a reliance on the DCO process to pick up on the unrecorded non-designated assets. There is also potential for non-designated concrete structures associated with Lissett Airfield to survive.	assets not currently recorded but identified as being of heritage interest were brought through for impact assessment (Section 5.11). Generally, few extant assets were specifically identified within the study areas which were not already recorded. Consideration of war memorials throughout each study area was given, especially since the majority within the region are not designated or recorded on the HHER.
Technical Panel (Mr J. Goodyear, HAP and Mr S. Devey, ERYC Conservation Officer)	02/04/19 Historic Environment Technical Panel Meeting 3	Stakeholders generally agreed that as long as the working area for decommissioning is similar to the construction activities, an assessment of decommissioning impacts may not be required.	Consideration of impacts from decommissioning is given within the impact assessment (Section 5.11.4).
Email correspondence (Mr K. Emerick, Historic England)	17/06/19 (email correspondence)	*"I think we can agree that direct physical impacts on designated assets can be scoped out if you can demonstrate that the designated sites have been avoided. But I am concerned about the use of the word 'direct' as it is often used when discussing 'setting' and implies a lesser form of impact, when – in fact – the impact within setting can be 'direct' on the significance of the place. "*	The terms direct (physical) impacts and indirect (non-physical) impacts are described in Section 5.10. The impacts scoped out are presented in Section 5.8.2.

5.4.2 Hornsea Four Design Evolution – Stakeholder Consultation

5.4.2.1 As identified in **Volume 1, Chapter 3: Site Selection and Consideration of Alternatives** and **Volume 1, Chapter 4: Project Description**, the Hornsea Four design envelope has been refined significantly and is anticipated to be further refined for the DCO submission. This process is reliant upon stakeholder consultation feedback.

5.4.2.2 Design amendments of relevance to Historic Environment comprise:

- Landfall – the Hornsea Four PEIR boundary currently comprises two landfall options (shown in **Volume 1, Chapter 4: Project Description, Figure 4.13**), which have been assessed in the respective PEIR receptor chapters A decision on the preferred landfall (A3 or A4) will be made post-PEIR and the Project Description and assessments updated for the ES and DCO for the preferred 40,000 m^2 compound within the landfall location.

- OnSS Operation and Maintenance Access - Hornsea Four are currently investigating the possibility of making the temporary construction access off the A1079 a permanent operational access and utilising the operation access from Dunswell and Cottingham for limited construction works associated with HDD from the ECC to the OnSS.

- OnSS Design: The design of the Hornsea Four OnSS mitigation (inclusive of measures set out in **Volume 4, Annex 4.6: Outline Design Vision Statement**) will be further evolved based on the results of the PEIR assessments, in addition to stakeholder feedback and suggestions.

5.5 Study area

5.5.1.1 For the PEIR phase of Hornsea Four, four historic environment study areas of varying size have been established around the onshore elements of the Hornsea Four footprint, to ensure a full assessment of any potential impacts can be undertaken (**Figure 5.2**). These study areas were decided through professional judgement and industry guidance, alongside consideration of the ZTV produced for the OnSS (**Chapter 4: Landscape and Visual**)

5.5.1.2 These study areas were deemed appropriate by all heritage stakeholders during Technical Panel Meetings and comprise:

- Onshore ECC Boundary (including landfall):
  - A 500 m study area either side of the onshore ECC for non-designated heritage assets; and
  - A 1 km study area either side of the onshore ECC for designated heritage assets.
- OnSS Boundary (including 400 kV ECC):
  - A 5 km study area from the OnSS permanent footprint boundary for designated heritage assets and non-designated built heritage assets; and
  - A 1 km study area from the OnSS permanent footprint boundary (and its associated permanent infrastructure) is used for other non-designated heritage assets (i.e. buried archaeological remains and findspots).

5.5.1.3 The onshore ECC study area starts at the Mean Low Water Springs (MLWS) with the offshore ECC study area starting at Mean High Water Springs (MHWS), resulting in a slight overlap at the intertidal zone (see **Volume 2, Chapter 10: Marine Archaeology**).

5.5.1.4 The OnSS study area includes the whole of the 400 kV ECC area. Note that all non-designated built heritage assets have been included within the 5 km OnSS study area to ensure consideration is given regarding potential impacts through an alteration to their setting.

5.5.1.5 These study areas allow for a proportionate assessment of any potential direct and indirect impacts upon designated and non-designated heritage assets.

5.5.1.6 Refinement of these study areas will be undertaken at the ES stage and tailored to include specific heritage assets which will be impacted by Hornsea Four and to reflect the LVIA study areas.

5.5.1.7 Separate study areas were utilised for the Aerial Photographic and Lidar Assessment (**Section 5.6.4**), Priority Archaeological Geophysical Survey (**Section 5.6.5**) and Geoarchaeological DBA (**Section 5.6.6**).

5.6 Methodology to inform baseline

5.6.1.1 The documents produced to aid in the production of this PEIR chapter are outlined in **Table 5.4**.

5.6.1.2 The baseline data set out in this chapter (**Section 5.7**) is a summary of the data produced as part of the Historic Environment DBA **(Volume 6, Annex 5.1**). This data has been refined and updated following completion of the interim aerial photography and Lidar assessment report, initial priority archaeological geophysical survey results and the geoarchaeological DBA (**Volume 6, Annexes 5.2, 5.3** and **5.4**).

Table 5.4: Historic environment baseline studies and resulting reports undertaken for Hornsea Four to date.

Document	Summary	Annex
Historic Environment DBA	Details the baseline environment with respect to the onshore historic environment within the defined study areas. It incorporates available archaeological assessment data, including desk-based research, a high-level review of historic mapping and a setting assessment of heritage assets identified as potentially being affected by Hornsea Four.	**Volume 6, Annex 5.1**
Heritage Asset Gazetteers	Historic environment data obtained from the HHER has been collated into gazetteers, presenting all known designated and non-designated heritage assets within the Hornsea Four heritage study areas.	**Volume 6, Annex 5.1 (Appendices B and C)**
Aerial Photography and Lidar interim assessment report	Initial assessment and interpretation of aerial imagery, Lidar and NMP data was undertaken to identify any earthworks or cropmarks within a 200 m study area either side of the onshore ECC and OnSS permanent footprint. The results were cross-referenced with the HHER data. Information from this assessment feeds into the updated baseline data within this chapter.	**Volume 6, Annex 5.2**
Priority Archaeological Geophysical Survey Results Report	An interim report detailing the results of the priority archaeological geophysical surveys undertaken along the Hornsea Four onshore ECC, totalling 53.2 ha to date. These results have informed the updated baseline presented within this chapter, identifying new archaeological sites / confirming and adding to the HHER data.	**Volume 6, Annex 5.3**
Geoarchaeological DBA	A scheme-wide review of existing geotechnical and geoarchaeological sources of information was undertaken. This data identified areas of geoarchaeological potential and provides recommendations for geoarchaeological-specific surveys for Hornsea Four.	**Volume 6, Annex 5.4**

5.6.2 Historic Environment Desk-Based Assessment

5.6.2.1 A Historic Environment DBA (**Volume 6, Annex 5.1**) was undertaken to collate baseline data to inform this PEIR chapter. This detailed desk-based review of existing historic environment data was used to identify the archaeological potential within the historic environment study areas.

5.6.2.2 A setting assessment was also undertaken as part of the Historic Environment DBA (**Volume 6, Annex 5.1**), which followed the Historic England guidance on setting assessment (Historic England, 2017a). The first two stages to undertaking a setting assessment, as set out within the Historic England guidance, are presented within the Historic Environment DBA with stages 3 and 4 (to be revisited and further updated between PEIR and ES) presented in **Section 5.11**.

5.6.2.3 The specific objectives of the Historic Environment DBA were to:

- outline and describe the known and potential heritage assets, based on a review of existing information to provide an archaeological and historical baseline within defined study areas;
- assess the significance of the known and potential heritage assets through a consideration of their archaeological, architectural, artistic and historic interests, and to provide a consideration of the contribution that setting makes to their heritage significance, where relevant; and
- identify the potential impacts of Hornsea Four upon heritage assets, including impacts resulting from change in setting, as part of a high-level assessment.

5.6.3 Walkover Surveys

5.6.3.1 To inform the PEIR, two historic environment walkover surveys were completed between 28 to 30 November 2018 and 11 to 15 February 2019. The walkover surveys were undertaken to confirm the presence/absence of heritage assets identified on the HHER and through desk-based review of historic maps and aerial imagery, to assess their preservation, extent and setting, and to identify any previously unrecorded heritage assets. A total of 73 locations containing known heritage assets were visited as part of the walkover surveys; these were agreed in consultation with the heritage stakeholders at the Technical Panel meetings. Please note that the setting assessment was undertaken during the winter months when vegetation cover was at a minimum and therefore likely representing a worst-case in terms of intervisibility with Hornsea Four.

5.6.3.2 The aims of the walkover surveys were to:

- assess the condition of upstanding/above ground archaeological remains within identified sites (i.e. earthworks or structures);
- identify any currently unrecorded heritage assets (i.e. earthworks or structures);
- establish the potential for currently unknown heritage assets (e.g. buried archaeology) within the landfall, onshore ECC and OnSS footprints;

- assess the potential impact from other modern developments within the study areas which may have reduced the significance/preservation of known heritage assets;
- assess the viability of Priority Archaeological Geophysical Survey at targeted locations along the onshore ECC and OnSS; and
- undertake setting assessment site visits of and in the vicinity of identified key heritage assets.

5.6.4 Aerial Photography and Lidar Assessment

5.6.4.1 The aerial photographic and Lidar assessment (**Volume 6, Annex 5.2**) is being undertaken within a 200 m Aerial Photography and Lidar study area either side of the Hornsea Four PEIR centre line. The work is ongoing, and an interim report has been produced to inform this PEIR chapter (**Volume 6, Annex 5.2**), whilst a final report will inform the ES at DCO application.

5.6.4.2 The assessment utilised aerial and Lidar imagery from:

- the Historic England Archive;
- the Cambridge University Collection;
- the Humber Historic Environment Record Archive;
- Online Aerial and Satellite-derived Images;
- APEM Aerial Photo Survey of the route;
- Historic England National Mapping Programme (NMP); and
- Environment Agency Lidar Data.

5.6.4.3 The data from these resources was assessed, collated and presented within a GIS project. The results were then interpreted and cross-referenced with known heritage asset data held by the HHER and Historic England.

5.6.5 Priority Archaeological Geophysical Survey

5.6.5.1 The aim of the priority archaeological geophysical survey (**Volume 6, Annex 5.3**) was to identify any potential archaeological anomalies that would enhance current understanding of the archaeological resource at targeted locations within the Hornsea Four boundary.

5.6.5.2 A total of 35 areas, covering 356 ha, were identified as requiring a priority archaeological geophysical survey. These areas were targeted based on known locations of recorded heritage assets relating to buried archaeology within the HHER. Records of heritage assets located near or adjacent to the onshore ECC were also considered and the nearest section of the onshore ECC was identified for survey. This was due to the potential for the archaeological remains to extend into the footprint of the onshore ECC.

5.6.5.3 The priority archaeological geophysical survey was based on a 120 m wide corridor which includes a 20 m buffer either side of the onshore ECC and comprised the full extent of the fields associated with the landfall and OnSS. The survey is being undertaken within a grid

system, tailored to each survey area. The survey grid squares measure 30 m by 30 m and are set out by GPS.

5.6.5.4 Specifically, the aims of the priority archaeological geophysical survey are to:

- locate, record and characterise any surviving sub-surface archaeological remains at targeted locations within Hornsea Four;
- inform the Historic Environment PEIR Chapter (and subsequent ES Chapter) and inform the next stage of (non-intrusive and intrusive) evaluation;
- provide an assessment of the potential significance of any identified archaeological remains in a local, regional and (if relevant) national context; and
- produce a comprehensive site archive and report.

5.6.5.5 A total of 53.2 ha of the 356 ha identified for priority archaeological geophysical survey has been completed prior to PEIR submission. The lack of available survey areas to date has predominantly been due to land access constraints and crop cycles. However, the remaining survey work is being progressed as fields become available and the additional results will form part of the updated baseline data to inform the ES at DCO application.

5.6.6 Geoarchaeological Desk-Based Assessment

5.6.6.1 A geoarchaeological DBA (**Volume 6, Annex 5.4**) has been undertaken to inform the PEIR and subsequent ES chapter. Sources of information included in the assessment comprise but are not limited to: geological and soil maps, existing reports on previous environmental, geoarchaeological and archaeological works relevant to Hornsea Four and academic research papers related to the wider area.

5.6.6.2 A 200 m geoarchaeology study area for historic geotechnical (borehole) data was used either side of the Hornsea Four project footprint. Palaeoenvironment records and literature within 10 km of Hornsea Four have also been reviewed to identify relevant sites surrounding the project area.

5.6.6.3 The aims of this study were to:

- further understand geological changes across the Hornsea Four project footprint;
- better understand the varying depths of deposits likely to be present;
- build towards a better understanding of the archaeological and geoarchaeological landscape; and
- review available existing/historic geotechnical and geoarchaeological sources of information in order to target suitable locations for further geoarchaeological works.

5.6.7 Heritage asset numbering

5.6.7.1 The Historic Environment DBA (**Volume 6: Annex 5.1**) has used the preferential references as defined by the National Heritage List for England (NHLE) and HHER for all heritage assets described throughout the report and presented on the Historic Environment DBA figures

(Volume 6, Annex 5.1). Following the baseline data collation, walkover survey and setting assessment, heritage assets that were identified as being potentially affected, in addition to potential heritage assets not currently recorded which could also be affected, were given project-specific numbers (prefixed with 'RHDHV'), establishing these assets as key to the project and needing to be brought forward for impact assessment (Section 5.11). The term 'key asset' is used within this report to identify these heritage assets which are identified as sensitive to change arising from the construction, operation and maintenance or decommissioning of Hornsea Four. A list of these assets is provided in Section 5.7.10 following a summary of the historic environment baseline.

5.6.7.2 These RHDHV-specific numbers are used within this chapter and detailed within Section 5.7.10. Please see Figure 5.2 to Figure 5.24 for their location.

5.7 Baseline environment

5.7.1.1 The following Section summarises the currently known heritage assets within the study areas, as detailed within the Historic Environment DBA (Volume 6: Annex 5.1), Aerial Photographic and Lidar Assessment (Volume 6: Annex 5.2), Priority Archaeological Geophysical Survey Report (Volume 6: Annex 5.3) and the Geoarchaeological DBA (Volume 6: Annex 5.4). These assessments/surveys form the baseline upon which the potential impacts of Hornsea Four are assessed (Section 5.11) within this PEIR Chapter.

5.7.1.2 In summary, the Historic Environment DBA identifies a total of 644 designated heritage assets within the study areas. These consist of 30 Scheduled Monuments, 580 Listed Buildings (most within Beverley), two Registered Parks and Gardens, 19 Conservation Areas and ten areas of Ancient Woodland. None of these designated heritage assets are located within the footprint of Hornsea Four.

5.7.1.3 A total of 199 non-designated heritage assets are located within the study areas (165 within the onshore ECC study area and 34 within the OnSS 1 km study area) as presented in the Historic Environment DBA. A large number of buildings of historic interest are also locally listed within the study areas; nine are located within the onshore ECC study area and 672 within the OnSS 5 km study area (351 of which correlate with Listed Buildings).

5.7.2 Historic and archaeological background summary

5.7.2.1 Hornsea Four is located within the East Riding of Yorkshire, traversing through a landscape of varying character and geology. The most distinct landscapes are that of the Yorkshire Wolds and Holderness. The Wolds encompass the land west of Hull, heading northwards and eastwards, culminating at the North Sea Coast between Bridlington and Scarborough. These low-lying chalk hills form a distinct landscape, which border the onshore ECC to the west. The gently rolling plateau is cut by deep valleys of glacial origin. Holderness, is markedly different, characterised by its flat, low lying landscape, with the River Hull valley dominating the western half of Holderness. This landscape was formed through drainage of

marshland during the medieval and post-medieval periods and has similar characteristics to the silt and peat fens of East Anglia and Lincolnshire.

5.7.2.2 Geologically, the route is located on a White Chalk subgroup bedrock, with the majority of the area overlain by glacial till deposits. The onshore ECC passes through an area containing superficial deposits of alluvium near to Wansford, whilst the coast contains a complex mixture of alluvium and late glacial glaciofluvial deposits (see **Volume 6, Annex 5.4** for more information).

5.7.2.3 The East Riding of Yorkshire has a rich historical and archaeological heritage, with nationally significant archaeological sites and monuments located across the landscape, particularly within the Wolds. Early prehistoric activity is known within the region through pollen analysis, which indicates that forests were beginning to be cleared during the Mesolithic period. Following this, the Yorkshire Wolds and its hinterlands towards Holderness (then marshland) became well settled during the Neolithic period, due to the wide range of natural resources. Evidence for this habitation is seen in the surviving Neolithic ceremonial/funerary monuments in the Wolds landscape, such as long barrows and henges.

5.7.2.4 Settlement of the Wolds continued during the Bronze Age period. This is evidenced by over 140 Early Bronze Age round barrows known across the region, particularly on the higher ground overlooking river valleys. Groupings of barrows are notable within the valley of the River Hull and its tributaries. These funerary monuments indicate the landscape was well settled, although direct evidence for these settlements in the archaeological record is limited.

5.7.2.5 A distinctive material culture called the 'Arras Culture' prevailed throughout East Yorkshire during the Iron Age. A well-known element of this culture is burial within a square barrow, a subset of which contain high-status chariot burials. Square barrows survive as cropmarks on aerial photographs, usually in small groups, and as low earthworks, such as those at a cemetery containing about 120 square barrows just south of Scorborough, and the grouping of earthworks at Westwood Pasture, south-west of Beverley.

5.7.2.6 Activity during the Romano-British period often relates to periods of land division, seen in the form of field system cropmarks. Enclosures were the most common recorded feature-type during the NMP, often rectilinear in plan and isolated, although occasionally they were found in groups, aligned with trackways. Some of these identified enclosures survive as existing earthworks such as those at Westwood Pasture, which are scheduled (RHDHV34 and 35, **Figure 5.20**).

5.7.2.7 There is little evidence for Anglo-Saxon archaeological remains within the region, although the earliest phases of Beverley Minster, then known as *Inderauda* were constructed during the period. It was founded at the turn of the 8th century and re-founded after the reconquest from the Danes by King Athelstan in the 10th century. It is during the later centuries of the Anglo-Saxon period that many of East Yorkshire's settlements and their open-field systems

were established, with evidence suggesting many of the fields maintained a large open layout to that used during the Roman period (Muir, 1997, pp. 107).

5.7.2.8 Medieval activity is better attested to within the region. A total of 29 moated or defended sites were recorded during the NMP, with six sites potentially indicative of monastic granges. Deserted settlements are relatively common within the region, found at Wilsthorpe, Auburn, Hartburn (Fraisthorpe), Winkton (Barmston), Gembling, Raventhorpe (Cherry Burton), Risby, Rotsea, Winthorpe (Etton) and Bentley. Rotsea is worthy of distinction (NHLE 1005212), consisting of 15 ha of preserved earthworks, with an associated nearby moated site. Beverley Minster (NHLE 1084028) and most parish churches within the region were built in the medieval period and retain most or much of their late medieval fabric.

5.7.2.9 Except for some ecclesiastical buildings, most built-heritage assets within the region, including most of the 450 built-heritage assets at Beverley, were constructed during the post-medieval and early modern periods. Formal gardens were laid out at Risby Hall during the late 17th century and were extended with pleasure grounds and ornamental lakes a century later (NHLE 1001419).

5.7.2.10 A large number of World War II pillboxes, anti-tank defences, searchlight batteries, observation posts and other military installations and structures are common along the Holderness coast. This includes the Royal Observer Corps underground monitoring post at Skipsea and the anti-aircraft gunsite at Butt Farm, near Beverley, both of which are Scheduled Monuments.

5.7.3 Designated Heritage Assets

5.7.3.1 There is a total of 30 Scheduled Monuments, 580 Listed Buildings, two Registered Parks and Gardens, 19 Conservation Areas and 10 areas of ancient woodland within the study areas. A further three Scheduled Monuments located outside the onshore ECC study area were included in the baseline following consultation with stakeholders.

5.7.3.2 A total of 12 Scheduled Monuments relate to significant remains at Westwood Pasture, directly south-west of Beverley. These monuments comprise a Bronze Age oval barrow and three bowl barrows, nine Iron Age square barrows, and the extant earthwork remains of Romano-British enclosures.

5.7.3.3 Sixteen entries within the study areas relate to the medieval history of the local area, including five moated manor sites, one deserted village, two castles and two monastic sites. Moated sites and deserted medieval villages are relatively common monuments within the region and country.

5.7.3.4 Of the 580 Listed Buildings within the ECC study area, 560 are within the OnSS study area, principally due to the proximity of the historic town of Beverley, which contains 450 of them. A further 20 Listed Buildings are located within the historic cores of smaller rural settlements, often in the form of parish churches. In total, there are 13 Grade I Listed

Buildings and 47 Grade II* Listed Buildings with the remaining 520 Listed Buildings designated at Grade II located within the study areas.

5.7.4 Non-Designated Heritage Assets

5.7.4.1 Non-designated heritage assets are those which are not afforded protection through current legislation but given weight in planning considerations. Much of this resource consists of data obtained from the HHER which details archaeological sites, identified through previous fieldwork, the recovery of chance artefacts, reviews of aerial photography and any other research and development-led work undertaken and recorded in the HHER.

5.7.4.2 Within the 500 m onshore ECC study area, there is a total of 45 findspots and 120 monuments currently recorded within the HHER. Within the 1 km OnSS study area there are six findspots and 28 monuments. Of most relevance to the OnSS location is a grouping of two monuments and two findspots located within a 100 m vicinity of the OnSS permanent infrastructure site (RHDHV49 and 50, **Figure 5.3** and **Figure 5.24**).

5.7.4.3 There is an undated pit (RHDHV48) and medieval seal findspot (MHU1379 recorded adjacent to the OnSS location and cropmarks of an undated polygonal enclosure, associated trackways and other field system ditches (RHDHV49) located directly south of, and within, the OnSS location. These archaeological remains of a probable settlement are visible as cropmarks within aerial photographs and are far reaching, with the potential to extend further northwards into the OnSS location and eastwards towards the existing Creyke Beck NGET substation and across the 400 kV ECC. These remains may date to the Iron Age and are possibly associated with the Iron Age activity identified during archaeological investigation prior to the construction of the Creyke Beck NGET substation. The aerial photographs also record evidence for medieval ridge and furrow within the area which has the potential to mask earlier archaeological remains.

5.7.5 Setting Assessment

5.7.5.1 A setting assessment was undertaken as part of the Historic Environment DBA informed by baseline information obtained during the walkover surveys. This work identified which heritage assets may be impacted by Hornsea Four, as a result of changes in their setting. Following this, consideration of the assets' setting and the contribution this makes to their significance was undertaken (**Volume 6, Annex 5.1, Section 6**). The Historic Environment DBA addresses steps 1 and 2 of the Historic England guidance (2017a), allowing for this PEIR chapter to begin addressing steps 3 and 4.

5.7.5.2 29 heritage assets, or groupings of heritage assets, were visited as part of the setting specific walkover surveys. These site visits identified that many of the assets have a setting which makes a moderate or major contribution to their heritage significance, particularly assets along the onshore ECC or in and around Beverley (RHDHV36, **Figure 5.20**).

5.7.5.3 Following production of the visualisations and photomontages by the Hornsea Four Landscape and Visual Consultants, further consideration was given to potential changes in

setting which may affect the significance of heritage assets within the study area. The initial consideration of setting (see **Volume 6, Annex 5.1**) identified that many of the heritage assets potentially affected have a setting that contributes to their heritage significance. This contribution was often found to be more minor the closer to the south of Hornsea Four due to the cumulative impact that extant modern developments (new infrastructure, housing etc.) have had upon the historic landscape around the Hull suburbs.

5.7.5.4 The visualisations show that when within the immediate (c. 200 m) vicinity of the OnSS, the top of the substation buildings will be visible, along with other associated infrastructure due to the flat nature of the landscape, although partially masked by existing planting (tree lines and hedgerows) (**Chapter 4: Landscape and Visual**). These, alongside the ZTV (**Chapter 4: Landscape and Visual**) indicate that the OnSS will be at least partially screened from many heritage assets by existing landscape features, such as natural woodland (including ancient woodland), intervening built form and other infrastructure. Similarly, assessment of intervisibility between heritage assets, such as Beverley Minster (RHDHV38, **Figure 5.20**) and St Mary's Church, Cottingham, indicates that the OnSS is in an area where it will not interfere with these visual links, or their vertical dominance.

5.7.5.5 Consideration of all available data shows that some of the heritage assets nearby (e.g. heritage assets in Cottingham, the Hull suburbs and many within Beverley) will not be impacted by the OnSS or any other element of the Hornsea Four infrastructure through changes in their setting. This is due to the 'built up' nature of the existing environment around Cottingham and Hull, resulting in a general lack of visibility to the Hornsea Four OnSS (and other associated infrastructure) when within (or appreciating) the setting of heritage assets in Cottingham and the Hull suburbs.

5.7.5.6 The setting assessment work is ongoing and will be revisited, updated and assessed further during the ES phase, once further decisions on the OnSS layout and final design are made.

5.7.6 Aerial Photographic and Lidar Assessment

5.7.6.1 An interim report has been produced for the Aerial Photographic and Lidar Assessment (**Volume 6, Annex 5.2**), detailing the results of work undertaken up to 10 May 2019. The assessment is ongoing, and a final report will be completed prior the DCO application.

5.7.6.2 The initial, high-level results within the interim report have identified 283 archaeological sites, many of which have been previously identified and recorded within the HHER or by the NMP. The previously unrecorded remains identified are those of three round barrows, located south-west of Foston-on-the-Wolds and either side of the onshore ECC route. Similarly, some field systems and enclosure cropmarks were also identified which do not directly correlate with HHER records, although a nearby record does describe cropmarks of enclosures (MHU8161; RHDHV54**,** **Figure 5.11**).

5.7.6.3 The remains identified within the Historic Environment DBA around the OnSS (a complex of cropmarks of potentially Iron Age origin; RHDHV49, **Figure 5.3**) were confirmed and further detailed within the Aerial Photographic and Lidar Assessment (**Volume 6, Annex 5.2, Map**

Book Figure 1). The assessment revealed the cropmarks around the OnSS are extensive and indicate a large settlement(s) was located there.

5.7.6.4 Similarly, the cropmarks recorded within the HHER around the landfall location (RHDHV02, Figure 5.4) are also extensive and indicate a large settlement(s) was located there, possibly of Iron Age origins (Volume 6, Annex 5.2, Map Book Figures 28 and 29).

5.7.6.5 Overall, the initial results have identified that Hornsea Four passes through a landscape with high archaeological potential. Further analysis of the aerial imagery and Lidar data will allow for identification and interpretation of other, and potentially new, 'sites' to take place, which will inform the final ES.

5.7.7 Priority Archaeological Geophysical Survey

5.7.7.1 Eight areas (totalling 53.2 ha) were accessible and surveyed as part of this PEIR phase (Figure 5.1). The other areas identified for survey are ongoing and will inform the ES for the DCO application. Areas identified for Priority Archaeological Geophysical Survey were numbered by field, or groups of fields, and were targeted due to the high potential identified during baseline data collation. The areas where priority archaeological geophysical survey was completed or partially completed to-date are: 13, 33, 34, 35, 45, 48, 49 and 51 (Volume 6, Annex 5.3).

5.7.7.2 The results to-date of this first phase of Priority Archaeological Geophysical Survey successfully identified certain archaeological remains within two areas (Areas 13 and 34), whilst potential archaeological remains were identified in four of the eight surveyed areas (Areas 13, 33, 34 and 48). The buried archaeological remains identified within Areas 13, 34 and 48 correlate with HHER monuments.

5.7.7.3 The results revealed include:

- Area 13: anomalies identified which correlate with HHER entry (MHU3350), a continuation of Raventhorpe Deserted Medieval Village (RHDHV26, Figure 5.18);
- Area 33: two potential linear trackway features along with a potential ring ditch, possibly a round barrow (RHDHV10, Figure 5.12);
- Area 34: a square enclosure was identified which correlates with HHER entry (MHU8109; RHDHV11, Figure 5.12). Further detail is seen within the priority archaeological geophysical survey, which revealed other linear and rectilinear features associated with the enclosure, along with the continuation of a possible trackway from Area 33; and
- Area 48: a potential prehistoric pit alignment and a number of small rectilinear shapes with associated pit-like anomalies were identified. These remains are located near to a potential enclosure recorded within the HHER (MHU3346; RHDHV28, Figure 5.18).

