# XLINKS' MOROCCO-UK POWER PROJECT

## Environmental Statement

### Volume 3, Chapter 7: Marine Archaeology and Cultural Heritage

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# Glossary

| Term | Meaning |
|---|---|
| Applicant | Xlinks 1 Limited. |
| Environmental Impact Assessment | The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions. |
| Environmental Statement | The document presenting the results of the Environmental Impact Assessment process. |
| Intertidal area | The area between Mean High Water Springs and Mean Low Water Springs. |
| Listed Buildings | High and medium significance buildings designated for their historical, architectural or artistic importance under the *Planning (Listed Buildings and Conservation Areas) Act 1990*. |
| Mean High Water Springs | The height of mean high water during spring tides in a year. |
| Mean Low Water Springs | The height of mean low water during spring tides in a year. |
| National Policy Statement(s) | The current national policy statements published by the Department for Energy Security and Net Zero in 2023. |
| Offshore Cable Corridor | The proposed corridor within which the offshore cables are proposed to be located, which is situated within the UK Exclusive Economic Zone. |
| P1 archaeological rating | Feature of probable archaeological interest, either because of its palaeogeography or likelihood for producing palaeoenvironmental material |
| P2 archaeological rating | Feature of possible archaeological interest |
| Palaeoenvironmental remains | Minerogenic deposits such as alluvial silts and clays that have potential for ecofact preservation (such as diatoms, ostracods molluscs), the assessment of which can provide information on depositional environments (e.g. the salt or freshwater nature of deposits) that can enhance interpretation of the palaeolandscape. Peat deposits can preserve floral remains such as pollen, seeds and plant fragments and other organic remains. Organic material can also be dated by radiocarbon techniques, important for establishing the chronology for the depositional sequence. |
| Palaeolandscape | Palaeolandscape refers to an ancient/relict landscape that has been preserved in the geological record, in this case submerged by rising sea levels and seabed sediments. These landscapes provide insights into past environments, including the physical and ecological conditions that existed at different times. The study of the remnant palaeogeographic features provides insight into how ancient environments were exploited by early humans and how the landscape changed through time as a result of natural processes and human activities. |
| Policy | A set of decisions by governments and other political actors to influence, change, or frame a problem or issue that has been recognized as in the political realm by policy makers and/or the wider public. |
| Proposed Development | The element of Xlinks' Morocco-UK Power Project within the UK, which includes the offshore cables (from the UK Exclusive Economic Zone to landfall), landfall, onshore Direct Current and Alternating Current cables, converter stations, and highways improvements. |
| Protected Wrecks | High significance shipwrecks designated for their historical, archaeological or artistic importance under the Protection of Wrecks Act 1974. |
| Receptor | The element of the receiving environment that is affected. |

| Term | Meaning |
|---|---|
| Scheduled Monument | Areas containing high significance archaeological remains designated for their historical or archaeological importance under the *Ancient Monuments and Archaeological Areas Act 1979*. |
| Xlinks' Morocco- UK Power Project (the 'Project') | The overall scheme from Morocco to the national grid, including all onshore and offshore elements of the transmission network and the generation site in Morocco (referred to as the 'Project'). |

# Acronyms

| Acronym | Meaning |
|---|---|
| ADS | Archaeological Data Service |
| AEZ | Archaeological Exclusion Zone |
| BGS | British Geological Survey |
| CEA | Cumulative Effects Assessment |
| CIfA | Chartered Institute for Archaeologists |
| CITiZAN | Coastal and Intertidal Zone Archaeological Network |
| DCO | Development Consent Order |
| DESNZ | The Department for Energy Security and Net Zero |
| DHER | Devon Historic Environment Record |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| HDD | Horizontal Directional Drilling |
| HE | Historic England |
| HER | Historic Environment Record |
| MBES | Multibeam Echosounder |
| MHWS | Mean High Water Springs |
| MLWS | Mean Low Water Springs |
| MPS | Marine Policy Statement |
| NDB | North Devon Biosphere |
| NHLE | National Heritage List for England |
| NPPF | National Planning Policy Framework |
| NPS | National Policy Statement |
| OCC | Offshore Cable Corridor |
| OCEMP | Offshore Construction Environmental Management Plan |
| OOWSI | Outline Offshore Written Scheme of Investigation |
| PAD | Protocol for Archaeological Discoveries |
| SBP | Sub-bottom Profiler |
| SoS | Secretary of State |
| SSS | Sidescan Sonar |
| TAEZ | Temporary Archaeological Exclusion Zone |
| TW | Territorial Waters |

| Acronym | Meaning |
|---|---|
| UCH | Underwater Cultural Heritage |
| UK | United Kingdom |
| UKHO | United Kingdom Hydrographic Office |
| WSI | Written Scheme of Investigation |

# Units

| Units | Meaning |
|---|---|
| nm | Nautical Mile |
| nT | NanoTesla |

# 7 MARINE ARCHAEOLOGY AND CULTURAL HERITAGE

## 7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) undertaken for the United Kingdom (UK) elements of Xlinks' Morocco-UK Power Project (the 'Project'). For ease of reference, the UK elements of the Project are referred to in this chapter as the 'Proposed Development'. The ES accompanies the application to the Planning Inspectorate for development consent for the Proposed Development.

7.1.2 This chapter considers the likely impacts and effects of the Proposed Development on marine archaeology and cultural heritage during the construction, operation and maintenance and decommissioning phases. Specifically, it relates to the offshore elements of the Proposed Development seaward of Mean High Water Springs (MHWS). Those elements of the Proposed Development located landward of Mean Low Water Springs (MLWS) are addressed in Volume 2, Chapter 2: Historic Environment of the ES.

7.1.3 In particular, this ES chapter:

- identifies the key legislation, policy and guidance relevant to marine archaeology and cultural heritage;
- details the EIA scoping and consultation process undertaken to date for marine archaeology and cultural heritage;
- confirms the study area for the assessment, the methodology used to identify baseline environmental conditions, the impact assessment methodology, and identifies any assumptions and limitations encountered in compiling the environmental information;
- sets out the existing and future environmental baseline conditions, established from desk studies, surveys and consultation;
- details the mitigation and/or monitoring measures that are proposed to prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process;
- defines the project design parameters used to inform the impact assessment;
- presents an assessment of the likely impacts and effects in relation to the construction, operation and maintenance and decommissioning phases of the Proposed Development on marine archaeology and cultural heritage; and
- identifies any cumulative, transboundary and/or inter-related effects in relation to the construction, operation and maintenance and decommissioning phases of the Proposed Development on marine archaeology and cultural heritage.

7.1.4 The marine historic environment (archaeology and cultural heritage) comprises potential submerged prehistoric landscapes, archaeological remains of watercraft, aircraft crash sites and structural remains other than watercraft. This includes designated heritage assets and assets identified by the local planning authority (including local listing), which are protected by law or local policy.

7.1.5 The terms 'archaeology' and 'cultural heritage' are, in general, perceived as interchangeable. Strictly, though, 'archaeology' refers to the process of obtaining information from the material culture of past societies. For the purposes of this document, 'archaeology' refers to cultural heritage that has the potential to provide information about the past through scientific and academic research, whereas 'cultural heritage' refers more broadly to all aspects of the material and intangible culture of past societies. The term 'underwater cultural heritage' (UCH) refers to cultural heritage within or on the seabed or within estuaries, rivers, lakes and other bodies of water.

7.1.6 The assessment presented is informed by and should be read in conjunction with the following ES chapters:

- Volume 1, Chapter 2: Policy and Legislation;
- Volume 1, Chapter 3: Project Description;
- Volume 1, Chapter 5: EIA Methodology;
- Volume 2, Chapter 2: Historic Environment;
- Volume 3, Chapter 8: Physical Processes; and
- Volume 4; Chapter 2: Landscape, Seascape and Visual Resources.

7.1.7 This chapter also draws upon additional information to support the assessment contained within the following ES appendices:

- Appendix 7.1: Marine Archaeology Desk-based Assessment;
- Appendix 7.2: Archaeological assessment of geophysical survey data;
- Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment;
- Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data;
- Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation; and
- Appendix 7.6: Protocol for Archaeological Discoveries.

# 7.2 Legislative and Policy Context

## Legislation

7.2.1 The Proposed Development is located within the UK Exclusive Economic Zone (EEZ) with a proposed landfall in Devon, west of Bideford. The Offshore Cable Corridor (OCC) crosses the Bristol Channel and the Celtic Sea through UK territorial waters (up to 12 nautical miles (nm)) to the UK EEZ limit bordering French waters. The following legislation applies to archaeology and cultural heritage within both the UK territorial waters and the UK EEZ:

- Protection of Wrecks Act 1973: Sections One and Two;
- The Marine and Coastal Access Act (2009);
- Ancient Monuments and Archaeological Areas Act 1979 (as amended);
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

7.2.2 The above legislation provides protection for wrecks of high historical, archaeological or artistic value, as well as allowing military wrecks and aircraft remains to be protected. There are currently no known protected wrecks within the study area; the archaeological study area is defined in **section 7.4**. If encountered, all military aircraft crash sites are automatically protected under the Protection of Military Remains Act 1986. Ownership of any wreck remains is determined in accordance with the Merchant Shipping Act 1995.

7.2.3 In 2000, the UK government ratified The European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (The Valletta Convention). The convention binds the UK to implement protective measures for the archaeological heritage within their jurisdiction, including marine environments.

7.2.4 The UNESCO Convention on the Protection of Underwater Cultural Heritage, adopted in 2001, is intended to enable States to better protect their submerged cultural heritage. The UK was one of a number of States that abstained from the 2001 vote and has not ratified the Convention. However, the UK has adopted the 'The Rules', an Annex to the Convention that sets out a standard for archaeological investigations, as government policy for underwater cultural heritage.

## Planning Policy Context

7.2.5 The Proposed Development is located within the UK EEZ, crossing the Bristol Channel and Celtic Sea, making landfall in Devon, west of Bideford, with the onshore infrastructure proposed to be located wholly within Devon, England. As set out in Volume 1, Chapter 1: Introduction of the ES, the Secretary of State for the Department for Energy Security and Net Zero (DESNZ) has directed that elements of the Proposed Development are to be treated as a Nationally Significant Infrastructure Project (NSIP) development for which a development consent order (DCO) is required under the Planning Act 2008, as amended.

### National Policy Statements

7.2.6 There are currently six energy National Policy Statements (NPSs), three of which contain policy relevant to the Proposed Development, specifically:

- Overarching NPS for Energy (NPS EN-1) which sets out the UK Government's policy for the delivery of major energy infrastructure (Department for Energy Security & Net Zero 2024a);
- NPS for Renewable Energy Infrastructure (NPS EN-3) (Department for Energy Security & Net Zero 2024b); and
- NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security & Net Zero 2024c).

7.2.7 **Table 7-1** sets out key aspects from the NPSs relevant to the Proposed Development, with particular reference to the need for and approach to consenting such infrastructure.

## Table 7-1: Summary of relevant NPS policy

| Summary of NPS requirement | How and where considered in the ES |
|---|---|
| **NPS EN-1** | |
| Paragraph 5.9.9: "The applicant should undertake an assessment of any likely significant heritage impacts of the proposed development as part of the EIA and describe these along with how the mitigation hierarchy has been applied in the ES. This should include consideration of heritage assets above, at, and below the surface of the ground. Consideration will also need to be given to the possible impacts, including cumulative, on the wider historic environment. The assessment should include reference to any historic landscape or seascape character assessment and associated studies as a means of assessing impacts relevant to the proposed project." | The potential impact significance on archaeological receptors is considered in this chapter, and the contribution of setting to that significance is discussed (e.g. **Section 7.10** and in Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of this ES). Issues relating to the setting of onshore heritage assets have been considered as part of Volume 2, Chapter 2 of this ES: Historic Environment. |
| Paragraph 5.9.11: "Where a site on which development is proposed 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, accurate representative visualisations may be necessary to explain the impact." | **Section 7.7** of this chapter and Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of this ES provides a full assessment of the baseline environment. |
| Paragraph 5.9.12: "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. Studies will be required on those heritage assets affected by noise, vibration, light and indirect impacts, the extent and detail of these studies will be proportionate to the significance of the heritage asset affected." | This chapter provides an account of the potential impacts of the Proposed Development on heritage assets and their significance (**sections 7.10-7.12**). |
| **NPS EN-3**<br>(NPS EN-3 Section 2.8, despite referring directly to offshore wind, contains policy relevant to the Proposed Development. Specifically, NPS EN-3 Section 2.8 (paragraph 2.8.4) references offshore transmission cabling similar to the Proposed Development proposals) | |
| Paragraph 2.8.77: "To inform micrositing/microrouting applicants should undertake high-resolution survey work and make provision for investigative work, such as archaeological examination, to assess the impacts of any proposed cables or foundation placement on potential heritage assets." | The assessment has been undertaken in accordance with section 2.8 of EN-3. The geophysical survey data have been reviewed and analysed by a suitable archaeological contractor and the results have been used to inform the ES chapter and are presented in Volume 3, Appendix 7.2: Archaeological assessment of geophysical survey data of the ES. |
| Paragraph 2.8.78: "Applicants should submit an Outline Offshore Archaeological Written Scheme of Investigation (OOWSI )as part of the Development Consent Order (DCO) submission, with a commitment to complete a project specific WSI post-consent in consultation with Historic England." | A project-specific OOWSI is part of the DCO submission package, with an OOWSI appended to this ES chapter (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation). |

| Summary of NPS requirement | How and where considered in the ES |
|---|---|
| Paragraph 2.8.168: "Applicants should consult with the relevant statutory consultees, such as Historic England or Cadw, on the potential impacts on the marine historic environment at an early stage of development during pre-application, taking into account any applicable guidance (e.g., offshore renewables protocol for archaeological discoveries." | A summary of consultation undertaken to date with Historic England is included in **Table 7-7.** Consultation will be ongoing throughout the development process i.e. continuing post consent. |
| Paragraph 2.8.173: "Applicants are required to determine how any known heritage assets might best be avoided." | This ES chapter provides an account of how the known heritage assets should be avoided (**Table 7-21**). |
| Paragraph 2.8.175: "Once a site has been chosen, it may be necessary to undertake further archaeological assessment, including field evaluation investigations prior to construction, to understand a known site's significance and full extent, and, to identify as yet unknown heritage assets when considering the options for detailed site development, in accordance with an archaeological written scheme of investigation included with the application." | Areas for further investigation have been identified in the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation, of the ES). |
| Paragraphs 2.8.252 - 2.8.255: "The avoidance of important heritage assets to ensure their protection *in situ*, is the most effective form of protection. This can be achieved through the implementation of exclusion zones around known and potential heritage assets which preclude development activities within their boundaries. These boundaries can be drawn around either discrete sites or more extensive areas identified in the Environmental Statement produced to support an application for consent. The ability of the applicants to microsite specific elements of the proposed development during the construction phase should be an important consideration by the Secretary of State when assessing the risk of damage to archaeology." | The avoidance of heritage assets is detailed in **sections 7.7** and **7.8** of this chapter. |
| Paragraph 2.8.325: "The Secretary of State should be satisfied that any proposed offshore wind farm and/ or offshore transmission project has appropriately considered and mitigated for any impacts to the historic environment, including both known heritage assets, and discoveries that may be made during the course of development." | This ES chapter considers the potential impacts on the known and hitherto unknown maritime heritage assets and makes appropriate recommendations to mitigate any adverse impact on them. |
| Paragraphs 2.10.137- 2.10.138: "The ability of the applicants to microsite specific elements of the proposed development during the construction phase should be an important consideration by the Secretary of State when assessing the risk of damage to archaeology. Where requested by the applicant, the Secretary of State should consider granting consents which allow for the micrositing within a specified tolerance of elements of the permitted infrastructure so that precise locations can be amended during the construction phase if unforeseen circumstances, such as the discovery of previously unknown archaeology, arise." | Mitigation via avoidance has been advocated. The heritage assets will be avoided principally by means of microrouting during detailed project design and during installation, where applicable. The variable width (500 m minimum) OCC provides flexibility for microrouting. |
| **NPS EN-5** | |

| Summary of NPS requirement | How and where considered in the ES |
|---|---|
| Paragraph 2.2.10: "…applicants must take into account Schedule 9 to the Electricity Act 1989, which places a duty on all transmission and distribution licence holders, in formulating proposals for new electricity networks infrastructure, to "have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and …do what [they] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects." | Potential impacts upon sites and objects of offshore archaeological and heritage interest are set out in **sections 7.5 and 7.10-7.12** along with a proposed approach to mitigation (**Section 7.8**). |

## The National Planning Policy Framework

7.2.8 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019 and 2021 and 2023, with an updated draft version released for consultation in August 2024 (Department for Levelling Up, Housing and Communities, 2023). The NPPF sets out the Government's planning policies for England.

7.2.9 **Table 7-2** sets out a summary of the NPPF policies relevant to this chapter.

**Table 7-2: Summary of NPPF requirements relevant to this chapter**

| Policy | Key provisions | How and where considered in the ES |
|---|---|---|
| 16 (Paragraph 195) | Recognises that heritage assets are an irreplaceable resource. | The ES chapter recognises this and sets out the proposed approach to mitigation in **section 7.8.** |
| 16 (Paragraph 200) | Requires applicants to provide a level of detail that is proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. | **Section 7.7** and Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment provides an assessment of the baseline environment and the significance of the archaeological receptors is detailed in **sections 7.7 and 7.10-7.12**. |
| 16 (Paragraph 203) | Takes into account the desirability of sustaining and enhancing the significance of heritage assets, including any contribution made by their setting, and putting them to viable uses consistent with their conservation. | The significance of the archaeological receptors and the contribution of setting to that significance have been detailed in **sections 7.7 and 7.10-7.12**. |
| 16 (Paragraphs 205-208) | Places weight on the conservation of designated heritage assets (which include world heritage sites, scheduled monuments, listed buildings, protected wreck sites, registered parks and gardens, registered battlefields or conservation areas), with any anticipated substantial harm weighed against the public benefits of the proposal. | **Section 7.7** and Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment provides an assessment of the baseline environment and **section 7.8** sets out the proposed approach to mitigation. |

| Policy | Key provisions | How and where considered in the ES |
|---|---|---|
| 16 (Paragraph 209) | Requires applicants to include a consideration of the effect of an application on the significance of non-designated heritage assets, giving regard to the scale of any harm or loss and the significance of the heritage asset. | **Sections 7.10-7.12** provide an assessment of the effect of the Proposed Development on non-designated heritage assets. |
| 16 (Paragraph 211) | Requires developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and impact, and to make this evidence (and any archive generated) publicly accessible. | **Section 7.8** sets out the proposed approach to mitigation and a project-specific OOWSI is presented as Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation of the ES. |
| 16 (Paragraph 212) | Regards proposals that preserve those elements of the setting that make a positive contribution to the asset (or which better reveal its significance) favourably. | Setting impacts on on-shore heritage assets have been scoped out of this assessment based on the rationale presented in **Table 7-9**. The contribution of the setting on the sensitivity of submerged heritage assets is negligible given the nature of asset and how it is experienced and understood within its landscape. |

7.2.10 The Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2023) supports the NPPF and provides guidance on applying the framework to assessment of the Historic Environment.

## Marine Policy

### UK Marine Policy Statement

7.2.11 This assessment also takes account of the UK Marine Policy Statement (MPS) (HM Government, 2020). The MPS sets out high-level objectives for marine planning, which has informed and directed the development of regional and local plans. Marine Plans must be set out in accordance with other relevant national policies and are intended to contribute to the achievement of sustainable development in the UK marine area. Of particular relevance to the Proposed Development is the South West Inshore and South West Offshore Marine Plan (DEFRA, 2021a) ('South West Marine Plan').

### South West Inshore and South West Offshore Marine Plans

7.2.12 The South West Marine Plan has been prepared to address Section 51 of the Marine and Coastal Access Act 2009, which states "a marine plan authority may prepare a marine plan for an area consisting of the whole or any part of its marine planning region" to include "the authority's policies for and in connection with the sustainable development of the area", and has been agreed and adopted by the Secretary of State for Environment, Food and Rural Affairs. The South West Marine Plan covers the footprint of the Proposed Development and the associated

marine archaeology and cultural heritage study area (see **section 7.4** for more details).

7.2.13 **Table 7-3** is a summary of the specific policies set out in the South West Inshore and South West Offshore Marine Plan (DEFRA, 2021a) relevant to this chapter.

**Table 7-3: Summary of inshore and offshore marine plan policies relevant to this chapter**

| Policy | Key provisions | How and where considered in the ES |
|---|---|---|
| SW-HER-1 | Proposals that may affect heritage assets should demonstrate, in order of preference:<br>a) avoid<br>b) minimise<br>c) mitigate<br>- any harm to the significance of heritage assets.<br>If it is not possible to mitigate, then public benefits for proceeding with the proposal must outweigh the harm to the significance of heritage assets. | **Section 7.7** provides an overview of the heritage assets that may be affected by the Proposed Development and **Section 7.8** sets out the proposed approach to mitigate the potential impacts. |

## Local Planning Policy

7.2.14 The onshore and intertidal elements of the Proposed Development are located within the administrative area of Torridge District Council (and Devon County Council at the County level). The local planning policies are not applicable for offshore elements; however, the local planning policy is applicable to the onshore elements for cultural heritage and have been considered in Volume 2, Chapter 2: Historic Environment of this ES.

## North Devon Biosphere Reserve

7.2.15 The Proposed Development is partially located within the North Devon Biosphere Reserve, which is recognised under UNESCO's Man and the Biosphere Programme and designated as an area for testing and demonstrating sustainable development on a sub-regional scale.

7.2.16 The North Devon Biosphere Reserve consists of three zones; a core zone centred around Braunton Burrows SAC/SSSI, a buffer zone consisting of the Taw Torridge Estuary (as far as Barnstaple and Bideford), and a transition zone formed by the catchment area of the rivers and streams that drain to the North Coast of Devon in addition to an area of sea as far out as Lundy.

7.2.17 The Biosphere Reserve is overseen by the North Devon Biosphere Reserve Partnership, which is a collaboration of 26 partnership organisations who work to deliver sustainable development through direct action, through advocacy and providing advice. The non-statutory 'North Devon Biosphere Reserve Strategy for Sustainable Development 2014 to 2024' (NDB undated) provides a context for stakeholders to deliver programmes and plans in support of the sustainable development of the Biosphere Reserve.

7.2.18 Within the North Devon Biosphere Reserve, non-statutory programmes and plans relevant to marine archaeology and cultural heritage include:

- BioCultural Heritage Tourism Project - to increase the economic value of tourism based on their natural and cultural resources, whilst reducing its environmental impact; and
- North Devon Marine Natural Capital Plan.

7.2.19 The extent to which the Proposed Development impacts on the North Devon Biosphere Reserve and its relevant programmes/plans has been considered in this marine archaeology and cultural heritage chapter, and consultation has taken place with the North Devon Biosphere Reserve Partnership ahead of ES stage. No issues regarding Cultural Heritage and Archaeology were raised as part of the discussion. **Table 7-4** presents a summary of the specific policies set out in the North Devon Marine Natural Capital plan (North Devon UNESCO Biosphere Reserve, 2020) and the Strategy for Sustainable Development (NDB undated) relevant to this chapter.

**Table 7-4: Summary of North Devon Biosphere Marine Natural Capital Plan and Strategy for Sustainable Development policies relevant to this chapter**

| Policy | Description | How and where considered in the ES |
|---|---|---|
| Marine Natural Capital Plan PL01: Novel and ongoing monitoring of the marine environment should incorporate local knowledge to identify where there may be potential for research and data gathering, and promote partnership working between regulators, academics and local stakeholders. | A key function of the Biosphere Reserve is to research, monitor and disseminate the learning from our approaches to sustainable development. In addition, there is a rich heritage of marine and maritime sectors in north Devon with a variety of stakeholder groups. PL01 recognises the value of collaboration with local users of the marine environment to gather novel anecdotal evidence, and to deliver bespoke, locally led approaches to sustainable governance. Furthermore, PL01 highlights that the natural capital assets in MNCP area deliver benefits from multiple ecosystem services and will require multi-agency, cross-jurisdiction working to ensure effective, site level management approaches to underpin flows of ecosystem services benefits. | As outlined in **Table 7-7**, relevant results from geotechnical surveys will be shared with Historic England, with the aim to enhance the palaeogeographic knowledge and understanding of the area. |
| Strategy for Sustainable Development SOC5 | Promote the conservation and enhancement of cultural assets and sites and the public participation in their management. | Proactive management of marine archaeology and cultural heritage throughout the project is part of the embedded mitigation strategy, see e.g. **Table 7-21**. The OOWSI (Volume 3, Appendix 7.5 of the ES) contains further information on the enhancement of cultural heritage assets (e.g. approaches to recording, reporting, archiving and dissemination of data). |

# 7.3 Consultation and Engagement

## Scoping

7.3.1 In January 2024, the Applicant submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why

the Proposed Development would not have the potential to give rise to significant environmental effects in these areas.

7.3.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State (SoS)) provided a Scoping Opinion on 7 March 2024. Key issues raised during the scoping process specific to marine archaeology and cultural heritage are listed in **Table 7-5**, together with details of how these issues have been addressed within the ES.

**Table 7-5: Summary of Scoping Responses**

| Comment | How and where considered in the ES |
|---|---|
| **Planning Inspectorate** | |
| It is noted that the Scoping Report includes consideration of potential transboundary effects in relation to the following aspects:<br>• Benthic Ecology;<br>• Fish and Shellfish Ecology;<br>• Commercial Fisheries;<br>• Marine Mammals and Sea Turtles;<br>• Offshore Ornithology;<br>• Other Marine Users;<br>• Marine Archaeology and Cultural Heritage;<br>• Physical Processes;<br>• Underwater Noise; and<br>• Climate Change.<br>The Inspectorate also notes reference to potential positive impacts on other European Economic Area States at paragraphs 9.4.37 to 9.4.38 in respect of socio-economic effects but these are proposed to be scoped out on the basis that they are positive.<br><br>The Inspectorate recommends that the ES should identify whether the Proposed Development has the potential for significant transboundary effects, and if so, what these are, and which EEA States would be affected. The Inspectorate will undertake a transboundary screening on behalf of the SoS in due course. | Transboundary effects are considered within the ES in **section 7.14**. |
| **Change in hydrodynamic regime (scour and accretion) during construction, operational repair and decommissioning (if the cable is removed)**<br>The Scoping Report states that changes could occur from the presence of rock berms, which may be required for cable protection at crossings or in isolated hard seabed areas during operation. The Inspectorate notes the predicted construction timetable and two offshore cable laying phases as described at Paragraphs 4.7.10 to 4.7.12 of the Scoping Report. It appears possible that rock berms would be in place for extended periods of construction activity in advance of the cable becoming operational and that mitigation may also be required during this period. The Inspectorate advises that the potential for change to the hydrodynamic regime due to the presence of cable | Concerns have been noted. Changes to the hydrodynamic regime during the construction phase is scoped in to the assessment and is considered in the ES (see **section 7.10**) as part of Impact 2. Mitigation measures adopted as part of the Proposed Development are outlined in **Table 7-21**. |

| Comment | How and where considered in the ES |
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| protection should be assessed for the phases during which it is likely to give rise to significant effects and that the ES should describe any mitigation required and explain how this would be secured in the DCO. | |
| **Habitat alteration and change in hydrodynamic regime in the construction and both decommissioning phases (ie *in situ* and removal)**<br>The Inspectorate is content for the effect of the introduction of hard substrate to be considered during operational phase and therefore agrees this matter can be scoped out of the construction stage assessment. The ES should however consider the removal of subsequent hard substate in the decommissioning (removal) phase, where likely significant effects could occur, or provide evidence demonstrating agreement with the relevant consultation bodies that significant effects are not likely to occur. | The impact of potential removal of the cables and any of their associated protections has been scoped into the assessment and is considered in the ES (see **section 7.12**) as part of Impacts 7 and 8. |
| **Direct impacts to cultural heritage assets within the footprint of the Proposed Development during operation (excluding repair) and decommissioning (in situ)**<br>The Inspectorate notes that no justification is presented in the Scoping Report to scope this matter out from these stages of the Proposed Development. However, it considers that a pathway for effect is unlikely to arise during operation (excluding repair) and decommissioning *in situ*) given the limited activities involved. The Inspectorate agrees that this matter can be scoped out of the assessment. | The scoped out elements have been summarised in **Table 7-9**. |
| **Direct and indirect impacts as a result of geo-morphological changes during decommissioning (*in situ*)**<br>The Inspectorate notes that no justification is presented in the Scoping Report to scope this matter out from the decommissioning (*in situ*) option. Where the offshore cable is proposed to remain *in situ* there could be future effects with geomorphological changes, akin to potential effects by remaining in situ during operation. It is not clear why this matter is not required to be scoped in and therefore the Inspectorate cannot agree to scope this matter out at this stage. The ES should include an assessment of this matter, where likely significant effects could occur, or evidence to support that significant effects are not likely. | Indirect physical Impacts from geomorphological changes during decommissioning (*in situ*) have been reconsidered and scoped into the assessment. This impact has been considered in the ES (see **section 7.11**) as part of Impact 6. |
| **Potential effects to the setting of onshore cultural heritage assets – all phases**<br>The Inspectorate is content to scope out this matter as all onshore cultural heritage assets are located away from the marine environment, therefore any activity is unlikely to impact the setting of any onshore assets. | The scoped out elements have been summarised in **Table 7-9**. |
| **Potential effects arising from the decommissioning of the Proposed Development** | The scoping for aspects of the decommissioning phase has been clarified in **Table 7-8** and **Table 7-9**. |

| Comment | How and where considered in the ES |
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| The general approach and justification to scoping out the decommissioning phase is described in Table 8.8.3; however, it is not confirmed whether this relates to decommissioning (*in situ*) or decommissioning (removal). It is however assumed it relates to decommissioning (*in situ*) as Table 8.8.2 confirms that decommissioning (removal) would be assessed in the ES. As such,<br>the Inspectorate agrees that this matter can be scoped out. | |
| **Heritage Assets**<br>The Inspectorate considers that the Hartland Heritage Coast should be included on Figure 8.8.1, which shows other heritage assets in the<br>vicinity of the Proposed Development. | The Heritage Coasts that lay within the boundary of the study area have been added to Volume 3, Figure 7.1 of the ES and have been considered within the assessment in **paragraph 7.7.8**. |
| **Mitigation measures**<br>The ES should clearly identify the proposed mitigation measures to be included in respect of marine archaeology. A WSI should steer the<br>final design of the offshore cable and appropriate mechanisms should be clearly laid out to deal with any finds during implementation. Mitigation measures including any Archaeological Exclusion Zones (AEZs) should be clearly identified and the distance justified accordingly. The ES should also explain how the WSI, including any AEZs, are to be appropriately secured and effort made to agree the WSI with consultation bodies. | Proposed mitigation measures are outlined in **Table 7-21** and the results of archaeological review of the geophysical and geotechnical surveys undertaken in 2024 have allowed for a detailed targeted mitigation strategy to be identified for the ES chapter. An OOWSI is presented as Volume 3, Appendix 7.5 of the ES. |
| **Assessment criteria**<br>Tables 8.8.4 and 8.8.5 describe how the value/sensitivity and magnitude of change is defined; however, there is no explanatory text to confirm where this has been derived from. The ES should include information regarding any guidance used to inform the assessment criteria. | The guidance used to inform the value/sensitivity definitions is described in **paragraph 7.6.9** of this chapter.<br><br>The guidance used to inform the magnitude of change definitions is described in **paragraph 7.6.14** of this chapter. |
| **Potential inter-related effects**<br>The Scoping Report states that data gathered for the onshore archaeological and cultural heritage assessment will be reviewed as part of the marine archaeology assessment. Consideration should be given to including onshore archaeology and cultural heritage aspect chapter within an inter-related effects section, should it be appropriate following consultation feedback and further design work. | Onshore archaeology and cultural heritage data have been reviewed to provide context for the potential marine archaeology and cultural heritage assets. The onshore cultural heritage chapter (Volume 2, Chapter 2: Historic Environment of the ES) has been considered within the inter-related effects section. |
| The Scoping Report states that the construction phase would not be lengthy enough for significant climate change risks to occur compared to the present-day baseline. The Applicant states that they would employ good health and safety practices with respect to risks such as heatstroke or storm events offshore.<br><br>A construction programme of approximately up to 84 months (7 years) is estimated at Paragraph 4.2.98 of the Scoping Report. The Inspectorate disagrees that | Potential climate change impacts on the baseline have been considered in the Future Baselines section within **section 7.7.** |

| Comment | How and where considered in the ES |
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| during this period of construction the impacts from climate change would not lead to a significant effect, as this does not take into account extreme weather events both onshore and offshore or impacts to human receptors (eg construction workers). The ES should assess impacts from climate change, including extreme weather events over the construction and decommissioning periods, where significant effects are likely to occur and describe and secure any relevant mitigation measures. | |
| The Inspectorate notes the references in the Scoping Report to professional guidance (ie 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (Institute of Environmental Management and Assessment (IEMA) 2022)) and IEMA's 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (IEMA, 2020). The ES should set out the methodologies used to explain any departure from the proposed approach where professional judgement is applied. Outputs from other assessments should be clearly explained where these have been applied. | Professional guidance used to inform the assessment methodologies for the marine archaeology and cultural heritage assessment is outlined in **Table 7-10**. The assessment methodology is explained in **paragraphs 7.6.6** to **7.6.26**. |
| Where significance criteria are not explicitly defined within the guidance, the ES should clearly set out where deviation from guidance has occurred and professional judgement has been applied. | The significance criteria are explained in **paragraphs 7.6.9** to **7.6.12**. |
| The Scoping Report states that potential impacts on material assets arising from the Proposed Development will be considered in the other marine users, historic environment, land use and recreation; and socio-economics aspect chapters of the ES and a standalone material assets aspect chapter is not proposed. The Inspectorate agrees with the proposed approach on this basis. | Noted. |
| **Historic England** | |
| At present we consider that the impacts included within table 8.8.2 present a good starting point in which to inform any subsequent EIA. Additionally, that the impacts scoped in or out are acceptable. However, as explained within the Historic England guidance document The Setting of Heritage Assets (Good Planning Advice in Planning 3), impacts to the setting and the significance of heritage assets such as scheduled monuments or Protected Wreck Sites - that are periodically, partly or wholly submerged - are equally applicable in some rare cases. Which in respect to the project's development infrastructure may present such instances where the extent of cable burial is not altogether possible. | The known protected wrecks and scheduled monuments within the marine or intertidal environment within the study area are identified in the baseline in **Table 7-16** and considered within the ES assessment (**section 7.7**). |
| Regarding only the archaeological science elements of the proposed offshore works, consideration of the potential impact of geomorphological changes is welcomed, as is the assessment of potential impacts through physical process modelling. | Noted. |