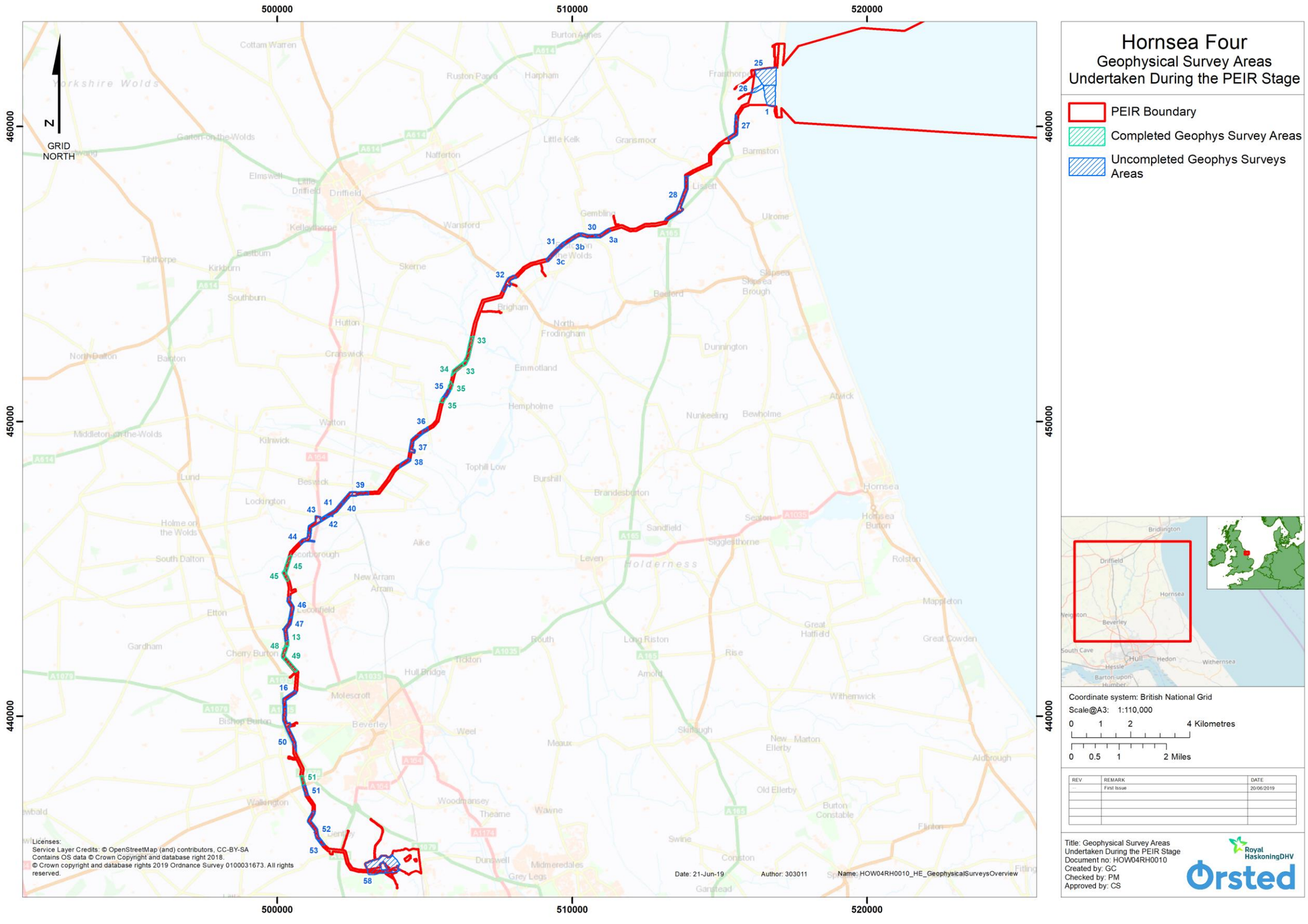

Figure 5.1 : Priority Geophysical Survey Areas Undertaken During the PEIR stage (not to scale).

5.7.8 Geoarchaeological Desk-based Assessment

5.7.8.1 The review of geological and palaeoenvironmental data revealed that Hornsea Four is located in an area rich in evidence of landscape evolution from the Quaternary and Holocene periods (**Volume 6, Annex 5.4**). Two sections (out of five, see **Volume 6, Annex 5.2**) of the onshore ECC are identified as being located within an area of high geoarchaeological potential; Section 1 (Fraisthorpe to North Pasture Farm) and Section 2 (North Pasture Farm to Rotsea).

5.7.8.2 The north-east part of the onshore ECC (Section 1) is located within an area known to contain preserved alluvial deposits associated with the Earl's Dike and also lies close to the northern margin of the infilled Bramston Mere. A possible palaeochannel was also identified at Lissett Bridge.

5.7.8.3 Section 2 is located within an area of sand and gravel deposits (near Foston-on-the-Wolds), which indicate drier areas within what would have been marshland until the medieval period, suggesting the area may hold a high potential for settlement. Glaciofluvial deposits were identified at Rotsea, whilst alluvial deposits, palaeochannels and warp deposits are known of at Nafferton Drain and within the River Hull valley near Skerne.

5.7.8.4 Outside of these two sections, there is a moderate geoarchaeological potential along the rest of the onshore ECC. Evidence for preserved palaeoenvironmental remains is relatively limited, due to the medieval and post-medieval drainage of Holderness. This resulted in any areas of well-preserved sediments, which were once part of the extensive marshlands of Holderness, only surviving in small pockets.

5.7.8.5 Monitoring or review of any geotechnical test pits and boreholes taken for Hornsea Four will provide further detail regarding the extent and nature of any geoarchaeological deposits to be assessed and suitable mitigation measures to be identified.

5.7.8.6 The results of the Priority Geophysical Surveys will be compared with the details within the Geoarchaeological DBA once further areas have been surveyed. This work will be undertaken during the Environmental Impact Assessment for the ES of the project, where potential deposits or features of geoarchaeological interest identified as part of the geoarchaeological DBA will be cross-referenced with the geophysical results, to see if any high potential areas can be further refined. This will be presented within updated baseline data in the ES for the DCO application.

5.7.9 Summary of Potential

5.7.9.1 The baseline information has indicated that Hornsea Four is in a rich historic landscape with numerous heritage assets, in the form of buried archaeological remains, earthworks and historic buildings. Some of these known assets can be identified as of medium or high (national) heritage importance. Other assets are, however, considered to be of negligible or low importance.

5.7.9.2 The potential for encountering archaeological remains (of varying importance) within the Hornsea Four boundary is considered high. In consideration of the known heritage assets indicative of buried archaeological remains, the following list presents those assets which are likely to survive and be of possible low, medium or at most high heritage importance:

- **Landfall**:
  - areas of Iron Age to Romano-British cropmarks identified from aerial photographic sources (RHDHV02, **Figure 5.4**);
- **Onshore ECC**:
  - north of Foston-on-the-Wolds, near to identified Iron Age to Romano-British cropmarks and newly identified sites (RHDHV08, 53 and 54**,** **Figure 5.9** to **Figure 5.11**);
  - north of Scorborough and south of Lockington, near to identified Iron Age to Romano-British cropmarks (RHDHV22, **Figure 5.16**);
  - directly adjacent to Raventhorpe Deserted Medieval Village (RHDHV26**, Figure 5.18**);
- **OnSS and 400 kV ECC**:
  - cropmarks identified from aerial photographic sources show evidence for a large settlement(s) of probable Iron Age to Romano-British date (RHDHV49, **Figure 5.3**); and
  - A Bronze Age round barrow cemetery, is identified in cropmarks east of Creyke Beck NGET substation, which could extend westwards (RHDHV50, **Figure 5.3**).

5.7.9.3 The Aerial Photographic and Lidar assessment has added further detail to the previously identified cropmarks located at the landfall (RHDHV02) and the OnSS (RHDHV49), resulting in further valuable information on the form and scale of the cropmarks to that recorded within the HHER and discussed within the Historic Environment DBA (**Volume 6, Annex 5.1**). The assessment identified that the cropmarks at landfall are extensive, spreading across at least four fields, with the majority of visible archaeological remains consisting of field systems and enclosures of probable Iron Age to Romano-British date (**Volume 6, Annex 5.2, map book Figure 28**).

5.7.9.4 Cropmarks at the OnSS (**Volume 6, Annex 5.2, map book Figure 1**) were also confirmed to be extensive, and there is some evidence of the remains surviving as very faint earthworks, as identified during the walkover survey.

5.7.9.5 The results of the Priority Archaeological Geophysical Survey have also confirmed some areas which were thought to have high potential as presented in the Historic Environment DBA. This includes the area around Raventhorpe Deserted Medieval Village as well as an area near to Rotsea, which correlate with key heritage assets (RHDHV10 and 11, **Figure 5.15**) brought forward for impact assessment (see **Section 5.7.7**). Further priority archaeological geophysical surveys will inform the updated baseline data presented within the final ES. Similarly, there is a high potential for geoarchaeological deposits to be located within the northern third of the onshore ECC, particularly around Lissett and Rotsea as identified in the Geoarchaeological DBA (**Volume 6, Annex 5.2**).

5.7.10 Key heritage assets

5.7.10.1 A total of 54 heritage assets, or groupings of heritage assets (both designated and non-designated), have been identified as 'key' to Hornsea Four due to their susceptibility to an impact arising during construction, operation and maintenance, or decommissioning (**Table 5.5**, **Figure 5.2**). These were initially identified as part of the Historic Environment DBA and then refined and updated for this chapter following the information provided from the further archaeological assessments (Aerial Photographic & Lidar Assessment, Priority Archaeological Geophysical Survey and Geoarchaeological DBA).

5.7.10.2 These key heritage assets are those which have the potential to be affected, either directly or indirectly by the project, including impacts resulting from change in the setting of assets. Note that some of these RHDHV-specific locations are groupings of HHER entries, which identifies an area with multiple nearby records which might indicate a high archaeological potential (e.g. RHDHV02 or RHDHV28). The key designated heritage assets presented have the potential to be affected by indirect (non-physical) impacts through an alteration to their setting, where setting contributes to heritage significance. The key non-designated heritage assets presented are either likely to be subject to a direct (physical) impact to significance due to their location with the Hornsea Four project footprint, or there is potential for an indirect (non-physical) impact to significance through the alteration of their setting.

5.7.10.3 Some heritage assets near to Hornsea Four have not been brought forward into the impact assessment, despite a relatively close proximity; this is due to a lack of intervisibility as a result of the built-up nature in some parts of the landscape. In particular, to the south of the OnSS near to Hull (within Cottingham) the built-up nature of the topographically flat landscape results in many heritage assets having no meaningful views towards Hornsea Four. This lack of intervisibility was identified through consideration of the ZTV produced for the OnSS (**Chapter 4: Landscape and Visual**) and on-site consideration during walkovers surveys. Consideration of intervisibility and whether there is potential for indirect (non-physical) impacts resulting from change in setting is undertaken as part of the setting assessment within the Historic Environment DBA (**Volume 6, Annex 5.1, Section 6**).

5.7.10.4 The key heritage assets are presented in **Table 5.5**, along with an indication of heritage importance (please refer to **Table 5.9**) and these assets are considered further as part of the impact assessment (**Section 5.11**).

5.7.10.5 Following initial assessment work for this PEIR chapter, a further two areas considered "key" to the project have been identified (**Figure 5.14**). These are a grouping of undated (although likely Early Bronze Age) round barrows (RHDHV53) and enclosures and field system ditches (RHDHV54), revealed in the aerial photographic and Lidar assessment south-west of Foston-on-the-Wolds (RHDHV09). The round barrows (RHDHV53) appear to not have been previously identified and are not recorded within the HHER. Similarly, the field systems and enclosures (RHDHV54) do not appear to directly correlate to HHER data, although one HHER entry (MHU8161) could be related, located 300 m north-west of the onshore ECC boundary.

Table 5.5: Hornsea Four Key Heritage Assets.

RHDHV ID	Name	Survey Area	Aerial Photo/Lidar Assessment ref	Designation	HHER/NHLE Reference	Heritage Importance	Figure Ref.
1	World War II sea defences		n/a	Non-Designated	MHU21052	Medium	4
2	Buried archaeological remains (Iron Age to Romano-British enclosures) & World War II defences	1, 25, 26	n/a	Non-Designated	Multiple points including MHU21076, 21078, 21081 & 331	Medium	4
3	St Edmunds Chapel		n/a	Grade II listed	NHLE 1083849	High	4
4	Winkton Deserted Medieval Village	27	n/a	Non-Designated	MHU365	Medium	5, 6
5	Medieval complex, Church of All Saints and Old Hall		n/a	Scheduled Monument (medieval complex) and Grade II* (Old Hall) & I (church) listed	NHLE 1007846, 1083851 & 1204832	High	5, 6
6	Lissett Airfield & Church of St James Geoarchaeological potential within area	28	n/a	Non-Designated (airfield) & Grade II listed (church)	MHU11147 & NHLE 1083826	Low (airfield), Medium (buried remains), High (church)	7, 8
7	Skipsea Castle & Halgarth moated site		n/a	Scheduled Monuments	NHLE 1011212 & 1013705	High	Not illustrated (see Figure 2)
8	Buried archaeological remains (Iron Age enclosures) and geoarchaeological potential within area	3a-c, 30, 31	n/a	Non-Designated	MHU22121 & 22148	Low to Medium	8, 9 10
9	Foston-on-the-Wolds		n/a	Conservation Area	N/A	High	9, 10
10	Buried archaeological remains (ditch) **Location confirmed in Priority Archaeological Geophysical Survey**.	33	APS_175	Non-Designated	MHU2252	Low to Medium	12
11	Buried archaeological remains (enclosure). **Location confirmed in Priority Archaeological Geophysical Survey**.	34	APS_162, 167, 169, 171, 172, 173, 174, 175	Non-Designated	MHU8109	Low to Medium	12

RHDHV ID	Name	Survey Area	Aerial Photo/Lidar Assessment ref	Designation	HHER/NHLE Reference	Heritage Importance	Figure Ref.
12	Rotsea Deserted Medieval Settlement			Scheduled Monument	NHLE 1005212	High	12
13	Potential buried archaeological remains (road and field systems)	35	APS_155	Non-Designated	MHU9878	Low to medium	12, 13
14	Possible enclosures near Carr Lane	37	n/a	Non-Designated	MHU19432	Low to medium	14
15	Buried archaeological remains (gravel pit)	38	APS_145 (possibly)	Non-Designated	MHU13107	Low	14
16	Wilfholme Road bridge		n/a	Non-Designated	MHU12871	Low	14
17	Potential buried archaeological remains (well, ring ditch, road)	39	APS_141, 142	Non-Designated	MHU979, 12875	Low to medium	15
18	Potential Iron Age Square Barrow	40	APS_134	Non-Designated	MHU19425	Low to High	15
19	Beswick		n/a	Conservation Area	N/A	High	15
20	Lockington		n/a	Conservation Area	N/A	High	16
21	Buried archaeological remains (gravel pit)	43	n/a	Non-Designated	MHU12882	Low to medium	15, 16
22	Buried archaeological remains (Iron Age enclosure)		APS_122, 123	Non-Designated	MHU22179	Low to medium	16
23	Scorborough Listed Buildings, Scheduled Monuments and village	44	n/a	Grade I and II and Scheduled Monuments	NHLE 1015613, 1015818, 1160555, 1103451 & 1160548	High	16, 17
24	Buried archaeological remains (manor site)	45	APS_117, 118	Non-Designated	MHU3725	Low to Medium	17
25	Leconfield Castle moated site		n/a	Scheduled Monument	NHLE 1007949	High	17, 18
26	Raventhorpe deserted medieval settlement. Continuation of the remains identified south-west in Priority Archaeological Geophysical Survey.	13	APS_098	Non-Designated	MHU3350	Medium to High	18
27	Moated sites at Parkhouse Farm		n/a	Non-Designated	NHLE 1008292	Medium	18

RHDHV ID	Name	Survey Area	Aerial Photo/Lidar Assessment ref	Designation	HHER/NHLE Reference	Heritage Importance	Figure Ref.
28	Buried archaeological remains (Oval enclosure, post-medieval farm). Potential buried remains associated with enclosure to the west within Priority Archaeological Geophysical Survey.	48	n/a	Non-Designated	MHU3346, 13020, 19099	Low to medium	18
29	Cherry Burton		n/a	Conservation Area	N/A	High	18
30	Bishop Burton		n/a	Conservation Area	N/A	High	19
31	Early Iron Age to Roman Enclosure	16	APS_085	Non-Designated	MHU22297	Low to medium	18, 19
32	Medieval Bank (earthwork)	50	APS_077	Non-Designated	MHU13179	Low to medium	19
33	Burton Bushes Ancient Woodland		n/a	Ancient Woodland	NE 1115366	Medium	19
34	Buried archaeological remains (scheduled earthworks) on Westwood Pasture		n/a	Scheduled Monument	NHLE 1013999	High	19, 20
35	Buried archaeological remains (barrow earthworks) and Mill on Westwood Pasture		n/a	Scheduled Monuments & Grade II Listed Building	NHLE 1013994 1013992 1013998 1310087	High	20
36	Beverley		n/a	Conservation Area	N/A	High	20
37	St Mary's Church, Beverley		n/a	Grade I Listed Building	NHLE 1162693	High	20
38	Beverley Minster		n/a	Grade I Listed Building	NHLE 1084028	High	20
39	Grosvenor Place		n/a	Conservation Area	N/A	High	20
40	Beverley Limit Stone, Walkington Cross		n/a	Scheduled Monument	NHLE 1012591	High	22
41	Butt Farm Scheduled Monument (anti-aircraft gunsight)		n/a	Scheduled Monument	NHLE 1019186	High	22
42	Beverley Sanctuary Limit Stone, Bentley Cross		n/a	Scheduled Monument	NHLE 1012590	High	21
43	Cellar Heads moated site		n/a	Scheduled Monument	NHLE 1015312	High	23

RHDHV ID	Name	Survey Area	Aerial Photo/Lidar Assessment ref	Designation	HHER/NHLE Reference	Heritage Importance	Figure Ref.
44	Risby Hall		n/a	Scheduled Monument and Grade II Registered Park & Garden	NHLE 1018600, 1001419	High	23
45	Risby Hall Folly		n/a	Grade II Listed Building	NHLE 1161815	High	23
46	Birkhill Woodland		n/a	Ancient Woodland	NE 1115368	Medium	23, 24
47	Skidby Windmill and outbuildings		n/a	Grade II* (Mill) and Grade II Listed Buildings	NHLE 1103339 & 1276984	High	23
48	Undated pit near buried archaeological remains RHDHV49	58	n/a	Non-Designated	MHU12381	Low to medium	24
49	Buried archaeological remains (Polygonal enclosure) and potential round barrow	58	APS_002, 003, 005, 007, 008, 010, 017	Non-Designated	MHU1381, 6599	Medium to High	24
50	Buried archaeological remains (barrow cemetery)		n/a	Non-Designated and a Scheduled Monument	NHLE 1007731 and MHU833, 6618, 18737	Medium to High	24
51	White Hall		n/a	Grade II	NHLE 1161458	High	21
52	Old Hall and outbuildings		n/a	Grade II	NHLE 1103419, 1103420 & 1346992	High	21
53	Buried archaeological remains (three round barrows)		APS_188, 190, 191	Non-Designated	Unrecorded	Low to Medium	11
54	Buried archaeological remains (enclosures and field systems)	32	APS_199, 200, 201,202	Non-Designated	Unrecorded, possibly associated with MHU8161	Low to Medium	11

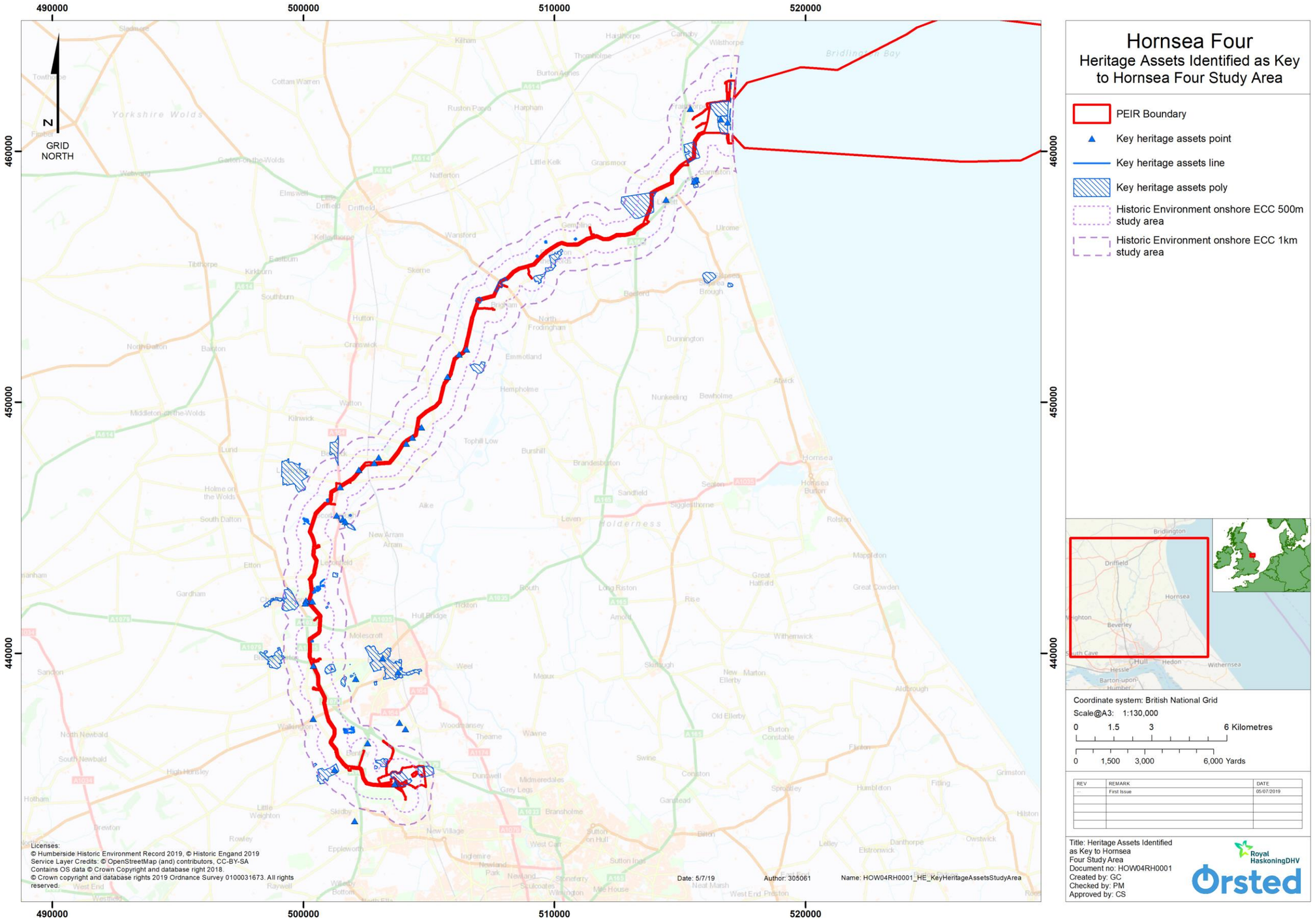

Figure 5.2: Heritage Assets identified as 'key' to Hornsea Four (not to scale).

5.7.11 Predicted future baseline

5.7.11.1 The future baseline scenario without implication of Hornsea Four is expected to change adversely in the future due to several factors. Changes would occur within the OnSS study area through further development work, particularly around Hull and Beverley, which could impact buried archaeological remains and built heritage assets (e.g. impacts through changes in setting). Other changes to known and potential buried archaeological remains would also occur, mostly within the onshore ECC study area, through a continuation of modern agricultural practices. Modern agricultural practices, particularly modern ploughing and drainage techniques within arable fields will likely continue to erode buried archaeological remains sealed below the topsoil, slowly impacting their preservation and potentially their significance.

5.7.11.2 In broader terms, the historic environment is vulnerable to the effects of climate change (Atkins, 2013). Increased coastal erosion, inland water inundation, extremes of wetting and drying, and increased fire risk from warmer conditions all present a significant risk to heritage assets which is increasing due to climate change. Similarly, changes in the environment (e.g. alteration in the type and range of flora and fauna) has the potential to alter the setting of heritage assets, which could affect its significance. Furthermore, buried archaeological remains are particularly sensitive to climate change. For example, changes in ground water levels due to drought has the potential to significantly damage palaeoenvironmental remains and the preservation of archaeological remains.

5.7.11.3 One of the main elements of climate change relevant to the historic environment within the onshore ECC study areas are those associated with sea level changes and the effects of coastal erosion. This could significantly impact the World War II assets along the coastline. Erosion was clearly noticeable along the coast at landfall during the walkover survey and further coastal erosion processes will result in the destruction and loss of some of the heritage assets, such as the pillboxes located on the edge of the cliffs along the coast. Erosion of the other World War II concrete objects along the beach will also occur. Although this is a relatively limited change, with in fact minimal erosion occurring over the previous 70 years, they are still vulnerable to for example storm events.

5.7.11.4 Coastal erosion has the potential to destroy buried archaeological remains located along or within the coastline. As the cliff erodes, buried archaeological remains located within the fields adjacent to the coast will also erode, destroying the remains before there is the opportunity for them to be recorded (e.g. RHDHV02, **Figure 5.4**).

5.7.11.5 Increased flood risk due to climate change is another important consideration. Holderness is a very low lying, flat landscape and heritage assets within the area are at risk of flooding due to increased storms or coastal inundations. These floods can have a major effect upon buried archaeological remains and built heritage. In particular, floods can cause costly damage to historic buildings in low lying areas.

5.7.11.6 Overall, the degree of change in the future baseline condition for the historic environment is difficult to predict. It is expected to undergo a gradual negative change however, for the reasons outlined above.

5.7.12 Data Limitations

5.7.12.1 The HHER is not a complete record, as it relies on non-designated assets being recorded and reported. Dependant on how much archaeological work has been undertaken in an area and whether findspots have been reported, limits what level of records may be held within the HHER. Similarly, unknown heritage assets are being found regularly, as part of new developments or new local research. As such, the HHER is not a complete and final record and does not preclude further heritage assets being found in the future.

5.8 Project basis for assessment

5.8.1.1 This historic environment PEIR chapter has been undertaken following Hornsea Four's approach to proportionate EIA (**Volume 1, Chapter 5: EIA Methodology**).

5.8.1.2 Throughout the Hornsea Four design process, the level of assessment for each likely significant effect has been identified as either following a "simple" or "detailed" assessment methodology. This was initially described at scoping and has been continually refined throughout the PEIR stage. A simple assessment is based on readily available information, requiring limited on-site field survey to inform the likely significant effect. Whereas a detailed assessment is identified where further detailed field survey (i.e. setting assessment, priority archaeological geophysical survey, geoarchaeological monitoring) or production of modelling is required (e.g. use of ZTV's produced for **Chapter 4: Landscape and Visual**) to inform the likely significant effect.

5.8.2 Impact register and impacts "scoped out"

5.8.2.1 Based on the baseline environment, the project description outlined in **Volume 1, Chapter 4: Project Description** and the Commitments Register in **Volume 4, Annex 5.2: Commitments Register**, a number of impacts are proposed to be "scoped out" of the PEIR assessment for the historic environment. These impacts are outlined, together with a justification for scoping them out, in **Table 5.6**. Further detail is provided below and, in the Impacts Register in **Volume 4, Annex 5.1: Impacts Register**.

5.8.2.2 Please note that the term "scoped out" relates to the Likely Significant Effect (LSE) in EIA terms and not "scoped out" of the EIA process per se. All impacts "scoped out" of LSE are assessed for magnitude, sensitivity of the receiving receptor and conclude an EIA significance in the Impacts Register (see **Volume 4, Annex 5.1**). This approach is aligned with the Hornsea Four Proportionate approach to EIA (see **Volume 1, Chapter 5: EIA Methodology**).