| Comment | How and where considered in the ES |
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| The Scoping report explains in summary (within table 8.8.1 and 8.8.27) the EIA's marine archaeology and cultural heritage assessment will be informed by the interpretation of the geophysical and geotechnical survey data. Principally through Multibeam Bathymetry, Sidescan Sonar, Magnetometer and Sub-bottom Profiling geophysical techniques. With reference to up-to-date standards and guidance included. Whilst we welcome this approach, to support a clear characterisation level of seabed impacts, if this data is to be solely used for the purposes of the final route design, it runs the risk of being insufficient to inform a more iterative approach to gathering important information about impacts to the historic environment.<br><br>Therefore, the PEIR archaeological assessment technical reports included at the stage of the pre-application should be given the complete autonomy to issue recommendations as to where such acquired data is insufficient, lacking in resolution or demonstrating gaps in coverage. Such that plans for schemes of further work can be effectively captured within supporting documentation attached to any consent granted. I.e. through an Outline Offshore Written Scheme of Investigation (WSI). | Any insufficient data in the geophysical and geotechnical surveys have been identified and recommendations have been made where warranted to ensure that potential remains and associated impacts are accurately identified, characterised, and mitigated. This is included within the ES in **sections 7.8, 7.10-7.12** and as part of the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation, of this ES). |
| We note and welcome the alluded to known and recorded nature of maritime and aviation related archaeology within the study area. Such as paragraph 8.8.15. However, we feel the potential for unrecorded sites in or close to the development area is very high. The justification for this uncertainty is given the marine historic environment comprises more than those sites that are currently recorded with in accessible marine datasets. As an example, the seabed around Cornwall contains approximately 4,500 shipwrecks, of which 85% are unaccounted for wrecked, foundered and stranded vessels. Therefore, it is quite possible should this project progress to consent and construction, such sites may well be encountered, and requiring an effective management response. Furthermore, below the seabed surface important evidence of prehistoric landscapes and associated artefacts dating to past human activity may also exist, yet to be mapped and yet to be understood and shared with the wider community. | The potential for marine archaeological remains to be present within the study area is presented in the desk-based assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment, of this ES). |
| We note that as a form of 'embedded mitigation' the "micro-routing of the cable corridor will be undertaken where possible and archaeological exclusion zones applied to avoid direct impacts on cultural heritage assets and submerged land surfaces beneath marine sediments where possible". As such, there are some points the Environmental Statement (ES) should look to consider in further detail on this provision. | Noted. The extent of archaeological exclusion zones has been conservatively determined where uncertainty exists by experienced marine archaeologists. This is reported in the ES chapter in **section 7.7** and in Volume 3, Appendix 7.2: Archaeological assessment of geophysical survey data of the ES and has informed the OOWSI, which is presented as Volume 3, Appendix 7.5 of the ES. Micro-routing of the route will take into account any areas of constriction and the mitigation strategy in |

| Comment | How and where considered in the ES |
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| The first being that, as illustrated in figures 8.6.2: 'Navigational features and 8.7.4: 'Subsea cables', there is a high level of seabed coverage in or close to the proposed route already being utilised. As a result, affording effective micro-routing may require careful planning, with survey data and other strategies of investigation important in identifying any constrictive area issues early on.<br><br>Secondly, whilst in many cases the use of a full suite of high-resolution geophysical survey methods can provide confidence as to the extent of an archaeological exclusion zone. There are always some instances where, due to a range of factors (e.g. wrecking process or subsequent clearance activities) where the full extent of a wreck sites remains uncertain. With some outlying geophysical anomalies, which may seem less significant, in fact on closer inspection forming part of a broader wreck assemblage. It is therefore through the referenced (forthcoming) ES and supporting WSI, that mechanisms for targeting and adapting to these cases should be coherently considered. | those areas will be carefully designed to minimise impact to the assets. |
| A draft Outline Offshore Archaeological WSI should be included at the PEIR stage. Thereby providing a systematic link with the impacts identified, with the description of resulting measures of evaluation and mitigation (or offsetting) through targeted schemes of investigation, set out clearly (and in good time) between any potential consent and seabed preparations. Specifically, these schemes of investigation will need to evaluate and further characterise features of the known or unknown historic environment - through ground truthing surveys - that may present a potential seabed constraint. Which we wholly recommend utilise onboard archaeological expertise during such surveys, to maximise the information outputs. | An OOWSI was included in the PEIR and comments from HE on the draft has been incorporated into the updated OOWSI which is presented as Volume 3, Appendix 7.5 of the ES (which was drafted following the completion of the baseline archaeological review of the geophysical data, and geoarchaeological review of the geotechnical data). |
| In doing so we feel this will align closely with the stated policy provisions of EN-1, paragraph 5.9.13 whereby the "applicant is encouraged, where opportunities exist, to prepare proposals which can make a positive contribution to the historic environment". And paragraph 5.9.19 "Where there is a high probability (based on an adequate assessment) that a development site may include, as yet undiscovered heritage assets with archaeological interest, the Secretary of State will consider requirements to ensure appropriate procedures are in place for the identification and treatment of such assets . .. ". | The stage 1 and stage 2 geoarchaeological review of the geotechnical borehole logs forms Volume 3, Appendix 7.3 of this ES. The review includes recommendations for further investigation where necessary and further mitigation activities. The OOWSI is presented as Volume 3, Appendix 7.5 of the ES, which presents the framework for further archaeological works required post-consent. |
| This we feel also fits closely to the EN-3 provision we would like to see considered appropriately in an ES assessment, to "also include the identification of any beneficial effects on the marine historic environment, for example through improved | |

| Comment | How and where considered in the ES |
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| access or the contribution to new knowledge that arises from investigation" - paragraph 3.8.191. | |
| To do this we request that input of archaeological expertise (to accredited standards and utilising a range of appropriate specialists where necessary), to maximise design and survey planning opportunities, needs to be fully confirmed throughout the ES and OOWSI. | |
| Specifically, as noted above, an experienced offshore/onshore geoarchaeologist is necessary to fully assess the submerged prehistoric potential, based upon a comprehensive ground model (of sub-surface deposits). | |
| In order to consider the potential impact on the geoarchaeological and palaeoenvironmental significance of deposits, the heritage assessment should include a detailed geoarchaeological and palaeoenvironmental desk based assessment which considers recent palaeoenvironmental studies with in the Taw Torridge estuary, this should be supported by a review of current, previous and any intended geotechnical assessment or targeted geoarchaeological boreholes. With clear reference to applicable Historic England guidance. | |
| With respect to measures to mitigate impacts to known and potential archaeological features and deposits within the intertidal, nearshore and punch-out area onshore, a full strategy to assess and survey this area needs to be discussed and agreed upon with Historic England and the Local Authority ahead of any PEIR submission. | Extensive consultations have been undertaken with Historic England throughout this ES process. The OOWSI (presented as Volume 3, Appendix 7.5 of the ES) commits to further consultations post-consent to ensure continue Historic England (HE) involvement and effective post-consent strategy (see e.g. **Table 7-7)**. |

## Preliminary Environmental Information Report

7.3.3 The preliminary findings of the EIA process were published in the Preliminary Environmental Information Report (PEIR) on 16 May 2024. The PEIR was prepared to provide the basis for statutory public consultation under the Planning Act 2008. This included consultation with statutory bodies under section 42 of the Planning Act 2008.

7.3.4 A summary of the key items raised specific to marine archaeology and cultural heritage is presented in **Table 7-6**, together with how these issues have been considered in the production of this ES chapter.

## Table 7-6: Summary of PEIR Responses

| Comment | How and where considered in the ES |
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| **Historic England** | |
| We note that the National Planning Policy Framework (NPPF) is used to explain and define the importance of a receptor, the significance of effect, and the criteria for determining the heritage importance of any relevant heritage assets, amongst other references. As such, both the Marine Policy Statement (2011) and National Policy Statement (2024) EN-1 – which are more directly applicable - allude to these, alongside Historic England's 2017 guidance on The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Note 3 (Second Edition). Whilst we agree the NPPF can help to support the EIA methodology and associated definitions, we recommend that reference to the MPS and NPS are more prominently utilised in this regard. | The guidance used to inform the value/sensitivity definitions is described in **paragraph 7.6.9** in the ES. |
| We consider that the comment we made in relation to the Scoping Report that the "archaeological assessment technical reports included at the stage of the pre-application should be given the complete autonomy to issue recommendations as to where such acquired data is insufficient, lacking in resolution or demonstrating gaps in coverage. Such that plans for schemes of further work can be effectively captured within supporting documentation attached to any consent granted. I.e. through an Outline Offshore Written Scheme of Investigation (WSI)" remains applicable until the ES has been submitted and such detail has been included. | Any insufficient data in the geophysical and geotechnical surveys has been identified and recommendations have been made where warranted to ensure that potential remains and associated impacts are accurately identified, characterised, and mitigated. This has been included within the ES as part of the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation, of the ES); see also **paragraph 7.6.29**. |
| Similarly, the appointed archaeologists (in their various roles and capacities) should also be afforded such autonomy to make recommendations, based on their specialist knowledge and experience throughout the project's timeline. | Noted. A Statement of Expertise is included at Volume 1, Appendix 1.1 of the ES which presents the qualifications and experience of the authors of this marine archaeology and cultural heritage ES chapter.<br>The OOWSI (Volume 3, Appendix 7.5 of the ES) sets out the various other roles and capacities relevant to the current and ongoing OOWSI framework, including Wessex Archaeology as the appointed archaeologists. |
| 7.4.11 - We note results of the analysed marine geophysical survey data will be included within the final marine archaeology and cultural heritage ES marine archaeology chapter. We would expect the result of this report (when accepted) will also be included in the OOWSI. | The results of the geophysical analysis have been used to inform the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation, of the ES) and has informed the mitigation measures in **Table 7-21**. |
| Table 7.11 – the definition relating to Low and Negligible Magnitude of Impact includes the statement "Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed", which we found to be unclear. | The revised text can be found in **Table 7-14**. |

| Comment | How and where considered in the ES |
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| Table 7.13 – It is unclear why the projects technical Appendix 7.1: Stage 1 Geoarchaeological Review of Marine Geotechnical Investigation has not been included here. | The sources have been updated in **Table 7-11**. |
| Under the heading of 'Historical and Archaeological Background, Prehistoric (970,000 BC –43 AD)' we recommend that given the rarity in corresponding offshore developments in the South West that this chapter and the associated WSI consider the content used to inform the White Cross Offshore Windfarm (MLA/2023/00113) – from within the Archaeological Assessment of Geophysical and Hydrographic Data (produced by MSDS Marine) - found on the marine management organisations public register. | This information has been used to inform the background information in the Desk-based Assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES) and in **section 7.7** of this chapter. |
| As such, given the projects share a similar offshore cable route for some extent, we believe this will aid in supporting conclusions on the potential impact this project may generate. In particular related to submerged Palaeolandscape deposits. With the objectives to gather evidence on:<br>• Glacial sediments (in particular associated to the Western Irish Sea or<br>• Cardigan Bay Formations)<br>• Pleistocene and Holocene fluvial and related features<br>• Holocene organic sediments laid down prior to marine inundation by c. 5k BP<br>• Marine sediments post-dating the Holocene marine transgression. | This information has been used to inform the background information in the Desk-based Assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES) and in **section 7.7** of this chapter. |
| Paragraph 7.5.9 – Also of relevance, ideally the work looking into the influence of crustal rebound from the glacial unloading of northern Britain and the associated melt-water loading of the adjacent seas and Atlantic Ocean on sea levels should be included here. Such as from:<br>• Lambeck, K. 1995. Late Devensian and Holocene shorelines of the British Isles and North Sea from models of glacio-hydro-isostatic rebound. Journal of the Geological Society of London 152, 437-448<br>• Lambeck, K. and Purcell, A.P. 2001. Sea-level change in the Irish Sea since the Last Glacial Maximum: constraints from isostatic modelling. Journal of Quaternary Science 16 (5), 497-505<br><br>Which also highlight the importance of attaining sedimentary cores from these localities, due to their potential to contain important information for constraining the ice models and prehistoric land surfaces. In part due to the lack of | This information has been used to inform the background information in the Desk-based Assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES), geoarchaeological and palaeolandscape assessments (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment and Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES) and in **section 7.7** of this chapter. |

| Comment | How and where considered in the ES |
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| substantial development in this area, with limited investigations undertaken for archaeological purposes. | |
| We request that the chapter include reference to how the English Palaeolithic and Pleistocene remains are of both national and international significance, with regard to Historic England's 2023 guidance Curating the Palaeolithic. Furthermore, the<br>Resource Assessment and Research Agenda for the South West should be utilised to inform a robust desk based study of prehistoric potential. In addition, the subdivisions of the Palaeolithic period should be checked for accuracy. | Potential Pleistocene and Palaeolithic remains have been considered of up to high significance (National) depending upon the type and extent of the remains present as a result of the assessment of the geotechnical boreholes and the sub-bottom profiler data (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES and Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES). This information has been used to inform the background information in the Volume 3 Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES and the significance determinations within this chapter. |
| There is also no reference to the assessment of Sub-Bottom Profiler data. Which was detailed as being acquired in the Scoping Report. We recommend that this is checked, and such data is archaeologically assessed and incorporated appropriately. | The sub-bottom profiler data has been analysed and reported in Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data, of the ES and summarised in **section 7.7**. |
| 7.5.15 During the Bronze Age (2200–800 BC) - Moor Sand and Salcombe B sites, and the Erme Ingot site (all in South Devon) certainly point toward some of the first evidence of a proper bulk trade with Europe. | This information has been used to inform the background information in the Desk-based Assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES) and in **section 7.7** of this chapter. |
| 7.5.19 – Whilst we agree that the paucity of evidence for coastal Roman sites and Roman ships does not discount the potential for Roman activity to be found within the study area. It is worth mentioning here that such evidence may not always definitively point specifically to Roman activity from this period. Uncertainty surrounding the Romano-Celtic Barland's Farm Boat is a good example of fused shipbuilding ideas resulting in a 'single' tradition. With an ability, like many other vessels of its time to sail the Severn estuary and Bristol Channel, and would have been of great importance to the economic and social life of the region. | This information has been used to inform the background information in the Desk-based Assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES) and in **section 7.7** of this chapter. |
| Post-medieval (AD 1540–1900) and Modern (AD 1900 – modern day) – to inform this sub-section the Wessex Archaeology Ltd (2011) Assessing Boats and Ships 1860-1913 (which is included as a reference) explains that the period from 1860 to 1913 "was arguably the most important in British maritime history". With rapid "technological innovation fuelled by the Industrial Revolution and the demands of an expanding worldwide merchant marine and navy [that] revolutionised the design and use of ships" (paragraph 7.1.1). | This information has been used to inform the background information in the Desk-based Assessment (Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES) and in **section 7.7** of this chapter. |
| 7.5.52 and 7.8.6 – Although we can see benefits of drawing out the differences between shipwreck remains in relation to their material | The receptors have been reconsidered and laid out in **Table 7-20**. |

| Comment | How and where considered in the ES |
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| tolerances, we do however feel that it does in this instance overcomplicate the EIA process. In addition, to some degree it does not account for composite hulled vessels, or those that could be iron or steel but a rarity within the archaeological record – thereby potentially unwittingly dismissing their heritage interest simply on the material used in its construction. Therefore, we request that such an approach is reconsidered ahead of any ES submission. | |
| In 7.8.1 and throughout the document the term "preservation by record" is used. This as a phrase in relation to the historic environment is no longer in use within planning policy in England. Which is in part due to the nature of the destructive process of archaeological excavation, and that any such practical work should look to balance the need for recording strategies with interpretation (relevant to research questions). | Noted. This has been reconsidered in the mitigation presented in **Table 7-21**. Details of the mitigation strategy elements including physical archaeological investigation and interpretation are presented in Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation. |
| In Table 7.16 it is stated that relevant results from geotechnical surveys will be shared with the Archaeological Data Service (ADS), with the aim to enhance the palaeogeographic knowledge and understanding of the area. Whilst we welcome this, we also consider that submitting results to a grey literature archive shouldn't be the only aspirational publication outcome of such a project. | Noted. This has been reconsidered in the mitigation presented in **Table 7-21**. An outline of the potential publications that could be considered following completion of necessary archaeological investigation is presented in the Outline Offshore Archaeological Written Scheme of Investigation (Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation of the ES. |
| 7.8.16 – States that "The Proposed Development embedded mitigation includes archaeological assessment of the offshore geophysical surveys". Due to the stage the project is at we feel that characterisation assessments are not mitigation in themselves. As they inform further evaluation or mitigation strategies, such as avoidance. In addition, we believe it conflicts with the statement in 7.8.17 and approach in 7.8.35. | Noted. This has been reconsidered in the mitigation presented in **Table 7-21**. |
| 7.8.19 to 7.8.26 - we consider there needs to be a subheading or an introductory statement as to what it is that is being conveyed. Is it that the impact magnitude to those listed receptors would be low adverse or medium adverse if mitigation is or is not applied? We feel this needs more thought. | This has been reconsidered and is presented in **sections 7.10– 7.12** i.e. an introductory paragraph has been added in each discussion of 'Magnitude of Impact' for each impact. |
| Similarly, we consider that many of the direct impacts and indirect impacts could be packaged together, due to the continued repetition throughout the chapter. For instance, Impacts (1-5): Direct impact to potential heritage assets prior to mitigation – from activities:<br>1. Direct disturbance of sediment during seabed preparation works;<br>2. Direct disturbance from compression or penetration during construction; | This has been reconsidered and is presented in **sections 7.10– 7.12,** i.e. the impacts have been reconsidered and packaged together to streamline the discussion of impacts. |

| Comment | How and where considered in the ES |
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| 3. Direct disturbance from compression or penetration by anchoring during<br>seabed preparation works and construction;<br>4. Seabed contact by legs of jack-up vessels and / or anchors; and<br>5. Cable installation at the landfall. | |
| 7.8.53 - Can it be explained as to why the impact magnitude to sub-seabed deposits of palaeoenvironmental interest is expected to be no more than low adverse? | Impact magnitude expected to be no more than low adverse given the localised nature of the impact and scale of the deposits identified in the geoarchaeological and palaeolandscapes assessment. See **sections 7.10 – 7.12**. |
| We are of the opinion that Impact 5 needs further consideration with respect to the terms and processes of EIA for schemes deemed to be Nationally Significant Infrastructure Projects. Whilst we accept that the extent of newly discovered archaeological sites necessitates an accurate baseline, this is only required to address the impacts from the newly installed infrastructure. Directly through interactions, or indirectly as a result of seabed changes, as well as to establish an effective archaeological exclusion zone. | This impact has been reconsidered and removed. The concerns addressed in this impact have been captured within the Interrelated effects (**section 7.15**). |
| As such we consider that where there is uncertainty about the significance of a newly discovered heritage asset, or the potential extent of its associated remains, then this needs to be reviewed on a case-by-case basis. In doing so this would afford the developer an understanding of what their responsibilities are in relation to the mitigation hierarchy, and the requirements for ongoing monitoring. This is also something we consider is supported by the guiding principles of NPS EN-1 Paragraph 5.9.12, 5.9.19 & EN-3 Paragraph 2.8.77. | The mechanism for the review process, which would include assessment of the asset either following retrieval or through remote sensing or remote operated vehicle footage to determine the type, significance and extent of any newly discovered assets and extent of associated remains has been outlined in the Outline Offshore Archaeological Written Scheme of Investigation (Appendix 7.5 of the ES: Outline Offshore Archaeological Written Scheme of Investigation and the Protocol for Archaeological Discoveries (Appendix 7.6: Protocol for Archaeological Discoveries of the ES.<br>The mechanism for this process has been outlined in **Table 7-21**. |
| With respect to the 'Magnitude of Impact' assigned for Impact 5, to receptors such as palaeolandscape and sub-seabed deposits of palaeoenvironmental interest, we encourage you to revise these and determine them with respect to the current geoarchaeological logging and recording of cores. In addition will this assessment of vibrocores include reference to sub-bottom profile data, to aid in generating a deposit model to form 'Further Mitigation' (page 63). | Impact 5 has been reconsidered and removed. The assessment of the sub-bottom profiler data was undertaken in respect to the assessment of the vibrocores and results were considered as part of the deposit model. These can be found in Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES and Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES. The results of these assessments have informed the assessment of significance and potential impacts and is presented in **sections 7.10– 7.12**. |
| Impact 8 makes reference to 'potential marine heritage receptors during maintenance activities (Operational-repair), or from alteration of local currents resulting in scour (Operational-normal)'. Are such impacts relevant to known heritage assets also? Similarly, is this the case for Impact 9? | This has been clarified and is presented in **section 7.11**. |
| 7.9.34 – States (as do other paragraphs) that a mitigation strategy may include | The state of preservation of the cores was not known at the time of writing the PEIR. The cores identified as of |

| Comment | How and where considered in the ES |
|---|---|
| "geoarchaeological assessment and testing of the surviving borehole cores taken during the 2023 geotechnical investigation". Could it be clearly explained what is meant by "surviving boreholes"? | interest survived intact and were sent to Wessex Archaeology for analysis and the report is appended to the ES (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES). The results were used to inform the baseline and the impacts presented in this chapter. |
| 7.12.3 – Given there are equivalent level environmental surveys being undertaken within the French jurisdiction (equivalent to those undertaken in UK waters), including the archaeological review of geotechnical investigations to identify features of archaeological interest in French waters. We would be interested to hear of opportunities for a cross border synthesis of submerged landscape deposits along the cable route study area. | It is anticipated that the results of the geotechnical and geophysical investigations undertaken within the French jurisdiction will be used to better inform the results of any further investigations undertaken in British territorial waters. The combined results will allow for a broader understanding of the potential and will inform the scope and analysis of any future works within the region both on this project and, once the results are made publicly available, on future projects. |
| 7.14 'Summary of Impacts, Mitigation Measures and Monitoring' – a reference to the importance of post-construction monitoring should be included here. | This has been added in **sections 7.10-7.12** and **Table 7-31**.<br>A reference to the importance of post-construction monitoring has been added.<br>The results of the site-specific Sub-bottom Profiling, Sidescan Sonar, Magnetometer and Multibeam Bathymetry surveys, and the geoarchaeological investigation were used to inform the potential for cumulative effects on identified assets. |
| We welcome further detail on cumulative impacts following the archaeological assessment of the site-specific Sub-bottom Profiling, Sidescan Sonar, Magnetometer and Multibeam Bathymetry surveys, and the geoarchaeological investigation (7.14.4). | Cumulative impacts are assessed in **section 7.13**. |
| Volume 3, Figure 7.2 – Scheduled Monuments of two wrecks are not annotated correctly on 'sheet2' | Noted and updated on Volume 3, **Figure 7.1** of the ES. |
| Appendix 7.1: Stage 1 Geoarchaeological Review of Marine Geotechnical Investigation - After reviewing the document, we are concerned the intended focus of the report appears to rest specifically on the identification and characterisation of palaeoenvironmental and archaeological remains on the near-shore continental shelf within just 3 selected cores (Section 1.3.2-1.3.3). | An updated stage 1 geoarchaeological assessment (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES) was undertaken as part of the Stage 2 assessment of three identified cores which provides characterisation and consideration of the wider seabed as well as the near-shore continental shelf. |
| Appendix 7.1: Stage 1 Geoarchaeological Review of Marine Geotechnical Investigation - Evidence for the Palaeolithic and Mesolithic terrestrial landscape extends across the continental shelf. This information is highlighted in the 2011 'Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector' document, a document that has been widely used throughout this report. Section 8 Research Agendas highlights the dual purpose of these investigations is not only to inform on | Noted. An updated stage 1 geoarchaeological assessment (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES) was undertaken as part of the Stage 2 assessment of three identified cores which provides more characterisation and consideration of the wider seabed. This was also considered as part of Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES. |

| Comment | How and where considered in the ES |
|---|---|
| the potential impacts of the development on the historic environment but also to increase knowledge and understanding of the UK's prehistoric past and the submerged former terrestrial landscape of the continental shelf. It goes on to outline the research aims in Maritime and Marine Historic Environment Research Framework for Mesolithic and Palaeolithic submerged archaeological research, commissioned by English Heritage. One of which focused on developing a clearer picture of the role of the continental shelf in the Mid-Upper Palaeolithic transition between 45,000–30,000 years BP (8.16 p. 18). | |
| Appendix 7.1: Stage 1 Geoarchaeological Review of Marine Geotechnical Investigation - Therefore, the statement in section 1.3.2 (below) is misleading and should in fact extend that focus across the entire research area, including all 44 cores, to encompass the Mesolithic and further Palaeolithic landscapes. 'As terrestrial environments are of greatest geoarchaeological potential, the nearshore continental shelf (above elevations of c. -18m relative to sea-level) comprises the principal zone of geoarchaeological potential where remnants of now offshore terrestrial sediments could harbour archaeological and palaeoenvironmental remains' | Noted. An updated stage 1 geoarchaeological assessment (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES) focussing on the entire research area was undertaken as part of the Stage 2 assessment of three identified cores. The potential Palaeolithic and Mesolithic landscapes and deposits were also considered as part of Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES). |
| Appendix 7.1: Stage 1 Geoarchaeological Review of Marine Geotechnical Investigation - Going forward, to address these research aims, the Stage 1 review report should include a descriptive assessment and discussion of the Pleistocene deposits in the remaining cores, readdressing the potential for palaeoenvironmental remains following a more detailed assessment of previous borehole data and available literature. This information should be added to Table 1-4. | An updated stage 1 geoarchaeological assessment (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES) was undertaken as part of the Stage 2 assessment of three identified cores which provides more characterisation and consideration of the wider seabed and readdresses the potential for palaeoenvironmental remains within the rest of the project boreholes. |

## Further Engagement

7.3.5 Throughout the EIA process, consultation and engagement (in addition to scoping and section 42 consultation) with interested parties specific to marine archaeology and cultural heritage has been undertaken.

7.3.6 A summary of the key items raised specific to marine archaeology and cultural heritage is presented in **Table 7-7**, together with how these issues have been considered in the production of this ES chapter.

**Table 7-7: Summary of consultation relevant to this chapter**

| Date | Consultee and type of response | Issues raised | How and where considered in the ES |
|---|---|---|---|
| 12 December 2023 | Project Introduction Meeting with Historic England and the project team | Consenting overview, project introduction, route review, data gathering, methodology, and Historic England's expectations. | As per project description (e.g. Volume 1, Chapter 3 of this ES) and methods discussions (**sections 7.4** through **7.6**). |
| 25 January 2024 | Historic England - progress update meeting | White Cross windfarm – both developers to share spatial scheme data and work collaboratively.<br><br>Locations of geotech cores to be shared with Historic England.<br><br>Historic England encouraged by gap between consenting and construction, which would allow time to be able to address (plan or mitigate) any significant archaeological remains prior to works commencing. | Cumulative projects considered in **section 7.13.**<br><br>Further geo-archaeological investigation has been considered as part of additional mitigation. |
| 17 April 2024 | Historic England - progress update meeting | Geophysical survey, expectation of acquisition of more detailed UXO level survey to support construction (possibly in 2026) which would also be subject to archaeological assessment/interpretation.<br><br>Geophysical data acquired will be available to support the ES. The 'seabed features assessment' and the 'geoarchaeology assessment' will be separate sections for the purposes of the ES.<br><br>The question was raised about the completeness of BH samples for next stages, and will inform the potential extent of 'available resource' that could be further assessed. If further stages are deemed necessary Wessex Archaeology would be contracted to provide these. | Additional surveys considered in **Table 7-21** and in the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation of the ES).<br><br>The archaeological assessment of geophysical data is reported in Volume 3, Appendix 7.2: Archaeological assessment of geophysical survey data of the ES and summarised in **section 7.7** of this chapter. The seabed characterisation is reported in Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES and summarised in **section 7.7** of this chapter. The geoarchaeological assessment of the geotechnical investigation results is reported in Volume 3, Appendix 7.3: Stage 1 and 2 Marine |

| Date | Consultee and type of response | Issues raised | How and where considered in the ES |
|---|---|---|---|
| | | | Geoarchaeological Assessment and summarised in **section 7.7** of this chapter. |
| 19 August 2024 | Historic England - progress update meeting | Comments about the PEIR were received from HE, and responses were provided by WSP. Comprising general recommendations which can be addressed going forward and actioned in the ES text.<br><br>Stage 1/2 Geoarchaeology review report, review of marine geophysics and buried features report to be forwarded to HE for review before ES submission. | See **Table 7-6** for Historic England comments regarding the PEIR, including where these have addressed. |
| 18 October 2024 | Historic England - progress update meeting | Discussions regarding the geoarchaeological and palaeolandscape assessments including Wessex Archaeology. Discussion regarding Historic England expectations for the ES. | Historic England comments used to inform the proposed additional mitigation outlined in **sections 7.10** to **7.12** of this ES. |

## 7.4 Study Area

7.4.1 A marine archaeology study area has been established for the purposes of collating and characterising the baseline data as part of this ES. The study area comprised a 5 km buffer around the OCC from MHWS to the UK EEZ boundary (Volume 3, Figure 7.1 of this ES). All receptors landwards of MHWS will be included within Volume 2, Chapter 2: Historic Environment of the ES.

7.4.2 The marine archaeology study area (5 km buffer) is industry standard and allows for the consideration of direct and indirect effects on marine archaeological and cultural heritage receptors and is designed to accommodate the potential imprecision of historic marine positioning.

7.4.3 Data gathered for the onshore assessment will be reviewed to identify whether there is relevant contextual data that could inform the marine archaeology assessment.

7.4.4 There is an intertidal overlap between the onshore and offshore archaeology study areas to ensure that there is total coverage of the ES study areas between the two chapters.

## 7.5 Scope of the Assessment

7.5.1 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 7-5, Table 7-6,** and **Table 7-7**.

7.5.2 Taking into account the scoping and consultation process, **Table 7-8** summarises the impacts considered as part of this assessment.

**Table 7-8: Impacts considered within this assessment**

| Activity | Impacts scoped into the assessment |
|---|---|
| **Construction Phase** | |
| Direct disturbance of heritage assets | Impact 1: Direct impact of sediment removal during seabed preparation, penetration, compression, and disturbance during seabed preparation, laying of cables, the anchoring of jack-up barges and other construction vessels, and laying of rock protection e.g. at cable crossings, leading to the total or partial loss of marine heritage receptors. |
| Indirect disturbance of heritage assets | Impact 2: Indirect impacts upon known and potential marine archaeological receptors as a result of changes to sedimentation and erosion patterns. |
| **Operation and Maintenance** | |
| Direct disturbance of features (Operational – repair) | Impact 3: Direct impact by penetration, compression and disturbance effects during repair activities at the cable corridor and through the effects of anchoring of maintenance vessels leading to further degradation of marine heritage receptors. |
| Indirect disturbance of features (Operational-repair and Operational-normal) | Impact 4: Indirect impacts causing disturbance of sediment containing potential marine heritage receptors during maintenance activities (Operational-repair), or from alteration of local currents resulting in scour (Operational-normal) leading to the exposure of those marine |

| Activity | Impacts scoped into the assessment |
|---|---|
| | heritage receptors to physical, chemical or biological processes and indirectly causing or accelerating their loss. |
| **Decommissioning Phase** | |
| Indirect impact of assets (*in situ*) | Impact 5: Indirect impacts causing disturbance of sediment containing potential marine heritage receptors from leaving the cable and cable protection *in situ* leading to the exposure of marine heritage receptors to physical, chemical or biological processes and indirectly causing or accelerating their loss. |
| Direct impact to asset (removal of cable) | Impact 6: Direct impacts by penetration, compression and disturbance through removal activities and the anchoring of vessels during the decommissioning phase leading to further degradation of marine heritage receptors. |
| Indirect impact of assets (removal of cable) | Impact 7: Indirect impacts causing disturbance of seabed containing potential marine heritage receptors. Disturbance may result from removal of the cable and cable protection infrastructure. The activity may lead to the exposure of marine heritage receptors to physical, chemical or biological processes and indirectly causing or accelerating their loss. |

7.5.3 Impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with justification for scoping them out and whether the approach has been agreed with key stakeholders through either scoping or consultation, is presented in **Table 7-9**.