5.8.2.3 This impacts have been scoped out of formal assessment, as agreed with heritage stakeholders through email correspondence (**Table 5.3**) and through the identification of appropriate commitments to ensure that the footprint of Hornsea Four will avoid any direct

physical change to recorded designated heritage assets (see Co2 within **Volume 4, Annex 5.2: Commitments Register** and **Section 5.8.3**). The design of Hornsea Four has taken into account the location of designated heritage assets, which has fed into the alignment of the onshore ECC route and the positions of the OnSS and landfall locations. As this work has resulted in ensuring no direct (physical) change to designated heritage assets, no formal impact assessment is considered as being required. Change in the setting of designated heritage assets is retained as an important and detailed element of the assessment undertaken, particularly in respect to the operational phase.

Table 5.6: Historic Environment Impact Register.

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
Direct (physical) impact to designated heritage assets: Construction Phase (**HE-C-1**)	No likely significant effect	Scoped Out	All designated heritage assets have been avoided through the route planning and site selection process for landfall, the onshore ECC and OnSS. As such, no direct (physical) significant effects to designated heritage assets will occur. (see Co2 within the **Volume 4, Annex 5.2: Commitments Register** and **Section 5.8.3**) Email correspondence with Mr Keith Emerick at Historic England on 17.06.2019 has confirmed the following: *"we can agree that direct physical impacts on designated assets can be scoped out if you can demonstrate that the designated sites have been avoided. But I am concerned about the use of the word 'direct' as it is often used when discussing 'setting' and implies a lesser form of impact, when – in fact – the impact within setting can be 'direct' on the significance of the place."*
Direct (physical) impacts on designated heritage assets: Decommissioning phase (**HE-D-7**)	No likely significant effect	Scoped Out	The decommissioning footprint is anticipated to be similar to the construction footprint and avoid all designated heritage assets. Therefore, Co2 avoids the potential for direct (physical) impacts to designated heritage assets to occur.

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
Direct impacts on non-designated heritage assets: Decommissioning phase (HE-D-8)	Impacts are likely to be no higher than for construction	Scoped Out	The construction of Hornsea Four presents the highest potential for significant environmental effects. Impacts during decommissioning would result in an effect of equal significance, at worst. Primary, tertiary and secondary mitigation measures that are necessary to reduce significant effects during construction to acceptable levels would be secured for decommissioning activities, where relevant. In line with the proportionate approach to EIA, effects during decommissioning are therefore scoped out of the EIA for Hornsea Four.
Indirect impacts on designated heritage assets: Decommissioning phase (HE-D-9)	Impacts are likely to be no higher than for construction	Scoped Out	
Indirect impacts on non-designated heritage assets: Decommissioning phase (HE-D-10)	Impacts are likely to be no higher than for construction	Scoped Out	

Notes:
Red – Potential impact is scoped out with no consensus between PINS and Hornsea Four at EIA Scoping.

5.8.3 Commitments

5.8.3.1 Hornsea Four has brought forward a number of Commitments (a term used interchangeably with mitigation(s)) which will be adhered to (Volume 4, Annex 5.2), forming embedded mitigation for the project. These are primary design principles intrinsic to the project, which avoid impacts or reduce impacts as far as possible. Further Commitments (adoption of best practice guidance) are embedded as an inherent aspect of the EIA process.

5.8.3.2 The commitments adopted by Hornsea Four that relate to the historic environment are presented in Table 5.7. Principally, these commitments have resulted in the positioning of Hornsea Four having taken consideration of the historic environment, ensuring impacts upon it are minimised, wherever possible, from the outset.

Table 5.7: Relevant Historic Environment Commitments.

Commitment ID	Measure Proposed	How the measure will be secured
Co2	Primary: The following sensitive sites will be avoided by the permanent project footprint: Listed Buildings (580 sites), Registered Parks and Gardens (Thwaite Hall and Risby Hall), Scheduled Monuments (30 sites), Conservation Areas (19 sites), non-designated built heritage assets (368 sites) and Ancient Woodland (10 sites and TPOs). Please refer to PEIR Volume 6, Annex 6.5.1 Appendix B Designated Assets Gazetteer for detailed lists of designated heritage assets that are avoided by Hornsea Four. With the exception of River Hull Headwaters SSSI, sensitive sites have been avoided. Please refer to PEIR Volume 6, Annex 3.1: Extended Phase 1 Habitat Survey Report for details.	DCO Works Plan - Onshore

Commitment ID	Measure Proposed	How the measure will be secured
	Where possible, unprotected areas of woodland, mature, and protected trees (e.g. veteran trees) shall also be avoided or micro sited around.	
Co7	Primary: The temporary work area associated with onshore export cable corridor will be 80m working width to minimise the construction footprint, except the Network Rail Crossing near Beswick where the footprint is extended to 120m to facilitate HDD of the railway line. The permanent onshore export cable corridor width will be 60m except the Network Rail Crossing near Beswick where the footprint is extended to 120m to facilitate HDD of the railway line.	DCO Works Plan - Onshore
Co10	Tertiary: Post-construction, the working area will be reinstated to pre-existing condition as far as reasonably practical in line with DEFRA 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites PB13298 or latest relevant available guidance	DCO Requirement 16 (CoCP)
Co25	Primary: The onshore export cable corridor will be completely buried underground for its entire length. No overhead pylons will be installed as part of the consented works for Hornsea Four.	DCO Schedule 1, Part 1 Authorised Development
Co26	Primary: Where hedgerows require removal, this will be undertaken prior to topsoil removal and the width of hedge removed will be limited where practical. Removed hedges and trees will be replaced with locally appropriate native species.	DCO Requirement 16 (CoCP); and; DCO Requirement 9 (Ecological Management Plan)
Co28	Primary: Joint Bays will be completely buried, with the land above reinstated except where access will be required from ground level, e.g. via link box chambers and manholes.	DCO Requirement 16 (CoCP) DCO Requirement 19 (Restoration of land used temporarily for construction)
Co30	Secondary: A Landscape Management Plan will be developed in accordance with the outline Landscape Management Plan. The plan will include details of mitigation planting at the onshore substation site, including number, location and species. Details of management and maintenance of planting will be provided. Where practical, landscape mitigation planting will be established as early as possible in the construction phase.	DCO Requirement 7 (Provision of landscaping) Please also see **Volume 4, Annex 4.6: Outline Design Vision Statement**)
Co69	Secondary: Site lighting will only operate when required and will be directional to avoid unnecessary illumination.	DCO Requirement 16 (CoCP)
Co124	Tertiary: A Code of Construction Practice (CoCP) will be developed in accordance with the outline CoCP. The outline CoCP will include	DCO Requirement 16 (CoCP)

Commitment ID	Measure Proposed	How the measure will be secured
	measures to reduce temporary disturbance to residential properties, recreational users, and existing land users.	
Co145	Primary: Views of Beverley Minster from the A1079 will not be obstructed by the siting of the onshore substation,	DCO Requirement 6 (Detailed design approval onshore)
Co150	Primary: A new access will be taken directly from the A1079, to route construction traffic away from Cottingham and Dunswell	DCO Requirement 17 (Construction traffic management plan)
Co151	Primary: No above ground infrastructure associated with Hornsea Four will obstruct the view from St Mary's Church Cottingham to Beverley Minister through considered design of the OnSS and site selection.	DCO Requirement 6 (Detailed design approval onshore)
Co159	Secondary: Operational noise from the onshore substation will be at a noise level no greater than 5dB above the representative background (LA90,T) during the day time and night at the Nearest Sensitive Receptors, as stated within the onshore noise assessment (document reference A3.8).	DCO requirement 20 (Control of noise during operational phase)
Co160	Secondary: An Onshore Archaeological Written Scheme of Investigation (WSI) will be developed in line with an Outline Onshore Archaeological Written Scheme of Investigation (WSI). The onshore WSI will detail the survey and archaeological mitigation requirements in advance of and during construction.	DCO requirement 15 (Onshore archaeology)
Co162	Primary: Non-intrusive surveys (including Priority Archaeological Geophysical Survey, Geoarchaeological Desk Based Review and Aerial Photographic and Lidar Assessment) will be undertaken to identify and establish areas of buried archaeological remains and surviving historic earthworks. Where possible, the results will be used to inform design and minimise impacts on buried archaeological remains and historic earthworks through route refinement.	DCO requirement 15 (Onshore archaeology)

5.8.3.3 Alongside these commitments, an outline design vision (**Volume 4, Annex 4.6: Outline Design Vision Statement**) has been produced to detail the potential options used in construction of the landfall, the onshore ECC and OnSS. This details options for the building materials, colours and finishes of the OnSS infrastructure, to identify how it's final design can be such that any landscape and visual impacts (and potentially setting impacts) from the infrastructure will be reduced.

5.9 Maximum Design Scenario

5.9.1.1 This section outlines the Maximum Design Scenario (MDS) for potential impacts upon the historic environment arising from the development of Hornsea Four (see **Table 5.8**). The MDS project parameters represent the maximum possible effect upon the historic environment. The impact assessment has taken account of the options with the largest impact, i.e. with the OnSS constructed using the HVAC option, along with the construction of the Energy Balancing Infrastructure. As such, if the project design is altered (as set out in **Volume 1, Chapter 3: Project Description**) from that assessed as part of this Maximum Design Scenario, the results of the impact assessment are still effective. Impacts of greater significance would not arise from the final project design.

5.9.1.2 Implementation of embedded and further mitigation measures will ensure the application of appropriate levels of protection to the historic environment once the Hornsea Four project design is finalised. **Table 5.8** sets out the Maximum Design Scenario relevant to the Historic Environment for Hornsea Four.

Table 5.8: Maximum design scenario for impacts on the historic environment.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
Construction			
Indirect impacts on designated heritage assets. Construction activities which may lead to a change in the setting of assets.	Primary: Co2 Co7 Co26 Co69 Co150 Co151 Tertiary: Co10 Co124 Secondary: Co69 Co160	**Landfall:** • Construction duration: 32 months • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months • HDD: Number: 8 • HDD noise level: 120 dB **Onshore Export Cable Corridor:** • Construction duration: 30 months • Logistics compounds: Number: 8, Size: 140x140 m, Duration: 36 months • Noise levels during construction: Cable Installation: 108 dB, Construction of Joint Bays: 115 dB **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 36 months • Permanent infrastructure area: 155,000 m^2 • Temporary works area: 130,000 m^2 • Height of viewing platform: 30 m • Noise levels during construction: 108 dB **400 kV ECC:** • Number of cable circuits: 4 • Cable trench depth: 1.5 m • Length: 2,100m, Width: 60 m **Traffic Movements:** • Peak two-way daily HGV movements in one month: 1,097	These parameters present the maximum durations and disturbances which have the potential to indirectly (non-physically) impact upon designated heritage assets through an alteration to their setting.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
		• Peak two-way daily LCV movements: 368	
Direct impacts on non-designated heritage assets. Construction activities which may lead to disturbance of or removal of assets.	Primary: Co2 Co7 Co150 Co162 Tertiary: Co10 Co124 Secondary: Co160	**Landfall:** • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months • Transition Joint Bays (located within Landfall compound area): Number: 6, Depth: 6 m *HDD option (deeply buried archaeology):* • HDD cable ducts: Number: 8, Diameter: 1 m, Length: 1.5 km • HDD Entry Pits: Area: 125 m^2 per entry pit, Depth: 6 m • HDD burial depth: Maximum: 40 m, Minimum: 5 m • HDD Exit Pits: Number: 8, Area: 900 m^2 per exit pit, Depth: 5 m • Temporary intertidal exit pit working area: 1,600 m^2 per exit pit *Open cut option (near surface archaeology):* • Trench width per circuit: 15 m • Potential disturbance corridor from plant movements, excavation, etc.: 60 m per circuit • Maximum burial depth: 3 m **Onshore Export Cable Corridor:** • Construction duration: 30 months • Logistics compounds: Number: 8, Size: 140x140 m, Duration: 36 months • ECC: Length: 40 km (approximate), Width: 80 m, Area: 3,200,000 m^2 • Number of cable circuits (HVAC system): 6 • Cable trench: Depth: 1.5 m, Width at base: 1.5 m, Width at surface: 5 m	These parameters present the maximum below ground disturbances which could occur on buried archaeological and geoarchaeological remains at the landfall, onshore ECC, OnSS, Energy Balancing Infrastructure and 400 kV export cable including temporary compounds and access routes.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
		• Haul Road: Number: 1, Width: 6 m (with 7 m passing places), Length: 40 km, Depth: 1 m • Temporary access roads: Number: 24, Width: 6 m (with 7 m passing places), Total combined length (excluding existing paved sections): 10km, Depth: 1 m • Distance between Joint Bay/ Link Box: Minimum: 750 m, Maximum: 3,000 m • Joint Bays: Number: 240, Depth 2.5 m, Area: 225 m^2 per Joint Bay, Joint Bay compounds: 240 40x40 m compounds • Link Boxes: Number: 240, Depth: 2 m, Area: 9 m^2 per Link Box • HDDs: Number: 112, HDD compounds (entry and exit): Number: 56, Size: 70x70 m compounds **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 36 months • Permanent infrastructure area: 155,000 m^2 • Temporary works area: 130,000 m^2 • Temporary access road: Number: 1, Length: 1,600 m, Width: 15 m (8 m road, 7 m soil storage) **400 kV ECC:** • Number of cable circuits: 4 • Cable trench depth: 1.5 m • Length: 2,100m, Width: 60 m	
Indirect impacts on non-designated heritage assets. Construction activities which may lead to a	Primary: Co2 Co7 Co26 Co69 Co150	**Landfall:** • Construction duration: 32 months • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months • HDD: Number: 8 • HDD noise level: 120 dB	These parameters present the maximum durations and disturbances which have the potential to indirectly (non-

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
change in setting of assets.	Tertiary: Co10 Co124 Secondary: Co69 Co160	**Onshore Export Cable Corridor:** • Construction duration: 30 months • Logistics compounds: Number: 8, Size: 140x140 m, Duration: 36 months • Noise levels during construction: Cable Installation: 108 dB, Construction of Joint Bays: 115 dB **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 36 months • Permanent infrastructure area: 155,000 m^2 • Temporary works area: 130,000 m^2 • Height of viewing platform: 30 m • Noise levels during construction: 108 dB **400 kV ECC:** • Number of cable circuits: 4 • Cable trench depth: 1.5 m • Length: 2,100m, Width: 60 m **Traffic Movements:** • Peak two-way daily HGV movements in one month: 1,097 • Peak two-way daily LCV movements: 368	physically) impact upon non-designated heritage assets through an alteration to their setting.
Operation			
Indirect impacts on designated heritage assets. As a result of the presence of infrastructure in the	Primary: Co25 Co28 Co145 Co151	Onshore Operational life: 35 years **Landfall, Export Cable Corridor and 400kV ECC:** • N/A **Onshore Substation (HVAC option):** • Permanent infrastructure area: 155,000 m^2	These parameters present the maximum durations and maximum design scenarios for the permanent above ground infrastructure which have the potential

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
landscape with the potential to result in a change in setting of assets.	Secondary: Co30 Co159	• Main Buildings: Number: 2, Length: 240m (if single building), Width: 80m (if single building), Height: 25m • Secondary Buildings: Number: 15, Total Combined Area: 7,000m^2, Height: 15m • Height of lightning protection for main building: 30 m • Noise output (Variable Shunt Reactor): 97 dB per unit • Number of variable shunt reactors: 12 • Permanent access road: Number: 1 **Energy Balancing Infrastructure:** • Main and Secondary Buildings: Total Area (within permanent infrastructure area): 17,300 m^2 • Main buildings: Height: 15 m • Secondary buildings: Height: 20 m (type one) • Height of fire walls: 25 m • Lightning protection: Height: 25 m • Noise levels during operation (Power Convertors): 85 dB per unit • Power convertors: Number: 100	to indirectly (non-physically) impact upon designated heritage assets through an alteration to their setting.
Indirect impacts on non-designated heritage assets. As a result of the presence of infrastructure in the landscape with the potential to result in a change in setting of assets.	Primary: Co25 Co28 Secondary: Co30		
Decommissioning			
Scoped out of assessment			

5.10 Assessment methodology

5.10.1.1 The assessment methodology for the historic environment follows that presented in Annex C of the Scoping Report (Ørsted, 2018) with alterations which were agreed in previous consultation with the heritage stakeholders via the Evidence Plan process (Table 5.3).

5.10.2 Impact assessment criteria

5.10.2.1 The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity (heritage importance) of the heritage assets and the magnitude of the impacts (equivalent to degree of harm to heritage significance). This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors (importance of assets) and the magnitude of potential impacts. The terms used to define sensitivity (importance) and magnitude are based on those used in the DMRB methodology, which is described in further detail in Volume 1, Chapter 5: EIA Methodology.

5.10.2.2 The use of direct or indirect impact within this chapter has followed the methodology set out within the Scoping Report (Ørsted, 2018). In summary, direct is used where the impact could cause a physical change (via excavation, change in hydrology, etc.) to an asset through removal or disturbance or change of the asset's fabric (which could impact their heritage significance). Indirect has been used where the impact could cause a non-physical change to a heritage asset (e.g. through an alteration to the setting of an asset, which could impact heritage significance).

5.10.2.3 Table 5.9 contains criteria for defining sensitivity (heritage importance). For this chapter, sensitivity directly relates to the heritage importance of an asset. This is in part identified through consideration of the asset's significance which comprises one or a combination of its historic, archaeological, architectural and artistic interests.

5.10.2.4 *Heritage significance* is the sum of the heritage interests (as set out above) that are recognised within an asset, which should be protected or enhanced through sustainable development for future generations (NPPF 2019, Annex 2). The *importance* of a heritage asset is a measure of the degree to which the protection of an asset is sought (e.g. through protection via legislation, policy or the weight given to them in local planning decisions).

The examples used in Table 5.9 are only general and in some instances are indicative only. Non-designated heritage assets can (in certain circumstances) be as significant and important as designated heritage assets. Some heritage assets, principally buried archaeological remains, will often have limited information known about them (e.g. through a lack of archaeological evaluation/investigation) to confidently identify their heritage significance and likely importance. As such, where uncertainty occurs, the precautionary approach is to assign the highest likely level of importance. This is to ensure impacts to them are not underestimated. Where this is the case, the heritage importance will often be given in a range, e.g. low to medium or low to high, with the higher end used in consideration of the significance of effect when combined with impact magnitude.

Table 5.9: Definition of terms relating to receptor sensitivity (Heritage Importance).

Sensitivity (Heritage Importance)	Definition used in this chapter
Very High	Perceived international heritage importance. For example: World Heritage Sites and some Scheduled Monuments and Grade I and II* Listed Buildings and Registered Parks and Gardens Significance is related to an outstanding or very high degree of evidential, archaeological, historic, aesthetic, architectural or communal heritage interest, or combination of these.
High	Perceived national heritage importance. For example: Scheduled Monuments, Grade I, II* and II Listed Buildings, Registered Parks and Gardens and Conservation Areas. Significance is related to a high degree of evidential, archaeological, historic, aesthetic, architectural or communal heritage interest, or combination of these.
Medium	Perceived regional heritage importance. For example: some buried archaeological remains, 'locally listed' buildings or structures, and locally designated historic landscapes. Significance related to a moderate degree of evidential, archaeological, historic, aesthetic, architectural or communal heritage interest, or combination of these.
Low	Perceived local heritage importance. For example: assets which contribute to local research objectives, assets with a local value, educational interest or cultural appreciation, assets which may have been heavily compromised by poor preservation or poor contextual associations. Significance related to a certain (lower) level of evidential, archaeological, historic, aesthetic, architectural or communal heritage interest, or combination of these.

5.10.2.5 The criteria for defining magnitude of impact in this chapter are outlined in **Table 5.10**.

Table 5.10: Definition of terms relating to magnitude of an impact.

Magnitude of impact	Definition used in this chapter
Major	Total loss of, or substantial harm to, a heritage asset and / or its setting (adverse).
	Improvement to a heritage asset's significance, through restoration, enhancement or increased ability to appreciate that significance (beneficial).
Moderate	Partial loss of, harm to, or alteration of, a heritage asset and / or its setting which will detrimentally affect its significance (adverse).
	An enhancement to a heritage asset and / or its setting which affects its significance, or ability to appreciate the significance, moderately (beneficial).
Minor	Minor loss of or alteration to an asset and / or its setting which leaves its significance largely intact (adverse).
	Minor beneficial improvement to a heritage asset and / or its setting which provides some benefit to the historic environment (beneficial).
Negligible	Minimal alteration to an asset which does not affect its significance in any notable way (adverse or beneficial).

5.10.2.6 The significance of the effect upon the historic environment is determined by correlating the magnitude of the impact and the sensitivity (heritage importance) of the receptor (heritage asset). The method employed for this assessment is presented in Table 5.11. Where a range of significance of effect is presented in Table 5.11, the final assessment for each effect is based upon professional judgement.

5.10.2.7 For the purposes of this assessment, any effects with a significance level of minor or less are considered not significant in EIA terms.

Table 5.11: Matrix used for the assessment of the significance of the effect.

		Magnitude of Impact/Degree of Change			
		Negligible	**Minor**	**Moderate**	**Major**
Value, Importance, Sensitivity	**Low**	Not Significant	Not Significant or Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant) or Moderate (Significant)
	Medium	Not Significant	Minor (Not Significant)	Moderate (Significant)	Moderate (Significant) or Major (Significant)
	High	Not Significant	Minor (Not Significant) or Moderate (Significant)	Moderate (Significant) or Major (Significant)	Major (Significant) or Substantial (Significant)
	Very High	Not Significant	Moderate (Significant) or Major (Significant)	Major (Significant) or Substantial (Significant)	Substantial (Significant)

5.11 Impact assessment

5.11.1.1 During this PEIR stage of the project, a refined project footprint has been developed and further refinement of this route will continue through to the ES project phase, allowing for micro-siting/route re-alignment to be undertaken following completion of the non-intrusive archaeological evaluation works (i.e. priority archaeological geophysical survey) where possible, subject to survey timings and other non-heritage considerations. The opportunity for further micro-siting/re-routing will aim to reduce potential impacts to heritage assets particularly direct (physical) impacts on known non-designated buried archaeological remains. Appropriate commitments have been made and are detailed with the Commitments Register (**Volume 4, Annex 5.2**)

5.11.1.2 Consideration of any indirect (non-physical) impact, relating to change within the setting of heritage assets, from the offshore infrastructure upon onshore heritage assets has also been undertaken as part of this historic environment impact assessment and is discussed where appropriate, below. Overall, due to the lack of intervisibility between the offshore infrastructure and all onshore heritage assets (as a result of the long distances involved) there is considered to be no impact.

5.11.1.3 As part of the assessment of indirect (non-physical) impacts to heritage assets, relating to change in their setting, an assessment of how lighting, noise, traffic and visual changes could alter their setting (and as such potentially impact upon heritage significance) has also been undertaken with reference to the results of other PEIR chapters.

5.11.2 Construction

5.11.2.1 The impacts of the onshore construction of Hornsea Four have been assessed on the historic environment. The environmental impacts arising from the construction of Hornsea Four are listed in **Table 5.8** along with the maximum design scenario against which each construction phase impact has been assessed.

5.11.2.2 A description of the potential significance of effect on heritage assets caused by each identified impact (also described) is given below. In general terms, any intrusive ground work associated with site preparation and construction of the landfall, the onshore ECC, the OnSS and 400 kV ECC, inclusive of any temporary works areas, could result in physical damage and partial or complete removal of non-designated earthworks, buried archaeology, geoarchaeology or palaeoenvironmental remains.

Indirect Impacts on designated heritage assets (HE-C-2).

5.11.2.3 Indirect (non-physical) impacts, relating to change within the setting of heritage assets, could occur during construction activity due to the presence of machinery, construction traffic and general construction activities taking place within the landfall, onshore ECC, OnSS and 400 kV ECC areas along with any associated temporary works areas. This could

result in noise or visual changes which may affect the setting of a designated heritage asset and could potentially temporarily impact heritage significance.

5.11.2.4 All designated heritage assets brought forward for impact assessment (**Table 5.5**) have been considered for this type of impact. Due to the commitment to avoid direct (physical) impacts to designated heritage assets (see **Section 5.8.2**), this has resulted in most designated heritage assets being located at some distance from Hornsea Four.

5.11.2.5 Of particular importance in consideration of potential indirect (non-physical) impacts, relating to change within the setting of heritage assets, during construction are:

- Risby Hall Registered Park and Garden (RHDHV44) and its folly (RHDHV45), located 200 m to the west of the onshore ECC (**Figure 5.23**);
- The Scheduled Bronze Age Round Barrow within the barrow cemetery east of the OnSS location (RHDHV50**, Figure 5.3**); and
- Beverley Minster (RHDHV38) located approximately 4 km north of the OnSS **(Figure 5.20**).

5.11.2.6 Regarding the Risby Hall assets (RHDHV44 and 45), any indirect (non-physical) impact related to change in setting during construction is considered extremely minimal. This is because of the topography of the area and the fact that the Registered Park and Garden is masked from the onshore ECC by the tall and thick woodland belt on the eastern edge of the park.

5.11.2.7 Similarly, a change in the setting of the Scheduled Bronze Age Round Barrow (RHDHV50) during construction is also considered negligible, with the increase in traffic during construction being one which will not affect the setting in such a way that it affects the asset's heritage significance (see below). This is due to the lack of visibility and/or intervisibility as a result of existing infrastructure (the nearby rail line) and tree cover in the area.

5.11.2.8 As Beverley Minster (RHDHV38) is a dominant built feature in the landscape, how its setting may be affected by the construction of the onshore ECC and OnSS has also been considered, including a visit to the Minster to assess views from the top of its West Tower as part of the setting assessment (**Volume 6, Annex 5.1, Section 6**). This assessment identified that the OnSS is located at such a point in the landscape that any construction activity will only be present within the background of a wide panoramic view from the top of the Minster's West Towers and the OnSS area specifically is in an area already altered by modern infrastructure (Creyke Beck Substation, tall electricity pylons, main roads etc.). Views from, and the setting of, Beverley Minster was found to contribute to its significance mostly through its intervisibility with St Mary's Church, Beverley and the historic townscape visible within the immediate environs of the Minster.

5.11.2.9 The setting of a heritage asset can also be affected by changes due to the presence of machinery, use of lighting during construction, changes in traffic movements and potential noise issues (**Volume 3, Chapters 4, 7** and **8**). Upon consideration of the results of these topics

within other PEIR chapters, it is considered that the increases in lighting, noise and traffic movements during construction will not result in material changes to the setting of heritage assets, and would not affect their significance, ability to appreciate significance or ultimately their importance.

5.11.2.10 The increases in traffic were found to be most substantial along the A164, west of Cottingham and Beverley, where a peak of 1,097 two-way HGV movements would occur per-day during the construction period. This is due to the amount of deliveries required for construction of the OnSS in combination with the Onshore ECC and landfall construction traffic. This main road does not travel through any Conservation Areas or near to any other designated heritage assets. Towards landfall, the largest increase in traffic will occur on the A165, east of Lissett, where a maximum of 248 HGV two-way movements per-day will occur. Commitment Co150 (see Commitments Register: **Volume 4, Annex 5.2**) identifies that construction traffic for the OnSS will be routed around Cottingham, avoiding any potential temporary change in setting issues arising within the Conservation Area.

5.11.2.11 In terms of potential lighting impacts, task lighting may be required for certain aspects of work. However, as construction will mostly occur during daylight hours (Co36), lighting is not expected to be a major requirement or cause any potential temporary change within the setting heritage assets. Similarly, construction activity is located at such a distance that any temporary noise impacts associated with construction work is identified as not resulting in an indirect (non-physical) impact on designated heritage assets. A commitment has been made to ensure that site lighting will only operate when required and will be directional to avoid unnecessary illumination (Co69).

5.11.2.12 There is also a potential impact due to the introduction of the temporary access trackway to the OnSS during construction, which will result in the introduction of road traffic alongside (directly east of) the Ancient Woodland of Birkhill Wood (RHDHV46). Road traffic is currently not part of the woodland's setting (apart from some perceptible noise from the nearby A164). The construction-related traffic in this instance will be temporary in nature and therefore not a material consideration at this time. Furthermore, the introduction of the traffic will not result in a change in setting that would be considered to affect the medium heritage importance of the Ancient Woodland.