**Table 7-9: Issues scoped out of the assessment**

| Impact | Justification |
|---|---|
| **Construction Phase** | |
| Setting of onshore features | No intervisibility between the OCC and the onshore cultural features is anticipated given the nature of the environment and distance of the onshore cultural heritage assets from the temporary offshore development activity. Potential effects to the setting of onshore cultural heritage assets arising from the visibility of offshore infrastructure during construction of the Project have been scoped out of further assessment. |
| **Operation and Maintenance** | |
| Setting of onshore features | No intervisibility between the OCC and the onshore cultural features is anticipated given the nature of the environment and distance of the onshore cultural heritage assets from the offshore development activity. Potential effects to the setting of onshore cultural heritage assets arising from the visibility of offshore maintenance vessels during operation and maintenance of the Project would be short-term and temporary and would not constitute a significant change within the setting of the asset or impact how the asset is understood or experienced within its setting. Further assessment of these impacts has been scoped out. |
| Direct impact to features | Normal operation of the cables would not be expected to introduce any additional direct impacts to marine archaeology or cultural heritage features and therefore it is considered there would be no change to the importance of the asset. For this reason, further assessment of this impact has been scoped out. |
| **Decommissioning Phase** | |
| Direct impact of assets (*in situ*) | It is anticipated that there will be no direct impacts during decommissioning phase of the development if the cables are de-energised and left *in situ*. As such, potential direct effects arising from the decommissioning of the Proposed Development have been scoped out from further assessment. (Note, indirect disturbance from potential scour is assessed as Impact 5). |

# 7.6 Methodology

## Relevant Guidance

7.6.1 This chapter has been compiled in accordance with the following relevant standards and guidance (**Table 7-10)**.

**Table 7-10: Guidance relevant to the Marine Archaeology and Cultural Heritage assessment**

| Relevant Guidance | Relevance to assessment |
|---|---|
| Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology, 2007) | Guidance on survey, appraisal and monitoring of the historic environment for renewables projects. |
| Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008) | Guidance on the assessment of cumulative impacts on the historic environment for renewables projects. |

| Relevant Guidance | Relevance to assessment |
|---|---|
| Code of Practice for Seabed Development (Joint Nautical Archaeology Policy Committee and The Crown Estate, 2006) | The aim of the Code is to ensure a best practice model for seabed development. The Code offers guidance to developers on issues such as risk management and legislative implications. |
| Guidance for Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector (COWRIE, 2011) | Guidance on how best to achieve the integration of offshore geotechnical investigations and their data outputs, arising from offshore renewable energy projects, with archaeological historic environment analysis, and ensure optimum use of geotechnical data. |
| Assessing Boats and Ships 1860-1913, 1914-1938 and 1939-1950. Archaeological Desk-Based Assessments in 3 volumes (Wessex Archaeology, 2011) | Guidance to assess the significance of shipwrecks from the 19th and 20th centuries. |
| Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate, 2014) | Outlines a general protocol to be implemented for archaeological discoveries offshore. This is generally best practice and will be used to inform the result of mitigation. |
| The Chartered Institute for Archaeologists (CIfA) Codes, Standards and Guidance CIfA, 2020a; CIfA, 2020b; CIfA, 2020c; CIfA, 2022) | Range of documents to provide guidance, regulations and standards to use to ensure high ethical and professional standards, such as:<br>Standards and guidance for desk-based assessment (CifA, 2020b); Standards and guidance for commissioning work on or providing consultancy advice concerning archaeology and the historic environment (CifA, 2020b). |
| Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects, (The Crown Estate, 2021) | Guidance on the range of archaeological methodologies that may be required as part of the initial investigation stages or the mitigation phase of offshore projects. |
| People and the Sea: a maritime archaeological research agenda for England (Ransley et al., 2013 | An overview of the research questions that inform archaeological investigation within UK territorial waters. |
| Curating the Palaeolithic (Historic England, 2023) | Guidance on researching and assessing Palaeolithic and Pleistocene remains. |

# Methodology for Baseline Studies

## Desk Studies

7.6.2 Information on marine archaeology and cultural heritage assets within the study area was collected through a detailed review of existing studies and datasets. These sources are summarised in **Table 7-11** below.

**Table 7-11: Summary of desk study sources used**

| Source | Summary |
|---|---|
| UKHO records | Records of wrecks and obstructions data including 'dead' and salvaged wrecks that are no longer charted as navigational hazards. |
| Maritime records maintained by Historic England | Maritime records, including documented losses of vessels, and records of terrestrial monuments and findspots, including the archaeological excavation index. |
| National Heritage List of England (NHLE) | Records of designated heritage assets within England, maintained by Historic England. Geospatial Information Systems (GIS) data for all Protected Wrecks, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields. |
| Devon Historic Environment Record (DHER) | Primary repository of archaeological information. Includes information from past investigations, local knowledge, find spots, and documentary and cartographic sources. |
| British Geological Survey (BGS) | Historic borehole logs and the wider geological background for the region. |
| Coastal and Intertidal Zone Archaeological Network (CITiZAN) | Interactive mapping of intertidal heritage in England. |
| Existing archaeological studies and published sources | Background information on the archaeology of the Celtic Sea and the Atlantic Ocean, including recent work undertaken in the wider Atlantic Ocean area. Background information relating to submerged landscapes within the Celtic Sea and the Bristol Channel. |
| Archaeological assessment of geophysical data (Volume 3, Appendix 7.2 of the ES) | Assessment of the project geophysical data undertaken by a marine archaeologist. |
| Stage 1 and Stage 2 Geoarchaeological Assessment of Geotechnical Boreholes (Volume 3, Appendix 7.3 of the ES) | Assessment of the project geotechnical data undertaken by a marine geoarchaeologist supplemented by the seabed characterisation. |
| Palaeolandscapes assessment of sub-bottom profiler data (Volume 3, Appendix 7.4 of the ES) | Assessment of the project geophysical data undertaken by a marine archaeologist. |

## Site-Specific Surveys

7.6.3 For full details regarding the methodology and data collected as part of the archaeological assessment of geophysical data see Volume 3, Appendix 7.2 of the ES, and survey reports (GEOxyz 2023a, b). Geophysical data were collected by GEOxyz onboard survey vessels *Geo Surveyor XI* for the nearshore survey area between 27 August and 5 September 2022 and *Geo Ocean IV* for the offshore survey areas between 23 August 2023 and 08 September 2023. The survey data were acquired in approximately 10 km long blocks, with block U01 located at the UK waters (EEZ) border with France and U39 (nearshore) at the UK landfall.

**Table 7-12: Summary of geophysical survey data types acquired (summarised from Table 1 in Appendix 7.2)**

| Survey Vessel | Survey Type | Definition | Data Format |
|---|---|---|---|
| *Geo Surveyor XI, Geo Ocean IV* | Multibeam echosounder (MBES) | Multibeam echosounder is a device attached to the hull of a ship which sends out multiple, simultaneous sonar beams in a fan-shaped pattern to map the seabed and detect objects along the seafloor or within water column. | *.xyz* |
| *Geo Surveyor XI, Geo Ocean IV* | Sidescan sonar (SSS) | Sidescan sonar is comprised of a transducer array that sends and receives acoustic pulses either mounted on the ship's hull or placed on separate platform like a towfish. This survey is used to detect and identify objects on the seafloor or in the water column. | *.xtf* |
| *Geo Surveyor XI, Geo Ocean IV* | Magnetometer | Magnetometer is an instrument that measures changes in the Earth's magnetic field. A marine magnetometer can be used to characterise geological features on the seafloor or to survey ship and aircraft wrecks. | *.csv* |
| *Geo Ocean IV* | Remotely Operated Towed Vehicle (ROTV) Sidescan sonar | Sidescan sonar is comprised of a transducer array that sends and receives acoustic pulses mounted on a separate ROTV platform. This survey is used to detect and identify objects on the seafloor or in the water column in challenging marine environments. | *.xtf* |
| *Geo Surveyor XI, Geo Ocean IV* | Sub-bottom profiler (SBP) | Sub-bottom profilers are towed or hull-mounted seismic-acoustic systems that can detect, and image structures buried within the sediments | *.sgy* |

7.6.4 The marine geophysical survey data was subject to assessment by a qualified and experienced archaeological contractor in accordance with industry good practice as set out in available guidance such as the Historic England Marine Geophysics Data Acquisition, Processing and Interpretation (Plets et al. 2013).

The technical reports are appended (Volume 3, Appendix 7.2: Archaeological assessment of geophysical data to the ES; Volume 3, Appendix 7.4: Palaeolandscapes assessment of sub-bottom profiler data of the ES).

7.6.5 Volume 3, Figures 7.6 to 7.8 present location maps of site survey borehole locations, including cone penetration tests, and vibrocore locations.

# Impact Assessment Methodology

## Overview

7.6.6 The impact assessment methodology adopted for marine archaeology and cultural heritage will define heritage assets, and their settings, likely to be impacted by the proposed development and assess the level of any resulting beneficial or adverse impact regarding their significance. The assessment is not limited to direct (physical) impacts, but also assesses possible indirect (physical) impacts upon heritage assets which may arise as a result of changes to hydrodynamic and sedimentary processes and changes to the setting of heritage assets, whether visually, or in the form of noise, sediment and vibration, spatial associations and a consideration of historic relationships between places which may impact their significance.

7.6.7 Loss or disturbance of known and unknown heritage assets, palaeoenvironmental deposits and historic landscapes will be considered qualitatively in line with the principles set out in the relevant marine archaeology and cultural heritage legislation (**section 7.2**). The impact assessment criteria are informed by the guidance, regulations and standards set out in **Table 7-10**.

7.6.8 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity (importance) of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the importance of the receptors.

## Receptor Importance

7.6.9 It is normal practice within impact assessment for the historic environment topic to describe receptor 'Importance', in preference to value or sensitivity. The MPS states that "Significance is the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic." The statement reflects the definition of significance provided in NPS EN-1 (2023a), the South West Marine Plan Technical Annex (DEFRA 2021b) and the NPPF. These policy documents add that "Significance derives not only from a heritage asset's physical presence but also from its setting." The determination of the importance is based on statutory designation and/or professional judgement against these values (they are also identified in Historic England Conservation Principles revised consultation draft and Historic England Statements of Heritage Significance).

7.6.10 For the purposes of this assessment, the criteria for determining the heritage importance of any relevant heritage assets are described in **Table 7-13**.

7.6.11 The categories and definitions of heritage importance do not necessarily reflect a definitive level of importance of an asset. They are intended to provide a provisional guide to the assessment of perceived heritage importance, which is ultimately based upon professional judgement that incorporates the evidential,

archaeological, historical, aesthetic, architectural and communal heritage values of the asset or assets. It is important to note that the importance and cultural significance of an asset can be amended or revised as more information comes to light (i.e. as part of further investigations planned post-consent).

7.6.12 **Table 7-13** includes heritage assets of uncertain heritage importance i.e. where the importance, existence and/or level of survival of an asset has not been ascertained (or fully understood) from the available evidence. Although **Table 7-13** provides a definition for assets of an uncertain heritage importance, where uncertainty occurs, the precautionary approach is to assign the highest likely level of importance. This precautionary approach represents good practice in cultural heritage impact assessment and reduces the potential for impacts to be underestimated.

7.6.13 The criteria for defining importance in this chapter are outlined in **Table 7-13** below.

**Table 7-13: Importance (Sensitivity) criteria**

| Importance / Sensitivity | Definition |
|---|---|
| Very High | This category contains heritage assets that will be considered to be of international importance either for historic associations or their informative potential. This category includes World Heritage Sites (including nominated sites) and assets of acknowledged international importance. |
| High | This category contains heritage assets that will be considered to be of national importance either for historic associations or their informative potential. This category includes heritage assets designated as scheduled monuments, protected military remains, protected wrecks and those heritage assets of scheduled quality and importance. Also includes palaeoenvironment remains that are either very well-preserved or particularly important for understanding specific periods. |
| Medium | Heritage assets of regional importance for historic associations or their informative potential. This category includes well-preserved live wrecks that are not suitable for designation, or palaeoenvironmental remains that are typical of a region. |
| Low | Non-designated heritage assets of local importance for historic associations or their informative potential may include marine debris or less well-preserved marine material, or generally representative archaeological material or feature types. |
| Negligible | These include those features that are recorded but no longer extant, which are suggestive of further activity but not of intrinsic value (e.g. records of losses without identified wreck sites, some 'dead' wrecks, isolated finds of debris). |
| Uncertain | Heritage assets that have a clear potential, but for which current knowledge is insufficient to allow significance to be determined |

## Magnitude of Change

7.6.14 Magnitude broadly equates as the degree to which heritage interest may be positively or negatively changed by an individual impact as discussed in the Historic England Conservation Principles, Policies and Guidance (Historic England 2008).

7.6.15 Direct physical impacts, indirect physical impacts and impacts from a change in setting that may affect heritage assets are considered relevant. Impacts may be adverse or beneficial. Depending on the nature and duration of the potential

effect, impacts can also be temporary and / or reversible or permanent and / or irreversible.

7.6.16 The finite nature of archaeological remains means that physical impacts are permanent and irreversible as the 'fabric' of the asset and, hence, its potential to inform our historical understanding, will be removed. By contrast, impacts resulting from the change in the setting of heritage assets will depend upon the longevity of construction and operation of the proposed development and the sensitivity with which the seascape is re-instated where applicable.

7.6.17 The magnitude of adverse impact with respect to offshore archaeology and cultural heritage directly relates to the extent of harm to, or loss of, key elements of the asset's cultural significance, which may include its setting.

7.6.18 The magnitude of beneficial impact with respect to offshore archaeology and cultural heritage directly relates to the level of public benefit associated with an individual impact. Benefits may correspond directly to the Proposed Development itself where a project will enhance the historic environment (e.g. through measures which will improve the setting of a heritage asset or public access to it).

7.6.19 Alternatively, benefits may occur on the basis of data gathering exercises undertaken for the purpose of a project which will enhance public understanding by adding to the archaeological record (e.g. through the accumulation of publicly available information and data). The measure of beneficial impact (high/medium /low) is, therefore, necessarily situational and specific to a given site, area or subject. One such example of a positive magnitude of impact could be relevant to, for example, new survey data being acquired, which will ultimately be made publicly accessible.

7.6.20 The criteria for defining magnitude in this chapter are outlined in **Table 7-14** below.

**Table 7-14: Definition of magnitude criteria for Marine Archaeology and Cultural Heritage**

| Magnitude of impact | | Definition |
|---|---|---|
| High | Adverse | Total or substantial change to an asset. Loss or disturbance of defining features of the asset.<br>Comprehensive changes to setting such as extreme visual effects, gross change of noise or change to sound quality, or fundamental changes to use or access. |
| | Beneficial | Preservation of a heritage asset *in situ* where it would otherwise be completely or almost lost.<br>Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated, and experienced. |
| Medium | Adverse | Changes to many key archaeological materials or elements, such that the cultural significance of the heritage asset is clearly modified.<br>Changes that negatively affect the way in which the heritage asset is understood, appreciated, and experienced. |
| | Beneficial | Changes to important elements of a heritage asset's fabric or setting, resulting in its cultural significance being preserved (where this would otherwise be lost) or restored.<br>Changes that improve the way in which the heritage asset is understood, appreciated, and experienced. |
| Low | Adverse | Slight changes to key archaeological materials or elements, such that the cultural significance of the heritage asset is slightly altered. |

| Magnitude of impact | | Definition |
|---|---|---|
| | | Changes that result in a slight decline in the way a heritage asset is understood, appreciated, and experienced. |
| | Beneficial | Changes that result in the removal of elements of a heritage asset's fabric or setting that slightly detract from its cultural significance.<br>Changes that result in a slight improvement in the way a heritage asset is understood, appreciated, and experienced. |
| Negligible | Adverse | Changes to archaeological materials or historic buildings elements such that alterations to the cultural significance of the heritage asset are barely perceptible.<br>Very minor changes to setting such as virtually unchanged visual effects, or very slight changes to use or access. |
| | Beneficial | Very minor changes that result in the removal of elements of a heritage asset's fabric or setting that detract from its cultural significance.<br>Very minor changes that result in a slight improvement in the way a heritage asset is understood, appreciated, and experienced. |
| No Change | N/A | Changes to fabric or setting that leave cultural significance unchanged. |

## Significance of Effect

7.6.21 The significance of the effect upon marine archaeology has been determined by taking into account the importance of the receptor and the magnitude of the impact. The method employed for this assessment is presented in **Table 7-15**. Where a range of significance levels are presented, the final assessment for each effect is based upon expert judgement. Broad definitions of each level of significance are provided below.

7.6.22 In all cases, the evaluation of receptor importance, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by a narrative to explain the conclusions reached.

7.6.23 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

**Table 7-15: Assessment Matrix**

| Importance of Receptor | Magnitude of Impact | | | |
|---|---|---|---|---|
| | **High** | **Medium** | **Low** | **Negligible** |
| **Very High** | Major | Major | Major or Moderate | Minor |
| **High** | Major | Major or Moderate | Moderate or Minor | Minor |
| **Medium** | Major or Moderate | Moderate | Minor | Minor or Negligible |
| **Low** | Minor | Minor | Minor or Negligible | Minor or Negligible |
| **Negligible** | Minor | Minor or Negligible | Minor or Negligible | Negligible |

7.6.24 Where the magnitude of impact is 'no change', no effect would arise.

7.6.25 Broad definitions for significance of effect levels are described as follows:

- **Major**: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process. For the historic environment, in terms of the NPS EN-1, this equates to substantial harm to, or loss of, an asset of very high, high, or medium heritage importance, as a result of changes to its physical form or setting.

- **Moderate**: These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. For the historic environment, this equates to less than substantial harm to an asset of very high, high, or medium heritage importance, as a result of changes to its physical form or setting.
- **Minor**: These beneficial or adverse effects are generally, but not exclusively, raised as local factors. For the historic environment, this equates to less than substantial harm to an asset of very high, high, or medium heritage importance, because of changes to its physical form or setting, or substantial harm to, or the loss of, an asset of low heritage importance.
- **Negligible**: No effects or those that are beneath levels of perception as a result of the Proposed Development, within normal bounds of variation or within the margin of forecasting error.
- **No change**: No loss or alteration of characteristics, features or elements; no observable impact in either direction.

7.6.26 Effects that are classified as moderate or above are considered to be 'significant' in EIA terms. Effects classified as minor or below are considered to be 'not significant'. The language used in the NPS EN-1 (for example, substantial or less than substantial harm) has been correlated with the standard EIA methodology. A significant effect (major or moderate effect significance) equates to 'substantial harm', and non-significant effects (minor or less effect significance) are considered 'less than substantial harm'.

## Assumptions and Limitations of the Assessment

7.6.27 The records held by the United Kingdom Hydrographic Office (UKHO), Historic England (National Heritage List for England (NHLE) and maritime records), Devon Historic Environment Record (DHER), and Coastal and Intertidal Zone Archaeological Network (CITiZAN) used in this assessment are not a record of all surviving cultural heritage assets, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these datasets is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown. In particular, this relates to buried archaeological features.