Magnitude of impact

5.11.2.13 This impact will be temporary and intermittent, for the duration of construction works (maximum of 36 months) and reversible. The magnitude of the impact is considered **minor**.

Sensitivity of the receptor

5.11.2.14 The designated heritage assets within the study area are of **medium** (Birkhill Woodland), or **high** (Risby Hall assets, the Scheduled Bronze Age round barrow and Beverley Minster) heritage importance.

Significance of the effect

5.11.2.15 Overall, it is predicted that the indirect (non-physical) impact to designated heritage assets during construction is of temporary **minor adverse** significance, which is not considered significant in EIA terms.

Direct Impacts on non-designated heritage assets (HE-C-3).

5.11.2.16 Direct (physical) impacts could occur as a result of intrusive groundworks and other construction-related activities associated with the construction works at the landfall, onshore ECC, OnSS and 400 kV ECC. The construction-related works could impact upon the significance of known or as-yet unknown non-designated heritage assets including buried geoarchaeological and archaeological remains, historic earthworks and structures. The types of construction-related activities which could directly impact these types of heritage assets (and their associated heritage significance) are, but not limited to:

- Removal of topsoil and subsoil within the Hornsea Four project boundary;
- Excavation of Transition Joint Bays (TJBs) at the landfall;
- Open-cut excavation of the cable trenches within the onshore ECC;
- Excavation of joint bays, HDD pits and link boxes along the onshore ECC;
- Groundworks associated with temporary works areas at landfall, along the onshore ECC, OnSS and 400 kV ECC;
- Groundworks associated with other infrastructure for the project (i.e. new roads, temporary access points, new drainage etc.);
- Intrusive groundworks associated with the construction of the OnSS; and
- Hydrological changes as a result of intrusive works including HDD drilling.

5.11.2.17 Any direct (physical) impacts to non-designated heritage assets (and their associated heritage significance) would be permanent and irreversible. In particular, once buried archaeological and geoarchaeological remains, as well as earthworks/built heritage assets, are disturbed or removed without an appropriate record having been made, their context and relationship to other archaeological features and deposits is partially or completely lost and their heritage significance is as such likely to be reduced.

5.11.2.18 The non-designated heritage assets (**Figure 5.2**) identified as being potentially subject to direct (physical) impact by Hornsea Four, and areas where there is a high potential for other buried non-designated heritage assets to survive in association with the known non-designated heritage assets, include:

Landfall

- RHDHV01: World War II sea defences; and
- RHDHV02: buried archaeological remains & World War II defences.

Onshore ECC

- RHDHV04: Winkton Deserted Medieval Village;
- RHDHV06: Lissett Airfield (concrete remains associated with airfield, archaeological and geoarchaeological potential);
- RHDHV08: Three enclosures near Foston-on-the-Wolds;
- RHDHV10: Buried archaeological remains (ditch);
- RHDHV11: Buried archaeological remains (enclosure);
- RHDHV13: Potential buried archaeological remains (road);
- RHDHV14: Possible enclosures near Carr Lane;
- RHDHV15: Buried remains of a gravel pit;
- RHDHV17: Potential buried remains (well, ring ditch, road);
- RHDHV18: Potential Iron Age Square Barrow;
- RHDHV21: Archaeological remains, gravel pit and nearby prehistoric features;
- RHDHV22: Buried remains (Iron Age enclosure and nearby features);
- RHDHV24: Buried remains of Winthorpe Manor;
- RHDHV26: Raventhorpe deserted medieval settlement;
- RHDHV28: Buried remains (Oval enclosure, post-medieval farm);
- RHDHV31: Early Iron Age to Roman Enclosure;
- RHDHV32: Medieval Bank (earthwork);
- RHDHV53: Buried remains of three round barrows, identified as cropmarks; and
- RHDHV54: Buried remains of enclosures and field system ditches.

OnSS

- RHDHV48: Undated pit; and
- RHDHV49: Polygonal enclosure and potential round barrow.

The 400 kV ECC

- RHDHV50: Bronze Age round barrow cemetery.

5.11.2.19 There is potential for further, as yet, unknown non-designated heritage assets (i.e. archaeological sites) to be identified during the ES stage of Hornsea Four following the ongoing survey and assessment works (**Volume 6, Annex 5.2** and **Volume 6, Annex 5.3**). To date, the most important areas to highlight where there is a higher potential for encountering currently unknown heritage assets include:

- **RHDHV02**: evidence for buried archaeological remains of a large settlement in the form of cropmarks, recorded within the HHER and further detailed during the Aerial Photographic and Lidar Assessment and World War II defences (pillboxes) located within the footprint of the landfall compound (**Figure 5.4**);
- **RHDHV04**: Winkton Deserted Medieval Village is recorded within the HHER and indicates a high possibility of buried remains associated with the village to be located within the field which the onshore ECC passes through (**Figure 5.5**);
- **RHDHV 10 and 11**: HHER data records presence of buried archaeological remains (ditches). This was confirmed during initial Priority Archaeological Geophysical Survey (**Figure 5.12**, **Volume 6, Annex 5.3**);

- **RHDHV26**: Raventhorpe Deserted Medieval Village, seen as cropmarks and earthworks to the east of the onshore ECC, its extent is confirmed to continue into the onshore ECC during the initial Priority Archaeological Geophysical Survey (**Volume 6, Annex 5.3**);
- **RHDHV49**: evidence for extensive buried archaeological remains of multiple enclosures and potential round barrows recorded in the HHER and further detailed in the Aerial Photographic and Lidar Assessment are located within the permanent footprint at the OnSS (**Figure 5.3**); and
- **RHDHV50**: evidence for a barrow cemetery located within the fields to the north-east of the OnSS, including one barrow which is Scheduled (located outside of the 400 kV ECC search area) and further non-designated remains are recorded within the HHER and visible as cropmarks on aerial photography (**Figure 5.3**, **Volume 6, Annex 5.2**).

5.11.2.20 The remaining areas of Hornsea Four are also considered to have a medium potential for archaeological remains to be identified during ongoing non-intrusive evaluation work (geophysical surveys) and subsequent future intrusive evaluation (trial trenching) post-application, at the relevant juncture, agreed with Hornsea Four and the heritage stakeholders. This is in part due to the large amount of buried archaeological remains and findspots already identified and recorded by HHER within the study areas, and large areas of the onshore ECC not having been subject to previous development or ground intrusive impacts.

5.11.2.21 Certain areas will likely be 'quieter' or contain no remains or remains of lesser importance (e.g. post-medieval boundaries already recorded on historic mapping) than other areas. This is already being indicated in some of the Priority Archaeological Geophysical Survey area results, where some areas have little evidence for buried archaeological remains, or only evidence for furrows or post-medieval boundary ditches. This will ultimately be confirmed through ground truthing, again as part of subsequent future intrusive evaluation (trial trenching) post-application at the relevant juncture, agreed with Hornsea Four and the heritage stakeholders.

5.11.2.22 Two broad areas of high geoarchaeological potential (**Volume 6, Annex 5.4**) have currently been identified between:

- Fraisthorpe to North Pasture Farm; and
- North Pasture Farm to Rotsea.

5.11.2.23 In terms of potential hydrological changes to geoarchaeological or archaeological deposits caused by any intrusive groundworks, the Geoarchaeological Assessment (**Volume 6, Annex 5.4**) and **Chapter 2: Hydrology and Flood Risk** have identified that the depth of excavation work is one that could result in localised changes to groundwater. Deeper groundwater is not affected. As such, hydrological changes are expected within the direct locality of the cable trenches (which are 1.5 m deep), with any potentially deeper geoarchaeological deposits not affected by hydrological changes.

5.11.2.24 The built heritage resource potentially affected include the World War II pillboxes and anti-tank cubes located at the landfall (RHDHV01 and 02) and the concrete tracks associated

with Lissett Airfield (RHDHV06**,** Figure 5.7) along the onshore ECC. A pillbox is located within the centre of a field at landfall, along with another located on the field boundary at landfall (Figure 5.2). The anti-tank cubes are in linear sections along the beach, within the intertidal zone (see **Volume 2, Chapter 10: Marine Archaeology**).

Magnitude of impact

5.11.2.25 Direct (physical) impacts have the potential to partially or completely disturb or remove buried geoarchaeological and/or archaeological remains, along with the potential to disturb or remove the World War II defences at the landfall and the World War II concrete tracks at Lissett Airfield. Heritage significance could be lost or partially lost. Therefore, the magnitude of direct (physical) impacts upon certain non-designated heritage assets is considered **moderate** to **major** adverse, as a likely worst-case.

5.11.2.26 In consideration of buried archaeological and geoarchaeological remains, the extent and severity of the direct (physical) impact will depend upon the presence, nature and depth of the buried remains, comparative to the depth and extent of the construction-related groundworks. A reduction in magnitude could occur where interaction between the groundworks and potential buried archaeological and/or geoarchaeological remains is unlikely or limited.

Sensitivity of the receptor

5.11.2.27 The non-designated heritage assets potentially affected by Hornsea Four and brought forward to impact assessment have been identified as part of the baseline collation (Table 5.5). The baseline also identified a medium to high potential for as-yet unknown buried archaeological remains to be located within the Hornsea Four project boundary. These known heritage assets and potential buried archaeological remains are considered to have an unclear level of significance, due to a lack of information and could be anywhere from **low** to **high** heritage importance. In particular, the known and potential buried remains around the OnSS (RHDHV49) could be of **high** heritage importance. The built heritage assets potentially affected are considered to be of **low** or **medium** heritage importance.

Significance of the effect

5.11.2.28 In consideration of the (at most) high heritage importance of the known non-designated heritage assets and potential buried archaeological remains within the Hornsea Four project boundary, there is the potential for permanent **minor** to **major adverse** effects upon these assets, prior to any mitigation, an impact which would be considered significant in EIA terms.

Further mitigation: buried archaeological remains and above ground earthworks

5.11.2.29 To date, a staged programme of assessment and evaluation have been undertaken to ensure an understanding of the known and potential non-designated heritage assets within the Hornsea Four boundary is established. This assessment work began with the production of the Historic Environment DBA (**Volume 6, Annex 5.1**), which included walkover surveys. Baseline data for this chapter was further supplemented with the initial findings from the assessment of aerial imagery and Lidar data, initial Priority Archaeological Geophysical Survey and assessment of existing geoarchaeological and geotechnical information (**Volume 6, Annexes 5.2, 5.3** and **5.4**).

5.11.2.30 Hornsea Four is committed to completing the Priority Archaeological Geophysical Survey and Aerial Photographic and Lidar assessment work (Co162), which will inform the ES stage to further establish and refine the archaeological potential of Hornsea Four.

5.11.2.31 Archaeological trial trenching is anticipated to be undertaken at the post-consent/pre-construction stage, the methodology of which will be set out within an Onshore WSI (Co160). An outline WSI will be submitted to support the DCO. However, consideration of undertaking trial trenching at the post-application stage within the OnSS permanent footprint and/or any other areas where there are engineering constraints will be made should significant archaeological remains be identified through ongoing baseline surveys. Any areas of archaeological trial trenching will be agreed through ongoing consultation with the heritage stakeholders and will be subject to landowner access agreements.

5.11.2.32 Further micro-route refinement (within the redline boundary) and preservation of remains *in-situ* could also be considered where buried remains are revealed during post-consent/pre-construction evaluation works to be of high importance, and where direct impacts upon their heritage significance were also relevant.

5.11.2.33 Following the non-intrusive and intrusive archaeological evaluation stages and where preservation in-situ is not possible (e.g. due to other environmental and engineering constraints), archaeological mitigation will be implemented to off-set any direct impact upon non-designated heritage assets. These mitigation measures are considered industry standard in terms of ensuring archaeological remains are appropriately preserved by record and the residual impact is generally considered **non-significant** in EIA terms. Industry standard good practices for archaeological mitigation includes:

- **Open area or detailed excavation.**
  Including presentation of results within an archive and publication. This option results in machine stripping of topsoil/subsoil to the archaeological horizon. Features are excavated by hand to a percentage agreed with the heritage stakeholders. This is used where buried archaeological remains are of an importance and associated significance which requires a high sampling percentage of the remains.

- **Strip, Map and Sample excavation.**
  Including presentation of results within an archive and publication. This option is used where archaeological remains require hand excavation and recording and is undertaken following the same principles as open area excavation. However, the archaeological remains are identified as being of possibly lesser importance and associated significance and therefore can be understood through a lower sampling percentage as agreed with the heritage stakeholders.

- **Watching briefs/archaeological monitoring of groundworks.**
  Including presentation of results within an archive and (where appropriate) publication. This option is used where the heritage importance and associated significance of a known asset is considered low or very low, or where there is a lower potential for unknown remains to be present. Monitoring of intrusive groundworks is undertaken by a qualified archaeologist and any remains identified are excavated and recorded.

5.11.2.34 Areas of Hornsea Four where these standard mitigation practices may be required will be identified through further evaluation as part of the ES phase along with post-consent archaeological trial trenching. Any areas where these approaches could be required will be identified and agreed upon between the Applicant and the heritage stakeholders and detailed within an Onshore WSI (Co160). An outline WSI will be submitted to support the DCO.

5.11.2.35 Potential impacts to geoarchaeological deposits as a result of intrusive ground works or hydrological changes will be assessed and addressed through phases of geoarchaeological investigation / assessment of geotechnical logs produced as part of Ground Investigation (GI) works for Hornsea Four at the post-consent/pre-construction phase. This work would be detailed within an onshore WSI(s), to be agreed in outline between Hornsea Four and heritage stakeholders.

Further mitigation: built heritage

5.11.2.36 In consideration of the built heritage assets located within the landfall area (World War II defences, RHDHV01 and 02), recommended mitigation options include the use of exclusion zones during construction and potentially historic building recording prior to construction works.

5.11.2.37 The pillboxes located within the landfall footprint (RHDHV02), just above the cliff edge, could be protected through use of exclusion zones during construction. An area around the heritage assets could be secured with HERAS fencing, along with signage identifying the exclusion zone. The requirements and location of any exclusion zones will be identified and agreed between Hornsea Four and the heritage stakeholders prior to construction.

5.11.2.38 Within the intertidal zone, the built heritage assets which could be affected are the anti-tank blocks (part of RHDHV01); these may require moving to allow access for construction-related activities. To mitigate any impact, the blocks could be recorded to Historic England's Level 1 historic building recording standard and a report produced prior to the blocks being

moved and stored on-site. Following construction works, the anti-tank cubes could be reinstated to their original location; the requirement and practicalities of this would be discussed in consultation with the heritage stakeholders.

5.11.2.39 To minimise any impact upon the Lissett Airfield concrete tracks (RHDHV06) it is recommended that, should these be removed to enable construction, the concrete tracks are reinstated once construction work is complete. A level of historic building recording prior to removal may also be appropriate.

5.11.2.40 With these mitigation measures in place, alongside the Commitments set out by Hornsea Four, it is considered that the residual level of impact would not be reduced as the magnitude of effect to non-designated heritage assets would remain the same. However, the mitigation recommendations listed above are considered to offset the levels of impact to non-significant in EIA terms.

5.11.2.41 These mitigation measures will be secured through the Onshore WSI (Co160). An outline WSI will be submitted to support the DCO.

Indirect Impacts on non-designated heritage assets (HE-C-4).

5.11.2.42 During construction, there is the potential for non-designated heritage assets, including the historic landscape, to be indirectly (non-physically) impacted by construction-related activities, which could potentially impact heritage significance. Indirect (non-physical) impacts are likely to occur as a result of the presence of machinery, construction traffic and general construction activities taking place within the landfall, onshore ECC, OnSS and 400 kV ECC areas along with any associated temporary works areas. Indirect (non-physical) impacts could also result from the introduction of lighting and noise and increased traffic. These changes to the existing environment could alter the setting of an asset and as a result potentially affect its heritage significance.

5.11.2.43 The non-designated heritage assets identified which could be indirectly impacted during construction, as a result of temporary change in their setting, (**Figure 5.2** to **Figure 5.24**) are:

Landfall

- RHDHV01: World War II sea defences; and
- RHDHV02: Buried archaeological remains & World War II defences.

Onshore ECC

- RHDHV04: Winkton Deserted Medieval Village;
- RHDHV06: Lissett Airfield;
- RHDHV08: Buried archaeological remains of three enclosures near Foston-on-the-Wolds;
- RHDHV16: Wiltholme Road bridge;
- RHDHV22: Buried remains (Iron Age enclosure);
- RHDHV24: Buried remains of Winthorpe Manor;
- RHDHV26: Raventhorpe Deserted Medieval Village;

- RHDHV28: Buried remains of an oval enclosure and post-medieval farmstead;
- RHDHV31: Early Iron Age to Roman Enclosure; and
- RHDHV32: medieval earthwork bank.
- RHDHV53: Buried remains of three round barrows, identified as cropmarks; and
- RHDHV54: Buried remains of enclosures and field system ditches.

OnSS / EBI / 400 kV ECC

- RHDHV49: Polygonal enclosure and potential round barrow; and
- RHDHV50: Buried remains (Bronze Age round barrow cemetery).

5.11.2.44 These assets were visited as part of the walkover survey to inform the baseline, during which setting assessments were undertaken.

Magnitude of impact

5.11.2.45 Indirect (non-physical) impacts associated with change in the setting of non-designated heritage assets would be intermittent (during work hours), temporary, and of such a duration (up to 36 months) that it would not give rise to an impact of more than **minor** in magnitude.

5.11.2.46 Many of these non-designated heritage assets are buried archaeological remains located within arable fields. Where this is the case, the impact to setting is very minimal due to the setting being one of modern agriculture in most cases. As such, consideration of the magnitude is considered less than negligible, i.e. no impact.

Sensitivity of the receptor

5.11.2.47 These non-designated heritage assets include built remains and buried archaeological remains/earthworks located near to or within the Hornsea Four project footprint, as well as the historic landscape. The built remains are of **low** or **medium** heritage importance (e.g. RHDHV01) whilst the buried remains could be anywhere from **minor** to **high** heritage importance. The historic landscape is considered to be of **low** heritage importance.

Significance of the effect

5.11.2.48 Overall, it is predicted that the indirect (non-physical) impact to non-designated heritage assets during construction is of temporary **minor adverse** significance, which is not considered significant in EIA terms.

Further mitigation

5.11.2.49 In consideration of the Hornsea Four Project Commitments Co10, Co26 and Co28, the reinstatement of all work areas to pre-construction conditions and the reinstatement of hedgerows (including parish and county boundaries) will further reduce the significance of this negligible to minor adverse impact upon the historic landscape and setting of other non-designated heritage assets.

Future monitoring

5.11.2.50 Direct (physical) impacts would be offset or reduced through archaeological fieldwork and reporting, undertaken by professional archaeologists and monitored by Hornsea Four and the Archaeological Advisor to ERYC, or through avoidance of assets where possible within the confines of other engineering and environmental constraints.

5.11.3 Operation and Maintenance

5.11.3.1 The impacts of the onshore operation and maintenance of Hornsea Four have been assessed on the historic environment. The impacts arising from the operation and maintenance of Hornsea Four are listed in **Table 5.8** along with the maximum design scenario against which each impact has been assessed. These operation and maintenance impacts are also discussed below.

5.11.3.2 During operation and maintenance, no further intrusive ground works are expected to be required, apart from any unforeseen maintenance or repair requirements of the cable within the onshore ECC. This activity would not extend beyond the footprint used during construction however, resulting in no further potential for direct (physical) impacts to non-designated heritage assets (buried archaeology).

5.11.3.3 The potential impact identified as requiring the most consideration during the operation and maintenance phase of Hornsea Four is any indirect (non-physical) impacts, associated with a change in the setting of designated and non-designated heritage assets, which could affect their heritage significance. These impacts are related to the presence of the permanent infrastructure located at the OnSS.

Indirect Impacts on designated heritage assets (HE-O-5).

5.11.3.4 The presence of the OnSS permanent infrastructure within the landscape during the operation and maintenance phase could result in an indirect (non-physical) impact upon the significance of designated and non-designated heritage assets (**Figure 5.3**).

5.11.3.5 The majority of Hornsea Four consists of underground elements (landfall, the onshore ECC and the 400 kV ECC from the OnSS) and as such will not indirectly impact heritage assets during operation and are not considered further. Consideration was also given to potential indirect (non-physical) impacts on designated assets from the offshore infrastructure such as potential indirect impacts to the setting and associated heritage significance of Skipsea

Castle. However, the setting assessment has identified that no indirect (setting) impacts would occur due to the vast distance (approximately 65 km to the array and 25 km to the offshore booster station) precluding intervisibility between the heritage assets near the coastline and the offshore infrastructure.

5.11.3.6 Indirect (non-physical) impacts could occur as a result of change in the setting of designated heritage assets within the locality of the OnSS due to visual changes which may alter the setting and negatively affect the heritage significance of an asset. A setting assessment was undertaken on heritage assets identified as potentially being affected by Hornsea Four as part of the Historic Environment DBA (**Volume 6, Annex 5.1**). Some designated assets thought to potentially be affected during the setting assessment were found to have no visibility / intervisibility with the Hornsea Four OnSS during walkover surveys and are not considered further. These heritage assets are principally located within Cottingham and the Hull Suburbs (see **Volume 6, Annex 5.1, Section 6**).

5.11.3.7 The designated assets considered further at this stage (**Figure 5.3** to **Figure 5.24**) are:

- RHDHV33: Burton Bushes Ancient Woodland;
- RHDHV34: Roman enclosure earthworks on Westwood Pasture (Scheduled Monuments);
- RHDHV35: Round and square barrow earthworks on Westwood Pasture (Scheduled Monuments);
- RHDHV36: Beverley Conservation Area;
- RHDHV37: Church of St Mary, Beverley (Grade I Listed Building);
- RHDHV38: Beverley Minster (Grade I Listed Building);
- RHDHV43: Cellar Heads moated manor site (Scheduled Monument);
- RHDHV44 and 45: Risby Hall and folly (Scheduled Monument, Grade II Listed Building and Grade II Registered Park and Garden);
- RHDHV46: Birkhill Ancient Woodland;
- RHDHV47: Skidby Windmill (Grade II* Listed Windmill and Grade II Listed outbuildings);
- RHDHV50: Barrow cemetery east of OnSS (one barrow is a Scheduled Monument);
- RHDHV51: Old Hall (Grade II Listed Building); and
- RHDHV52: White Hall (Grade II Listed Building).

5.11.3.8 The potential indirect impact may occur mostly due to intervisibility between the heritage assets and the OnSS, however noise, lighting and changes to the landscape were also considered as these factors could also alter a heritage asset's setting, and associated heritage significance. Intervisibility was found to be most important for heritage assets closest to the OnSS permanent structure; these included: Birkhill Ancient Woodland (RHDHV46), Old Hall, White Hall (RHDHV51 and 52) and the Scheduled round barrow east of the OnSS (RHDHV50). Similarly, further afield, designated heritage assets with a strong vertical dominance (e.g. Beverley Minster and the Church of St Mary, Beverley) as well as assets topographically situated overlooking the OnSS (assets on Westwood Pasture) were identified as having a clear visual connection with other heritage assets and the landscape.

5.11.3.9 Intervisibility from the top of vertically dominant heritage assets was informed by on-site work, including a heritage site visit which accessed the Beverley Minster West Towers (RHDHV38), as well as consideration of visualisations produced for the LVIA (**Chapter 4: Landscape and Visual**). Of importance and identified during Technical Panel meetings, was the need to establish if the views shared between St Mary's Church, Cottingham and Beverley Minster (Viewpoints 9 and 10 in **Chapter 4: Landscape and Visual**) would be affected by the OnSS, which would be located between the two heritage assets. The LVIA visualisations, as well as the site visit, identified that intervisibility between St Mary's Church and Beverley Minster from the top of the Minster was not possible, whilst the views achieved offer wide panoramas of quite built up areas, of which, only the nearest historic buildings within the immediate townscape of the Minster are considered to contribute to its significance.

5.11.3.10 The designated heritage assets located in and around Beverley are considered as a whole (RHDHV 33 to 38, **Figure 5.20**). In particular, the designated heritage assets located on Westwood Pasture form a cohesive group, all adding greatly to the historic interest of the common land, which can be considered an asset in its own right and greatly contributing to the character of Beverley Conservation Areas (RHDHV36 and 39). Views towards the OnSS from Westwood Pasture are available, forming part of the Holderness backdrop and dominated by Beverley, particularly its Minster (RHDHV38) and St Mary's Church (RHDHV37), in the foreground. The OnSS location forms a very small part of this wider panoramic view, which is already busy with modern infrastructure such as the large power pylons of Creyke Beck NGET substation. Views from the top of Beverley Minster indicate that the OnSS would be visible, but this alteration within its wider view is not considered to represent a material change to the heritage significance of the Minster. Change in the setting is considered minimal as the wider landscape is already one with a considerable amount of modern infrastructure (busy roads, electricity pylons and industrial units).

5.11.3.11 Skidby Windmill (RHDHV47, **Figure 5.23**) is located in quite a prominent position overlooking much of the local landscape and forming a landmark when within approximately 1 km of the asset, due to the position on raised ground at the east of Skidby. The windmill dominates the local landscape and is visible on the approach from nearby roads. Intervisibility with the OnSS was identified from the ZTV (**Chapter 4: Landscape and Visual**), however following a site visit and setting assessment, when located within the setting of the windmill, intervisibility with the OnSS location is very limited and not considered to affect the setting and associated heritage significance of the asset.

5.11.3.12 A similar vista-like view is obtained from Cellar Heads moated site (RHDHV 43), which also forms part of a wider asset group with Risby Hall gardens, located to the south. Intervisibility with the OnSS from Cellar Heads is obtained from within its peaceful rural setting. This view incorporates the OnSS on the distant horizon which is already dominated by the tall electricity pylons of Creyke Beck NGET substation. This change in view is not considered to affect the heritage significance of the moated site. Inversibility with the OnSS from within the grounds of Risby Hall (RHDHV44; now a fishing lake) is not obtained due to the masking of views eastwards by a thick pine wood belt around its perimeter. Views towards the OnSS are obtained however from a PRoW directly east of Risby Hall's boundary (used as an LVIA

Viewpoint; **Chapter 4: Landscape and Visual, VP6**), from which views towards Beverley Minster are also possible.

5.11.3.13 The introduction of the OnSS will alter views across the historic Holderness landscape from those heritage assets located closer to the OnSS such as Old Hall and White Hall (RHDHV 51 and 52), located 1.7 km north of the OnSS, as well as Birkhill Ancient Woodland (RHDHV46, **Figure 5.3**), located c.400 m to the north-west, and the barrow cemetery (including one Scheduled Monument, RHDHV50) located c.840 m to the east. Again, changes in setting as a result of the OnSS permanent infrastructure is considered minimal due to the existing industrialised landscape character nearby (mainly influenced by the Creyke Beck NGET substation).

5.11.3.14 The ancient woodland (RHDHV46) is quite well masked from the OnSS, although the OnSS will be visible from the eastern and southern limits of the woodland. The Scheduled round barrow (part of RHDHV50) is partially masked as a result of Creyke Beck NGET substation and the Beverley rail line. Partial views are obtained from Old Hall (RHDHV51), which is in a very open Holderness landscape, whilst White Hall (RHDHV 52) is tightly contained within a more enclosed setting due to limited views out from the asset caused by a tall woodland belt around the farm. Views from these assets which form an important part of the setting (and contribute to heritage significance) are northwards however, with visibility of Beverley Minster forming an important aid in the appreciation of the assets, as well as adding to their historic interest. The views southwards are not as important and the change to them as a result of the OnSS is limited and considered not to affect their heritage significance.

5.11.3.15 Consideration of the lighting used on the OnSS has been given to identify if any permanent lighting will be used which could affect the setting of a heritage asset and their associated heritage significance. As the OnSS is an unmanned structure, the on-site lighting will only be required for security and will be designed to ensure as minimal a change possible in the local landscape. Full assessment of operational lighting is undertaken in **Chapter 4 Landscape and Visual**. It is considered that this lighting will not result in a change to the setting of an asset which could alter its heritage importance. Any maintenance works could require lighting; however, maintenance is expected to occur during normal working hours, reducing the potential for times when lighting may be required. Overall, the potential for lighting to impact the setting (and associated heritage significance) of a heritage asset during operation and maintenance is negligible.

5.11.3.16 Similarly, noise is expected to not alter the setting of the assets in such a way to affect the heritage significance of the assets. This is due to the operational noise levels of Hornsea Four being of such a level as to not be of significance (**Chapter 4: Noise and Vibration**).