7.6.28 Due to the nature of marine archaeological remains, their identification and assessment necessarily requires an element of assumption. The nature, extent, survival, and even the precise location, of marine heritage assets are often uncertain, as many sites have not been subject to physical archaeological investigation (ground-truthing). Assessment of the value of such sites (as part of the assessment process) is often, therefore, heavily reliant on informed extrapolation from limited data, comparison with similar assets in similar contexts and, ultimately, on professional judgment.

### Survey limitations

7.6.29 A number of features identified as static fishing gear were encountered within the survey corridor and adjacent to it. This prevented the achievement of full coverage in several blocks including U32, U34, U38C and U38E, in addition to the route development area north of U33 (e.g. Volume 3, Appendix 7.1 of the ES: Marine Archaeology Desk-based Assessment).

7.6.30 Expansion in the width of the Offshore Cable Corridor to the east of blocks U28 and U29 was introduced following the completion of the geophysical surveys (to allow flexibility and increased separation distance to potential future The Crown Estate (TCE) Project Development Area 3 (PDA3) infrastructure. This has introduced a gap in the data coverage in this area. The geophysical data (see Volume 3, Appendix 7.2 of the ES: Archaeological assessment of geophysical survey data) for U29/U28 show a very low density of features that could require micro-routing, which could be indicative of the density of features in this area, however the final micro-routing in this area would rely on post-consent geophysical surveys undertaken at the time of/in combination with the UXO surveys.

7.6.31 There is a gap in the MBES data along the south-west side of blocks U01-U07 which is approximately 25 m wide, however this was fully covered by SSS mosaic data, and therefore identification and interpretation of anomalies was still possible in this area (Volume 3, Appendix 7.2 of the ES: Archaeological assessment of geophysical survey data).

7.6.32 See **paragraph 7.7.12** for further discussion of survey coverage.

# 7.7 Baseline Environment

## Desk Study

7.7.1 Information on marine archaeology and cultural heritage within the study area was collected through a detailed review of existing studies and datasets. These are summarised in **Table 7-11**.

## Archaeological and Historical Background

7.7.2 The full archaeological and historical background of the Proposed Development and study area and descriptions of the heritage assets that form the baseline for the cultural heritage assessment are provided in Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES (inclusive of gazetteer), and the locations are shown in Volume 3, Figure 7.1: Designated Heritage Assets and Volume 3, Figure 7.2: Non-designated Heritage Assets of the ES. Each entry in the gazetteer has an assessment (A) reference number which is used to identify it on Volume 3, Figure 7.1 Designated Heritage Assets and Volume 3, Figure 7.2 Non-designated Heritage Assets of the ES. A summary of the assets identified and assessed as part of the desk-based assessment is presented in the next section.

7.7.3 The reference numbers (A1, A2, etc.) used in the background correspond to the reference numbers given by WSP within the Marine Historic Environment Gazetteer (Annex A) in Volume 3, Appendix 7.1: Marine Archaeology Desk-based Assessment of the ES.

# DBA Assets Summary

## Designated assets

7.7.4 All designated sites of historical and archaeological interest within the study area and qualifying interest features that could be affected by the construction, operation and maintenance, and decommissioning phases of the Proposed Development are set out in **Table 7-16** (inclusive of terrestrial sites).

**Table 7-16: Designated sites and relevant qualifying interests**

| Designated Site | Distance to the Proposed Development (nearest point) | Relevant Qualifying Interest |
|---|---|---|
| Wreck at Westward Ho! (**A92**; NHLE 1432418) | 2.5 km | Scheduled Monument |
| Wreck off Northam Burrows (**A89**; NHLE 1432949) | 2.7 km | Scheduled Monument |
| HMS *Montagu* (ex-Montague) (**A21**; NHLE 1440450) | 4.5 km | Scheduled Monument |
| Montagu Steps (**A15**; NHLE 1461607) | 4.8 km | Scheduled Monument |
| Standing stone and cairn 490m south of The Old Lighthouse, Lundy (**A2**; NHLE 1015929) | 4.9 km | Scheduled Monument |
| Standing stone 250m south west of St Helen's Church, Lundy (**A6**; NHLE 1018266) | 4.9 km | Scheduled Monument |
| Chambered tomb 165m north east of the Rocket Pole Pond, Lundy (**A7**; NHLE 1015931) | 4.9 km | Scheduled Monument |
| Lundy South Lighthouse including engine house and accommodation block (**A12**; NHLE 1326625) | 4.9 km | Grade II Listed Building |
| Magazine located immediately south-south-west of Lundy South Lighthouse (**A13**; NHLE 1277623) | 4.9 km | Grade II Listed Building |

## Non-Designated assets

7.7.5 There are 365 recorded non-designated heritage assets recorded by the UKHO, DHER, and CITiZAN databases within the study area (see Volume 3, Figure 7.1 of this ES), including 12 within the OCC boundary itself comprising seven UKHO wreck or obstruction locations and five DHER assets. The seven UKHO points are unspecified obstructions or foul ground (A58; A62; A128; A157; A226; A242; and A278). The five DHER points are located within the OCC and includes the location of former structures on the coast (A132, A135-A137) and the remains of late medieval or modern rig and furrow (A138).

7.7.6 Within the study area, there are 65 DHER records relating to wrecks and 219 wrecks and obstructions recorded by UKHO comprising 149 unspecified obstructions or foul ground, 43 unidentified wrecks, one aircraft remain, and 26

named wrecks (Volume 3, Figure 7.1 of this ES). The UKHO records largely date between the 18th and 21st centuries. The DHER wreck records date from the mid-17th century through to the mid-20th century.

7.7.7 Other than wreck sites, the HER and CITiZAN databases hold records related to the following:

- Palaeolandscape features and sub-seabed deposits of palaeoenvironmental interest (A70, A75, A79, A83, A84, A86, A87, A94, A95, A96, A97, A98, A101, A102, A103, A105, A106, A107, A111, A113, A114 and A130);
- Prehistoric occupation sites and midden deposits (A90, A100, A104, A108, A109, A112, A115, A116, A117 and A125);
- World War 2 (WWII) defence remains (A77 and A91); and
- Occupation activity related to all periods of human activity within the intertidal zone (A5, A4, A61, A69, A80, A93, A118, A154, A158, A160 and A164).

7.7.8 The study area includes two Heritage Coasts: Lundy (A1) and Hartland (A150). Heritage Coasts are defined by Natural England in order to:

- conserve, protect and enhance the natural beauty of the coastline, the terrestrial, coastal and marine flora and fauna, and heritage features;
- encourage and help the public to enjoy, understand and appreciate these areas;
- maintain and improve the health of inshore waters affecting heritage coasts and their beaches through appropriate environmental management measures; and
- take account of the needs of agriculture, forestry and fishing and the economic and social needs of the small communities on these coasts

The cultural heritage aspects of the Heritage Coasts consist of tangible and intangible heritage. The tangible heritage aspect is comprised of the designated and non-designated heritage assets within the boundary of each Heritage Coast. The heritage assets are considered individually as part of this assessment providing they lie within the project study area. The intangible heritage aspect is comprised of the open and expansive views both to the North Devon coast and Lundy which is also captured in the setting of the individual heritage assets. As the aspects that make up the cultural heritage components of the Heritage Coasts are already included within the assessment, the assets of Lundy Heritage Coast (A1) and Hartland Heritage Coast (A150) are not considered further within this assessment.

## Seabed features assessment summary

7.7.9 In order to inform the ES, site-specific surveys were undertaken. A summary of the surveys undertaken to inform the marine archaeology impact assessment is outlined in **Table 7-12**. All geophysical anomalies have been cross-referenced with records of marine heritage receptors identified during the baseline assessment (see Volume 3, Appendix 7.1: Archaeological Desk-based Assessment of the ES).

**7.7.10** A comprehensive marine geophysical survey was carried out within the footprint of the OCC. The surveys were undertaken to confirm the presence of known or previously located marine sites of archaeological potential and to comment on

their apparent character; identify, locate and characterise hitherto unrecorded marine sites of archaeological potential. An archaeological review of the geophysical data has been carried out and the technical report is presented in Volume 3, Appendix 7.2: Archaeological assessment of geophysical data of the ES.

7.7.11 The data quality varied across the survey area:

- nearshore MBES and SSS mosaic data was rated as Good, meaning suitable, clear data in which anomalies can be clearly identified and interpreted and provides the highest probability for marine heritage receptors to be identified.
- offshore MBES, SSS mosaic, SSS raw data, magnetometer data and nearshore magnetometer data were rated as Average, meaning suitable, moderately affected data in which anomalies can be identified and interpreted and provides adequate probability for marine heritage receptors to be identified.
- the quality of the SBP data has been rated as 'Good' using the above criteria, with shallow reflectors easily visible. Penetration was relatively limited, as is standard for parametric sonar data, but the very shallow depth of bedrock in the area meant this was a not a detriment to palaeolandscape assessment of the data.

7.7.12 Full coverage was not achieved in blocks U32, U34, U38C and U38E, as well as within the route development area north of U33 as a result of static fishing gear within the survey area (GEOxyz 2023b). Additionally, full coverage of blocks U28, U29 was not achieved due to changes to the proposed Offshore Cable Corridor following the completion of the geophysical survey – these changes were made to maximise separation distance with any potential future PDA3 infrastructure.

7.7.13 SSS, MBES, and magnetometer data interpreted by Wessex Archaeology have demonstrated the presence of several seabed features which have been identified at varying levels of archaeological potential. Seabed features are discriminated by Wessex Archaeology in accordance with the criteria set out in **Table 7-17**.

7.7.14 A total of 218 seabed features of archaeological potential were identified in the archaeological assessment of geophysical survey data and are discriminated as shown in **Table 7-18** below.

7.7.15 Of these, four are considered to be A1 - anthropogenic origin of archaeological interest.

7.7.16 A total of 22 anomalies have been discriminated as A2_h - anomaly of likely anthropogenic origin but of unknown date. These anomalies may indicate features of archaeological interest or a modern feature.

7.7.17 In total, 186 anomalies have been discriminated as A2_l - anomaly of possible anthropogenic origin. The interpretation of these features is uncertain, they may be of archaeological interest or natural.

7.7.18 One anomaly has been discriminated as A3 - historic record of possible archaeological interest with no corresponding geophysical anomaly. The five records that have been discriminated as U3 – recorded loss, have been retained in this chapter for reference; however, remains of these vessels have not been identified on the seabed to date.

**Table 7-17: Anomalies of archaeological potential within the Proposed Development**

| Archaeological Discrimination | Quantity within the Study Area | Criteria | Classification | Wessex ID |
|---|---|---|---|---|
| A1 (High) | 4 | Anthropogenic origin of archaeological interest | Archaeological | 7027, 7028, 7030 and 7196 |
| A2_h (Moderate) | 22 | Anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature | Archaeological | 7005, 7011, 7014, 7019, 7031, 7035, 7039, 7040, 7072, 7079, 7102, 7112, 7113, 7129, 7146, 7166, 7175, 7187, 7188, 7189, 7195 and 7207 |
| A2_l (Low) | 186 | Anomaly of possible anthropogenic origin but the interpretation is uncertain; may be anthropogenic or a natural feature | Archaeological | for full list see Volume 3, Appendix 7.2 of the ES |
| A3 (High) | 1 | Historic record of possible archaeological interest with no corresponding geophysical anomaly | Archaeological | 7026 |
| U3 (Moderate) | 5 | Recorded loss | Non-archaeological | 7029, 7082, 7104, 7114 and 7126 |

**Table 7-18: Types of geophysical anomalies identified**

| Anomaly classification | Definition | Number of anomalies | Associated Wessex and DBA Assessment ID numbers |
|---|---|---|---|
| Wreck | Areas of coherent structure including wrecks of ships, submarines and some aircraft (where coherent structure survives) | 1 | 7028 |
| Debris field | A discrete area containing numerous individual debris items that are potentially anthropogenic, and can include dispersed wreck sites for which no coherent structure remains | 1 | 7195 |
| Debris | Distinct objects on the seabed, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin | 3 | 7014, 7027, 7102 |
| Seabed disturbance | An area of disturbance without individual, distinct objects. Potentially indicates wreck debris or other anthropogenic features buried just below the seabed | 20 | 7001, 7002, 7003, 7009, 7010, 7017, 7071, 7131, 7141, 7143, 7151, 7153, 7154, 7155, 7170, 7178, |

| Anomaly classification | Definition | Number of anomalies | Associated Wessex and DBA Assessment ID numbers |
|---|---|---|---|
| | | | 7185, 7191, 7200, 7204 |
| Linear Debris | Distinct linear objects on the seabed, either straight or curved, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin. May represent linear anthropogenic debris which can include, for example, lengths of rope or chain or abandoned fishing gear | 8 | 7019, 7072, 7129, 7133, 7188, 7189, 7197, 7210 |
| Dark reflector | Individual objects or areas of high reflectivity, displaying some anthropogenic characteristics. Precise nature is uncertain | 39 | 7000, 7016, 7018, 7020, 7022, 7023, 7024, 7041, 7060, 7065, 7069, 7070, 7085, 7086, 7087, 7093, 7097, 7099, 7101, 7105, 7109, 7111, 7122, 7124, 7127, 7130, 7134, 7136, 7137, 7140, 7177, 7180, 7183, 7186, 7190, 7192, 7193, 7202, 7205 |
| Mound | A mounded feature with height not considered to be natural. Mounds may form over wreck sites or other debris | 13 | 7090, 7116, 7121, 7139, 7150, 7156, 7198, 7199, 7201, 7203, 7211, 7213, 7214 |
| Magnetic | No associated seabed surface expression, and have the potential to represent possible buried ferrous debris or buried wreck sites | 125 | 7004, 7005, 7006, 7007, 7008, 7011, 7012, 7013, 7015, 7021, 7025, 7030 – 7041, 7043 – 7059, 7061 – 7064, 7066 – 7068, 7073 – 7078, 7080, 7081, 7083, 7084, 7088, 7089, 7091, 7092, 7094, 7095, 7096, |

| Anomaly classification | Definition | Number of anomalies | Associated Wessex and DBA Assessment ID numbers |
|---|---|---|---|
| | | | 7098, 7100, 7103, 7106, 7107, 7108, 7110, 7112, 7115, 7117 – 7120, 7123, 7125, 7128, 7132, 7135, 7138, 7142, 7144 – 7149, 7152, 7157 – 7169, 7171 – 7176, 7179, 7181, 7182, 7184, 7187, 7194, 7196, 7206 – 7209, 7212, 7215 - 7217 |
| Magnetic trend | A linear trend of individual or continuous magnetic anomalies with no associated seabed surface expression, and have the potential to represent possible buried ferrous debris | 2 | 7079, 7113, |
| Recorded wreck | Position of a recorded wreck at which previous surveys have identified definite seabed anomalies, but for which no associated feature has been identified within the current data set | 2 | 7026, 7029 |
| Recorded obstruction | Position of a recorded obstruction (e.g. foul ground, fisherman's fastener recorded by the UKHO), but for which no associated feature has been identified within the current data set | 4 | 7082, 7104, 7114, 7126 |
| **Total** | **218** | | |

7.7.19 Twenty-seven anomalies have been assessed as high or moderate archaeological potential as summarised below and detailed in Volume 3, Appendix 7.2: Archaeological assessment of geophysical data of the ES:

- 7026 corresponds to UKHO record 12198 (A62), which is an unknown recorded wreck. Following a survey in 2008, an area of disturbed seabed was identified and the record was amended to dead. In the 2023 datasets, no corresponding anomalies were identified; however, this record has been retained in the gazetteer as remains have been identified at this position previously.
- Debris 7027 is an angular dark reflector with shadow measuring 6.3 x 4 x 1.2 m situated 6 m north east of the wreck *Thistlemor* (wreck 7028, UKHO 12339, A63).
- 7028 corresponds with UKHO record 12339 (A63), the *Thistlemor*. The *Thistlemor* was a steam ship which sunk in 1909. The wreck measures 105.2 x

35.7 x 1.3 and is orientated east to west. The wreck appears to be broken up and degraded with debris identified in the vicinity.

- 7030 is a strong magnetic anomaly either buried or with no surface expression, measuring 526 nT. The nature of this anomaly cannot be confirmed without further inspection.
- 7196 is a strong magnetic anomaly either buried or with no surface expression, measuring 1840 nT. The nature of this anomaly cannot be confirmed without further inspection.
- 7005 is possible ferrous debris either buried or with no surface expression, which may be modern. It is situated in the proximity of a UKHO obstruction recorded as a pipe or diffuser and may be associated.
- 7011 is a moderately strong isolated magnetic anomaly (347 nT).
- Debris 7014 is a double peaked mound within scour measuring 5 x 4 x 0.1.
- 7019, 7072, 7129, 7188 and 7189 are linear debris which were interpreted as lengths of rope or chain.
- 7031, 7035, 7039, 7040, 7112, 7146, 7166, 7175, 7187 and 7207 are possibly ferrous debris which are either buried or have no surface expression.
- 7079 is a magnetic trend which may be an uncharted cable, that may be buried or have no surface expression; however, this cannot be confirmed without further investigation.
- Debris 7102 is a distinct mound with steep sides and a double peak.
- 7113 is a magnetic trend which may be an uncharted cable that may be buried or have no surface expression; however, this cannot be confirmed without further investigation.
- Debris field 7195 is a group of at least four angular and rounded dark reflectors with varying shadows measuring 43.4 x 30.8 x 0.5 m.

7.7.20 The remaining 191 anomalies have been characterised as low potential. Most of them are isolated linear features, debris or weak magnetic anomalies.

7.7.21 A total of five AEZs have been recommended within the study area. Of the five high potential areas identified, three are located within the OCC and two are adjacent to it.

7.7.22 The following AEZs are recommended within the study area (shown in Volume 3, Figure 7.5 of the ES):

- 7026: 100m buffer around the recorded position (centre point 401827, 5658228 UTM30N);
- 7027: 30 m buffer merged with wreck 7028 (centre point 401717, 5658018 UTM30N);
- 7028: 100 m buffer around feature extent (centre point 401663, 5658016 UTM30N);
- 7030: 100 m buffer around recorded position (centre point 398469, 5660373 UTM30N); and
- 7196: 100 m buffer around recorded position (centre point 657296, 5455055 UTM29N).

7.7.23 Further information regarding the identified anomalies is presented in Volume 3, Appendix 7.2: Archaeological assessment of geophysical survey data of the ES.

## Palaeolandscapes assessment of sub-bottom profiler data

7.7.24 The analysis of the features and characteristics of the seabed is presented in Volume 3, Appendix 7.4 of the ES and is summarised below.

7.7.25 See **paragraph 7.7.12** for information on the survey coverage. The data quality varied across the survey area:

- nearshore MBES mosaic data was rated as Good, meaning suitable, clear data in which anomalies can be clearly identified and interpreted and provides the highest probability for marine heritage receptors to be identified.
- offshore MBES was rated as Average, meaning suitable, moderately affected data in which anomalies can be identified and interpreted and provides adequate probability for marine heritage receptors to be identified.
- the quality of the SBP data has been rated as 'Good' using the above criteria, with shallow reflectors easily visible. Penetration was relatively limited, as is standard for parametric sonar data, but the very shallow depth of bedrock in the area meant this was a not a detriment to palaeolandscape assessment of the data.

7.7.26 The shallow stratigraphy of the OCC presented in **Table 7-19** has been based on that presented in the marine geoarchaeological assessment report (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES) but modified to include additional features where visible in the geophysics, but not within the previously assessed cores. It is considered to be a complete stratigraphy but should be understood that it will not be present in any one vibrocore sample or SBP data section.

**Table 7-19: Shallow stratigraphy of the study area**

| Unit | Unit Name | Geophysical Characteristics (1) | Sediment Type (2) | Archaeological Potential |
|---|---|---|---|---|
| 7 | Seabed sediments (Holocene) | Generally observed as a thin veneer with occasional sand ripples, or thickening into large sand bank towards the nearshore. Boundary between surficial sediments and underlying Units 5 and 6 (where present) is not always discernible. | Gravelly sand and sandy gravel (Gravel lag) | Considered of low potential in itself, but possibly contains re-worked artefacts and can cover wreck sites and other cultural heritage. |
| 6 | Coastal to shallow marine (Early Holocene) | A relatively well defined, sub-horizontal reflector overlain by a relatively acoustically transparent unit that contains numerous faint internal reflectors, suggesting a complex structure. | Fine to medium sand with faint laminae and rare shells | Potential to contain derived archaeological and palaeoenvironmental material, and to protect underlying surfaces. |

| Unit | Unit Name | Geophysical Characteristics (1) | Sediment Type (2) | Archaeological Potential |
|---|---|---|---|---|
| 5 | Alluvium (Early Holocene) | A relatively well defined, sub-horizontal basal reflector and a single phase of generally unstructured, acoustically transparent fill. Some internal reflectors are visible, but do not show a coherent structure. Occasionally punctuated by erosive features (channels) that often cut through the whole thickness of the unit. | Low strength sandy clay | Potential to contain in situ and derived archaeological and palaeoenvironmental material, and to protect underlying surfaces. |
| 4 | Head (Late Weichselian to Early Holocene) | Not definitively identified within the geophysical data. | Gravelly clay and clayey gravel. | Unlikely to contain archaeological material. |
| 3 | Glaciomarine (Late Weichselian) | Not definitively identified within the geophysical data. | Firm to stiff sandy clay with laminae of sand and shell fragments. | Unlikely to contain archaeological material. |
| 2 | Diamict (Late Weichselian) | Tentatively identified in the nearshore area as an acoustically transparent unit. | High strength gravelly sandy clay. | Unlikely to contain archaeological material. |
| 1 | Pre-Quaternary bedrock | Variable, but often with a strong upper reflector and irregular/dipping internal reflectors. | Variable. | Pre-Earliest occupation of the UK. |
| (1) Based on geophysical data<br>(2) Based on vibrocore data (Volume 3, Appendix 7.3: Stage 1 and 2 Marine Geoarchaeological Assessment of the ES). | | | | |

7.7.27 Units 5, 6 and 7 have potential to contain archaeological and palaeoenvironmental material within the deposits. Unit 5 is potentially similar in date to the submerged forest at Westward Ho! and the deposits are considered to have high archaeological potential. There is potential for early occupation remains on the interface between the Unit 1 deposit and any directly overlying deposits.

7.7.28 A total of 19 features of palaeogeographic interest were identified within the OCC:

- a total of two channels were assigned a P1 archaeological rating;
- a total of three fine grained deposits were also assigned a P1 archaeological rating;
- a total of 13 simple cuts and fills were assigned an P2 archaeological rating; and
- a single erosion surface was also assigned a P2 archaeological rating.

## Future Baseline Conditions

7.7.29 Paragraph 3 of Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires that '*an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge'* is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.

7.7.30 The existing environment for offshore archaeology and cultural heritage as set out above has been shaped by a combination of factors, with the most prevalent being changes in global sea levels and associated climatic and environmental conditions. These conditions have and continue to affect the burial and preservation of remains. Historic England (2022) recognises, that 'the marine and inter-tidal zones are dynamic and have always undergone natural environmental change and changing patterns of use and exploitation which are nothing new'.

7.7.31 Marine physical processes, including the cycle of burial and exposure due to storm events, have an ongoing effect on the preservation of archaeological material. Sediment cover provides protection from physical marine processes, reducing the risk of erosion and degradation. It is not possible to assess the effect of this impact upon individual heritage assets as this will depend on the nature of the exposed heritage asset and site-specific conditions.

7.7.32 Underwater cultural heritage is also under threat from warming waters caused by climate change. As the sea levels rise the impact of the tidal activity on heritage assets within and adjacent to the intertidal will increase. In addition, warming waters result in the northward migration of invasive species, which may include the blacktip shipworm (*Lyrodus pedicellatus*), which is considered to be a major threat to wooden wrecks and other wooden structures within the marine environment.

7.7.33 Furthermore, marine infrastructure projects within the study area will all have the potential to cause adverse direct impacts on heritage assets or contribute to beneficial impacts. This includes large-scale enhanced understanding of the archaeological resource through large-area geophysical/geotechnical survey data released to the public domain or the enhanced knowledge of key characteristics, features or elements derived from site-specific survey and investigations.

## Key Receptors

7.7.34 **Table 7-20** identifies the receptors taken forward into the assessment.

**Table 7-20: Key receptors taken forward to assessment**

| Receptor type | Description | Importance |
|---|---|---|
| ***Thistlemor*** **(wreck 7028; A63)** | The remains of a merchant steamer constructed in 1906 and wrecked in 1909. Identified in the geophysical survey data and noted in the UKHO data. Historical accounts suggest that there is potential for human remains as not all the crew survived the wrecking. | Medium |

| Receptor type | | Description | Importance |
|---|---|---|---|
| **Two magnetic anomalies (7030 and 7196)** | | Date and type of remains was not able to be determined through geophysical survey. | High to low |
| **Debris (7027)** | | Date and type of remains was not able to be determined through geophysical survey. | High to low |
| **23 anomalies considered to have high or moderate archaeological potential** | | Date and type of remains was not able to be determined through geophysical survey. | High to low |
| **Palaeolandscape features and sub-seabed deposits of palaeoenvironmental interest** | | Remnants of the prehistoric landscape (including palaeochannels, depressions) that indicate how the landscape formed, developed, and potentially was used in the past prior to inundation. Nature of deposits was not able to be determined through geophysical survey. | High to medium |
| | | Palaeoenvironmental deposits include submerged peat deposits, organic remains and Pleistocene deposits that have the potential to inform scientific understanding of how the landscape developed, rate of inundation, and use of the landscape prior to inundation. Nature of deposits was not able to be determined through geophysical survey. Potential deposits were not sampled during geotechnical survey. | Medium for palaeoenvironmental remains<br>High to medium for Pleistocene deposits |
| **Unknown potential remains of all periods** | Prehistoric remains | Palaeolithic and Mesolithic temporary settlement remains which may include evidence of animal butchery or food processing, lithic scatters | High or medium depending upon type, extent and survival |
| | | Isolated remains | Low |
| | | Evidence of coastal marine resource exploitation which may include trackways or traps | Medium or low depending upon type, extent and survival |
| | | Watercraft remains | High |
| | Roman remains | Romano-British ship remains | High |
| | | Coastal infrastructure remains | High or medium depending upon type, extent and survival |
| | | Evidence of coastal marine resource exploitation which may include salt manufacture or fish/eel traps | Medium or low depending upon type, extent and survival |
| | | Isolated remains | Low |
| | Medieval remains | Early medieval and medieval ship remains | High |
| | | Coastal infrastructure remains | High or medium depending upon type, extent and survival |
| | | Evidence of coastal marine resource exploitation which may include salt manufacture or fish/eel traps | Medium or low depending upon type and survival |

| Receptor type | | Description | Importance |
|---|---|---|---|
| | | Isolated remains | Low |
| | Post-medieval remains | Early post-medieval ship remains | High |
| | | Later post-medieval wooden, iron, or composite ship remains | High or medium depending upon type and survival |
| | | Early steel ship remains | Medium |
| | | Coastal infrastructure remains | Medium or low depending upon type, extent and survival |
| | | Evidence of coastal marine resource exploitation which may include salt manufacture or fish/eel traps | Medium or low depending upon type, extent and survival |
| | | Isolated remains | Low |
| | Modern remains | Aircraft remains | High |
| | | Ship remains | Medium |
| | | Isolated remains | Negligible |

# 7.8 Mitigation Measures Adopted as Part of the Proposed Development

7.8.1 For the purposes of the EIA process, the term *'measures adopted as part of the Proposed Development'* is used to include the following types of mitigation measures (adapted from IEMA, 2016). These measures (including their securing mechanisms) are set out in Volume 1, Appendix 3.1: Commitments Register of the ES.

- Embedded mitigation. This includes the following.
  - Primary (inherent) mitigation - measures included as part of the Proposed Development design. IEMA describes these as '*modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken'*. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the project and the parameters secured in the DCO and/or marine licences. For example, a reduction in footprint or height.
  - Tertiary (inexorable) mitigation. IEMA describes these as '*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects*'. It may be helpful to secure such measures through a Construction Environmental Management Plan or similar.
- Secondary (foreseeable) mitigation. IEMA describes these as '*actions that will require further activity in order to achieve the anticipated outcome'*. These include measures required to reduce the significance of environmental effects (such as lighting limits) and may be secured through e.g. the Offshore

Construction Environmental Management Plan (an outline offshore CEMP is presented as application document 7.9 alongside this ES).

7.8.2 In addition, where relevant, measures have been identified that may result in enhancement of environmental conditions. Such measures are clearly identified within Volume 1, Appendix 3.1: Commitments Register of the ES. The measures relevant to this chapter are summarised in **Table 7-21**.

7.8.3 Embedded measures that will form part of the final design (and/or are established legislative requirements/good practice) have been taken into account as part of the initial assessment presented in **section 7.10** to **7.12** below (i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures to which the Applicant is committed are taken into account in the assessment of effects.

7.8.4 Where an assessment identifies likely significant adverse effects, further or secondary mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by IEMA as actions that will require further activity in order to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES (referred to as secondary mitigation measures in IEMA, 2016). For further or secondary measures both pre-mitigation and residual effects are presented.

**Table 7-21: Mitigation measures adopted as part of the Proposed Development** (c.f. Volume 1, Appendix 3.1: Commitments Register of the ES).

| Commitment Number | Measure Adopted | How the Measure Will be Secured |
|---|---|---|
| **Embedded Measures** | | |
| OFF03 | Micro-routing of the offshore cables, within the defined Order Limits, will be undertaken to avoid direct impacts where possible on archaeology and cultural heritage assets and submerged land surfaces. | Set out as 'Further Commitments' in the Outline Offshore CEMP (document ref. 7.9). |
| OFF29 | 100 m Archaeological Exclusion Zones (zone in which no construction activities will take place) are committed around the extents of known (x1 site identified) wreck sites and anomalies of archaeological interest. This commitment will lead to archaeological preservation *in-situ*. | OOWSI (Volume 3, Appendix 7.5 of the ES) |
| OFF30 | 100 m Archaeological Exclusion Zones (zone in which no construction activities will take place) are committed around the recorded point locations of previously recorded sites that have not been seen in the geophysical data but at which archaeological material is likely to be present, possibly buried. There are x3 such point locations identified. This commitment will lead to archaeological preservation *in-situ*. | OOWSI (Volume 3, Appendix 7.5 of the ES) |
| OFF31 | 30 m Archaeological Exclusion Zones (zone in which no construction activities will take place) are committed around the extent of likely anthropogenic debris. There are x1 such points identified. This commitment will lead to archaeological preservation *in-situ*. | OOWSI (Volume 3, Appendix 7.5 of the ES) |

| Commitment Number | Measure Adopted | How the Measure Will be Secured |
|---|---|---|
| OFF32 | Geophysical anomalies identified within the offshore archaeological assessment will be avoided where possible by micro-routing. Where this is not possible the OOWSI will provide the framework for potential further actions (an OOWSI is presented with the application for DCO as document ref. 6.3.7.5). This commitment will lead to archaeological preservation *in-situ*. | OOWSI (Volume 3, Appendix 7.5 of the ES) |
| OFF33 | Further investigation of identified anomalies and previously recorded sites that cannot be avoided by micro-routing of design will be undertaken within the framework of the Offshore Written Scheme of Investigation (an OOWSI is presented with the application for DCO as document ref. 6.3.7.5). | OOWSI (Volume 3, Appendix 7.5 of the ES) |
| **Secondary (Further) Measures** | | |
| OFF26 | Archaeological assessment of available data - Offshore geophysical surveys (including future UXO surveys as necessitated) and any additional offshore geotechnical campaigns undertaken pre-construction (if required) will be subject to archaeological review, where relevant in consultation with Historic England. Relevant results from geotechnical surveys will be released / shared with Archaeology Data Service (ADS), with the aim to enhance the paleogeographic knowledge and understanding of the area. | OOWSI (Volume 3, Appendix 7.5 of the ES) |
| OFF27 | Protocol for Archaeological Discoveries (PAD) - Additional unknown or unexpected cultural heritage and marine heritage features identified during the project stages will be reported utilising the project specific PAD, which is appended to the ES (Volume 3, Appendix 7.6 Protocol for Archaeological Discoveries of the ES) and which is an integrated requirement of the OOWSI. | OOWSI (Volume 3, Appendix 7.5 of the ES) and Outline Offshore CEMP (document ref. 7.9). |
| OFF28 | An OOWSI accompanies the ES, with site-specific WSIs produced prior to commencing construction to inform specific investigation activities to record cultural heritage assets and subsequently the production of a post-excavation report and, if warranted, further dissemination of results, i.e. publication in relevant journals or the production of a monograph. An OOWSI is presented within the application for DCO as Volume 3, Appendix 7.5 Outline Offshore Archaeological Written Scheme of Investigation of the ES. | Specified requirement of the Deemed Marine Licence. |
| **Enhancement Measures** | | |
| N/A | | |

# 7.9 Key Parameters for Assessment

## Maximum Design Scenario

7.9.1 The maximum design scenarios identified in **Table 7-22** have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the information provided in Volume 1, Chapter 3: Project Description of the ES. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g. different infrastructure layout), to that assessed here be taken forward in the final design. Therefore, this comprises a conservative assessment of a worst-case scenario.