Magnitude of impact

5.11.3.17 There is a **minor**, long-term, magnitude of indirect (non-physical) impact to these heritage assets as a result of some visual changes to their setting. This could be considered to contribute to their heritage significance and ultimately heritage importance. As described above, the intervisibility or visibility of the OnSS with and from the identified heritage assets

is often limited and the introduction of the OnSS within the existing landscape setting is not considered to result in a higher level of impact upon their setting, contribution to significance or appreciation of the assets. Similarly, the OnSS is not in a position which blocks any intervisibility between key heritage assets, nor is it within views considered to be of high historic interest.

Sensitivity of the receptor

5.11.3.18 The designated heritage assets listed above are of **high** heritage importance apart from the Burton Bushes and Birkhill Ancient Woodland areas, which are **medium**. The heritage assets located within Beverley, in particular Beverley Minster, are considered the most important assets to assess, due to their major historic and architectural interest fundamentally contributing to heritage significance. The other designated assets are importance due to forming a major part of the immediate historic landscape.

Significance of the effect

5.11.3.19 The significance of effect is considered, at worst, **minor adverse** which is not significant in EIA terms. The commitments and outline Design Vision Statement (**Volume 4, Annex 4.6: Outline Design Vision Statement**) for Hornsea Four ensure the residual effect is as minimal as possible. Certain aspects of the design and mitigation measures for the OnSS permanent infrastructure, influenced by other factors (e.g. **Chapter 4: Landscape and Visual**) could alter the perceptual changes which could reduce the impact on the significance of heritage assets further. For example, the final design of the OnSS will use colouring taken from the surrounding landscape, whilst carefully considered landscaping and planting can be used to reduce any visual impact from the presence of the OnSS whilst also not affecting the significance of any other nearby heritage assets. This in turn will reduce its visibility within the wider panoramic views from the heritage assets, described above, reducing the already negligible or minor indirect (non-physical) impact, associated with change in the setting of heritage assets.

Indirect Impacts on non-designated heritage assets (HE-O-6).

5.11.3.20 The non-designated heritage assets potentially affected by the presence of the OnSS permanent infrastructure (**Figure 5.3**) are the barrow cemetery (RHDHV50) and the archaeological remains located within and around the OnSS footprint (RHDHV49). No other non-designated heritage assets are identified as being potentially indirectly impacted, as a result of change in their setting, during the operation and maintenance of the OnSS. This is due to the majority of non-designated built heritage assets located within the confines of Beverley or Cottingham having no visibility with the OnSS. The non-designated buried archaeological remains identified within the OnSS study area are either no longer extant, having been excavated prior to other developments, or are sub-surface remains within modern agricultural fields and as such the change in setting is not considered to affect their heritage significance.

Magnitude of impact

5.11.3.21 There is a **minor**, long-term, magnitude of indirect impact to these non-designated heritage assets and their associated heritage significance. This is as a result of some visual changes to setting which could be considered to affect their heritage significance and ultimately heritage importance.

Sensitivity of the receptor

5.11.3.22 These non-designated heritage assets (enclosure and field systems, RHDHV49; buried remains associated with the scheduled barrow, RHDHV50) are of **medium** to **high** heritage importance, due to their ability to inform the prehistoric land use within the region. The barrow cemetery in particular can be considered of likely medium to high heritage importance due to forming part of a wider site and setting to the scheduled round barrow.

Significance of the effect

5.11.3.23 The significance of effect is considered to be, at worst, **minor adverse** which is not significant in EIA terms. The commitments and outline design vision statement (**Volume 4, Annex 4.6: Outline Design Vision Statement**) for Hornsea Four ensure the residual effect is as minimal as possible. As detailed above (see **paragraph 5.11.3.19**), certain aspects of the design and mitigation measures for the OnSS permanent infrastructure, influenced by other factors (e.g. **Chapter 4: Landscape and Visual**) could alter the perceptual changes which could reduce the impact on the significance of heritage assets further.

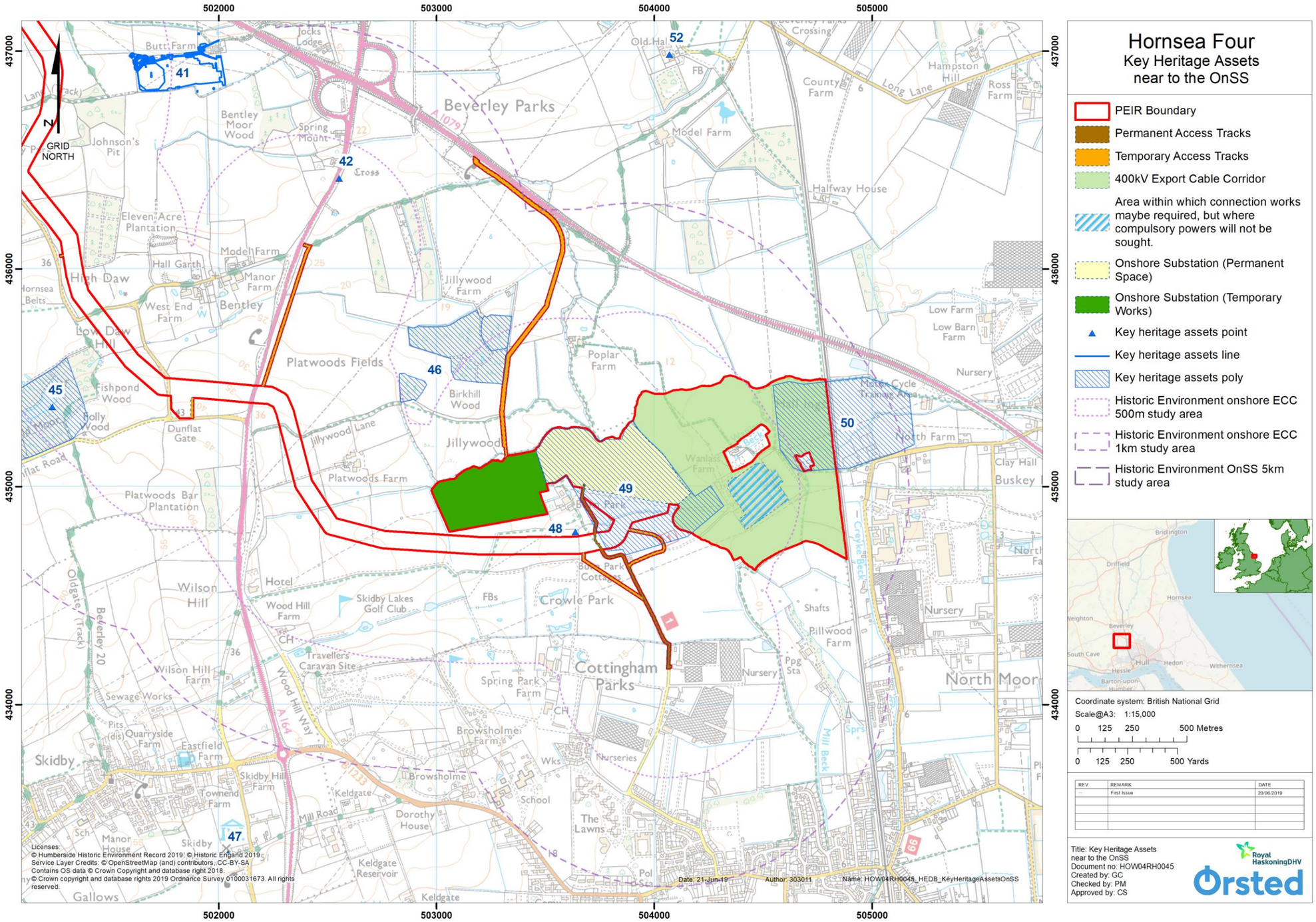

Figure 5.3: Key Heritage Assets near to the OnSS (Not to Scale).

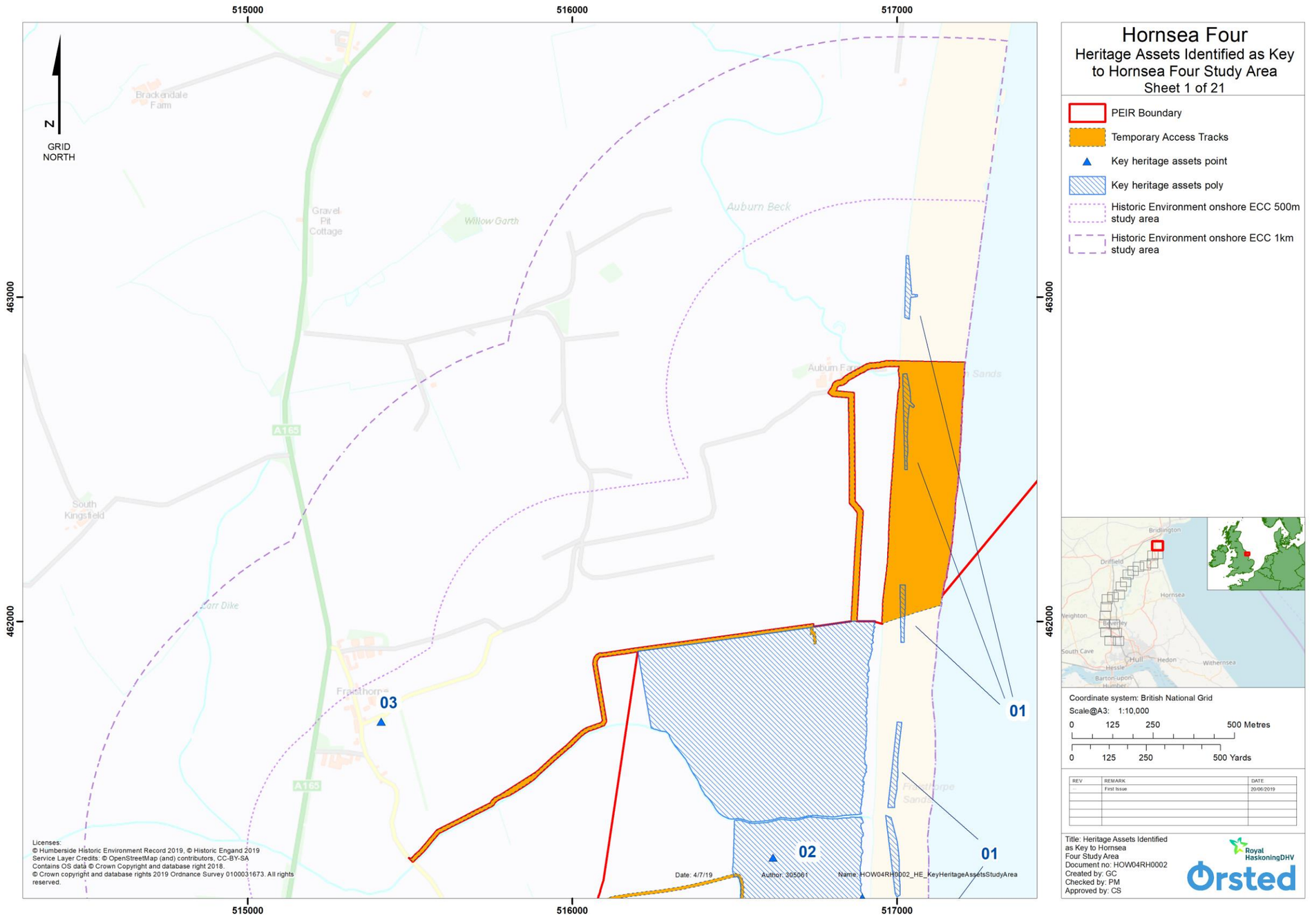

Figure 5.4: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 1 of 21) (Not to Scale).

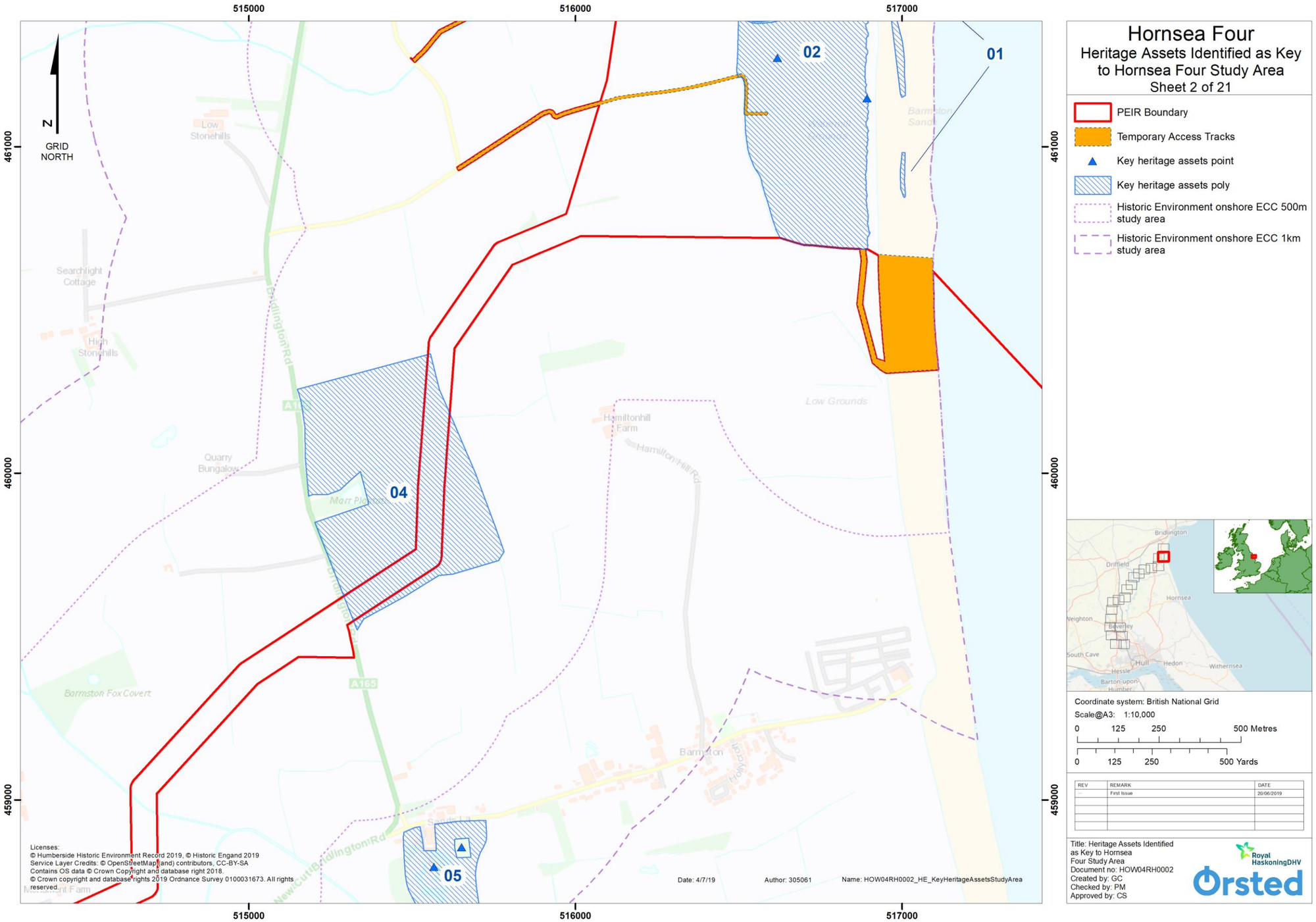

Figure 5.5: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 2 of 21) (Not to Scale).

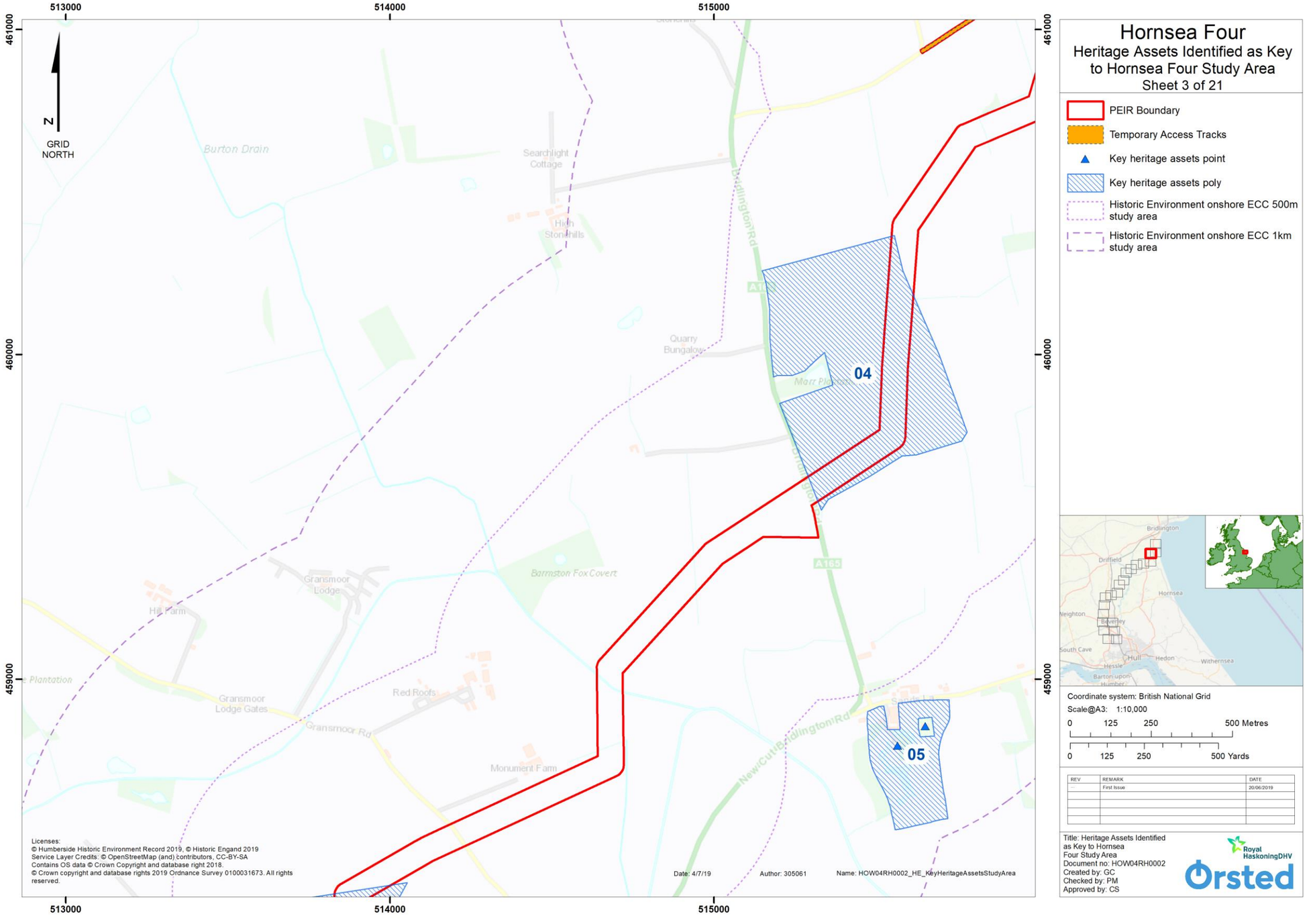

Figure 5.6: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 3 of 21) (Not to Scale).

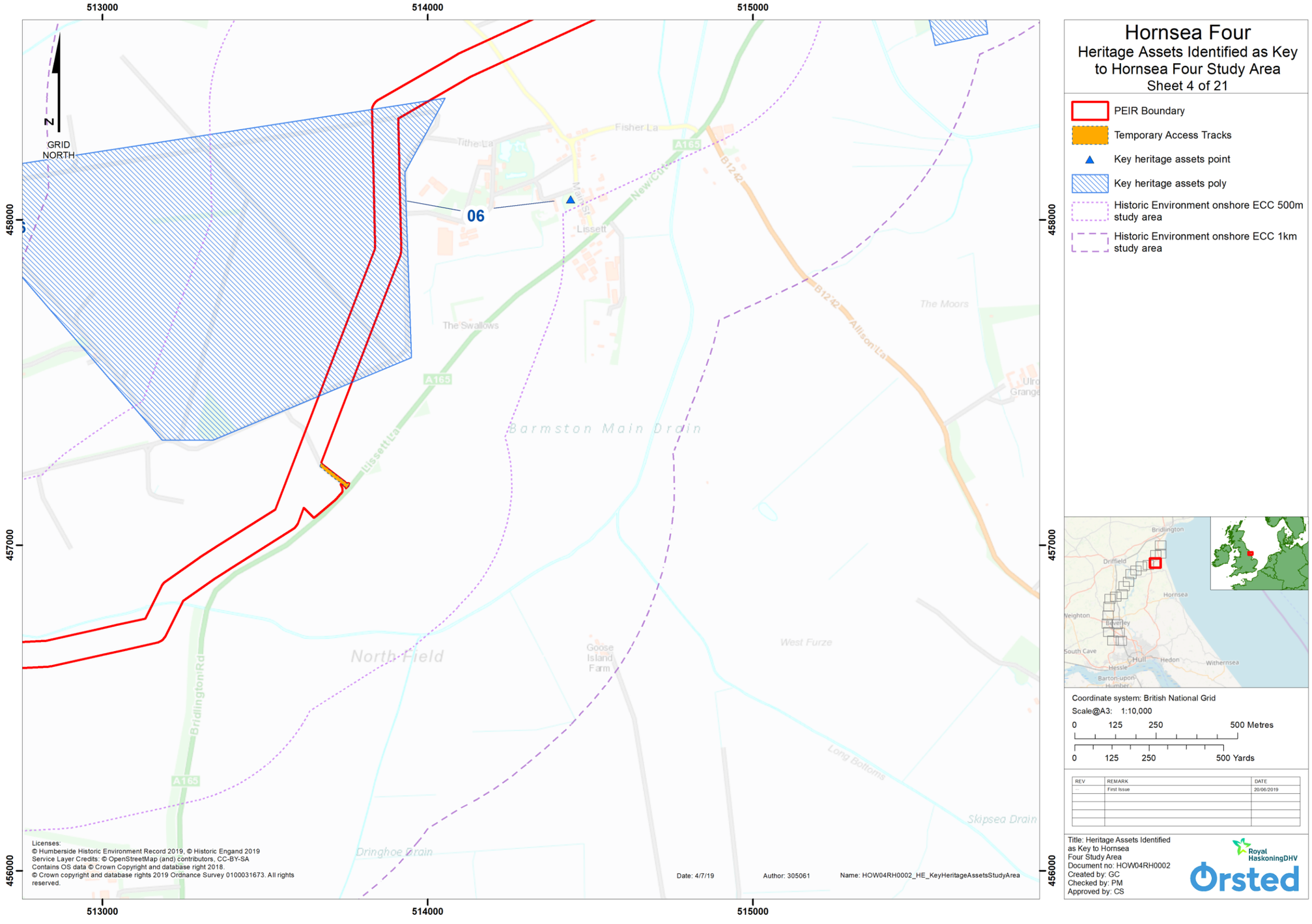

Figure 5.7: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 4 of 21) (Not to Scale).

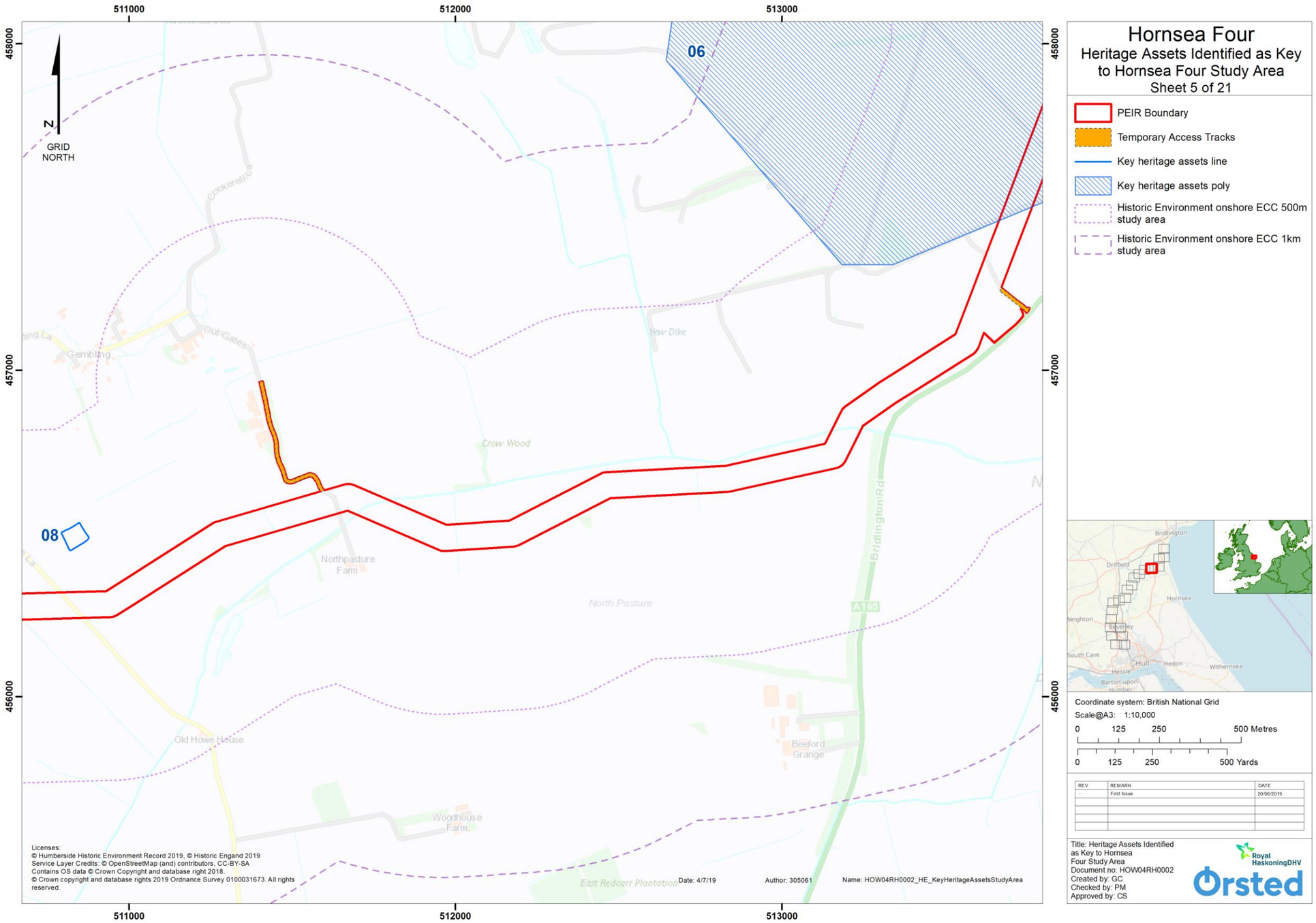

Figure 5.8: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 5 of 21) (Not to Scale).

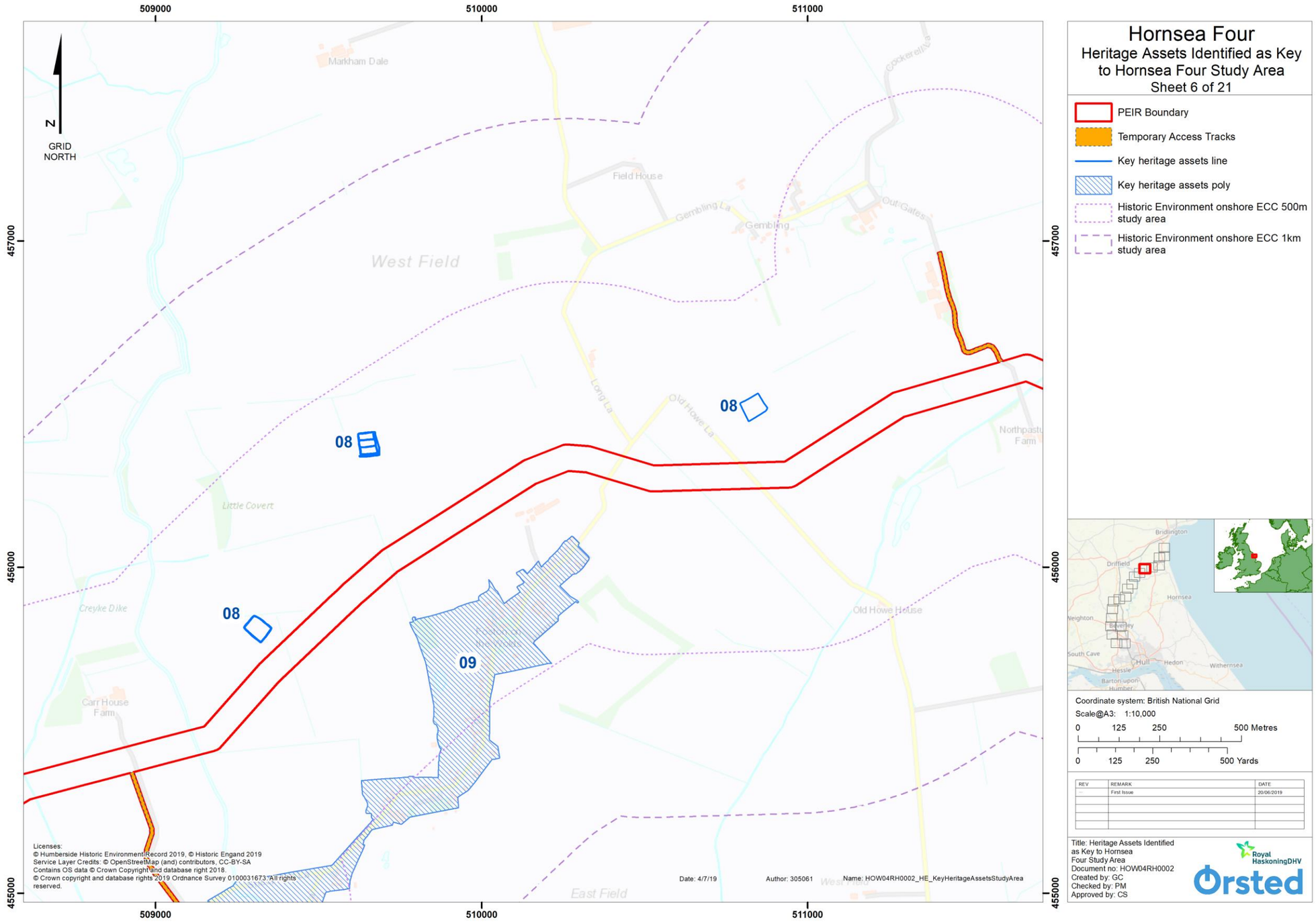

Figure 5.9: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 6 of 21) (Not to Scale).

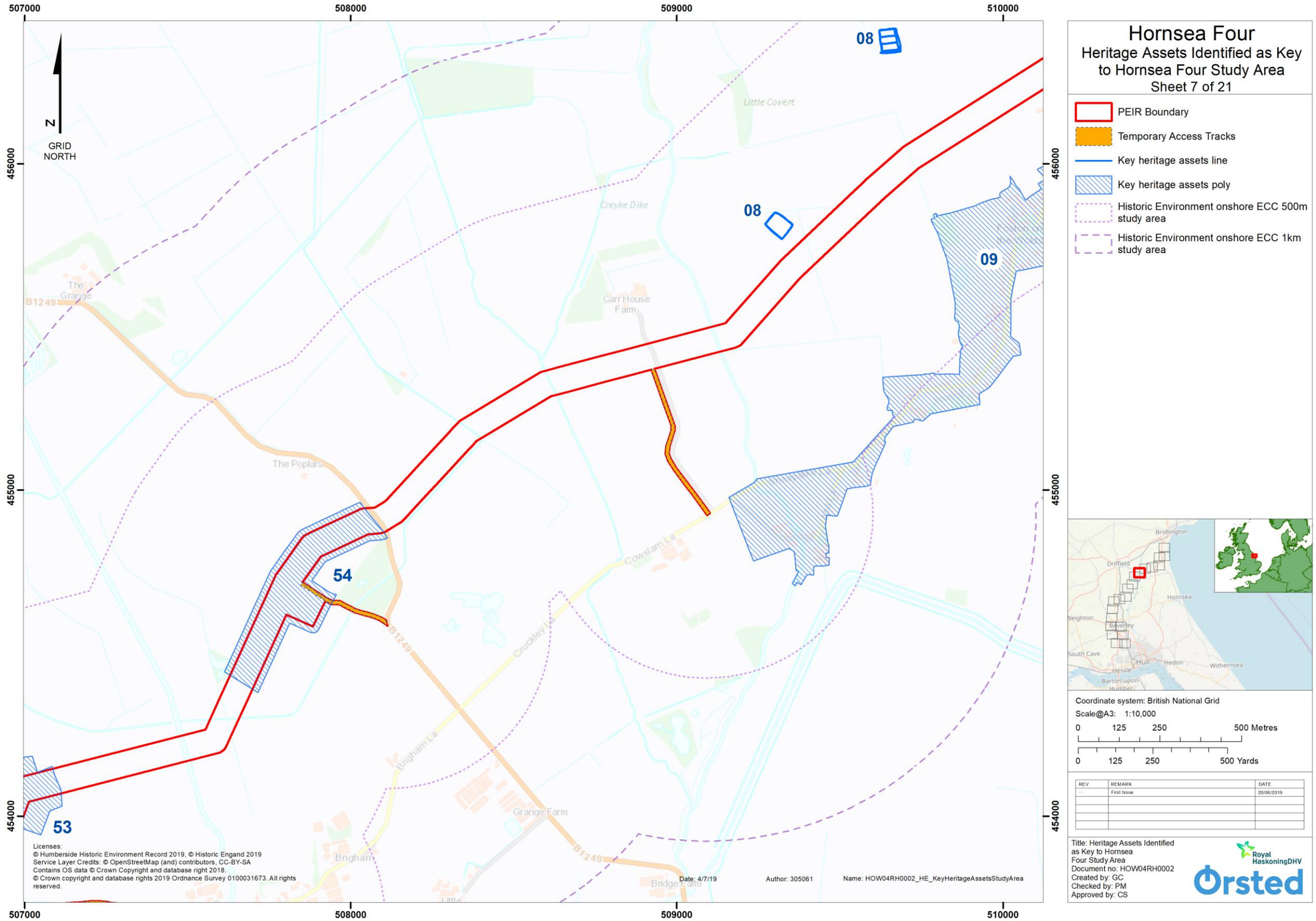

Figure 5.10: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 7 of 21) (Not to Scale).

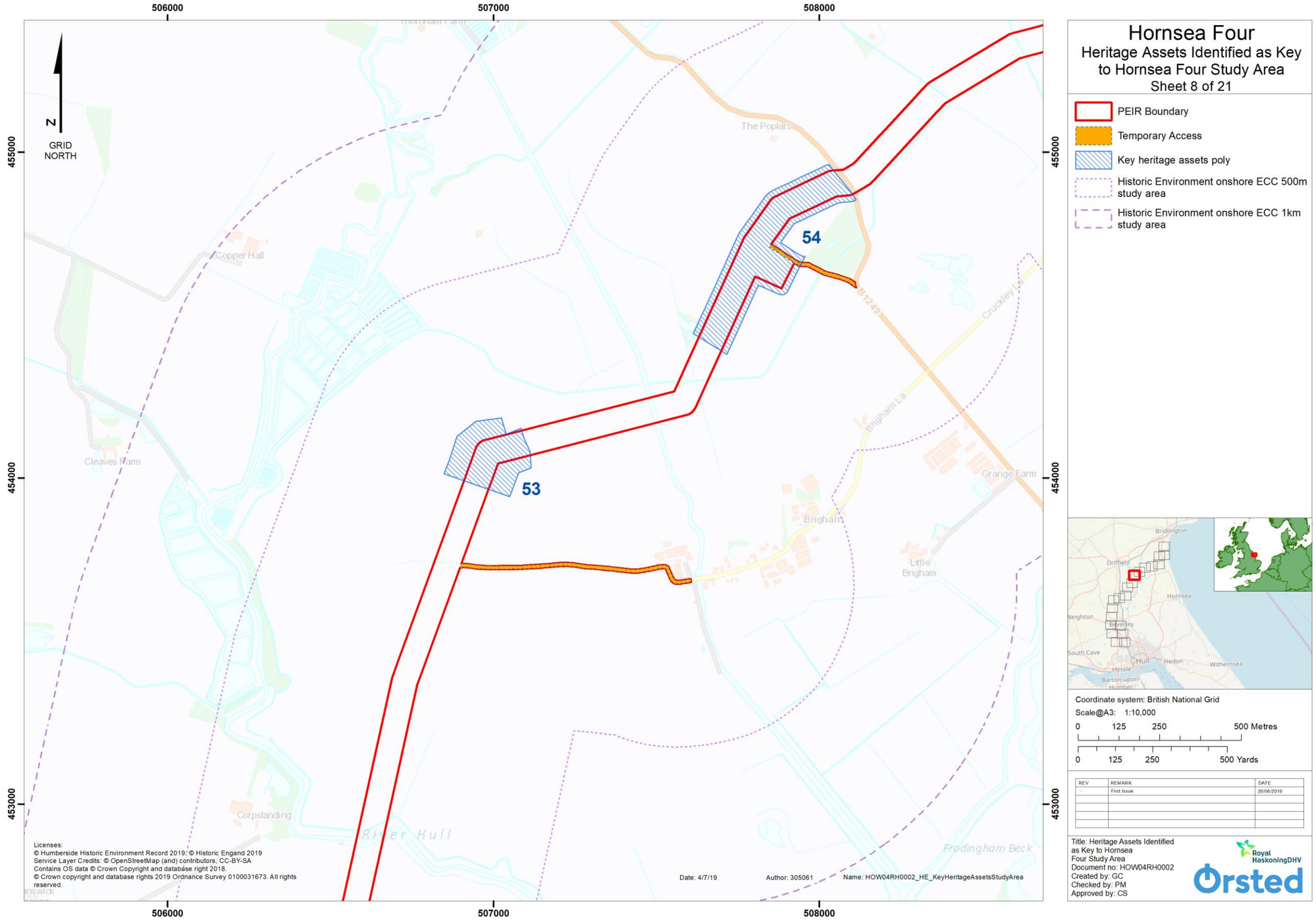

Figure 5.11: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 8 of 21) (Not to Scale).

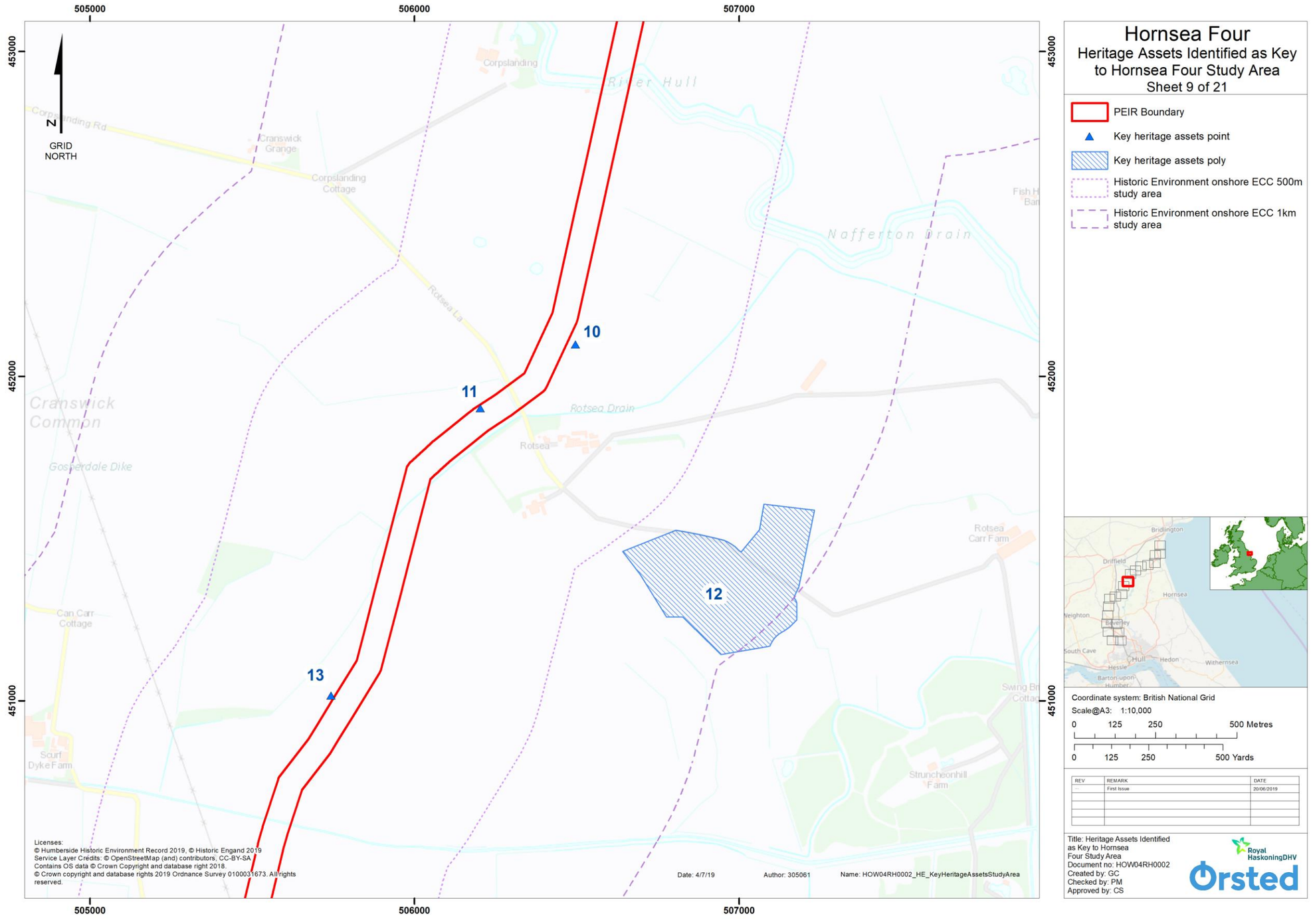

Figure 5.12: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 9 of 21) (Not to Scale).

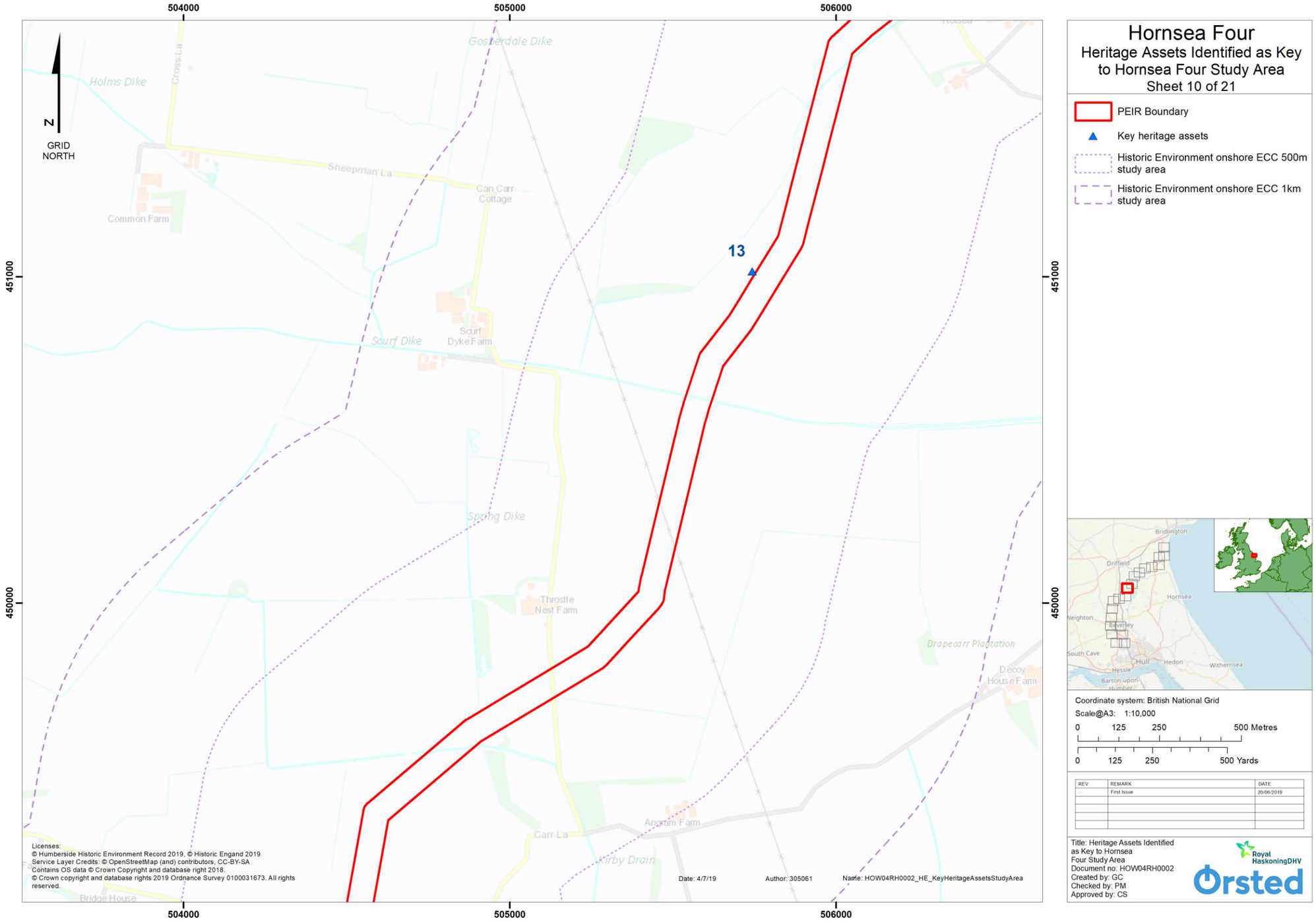

Figure 5.13: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 10 of 21) (Not to Scale).

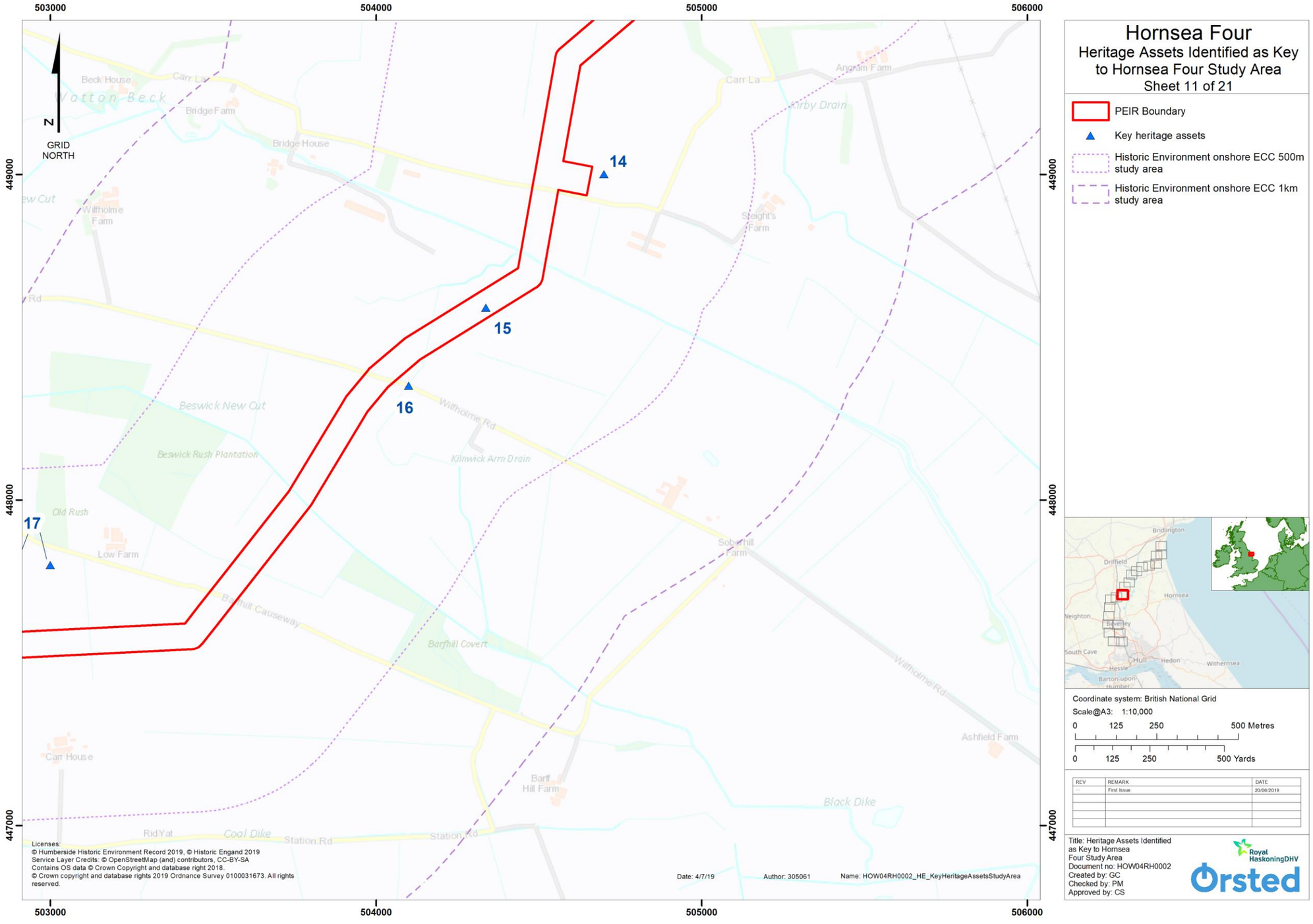

Figure 5.14: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 11 of 21) (Not to Scale).

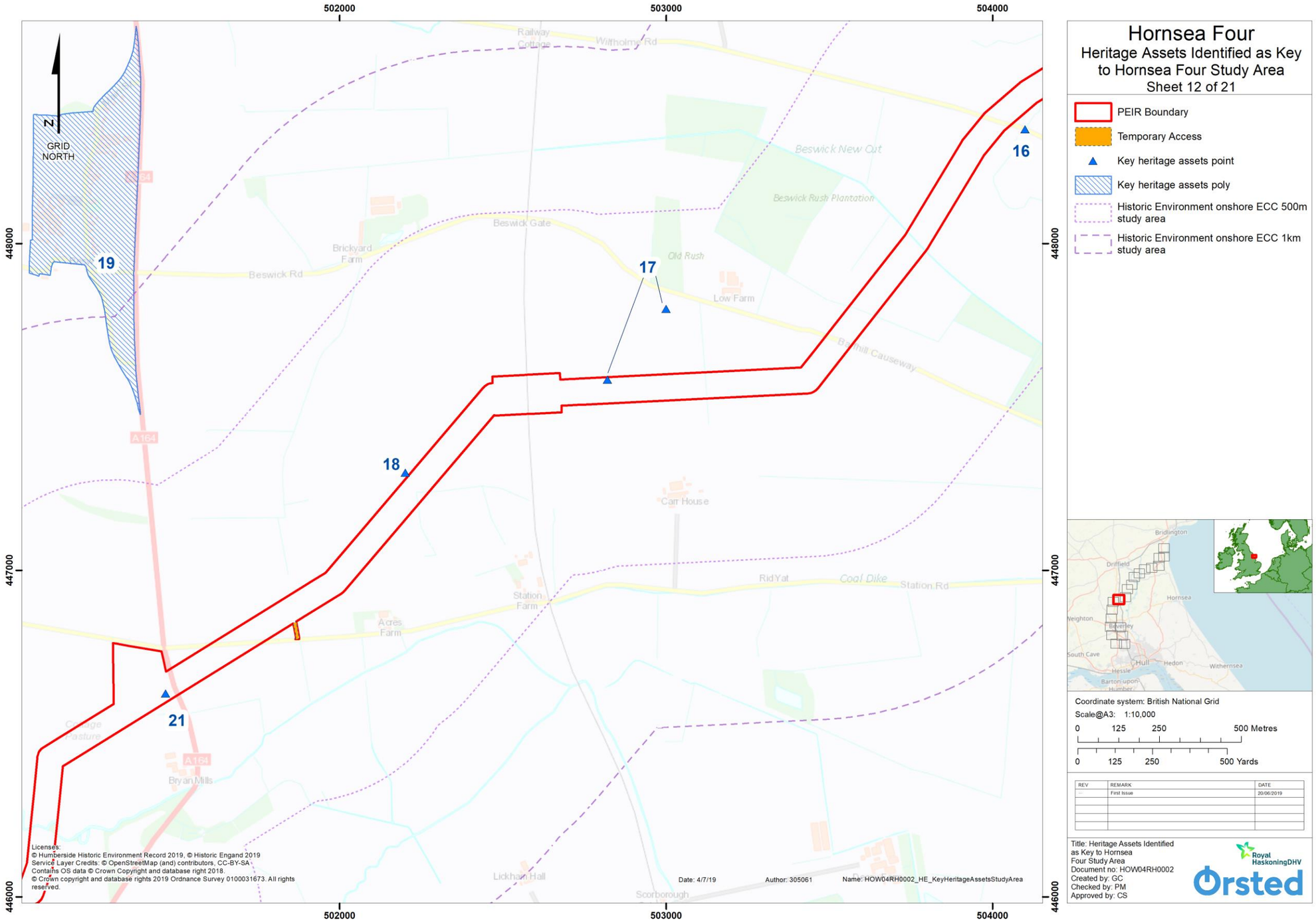

Figure 5.15: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 12 of 21) (Not to Scale).

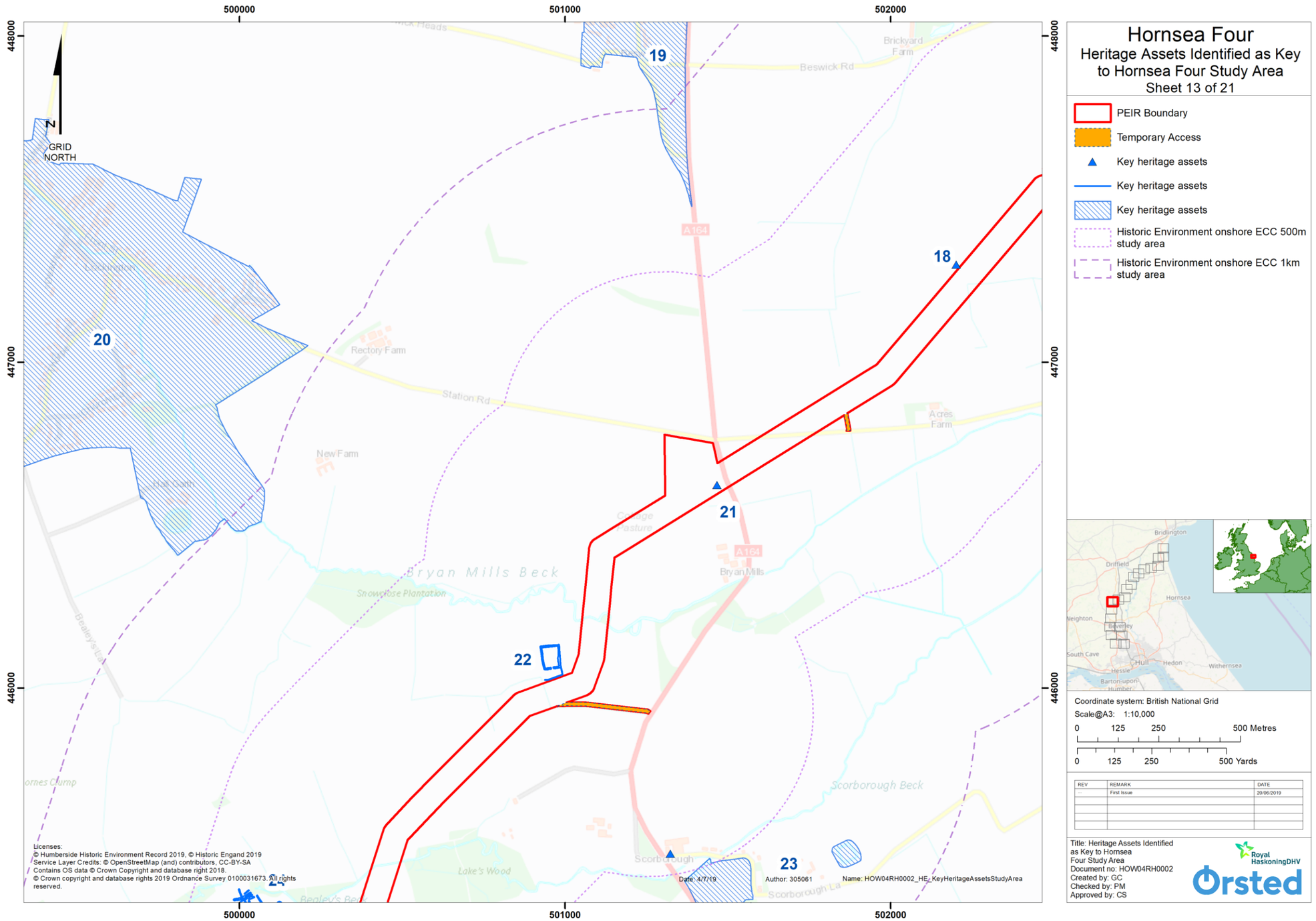

Figure 5.16: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 13 of 21) (Not to Scale).

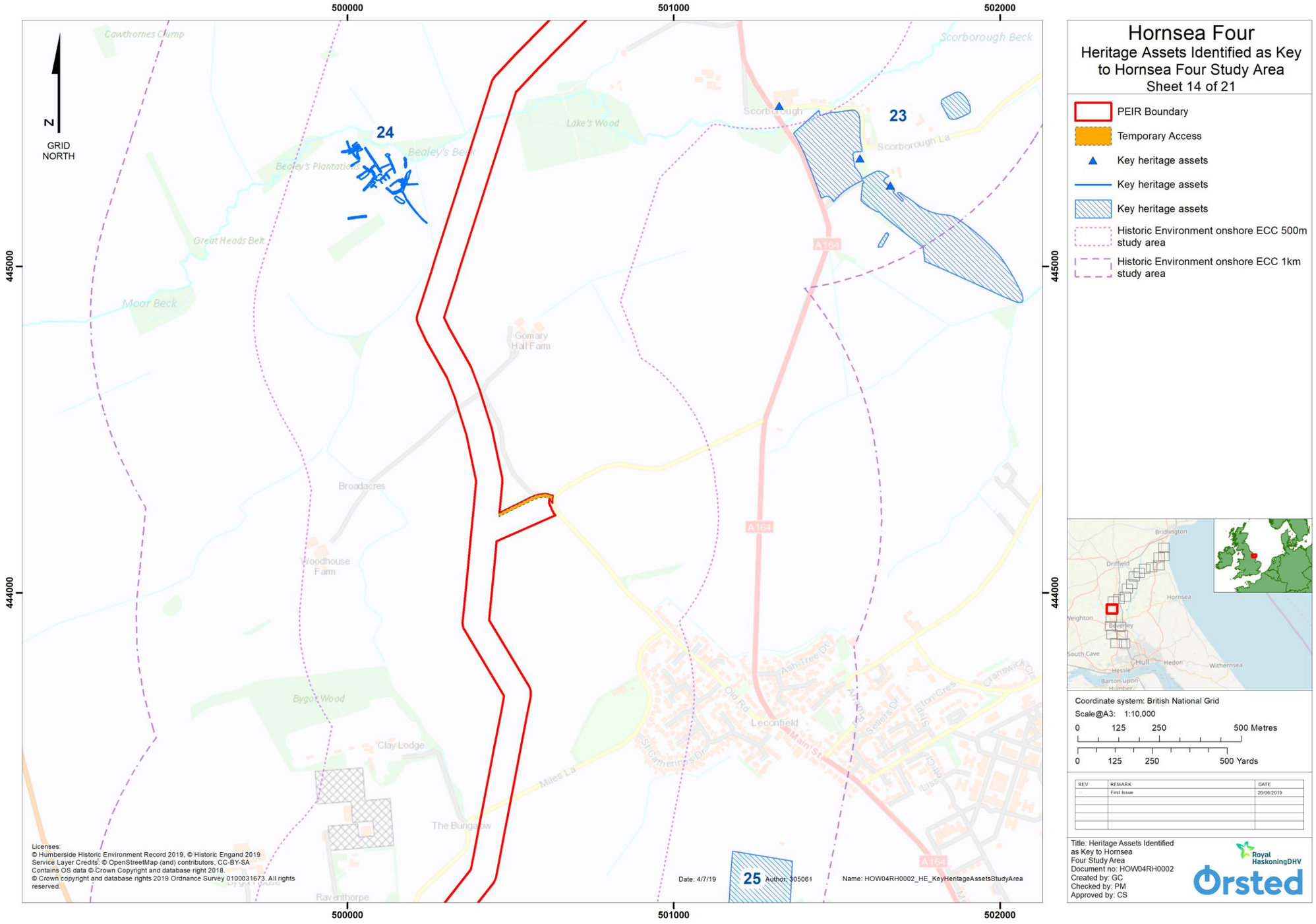

Figure 5.17: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 14 of 21) (Not to Scale).

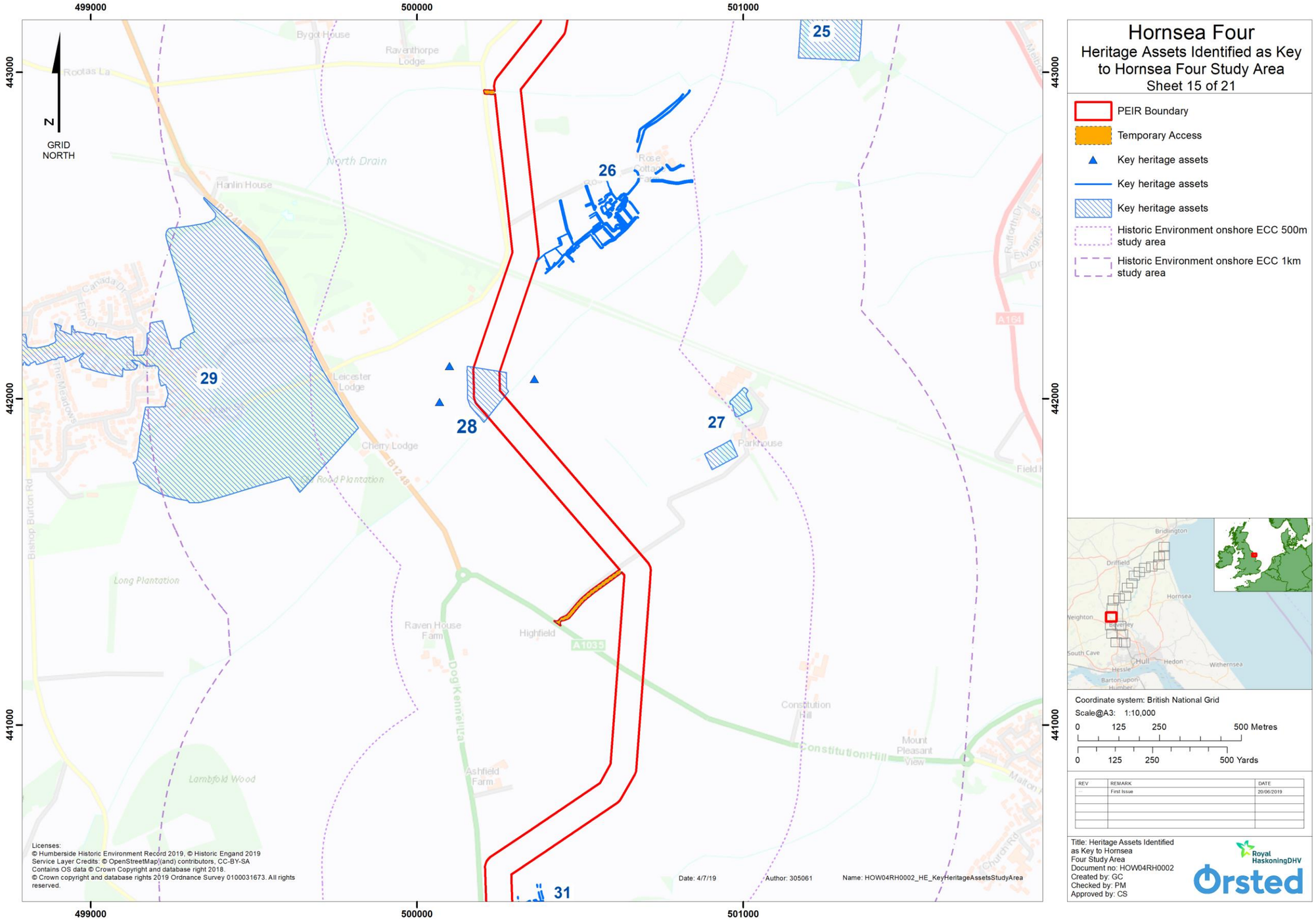

Figure 5.18: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 15 of 21) (Not to Scale).

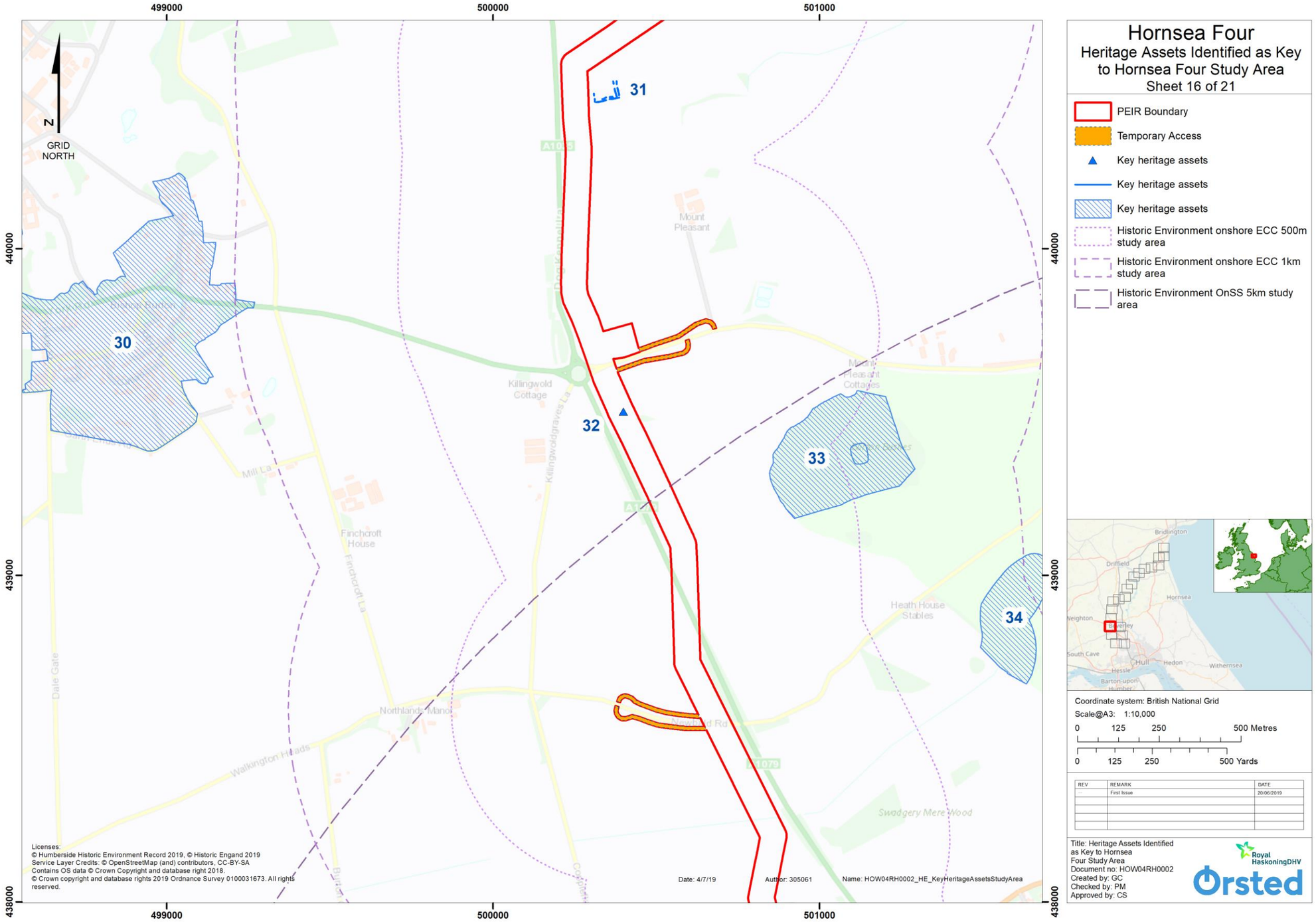

Figure 5.19: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 16 of 21) (Not to Scale).

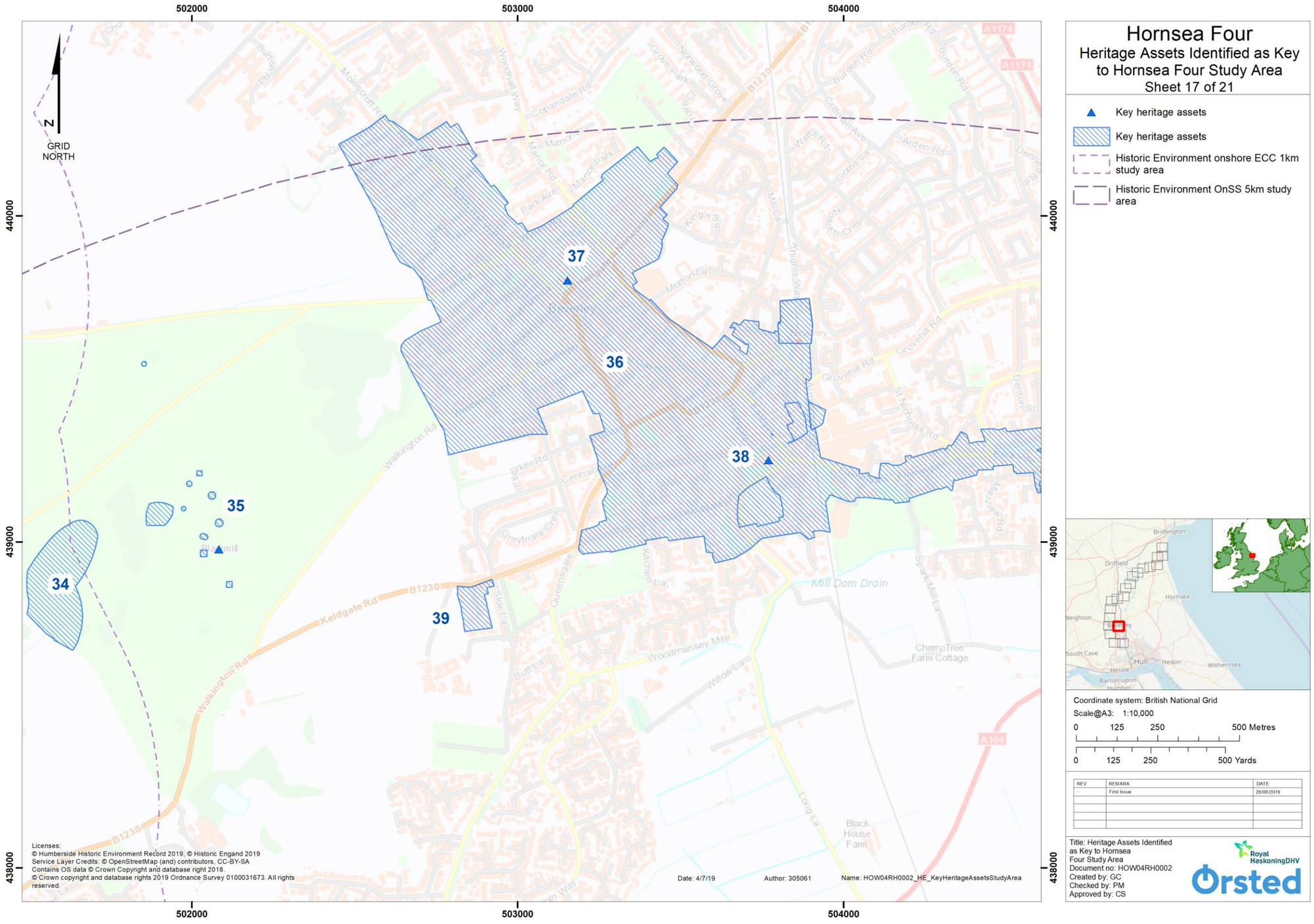

Figure 5.20: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 17 of 21) (Not to Scale).

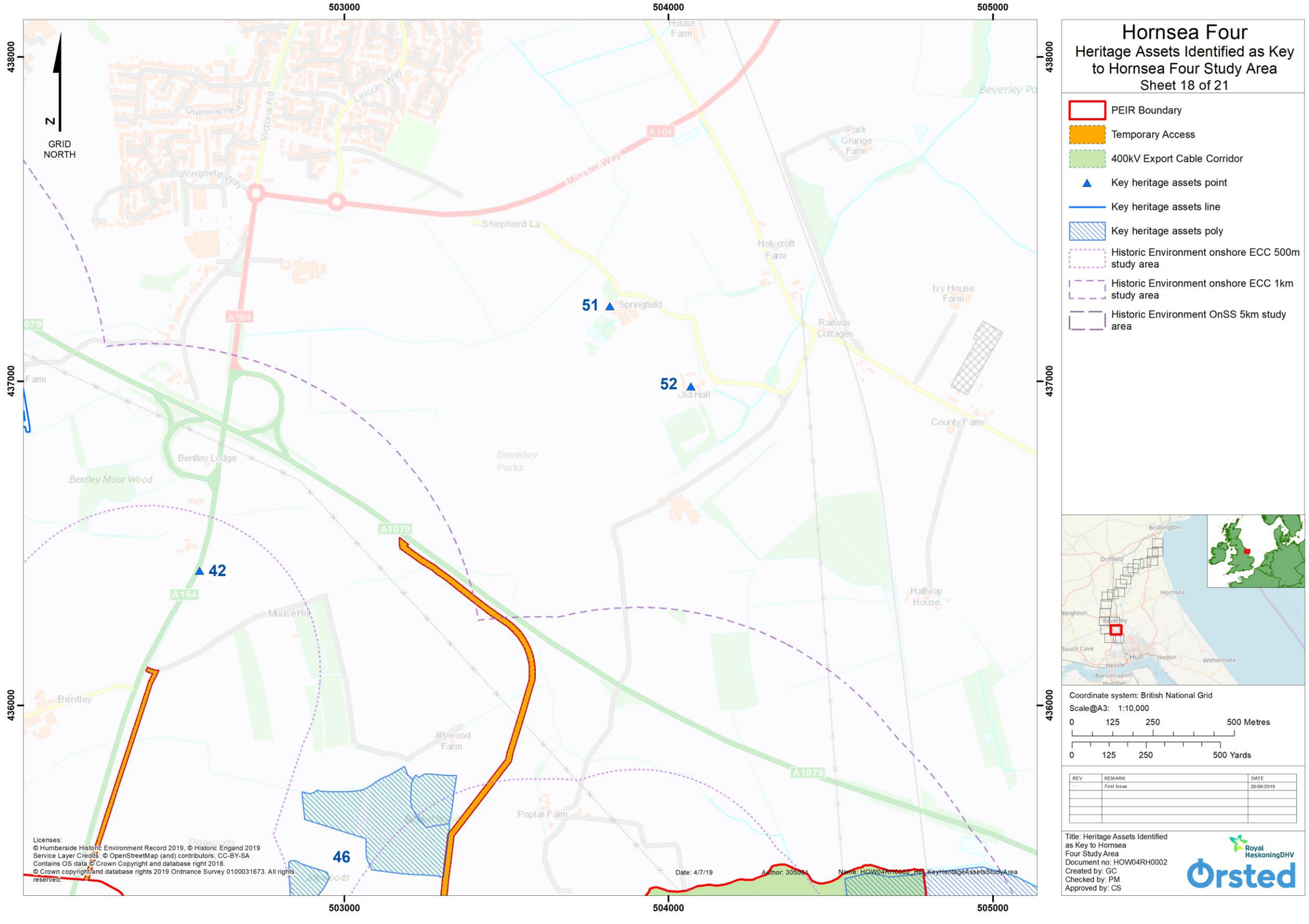

Figure 5.21: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 18 of 21) (Not to Scale).

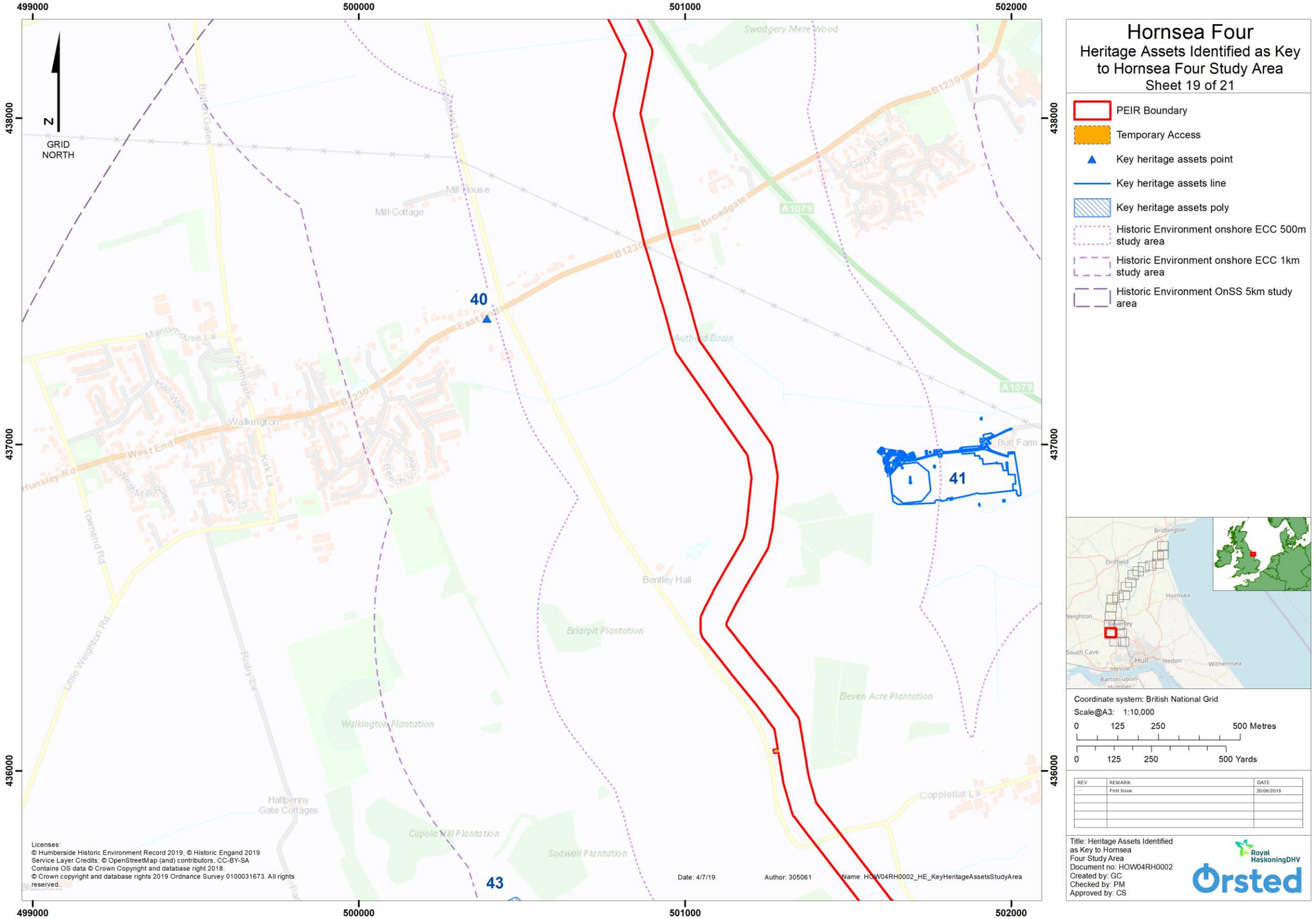

Figure 5.22: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 19 of 21) (Not to Scale).

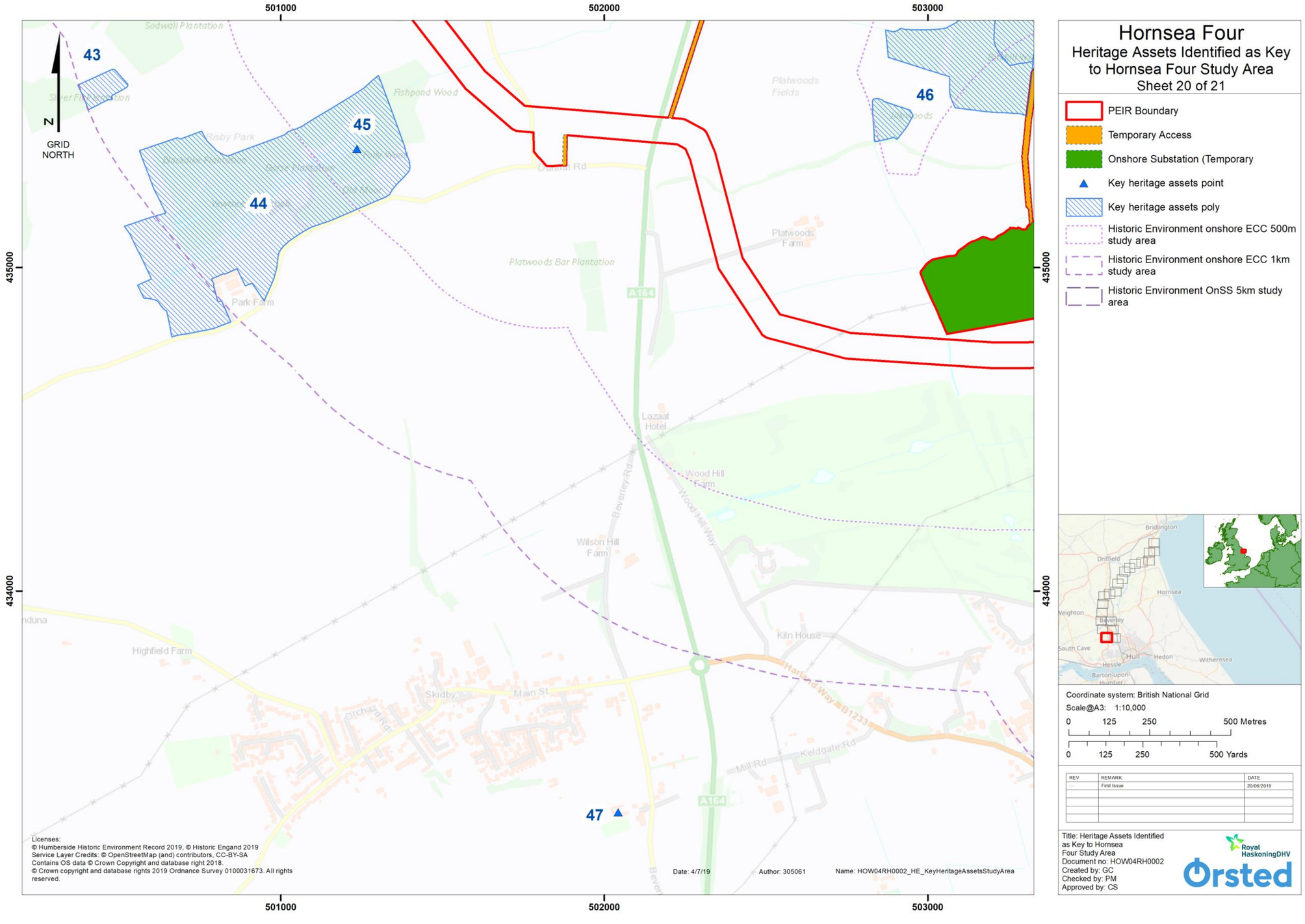

Figure 5.23: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 20 of 21) (Not to Scale).

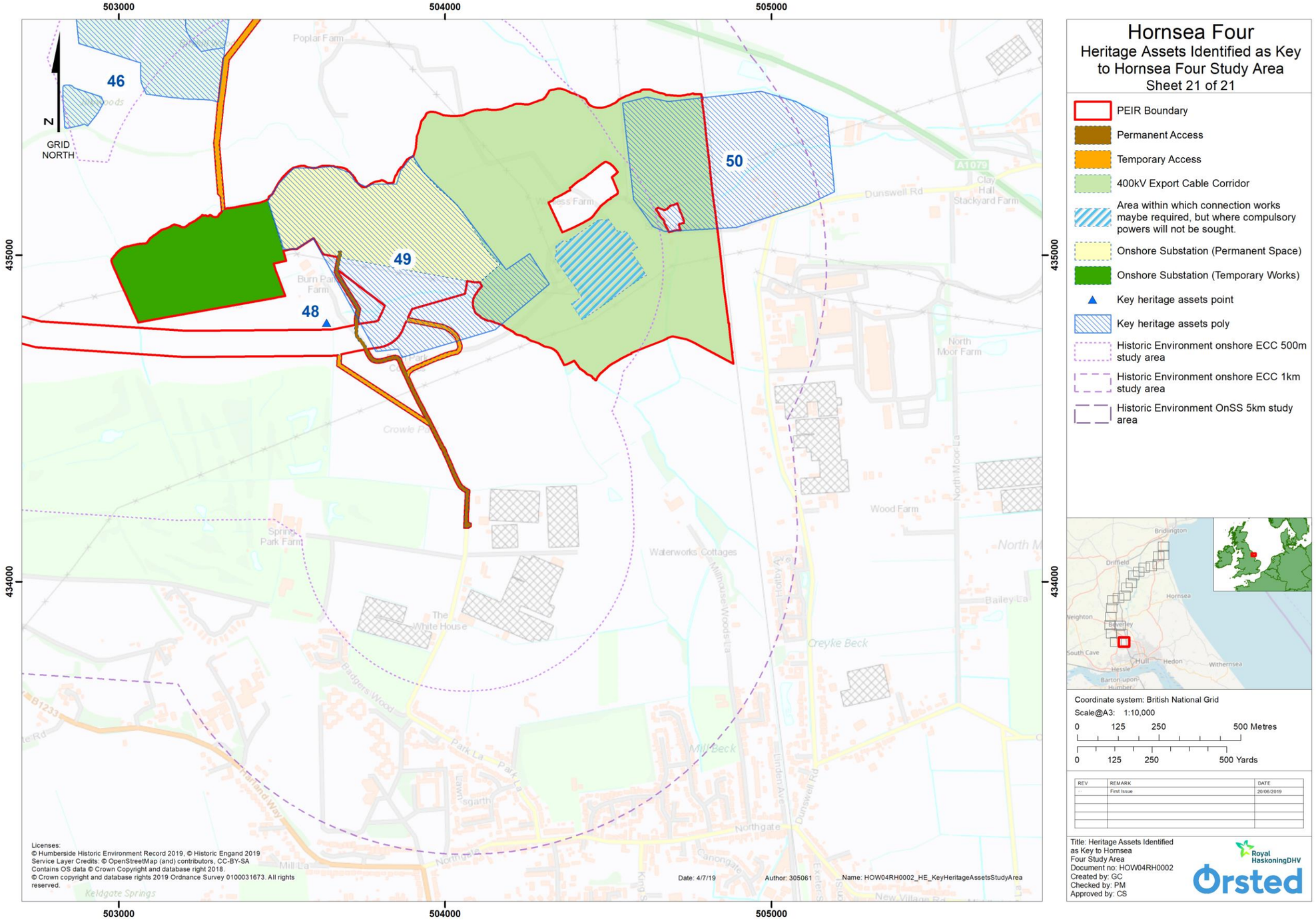

Figure 5.24: Heritage Assets Identified as Key to Hornsea Four Study Area (Sheet 21 of 21) (Not to Scale).

5.11.4 Decommissioning

5.11.4.1 The detail and scope of the decommissioning works will be determined by the relevant rules and regulations at the time of decommissioning, as well as industry best practises at the time of decommissioning with an associated Decommissioning Plan being subsequently prepared.

5.11.4.2 It is considered that impacts associated with the decommissioning phase will be of equal or lower magnitude to those identified for the construction phase with no additional significant effects identified above those set out for the construction phase. However, as a precautionary measure, to minimise the environmental disturbance during decommissioning, it is expected the onshore export cables will be left in situ underground with the cable ends cut, sealed and securely buried. The external structures of the joint bays and link boxes along the onshore ECC will be removed only if it is feasible with minimal disturbance. The OnSS above ground electrical equipment and infrastructure will be removed along with building foundations and security fencing, reverting the land to previous its use or used for another development.

5.11.4.3 Potential impacts arising from the decommissioning phase of Hornsea Four have been scoped out of further assessment. Historic Environment impacts arising from the decommissioning of Hornsea Four will be assessed closer to the time of decommissioning, in line with the applicable legislation and policy at such time.

5.12 Cumulative effect assessment (CEA)

5.12.1.1 Cumulative effects can be defined as effects upon a single receptor from Hornsea Four when considered alongside other proposed and reasonably foreseeable projects and developments. This includes all projects that result in a comparative effect that is not intrinsically considered as part of the existing environment.

5.12.1.2 The overarching method followed in identifying and assessing potential cumulative effects in relation to the onshore environment is set out in **Volume 4, Annex 5.5: Onshore Cumulative Effects**. The approach is based upon the Planning Inspectorate (PINS) Advice Note 17: Cumulative Effects Assessment (PINS, 2017). The approach to the CEA is intended to be specific to Hornsea Four and takes account of the available knowledge of the environment and other activities around the Hornsea Four boundary.

5.12.1.3 The CEA has followed a four-stage approach developed from Advice Note 17. Each of the four stages is identified in **Table 5.12** along with commentary specifically relating to the historic environment.

Table 5.12: Stages and activities involved in the CEA process.

CEA stage	Activity
Stage 1 – Establish the project's Zone of influence (ZoI) and establish a long-list of developments	Through consultation it has been identified that potential developments that need considering as part of the onshore CEA are restricted to those within the ERYC area. To determine a 'long-list' of possible projects for inclusion in the CEA the following actions have been carried out: • Interrogation of the ERYC planning portal (latest review is May 2019); and • Discussion of potential projects for specific inclusion in the CEA at the Evidence Plan meetings. To date these processes have identified 17 potential projects which form the 'long-list'. In order to attribute an element of certainty to the assessment each project has been assigned a Tier reflecting their current status within the planning and development process. The full list of projects and relevant tiers assigned can be found in Appendix A of **Volume 4, Annex 5.5: Onshore Cumulative Effects**. The location of projects is shown in **Volume 4, Annex 5.6: Location of Onshore Cumulative Schemes**.
Stage 2 – Screening of long list: Identify a shortlist of other developments for the CEA	A 1 km and 5 km buffer has been identified for the historic environment CEA to ensure direct (physical) and indirect (non-physical) cumulative effects can be appropriately identified and assessed. It is considered unlikely that significant effects greater than these distances would occur given the impacts under assessment and the nature of this topic.
Stage 3 – Information gathering	Where available information on the other developments within the shortlist generated at Stage 2 has been collated to inform the CEA. At this stage (PEIR) information is of high level unless explicitly discussed with ERYC. The information collected on each project is presented in **Volume 4, Annex 5.5: Onshore Cumulative Effects** with the location shown in **Volume 4, Annex 5.6: Location of Onshore Cumulative Schemes**.
Stage 4 - Assessment	The CEA has been undertaken in two stages: I. Each of the potential effects that are subject to assessment alone have been reviewed against the potential for cumulative effects to occur. II. A CEA assessment of each of the other developments on the short-list has taken place for those effects where it is considered that potential cumulative impacts could occur. The assessment also includes, where relevant, consideration of any mitigation measures where adverse cumulative effects are identified and signposts to the relevant means of securing mitigation.

5.12.2 CEA Stage 2 Shortlist and Stage 3 Information Gathering

5.12.2.1 A short list of projects for CEA has been produced using the screening buffer/criteria set out in **Table 5.12**. Information regarding all projects is provided in **Volume 4, Annex 5.5: Onshore Cumulative Effects** and **Annex 5.6: Location of Onshore Cumulative Schemes**. Summary information on the short-list projects for the historic environment is provided below.

5.12.2.2 Eight identified projects have been included on the short-list of projects to be assessed cumulatively. The remaining projects have not been considered as resulting in likely cumulative significant effects as they are located in excess of 1 km from the Hornsea Four onshore ECC boundary and 5 km of the OnSS. The nine projects can be summarised as:

- Dogger Bank Creyke Beck A and B substation and associated cabling projects;
- Other infrastructure projects near to the OnSS, such as a battery storage facility; and
- A number of "smaller" projects located within 5 km of the OnSS or 1 km of the onshore ECC including: power generation, energy storage projects, onshore components associated with other offshore wind farm projects, and agricultural related development.

5.12.3 CEA Stage 3 Assessment

5.12.3.1 As stated in **Table 5.12** the assessment is undertaken in two stages:

- **Table 5.13** sets out the potential impacts assessed in this chapter and identifies the potential for cumulative effects to arise, providing a rationale for such determinations; and
- **Table 5.14** sets out the CEA for each of the projects/developments that have been identified on the short-list of projects screened.

5.12.3.2 It should be noted that stage II of Stage 4 is only undertaken if stage I identifies that cumulative effects are possible. This summary assessment is set out in **Table 5.14.**

Table 5.13: Potential Cumulative Effects.

Impact	Potential for Cumulative Effect?	Rationale
Construction		
Indirect (non-physical) impacts on designated heritage assets	Yes	In combination effects of developments' construction could result in a cumulative impact to designated heritage assets through a change in their setting.
Direct (physical) impacts on non-designated heritage assets	Yes	Developments acting in-combination can have a cumulative impact on an archaeological resource which overlaps or intersects more than one development as

Impact	Potential for Cumulative Effect?	Rationale
		well as affecting the nature of the wider archaeological landscape.
Indirect (non-physical) impacts on non-designated heritage assets	Yes	In combination effects of developments' construction could result in a cumulative impact to non-designated heritage assets through a change in their setting.
Operation		
Indirect (non-physical) impacts on designated heritage assets	Yes	In combination effects of developments' operation could result in a cumulative impact to designated heritage assets through a change in their setting.
Indirect (non-physical) impacts on non-designated heritage assets	Yes	In combination effects of developments' operation could result in a cumulative impact to non-designated heritage assets through a change in their setting.
Decommissioning		
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage. Additionally, PINS have stated in their Scoping Opinion that cumulative decommissioning effects are scoped out of the EIA.		

5.12.3.3 The fourth stage of the CEA is a project specific assessment of the potential for any significant cumulative effects to arise due to the construction and/or operation and maintenance of Hornsea Four. To identify whether this may occur each shortlisted project is discussed in **Table 5.14**.

5.12.3.4 A cumulative assessment in relation to the historic environment has taken account of all of the identified projects to determine if there is a reasonable likelihood that any cumulative effects would result from their construction, operation or decommissioning when considered with Hornsea Four. Specifically, a review of such developments within a 1 km radius of the onshore ECC and a 5 km radius of the OnSS has been considered.

Table 5.14: Project Screening for CEA Historic Environment

Project	Description	Location Description (relative to HOW04 PEIR Redline Boundary)	Discussion	Likelihood and Significance of Cumulative Effects
Elm Tree Farm Substation and Access Track	Erection of a substation building and construction of an access track in connection with approved wind turbine	Substation is located adjacent to Hornsea Four boundary. Construction access tracks due to extend west and north outside of the Hornsea Four boundary.	In the absence of foundation design details, a MDS of piling has been assumed for the consented development. The adjacent proposed project boundaries and the potential for piling may result in direct and / or indirect impacts on buried archaeological remains within its footprint, which form part of the wider landscape's archaeological resource. With the assumption that appropriate mitigation measures (e.g. archaeological evaluation/excavation) were incorporated into the design, no cumulative impacts on the receptors identified are predicted.	No potential for cumulative effects.
Bridge House Wind Farm – Associated Facilities	Erection of a substation building and underground electricity cable in association with previously approved wind turbine.	Located north-west of cable centreline, outside of the Hornsea Four boundary. Associated infrastructure including electricity cable will travel within the Hornsea Four boundary.	In the absence of foundation design details, a MDS of piling has been assumed for the consented development. The overlapping proposed project boundaries and the potential for piling may result in direct and / or indirect impacts on buried archaeological remains within its footprint, which form part of the wider landscape's archaeological resource. However, based on the scale of the Bridge House Wind Farm substation (total floor area of 24.23 m^2), and the assumption that appropriate mitigation measures (e.g. archaeological evaluation/excavation) were incorporated into the design, no cumulative impacts on the receptors identified are predicted.	No potential for cumulative effects.
Teckno Developments Site	Erection of a building for Business (B1), General Industry (B2) and Storage/Distribution (B8)	Located approximately 210 m west of the Hornsea Four boundary, south of the A1035.	Due to the nature and scale of the development there is the potential for elements of the project to have direct and / or indirect cumulative effects on heritage assets through a direct impact any potentially shared	No potential for cumulative effects.

Project	Description	Location Description (relative to HOW04 PEIR Redline Boundary)	Discussion	Likelihood and Significance of Cumulative Effects
	uses and erection of boundary fence		archaeological resource and potential for indirect effects on heritage assets through a change in their setting. However, this is expected to be limited due to the archaeological mitigation measures in place for the project.	
Lawns Farm Park Battery Storage	Construction of a 49.5MW Battery Storage Facility (17 battery units) with associated infrastructure and landscaping.	Works are located east of OnSS within the Hornsea Four boundary.	Due to the proximity of the development to the project there is the potential for cumulative effects of a direct and / or indirect nature to heritage assets. The impact to archaeological resource will have been mitigated through appropriate archaeological mitigation. Indirect impacts to the setting of designated and non-designated heritage assets is not considered to be a significant concern, due to the scale of this development resulting in no impact greater than that of Hornsea Four as assessed individually as part of this chapter.	No potential for cumulative effects.
Jocks Lodge Highway Scheme	EIA Screening Opinion - A164 and Jocks Lodge Highway Improvement Scheme	Works occurring on the A1079. 700m northwest of Hornsea Four boundary access track	Due to the proximity of the development to the project there is the potential for cumulative effects of a direct and / or indirect nature to heritage assets. However, the size of the proposed development and the assumption that appropriate archaeological mitigation measures will be incorporated into the design will limit the potential for cumulative effects to occur.	No potential for cumulative effects.
Dogger Bank – Creyke Beck A	The consent application submitted allows for up to 400 wind turbines in total, therefore currently being split across the two phases. Project Capacity 1,000-1,200MW.	Windfarm located 131km offshore. The converter station would be north of the A1709 between Beverley and Cottingham in the East	Due to the nature and scale of the development there is the potential for the onshore elements of the project to have direct and / or indirect cumulative effects on heritage assets through a direct impact on the shared archaeological resource (most likely around the NGET substation at Creyke Beck) and potential for indirect effects on heritage assets through a change in their	No potential for cumulative effects.

Project	Description	Location Description (relative to HOW04 PEIR Redline Boundary)	Discussion	Likelihood and Significance of Cumulative Effects
		Riding of Yorkshire. The cable route would then connect to the National Grid at the existing substation at Creyke Beck. Cable landing point is between Barmstone and Ulrome.	setting. However, this is expected to be limited due to the archaeological mitigation measures in place for the project.	
Dogger Bank – Creyke Beck B	The consent application submitted allows for up to 400 wind turbines in total, therefore currently being split across the two phases. Project Capacity 1,000-1,200MW.	Windfarm located 131km offshore. The converter station would be north of the A1709 between Beverley and Cottingham in the East Riding of Yorkshire. The cable route would then connect to the National Grid at the existing substation at Creyke Beck. Cable landing point is between Barmstone and Ulrome.	Due to the nature and scale of the development there is the potential for the onshore elements of the project to have direct and / or indirect cumulative effects on heritage assets through a direct impact on the shared archaeological resource (most likely around the NGET substation at Creyke Beck) and potential for indirect effects on heritage assets through a change in their setting. However, this is expected to be limited due to the archaeological mitigation measures in place for the project.	No potential for cumulative effects.
Low Farm, Dunswell Lane, Dunswell	Erection of glasshouses, automated bedding units and wind breaks to outdoor planting beds, external and internal alterations to redundant agricultural buildings to allow	1.1km east of the Hornsea Four boundary.	Due to the proximity of the development to the project there is the potential for cumulative effects of an indirect nature to heritage assets through a change in their setting. However, the assumption that appropriate archaeological mitigation measures will be incorporated into the design will limit the potential for cumulative effects to occur.	No potential for cumulative effects.

Project	Description	Location Description (relative to HOW04 PEIR Redline Boundary)	Discussion	Likelihood and Significance of Cumulative Effects
	conversion to offices and stores, relocation of workers caravans, construction of reservoir with installation of drainage infrastructure across the site and creation of access to low farm, 5 passing places along Long Lane and junction improvements onto the A1174 (Hull Road)			

5.12.3.5 The CEA has not identified impacts that are considered to be of any greater significance than those identified in isolation and no cumulative effects of significance are forecast.

5.13 Transboundary effects

5.13.1.1 A screening of transboundary impacts has been carried out (Ørsted, 2018), this screening exercise identified that there was no potential for significant transboundary effects regarding the Historic Environment from Hornsea Four upon the interests of other EEA States due to the localised impact to the historic environment.

5.14 Inter-related effects

5.14.1.1 Inter-related effects consider impacts from the construction, operation or decommissioning of Hornsea Four on the same receptor (or group). The potential inter-related effects that could arise in relation to the historic environment are presented in **Table 5.15**. Such inter-related effects include both:

- Project lifetime effects: i.e. those arising throughout more than one phase of the project (construction, operation, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation; and
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

5.14.1.2 A description of the process to identify and assess these effects is presented in **Section 2** of **Volume 1 Chapter 5: EIA Methodology**. The basis for the identification of receptor led effects is the inter-related effects screening report supplied as Annex J to the Hornsea Four Scoping Report (Ørsted, 2018). Where necessary this has been updated in line with project details now available.

Table 5.15: Inter-related effects assessment on the historic environment.

Project phase(s)	Nature of inter-related effect	Assessment alone	Inter-related effects assessment
Project-lifetime effects			
Construction and Operation	Combination of indirect (non-physical) impacts upon heritage assets (designated and non-designated)	Impacts were assessed as being of minor significance through construction and operation.	The assessment of indirect (non-physical) impacts to designated and non-designated heritage assets was undertaken separating out construction and operation effects. There is the potential for the impacts to increase further than that identified within the assessment alone at the OnSS as any other construction works will combine with ongoing construction of the OnSS, which could increase

Project phase(s)	Nature of inter-related effect	Assessment alone	Inter-related effects assessment
			impact and associated effect as the OnSS construction progresses. This inter-relationship of impacts between construction and operation has been considered and it is not expected to cause an increase in impact significance. This is due to the effect during construction being temporary and should reduce during progression of the construction.
Receptor-led effects			
Geology and Ground Conditions: Historic assets can be affected by changes in ground conditions (e.g. subsidence, erosion, hydrology).			Changes to ground conditions are considered as part of the main impact assessment as this could result in an impact to buried archaeological and geoarchaeological remains. It is not anticipated that any inter-related effects will be produced that are of greater significance than those assessed individually in the main impact assessment.
Ecology: Loss of ecological features (especially hedgerows) can directly or indirectly affect an asset.			The loss of hedgerows in combination with the effect on the historic environment is considered as part of the main impact assessment, due to hedgerows forming part of the HLC. The inter-related effect is not expected to produce a greater effect than that identified in the individual assessment. This is especially due to the commitment for hedgerows to be reinstated post-construction (Co10 and Co26).
Landscape and Visual: Changes in landscape and views could change the setting of heritage assets.			Changes in the landscape are considered as part of the main impact assessment as it forms an integral part of assessing the change to the setting of heritage assets, which could alter their significance/importance. As such, this inter-related effect is not considered to result in an effect of greater significance than those identified in the main impact assessment.
Land Use and Agriculture: Change in land-use at the OnSS could indirectly affect the setting of an asset.			Changes in the land use at the OnSS are considered as part of the main impact assessment as it forms an integral part of assessing the change to the setting of heritage assets, which could alter their significance/importance. As such, this inter-related effect is not considered to result in an effect of greater significance than those identified in the main impact assessment.

5.14.1.3 Consideration of the inter-related effects has identified some project lifetime effects, whilst receptor-led effects have also been identified. The results of these inter-related effects are not considered to result in an effect of greater significance than when assessed individually.

5.15 Conclusion and summary

5.15.1.1 This PEIR chapter has identified that there is the potential for direct and indirect impacts upon the historic environment as a result of Hornsea Four. These impacts are assessed as being non-significant in EIA terms once mitigation has been implemented. At this stage, the final onshore development area has not been finalised and could potentially change during the ES phase.

5.15.1.2 Further consideration of any changes to the project parameters and identified impacts will be undertaken during the ES phase. The impacts identified within this chapter could therefore change during production of the ES chapter as a result of further design refinement and more baseline data being obtained through ongoing survey and assessment.

5.15.1.3 **Table 5.16** presents a summary of the impacts assessed within this historic environment PEIR chapter. This table should be used for summary purposes only, with the additional narrative explanations set out within **Section 5.11** referred to for further detail.

Table 5.16: Summary of potential impacts assessed for the historic environment.

Impact and Phase	Receptor and importance	Magnitude and Significance	Mitigation	Residual impact
Construction				
Indirect impacts on designated heritage assets. (HE-C-2)	3: St Edmunds Chapel, High	No impact		
	5: Medieval complex, Church of All Saints and Old Hall, High	No impact		
	6: Church of St James (in Lissett), High	Minor effect Temporary minor adverse	Co2, Co7, Co26, Co69, Co150, Co151, Co10, Co124, Co69, Co160	Temporary minor adverse (not significant)
	7: Skipsea Castle & Halgarth moated site, High	No impact		
	9: Foston-on-the-Wolds Conservation Area, High	Minor effect Temporary minor adverse	Co2, Co7, Co26, Co69, Co150, Co151, Co10, Co124, Co69, Co160	Temporary minor adverse (not significant)
	12: Rotsea Deserted Medieval Settlement, High			
	19: Beswick Conservation Area, High			
	20: Lockington Conservation Area, High			
	23: Scorborough Listed Buildings, Scheduled Monuments and village, High	No impact		
	25: Leconfield Castle moated site, High	No impact		
	27: Moated sites, Parkhouse Farm, Medium	No impact		
	29: Cherry Burton Conservation Area, High	Minor effect Temporary minor adverse (not significant)	Co2, Co7, Co26, Co69, Co150, Co151, Co10, Co124, Co69, Co160	Temporary minor adverse (not significant)
	30: Bishop Burton Conservation Area, High			
	33: Burton Bushes Ancient Woodland, Medium			
	34: Buried archaeological remains (Scheduled earthworks) on Westwood Pasture, High			
	35: Buried archaeological remains (barrows) and Mill on Westwood Pasture, High			
	36: Beverley Conservation Area, High			
	37: St Mary's Church, Beverley, High			
	38: Beverley Minster, High			

Impact and Phase	Receptor and importance	Magnitude and Significance	Mitigation	Residual impact
	39: Grosvenor Place Conservation Area, High			
	40: Beverley Limit Stone, Walkington Cross, High	No impact		
	41: Butt Farm Scheduled Monument (anti-aircraft gunsight, High	No impact		
	42: Beverley Sanctuary Limit Stone, Bentley Cross, High	Minor effect Temporary minor adverse (not significant)	Primary: Co2 Co7 Co69 Co150	Temporary minor adverse (not significant)
	43: Cellar Heads moated site, High			
	44: Risby Hall, High			
	45: Risby Hall Folly, High			
	46: Birkhill Woodland, Medium			
	47: Skidby Windmill and outbuildings, High			
	51: White Hall Farm, High			
	52: Old Hall and outbuildings, High			
Direct impacts on non-designated heritage assets. (HE-C-3)	Any potential (as yet unknown) archaeological remains within the Hornsea Four footprint	Minor to Major effect. Permanent negligible to major adverse (as a worst-case)	Co2, Co7, Co150, Co162, Co10, Co124, Co160 Exclusion zones / route refinement / micro-siting, industry standard archaeological mitigation (excavation / watching brief / historic building recording)	Predicted to be non-significant in EIA terms following the application of mitigation (both avoidance and offsetting measures)
	1: World War II sea defences, Medium			
	2: Buried archaeological remains & World War II defences, Medium			
	4: Winkton Deserted Medieval Village, Medium			
	6: Lissett Airfield, Medium to High			
	8: Three enclosures north of Foston-on-the-Wolds, Low to Medium			
	10: Buried archaeological remains (ditch), Low to Medium			
	11: Buried archaeological remains (enclosure), Low to Medium			
	13: Potential buried archaeological remains (road), Low to Medium			

Impact and Phase	Receptor and importance	Magnitude and Significance	Mitigation	Residual impact
	14: Possible enclosures near Carr Lane, Low to Medium			
	15: Buried archaeological remains (gravel pit), Low			
	17: Potential buried archaeological remains (well, ring ditch, road), Low to Medium			
	18: Potential Iron Age Square Barrow, Low to Medium			
	21: Archaeological remains, gravel pit and nearby prehistoric features, Low to Medium			
	22: Buried archaeological remains (Iron Age enclosure and nearby features), Low to Medium			
	24: Buried archaeological remains of Winthorpe Manor, Low to Medium			
	26: Ravensthorpe Deserted Medieval Settlement, Medium to High			
	28: Buried archaeological remains (Oval enclosure, post-medieval farm), Low to Medium			
	31: Early Iron Age to Roman Enclosure, Low to Medium			
	32: Medieval Bank (earthwork), Low to Medium			
	48. Undated pit, Low to Medium			
	49: Buried archaeological remains (Polygonal enclosure) and potential round barrow, Medium to High			
	50: Buried archaeological remains (barrow cemetery), Medium to High			
	53: Buried archaeological remains (three round barrows), Low to Medium			
	54: Buried Archaeological remains (enclosures and field systems), Low to Medium			

Impact and Phase	Receptor and importance	Magnitude and Significance	Mitigation	Residual impact
Indirect impacts on non-designated heritage assets. (HE-C-4)	1: World War II sea defences, Medium	Minor Temporary minor adverse (not significant)	Co2, Co7, Co26, Co69, Co150, Co10, Co124, Co69, Co160	Temporary minor adverse. (not significant)
	2: Buried archaeological remains & World War II defences, Medium			
	4: Winkton Deserted Medieval Village, Medium			
	6: Lissett Airfield, Medium to High			
	8: Three enclosures north of Foston-on-the-Wolds, Low to Medium			
	16: Wilfholme Road bridge, Low			
	22: Buried archaeological remains (Iron Age enclosure and nearby features), Low to Medium			
	24: Buried archaeological remains of Winthorpe Manor, Low to Medium			
	26: Ravensthorpe Deserted Medieval Settlement, Medium to High			
	28: Buried archaeological remains (Oval enclosure, post-medieval farm), Low to Medium			
	31: Early Iron Age to Roman Enclosure, Low to Medium			
	32: Medieval Bank (earthwork), Low to Medium			
	49: Buried archaeological remains (Polygonal enclosure) and potential round barrow, Medium to High			
	50: Buried archaeological remains (barrow cemetery), Medium to High			
	53: Buried archaeological remains (three round barrows), Low to Medium			
	54: Buried Archaeological remains (enclosures and field systems), Low to Medium			
Operation				
	33: Burton Bushes Ancient Woodland, Medium	Minor (not significant)		

Impact and Phase	Receptor and importance	Magnitude and Significance	Mitigation	Residual impact
Indirect impacts on designated heritage assets. (HE-O-5)	34: Buried archaeological remains (Scheduled earthworks) on Westwood Pasture, High	Permanent minor adverse (not significant)	Co25, Co28, Co145, Co151, Co30, Co159	Permanent minor adverse (not significant)
	35: Buried archaeological remains (barrows) and Mill on Westwood Pasture, High			
	36: Beverley Conservation Area, High			
	37: St Mary's Church, Beverley, High			
	38: Beverley Minster, High			
	43: Cellar Heads moated site, High			
	44: Risby Hall, High			
	45: Risby Hall Folly, High			
	46: Birkhill Ancient Woodland, Medium			
	47: Skidby Windmill and outbuildings, High			
	50: Buried archaeological remains (barrow cemetery – one scheduled) High			
	51: White Hall Farm, High			
	52: Old Hall and outbuildings, High			
Indirect impacts on non-designated heritage assets. (HE-O-6)	49: Buried archaeological remains (polygonal enclosure and other remains), Medium to High	Minor	Co25, Co28, Co30	Permanent minor adverse (not significant)
	50: Buried archaeological remains (barrow cemetery), Medium to High	Permanent minor adverse (not significant)		

5.16 References

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