**Table 7-22: Maximum design scenario considered for the assessment of impacts**

| Potential Impact | Phase[1] | | | | | Maximum Design Scenario | Justification |
|---|---|---|---|---|---|---|---|
| | C | Op | Op repair | D *in-situ* | D remove | | |
| Direct physical impacts leading to the total or partial loss of the marine heritage receptors | Yes | No | Yes | No | Yes | **Construction phase**<br>Direct impact (to cultural heritage receptors) from seabed disturbance activities and the construction of the landfall i.e. as a result of boulder clearance, pre-lay ploughing and seabed debris removal:<br>• 7,400,000 $m^2$ footprint for use of seabed surface plough and/or mass flow excavation. Seabed surface plough with swath width of 10-20 m wide. Precautionary estimate assuming plough use along 50% of OCC (20 [w] x 370,000 [l] x 2 [n] x 50%).<br>• 6,000,000 $m^2$ for boulder clearance, pre-lay plough with swath width of 10-15 m assumed across approximately 200 km of the cable route (15 [w] x 200,000 [l] x 2 [n]).<br>• 740,000 $m^2$ for max (precautionary) seabed debris removal, pre-lay grapnel run with 1 m width and at maximum penetration depth of 1 m (1 [w] x 370,000 [l] x 2 [n]).<br>• 11,100,000 $m^2$ for max (precautionary) pre-lay trench ploughing with disturbance width of 15 m (15 [w] x 370,000 [l] x 2 [n].<br>• Clearance of unconsolidated sediments at 4 x HDD exit pits (c. 15 m x 15 m each).<br><br>**Operational and maintenance phase - normal**<br>n/a<br><br>**Operational and maintenance phase - repair**<br>Direct impact from disturbance to cultural heritage receptors, localised to the area of the repair. (Infrequent, isolated repair activities). | The OCC is 370 km long in UK waters. Whilst the OCC is generally 500 m wide, the maximum area of (seabed) disturbance will be determined by the width of the route preparation and installation plant required.<br>The outline Cable Burial Risk Assessment (CBRA) provides seabed and burial risks which provide high level indication of most likely installation techniques. |

| Potential Impact | Phase[1] | | | | | Maximum Design Scenario | Justification |
|---|---|---|---|---|---|---|---|
| | C | Op | Op repair | D *in-situ* | D remove | | |
| | | | | | | **Decommissioning phase – *in situ***<br>n/a<br><br>**Decommissioning phase - removal**<br>Direct impact from disturbance to cultural heritage receptors adjacent to the cable corridor. | |
| Indirect impact to cultural heritage receptors (e.g. from disturbance of sediments, or scour) | No | Yes | No | Yes | Yes | **Construction phase**<br>n/a | The range of sediment disturbance activities characterised in the PEIR by the Physical Processes assessment has been reviewed, with characterisations used to inform the assessment of marine archaeology and cultural heritage receptors. |
| | | | | | | **Operation and Maintenance phases**<br>Indirect impact from disturbance to cultural heritage receptors in close proximity to the Proposed Development during operation/maintenance arising from altered sea-bed conditions, e.g. scour or differential deposition of sediments.<br>Maximum height of rock protection - up to 1.4 m at crossings and <1 m elsewhere. | |
| | | | | | | **Decommissioning phase – *in situ* and removal**<br>Indirect impact on cultural heritage receptors from disturbance of sea-bed conditions adjacent to the installed cable/removal works. | |

[1] C=construction, Op=operation and maintenance, D=decommissioning

# 7.10 Assessment of Construction Effects

## Introduction

7.10.1 The impacts of the construction of the Proposed Development have been assessed. The impacts arising from the construction phase of the Proposed Development are listed in **Table 7-22**, along with the maximum design scenario against which each impact has been assessed.

7.10.2 For the purpose of this assessment, potential heritage assets comprise the following asset types as detailed in **Table 7-20**:

- *Thistlemor* (wreck 7028; A63);
- Two magnetic anomalies (7030 and 7196);
- Debris (7027);
- 23 geophysical anomalies considered to have high or moderate archaeological potential;
- Palaeolandscape features;
- Palaeoenvironmental remains; and
- Unknown potential remains of all periods

7.10.3 A description of the likely effect on receptors caused by each identified impact is given below.

## Impact 1: Direct disturbance of sediment during seabed preparation works

7.10.4 Construction activities have the potential to cause total or partial loss of marine heritage receptors. Direct disturbance also has the potential to result in the deterioration or destruction of the relationships between marine heritage features and the wider environment (stratigraphic context or setting). These relationships are crucial to developing a full understanding of an asset. Such impacts may occur if heritage assets are present within the footprint of the Proposed Development.

7.10.5 Direct impacts may occur during construction activities within the offshore cable corridor associated with the following activities:

- Seabed preparation works including boulder clearance, where required (via e.g. penetration, compression, and disturbance of sediments);
- Excavation of the Horizontal Directional Drilling (HDD) exit pits;
- Installation of offshore cabling, including trench cutting;
- Placement of rock protection and construction of crossing 'structures'; and
- Seabed contact by legs of jack-up vessels (at HDD exit locations) and the anchoring of other construction vessels.

## Importance of the Receptor

7.10.6 Where the importance of the receptor is uncertain and described in a range (i.e. between high and low), the worst case (i.e. high importance) is used within the assessment of the construction effects.

7.10.7 *Thistlemor* (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.10.8 Two strong magnetic anomalies with no associated seabed expression were identified as 7030 and 7196 and identified as ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.10.9 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.10.10 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.10.11 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.10.12 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.10.13 Pleistocene deposits are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.10.14 There is potential for unknown remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of Impact

7.10.15 Magnitude of impact on marine heritage receptors have been assessed according to the criteria outlined in **Table 7-14**. The scale of seabed preparational works outlined in the assumed maximum design scenario table (**Table 7-22**) demonstrates that potential impact on marine heritage receptors is possible during seabed preparation and construction activities.

7.10.16 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

7.10.17 The impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **medium adverse** as a result of the location of the *Thistlemor* extending outside the OCC boundary and only the north eastern end of the wreck located within the OCC.

7.10.18 The impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **high adverse** as a result of the location of the anomalies fully within the OCC.

7.10.19 The impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **high adverse**.

7.10.20 The impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **high adverse**.

7.10.21 The impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.22 The impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.23 The impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.24 The impact to potential remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **high adverse**.

## Significance of the Effect

7.10.25 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impact of construction activities on marine heritage receptors.

7.10.26 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been recommended within the OCC. The AEZs are presented on Volume 3, Figure 7.5 of the ES, and in **section 7.7**.

7.10.27 AEZs are not recommended at this time for features interpreted as being of moderate or low archaeological potential or small magnetic anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible. If any of these features are proposed to be directly impacted by the Proposed Development and micro-siting is not possible, then further assessment to ascertain the nature of the features may be required, as per the direction of the OOWSI, which would direct archaeological works post-consent.

7.10.28 The commitment to potentially undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix 7.5 of the ES) and Protocol for Archaeological Discoveries (PAD) (Volume 3, Appendix 7.6 of the ES) as per the mitigation measures set out in **Table 7-21**. The OOWSI and the PAD are specific requirements secured by the (currently draft) Deemed Marine Licence (c.f. the Commitments Register, presented as Volume 1, Appendix 3.1 of the ES).

7.10.29 The significance of the effect on marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-23**.

Note the significance of effect presented here is prior to application of any *further* mitigation.

**Table 7-23: Impact 1 Significance of effect**

| **Key receptor** | **Magnitude of impact** | **Sensitivity of the receptor** (worst-case) | **Significance of Effect** (prior to the application of embedded mitigation measures) | **Significance of Effect** (following the application of embedded mitigation measures; prior to further mitigation) |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Medium adverse | Medium | **Moderate** adverse significance (significant) | **No effect** |
| Two magnetic anomalies (7030 and 7196) | High adverse | High | **Major** adverse significance (significant) | **No effect** |
| Debris 7027 | High adverse | High | **Major** adverse significance (significant) | **No effect** |
| 23 anomalies considered to have high or moderate archaeological potential | High adverse | High | **Major** adverse significance (significant) | **Minor adverse** significance (not significant) |
| Palaeolandscape features | Low adverse | High | **Moderate** adverse significance (significant) | **Moderate** adverse significance (significant) |
| Palaeoenvironmental remains | Low adverse | Medium | **Minor** adverse significance (not significant) | **Minor** adverse significance (not significant) |
| Pleistocene deposits | Low adverse | High | **Moderate** adverse significance (significant) | **Moderate** adverse significance (significant) |
| Potential (unknown) remains of all periods | High adverse | High | **Major** adverse significance (significant) | **Major** adverse significance (significant) |

7.10.30 If micro-siting or avoidance is not possible around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be correct. Secondary mitigation measures including ground truthing investigations within the anomaly location to determine the nature and significance of the anomaly and the introduction of Temporary Exclusion Zones (TEZs), AEZs, or archaeological watching briefs as appropriate to mitigate any further impact of the development on relevant receptors are anticipated to reduce the significance of effect to minor adverse (not significant).

## Further (Secondary) Mitigation and Residual Effect

7.10.31 Volume 1, Appendix 3.1 of the ES sets out the Commitments Register, including those that relate to the offshore archaeological environment.

7.10.32 An OOWSI (Volume 3, Appendix 7.5 of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy, which will secure the secondary mitigation. The final OWSI will be a requirement of the Deemed Marine Licence (a draft Deemed Marine Licence is submitted with the application for DCO). A detailed site-specific OWSI will be formalised through consultation with Historic England for each investigation undertaken as part of the determined mitigation strategy (see **paragraph 7.10.28**).

7.10.33 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. There is potential, albeit low likelihood, for additional hitherto unknown or unexpected cultural heritage and marine heritage receptors to be found and identified during the project stages. The finds will be reported utilising the project specific PAD (Volume 3, Appendix 7.6 of the ES), which is a contractor requirement via the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5 of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES), and explicitly secured via the Deemed Marine Licence (currently at draft). The impact on the hitherto unknown or unexpected cultural heritage and marine heritage receptor would be lessened through the implementation of the PAD and any targeted mitigation measures but the degree of change would be determined by a combination of several factors including the sensitivity of the asset, if the asset was physically impacted during its discovery, and the types of targeted mitigation measures utilised as part of the PAD process. The worst-case residual effect would decrease the significance of effect on a high sensitivity asset from **major** adverse to **moderate** adverse (significant) but this is considered to be unlikely. It is anticipated that, for the majority of potential assets, the appropriate application of additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects **no higher than minor adverse significance** which is **non-significant** in EIA terms.

7.10.34 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-related activities within their extents. All AEZs will be agreed with the Marine Management Organisation (MMO) via the implementation of the OOWSI (secured via the deemed Marine Licence (currently at draft)). AEZs around low potential anomalies are not recommended but those will be avoided by means of micro-siting.

7.10.35 The Palaeolandscapes assessment of sub-bottom profiler data is presented as Appendix 7.4 to this ES chapter. That palaeolandscapes assessment identifies two channels and three fine grained deposits that were assigned a P1 archaeological rating by Wessex Archaeology, that are not able to be avoided by the Proposed Development. As per the Wessex Archaeology recommendations, should further geotechnical investigation be undertaken in these areas, then the scope of those investigations should include archaeological investigation. Any such investigations could include for example, geoarchaeological boreholes within

the identified features to determine the nature and age of the deposits and refine the potential for palaeoenvironmental or prehistoric archaeological remains. Any such cores would be subject to the five-stage approach (detailed in Table 1-6 of Volume 1, Appendix 7.1: Marine Archaeology Desk-based Assessment of this ES) by a qualified marine geoarchaeologist.

7.10.36 If further marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **Section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore, the implementation of a formal PAD, supported by an archaeological watching brief in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects no higher than minor adverse significance which is non-significant in EIA terms.

### Future Monitoring

7.10.37 The post-installation surveys and detailed layout drawings required for e.g. charting purposes (as secured by the Deemed Marine Licence) will confirm the avoidance of AEZs. This will ensure that the remains within the determined AEZ limits remain undisturbed and that changes from any anthropogenic activities are recorded appropriately.

## Impact 2: Indirect disturbance of heritage assets

7.10.38 Indirect impacts may occur on known and potential marine archaeological receptors as a result of changes to sedimentation and erosion patterns. For example, the disturbance of sediment and seabed deposits could lead to the exposure of known receptors (e.g. recorded wreck sites) and the exposure of hitherto unknown wreck sites and materials.

### Sensitivity of receptor

7.10.39 *Thistlemor* (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.10.40 Two magnetic anomalies with no associated seabed expression were identified as 7030 and 7196 and have been identified as potential ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.10.41 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.10.42 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor does not recover once

impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.10.43 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.10.44 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.10.45 Pleistocene deposits are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.10.46 There is potential for remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of impact

7.10.47 The potential magnitude of impact on marine heritage receptors has been assessed according to the criteria outlined in **Table 7-14**. The construction activities outlined in the assumed maximum design scenario table (**Table 7-22**) have the potential to impact on marine heritage receptors during construction works.

7.10.48 If any marine heritage receptors are subject to increased sedimentation coverage, and this results in additional protection of the marine heritage receptor, as a result of the construction works, the marine heritage receptor could potentially benefit from the conditions by way of a higher level of preservation *in situ*.

7.10.49 Impacts of scour and exposure of previously buried marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

7.10.50 The potential impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.51 The potential impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.52 The potential impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.53 The potential impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.10.54 The potential impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.10.55 The potential impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.10.56 The potential impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.10.57 The potential impact to potential (unknown) remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

## Significance of effect

7.10.58 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impacts of construction activities on marine heritage receptors.

7.10.59 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been established within the Offshore Cable Corridor. The AEZs are presented on Volume 3, Figure 7.5 of the ES and in **section 7.7**.

7.10.60 AEZs are not recommended at this time for features interpreted as being of moderate or low archaeological potential or small magnetic anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible. If any of these features are proposed to be directly impacted by the Proposed Development and micro-siting is not possible, then further assessment to ascertain the nature of the features may be required, as per the direction of the OOWSI, which would direct archaeological works post-consent.

7.10.61 The commitment to undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix 7.5 of the ES) and Protocol for Archaeological Discoveries (PAD) (Volume 3, Appendix 7.6 of the ES) as per the mitigation measures set out in **Table 7-21**. This is also included within the principal commitments on the deemed Marine Licence and within the Commitments Register (Volume 1, Appendix 3.1 of the ES).

7.10.62 The significance of the effect on the marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-24**. Note the significance of effect presented here is prior to application of any *further* mitigation.

**Table 7-24: Impact 2 Significance of effect**

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect (prior to the application of embedded mitigation measures) | Significance of Effect (following the application of embedded mitigation measures) |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Low adverse | Medium | **Minor adverse** significance (not significant) | **No effect** |
| Two magnetic anomalies (7030 and 7196) | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| Debris 7027 | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| 23 anomalies considered to have high or moderate archaeological potential | Low adverse | High | **Moderate** adverse significance (significant) | **Minor adverse** significance (not significant) |
| Palaeolandscape features | Negligible adverse | High | **Minor adverse** significance (not significant) | **Minor adverse** significance (not significant) |
| Palaeoenvironmental remains | Negligible adverse | Medium | **Minor** adverse significance (not significant) | **Minor adverse** significance (not significant) |
| Pleistocene deposits | Negligible adverse | High | **Minor adverse** significance (not significant) | **Minor adverse** significance (not significant) |
| Potential (unknown) remains of all periods | Low adverse | High | **Moderate** adverse significance (significant) | **Moderate** adverse significance (significant) |

7.10.63 If micro-siting is not possible around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be correct. Secondary mitigation measures including ground truthing investigation within the anomaly location to determine the nature and significance of the anomaly and the introduction of TEZs, AEZs, or archaeological watching briefs as appropriate to mitigate the impact of the development on relevant receptors is anticipated to reduce the significance of effect to minor adverse (not significant).

## Further (Secondary) Mitigation and Residual Effect

7.10.64 An OOWSI (Volume 3, Appendix 7.5 of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy. A detailed site-specific WSI will be formalised through consultation with Historic England for each investigation undertaken as part of the mitigation strategy (see **paragraph**

**7.10.61**). The final WSI will be secured via the Deemed Marine Licence (Document Ref. Volume 1, Appendix 3.1: Commitments Register).

7.10.65 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. Additional hitherto unknown or unexpected cultural heritage and marine heritage receptors identified during the project stages will be reported utilising the project-specific PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), which is a contractor requirement via the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES).

7.10.66 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-related activities within their extents. All AEZs will be agreed with the MMO via the implementation of the OOWSI. AEZs around low potential anomalies are not recommended but those will be avoided by means of micro-siting.

7.10.67 If further unexpected marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore, the implementation of a formal PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), supported by an archaeological watching brief, as outlined in OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES), in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects **no higher than minor adverse significance** which is **non-significant** in EIA terms.

### Future Monitoring

7.10.68 Monitoring of the AEZs during operation and maintenance and decommissioning will be required to ensure that the remains within the determined AEZ limits remain undisturbed and that any changes from anthropogenic activities or scour are recorded appropriately as presented in the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5 of the ES).

## 7.11 Assessment of Operation and Maintenance Effects

7.11.1 The impacts of the operation and maintenance phase of the Proposed Development have been assessed. The impacts arising from the operation and

maintenance phase of the Proposed Development are listed in **Table 7-22**, along with the maximum design scenario against which each impact has been assessed.

7.11.2 A description of the likely effect on receptors caused by each identified impact is given below.

## Impact 3: Direct disturbance of features (Operational – repair)

7.11.3 Operational and maintenance phase, repair activities, should these be required, have the potential to cause similar effects to those associated with the construction phase activities. It is noted that these activities would likely occur over a much smaller spatial scale during the operational and maintenance phase (compared to the extensive construction footprint) however the potential for total or partial loss of marine heritage receptors remains. As with Impact 1, direct disturbance also has the potential to result in the deterioration or destruction of the relationships between marine heritage features and the wider environment (stratigraphic context or setting). These relationships are crucial to developing a full understanding of an asset. Such impacts may occur if heritage assets are present within the footprint of any operational and maintenance phase repair works.

7.11.4 Direct impacts could result via penetration, compression and disturbance of features during repair activities such as anchoring of maintenance vessels, reburial of repaired cable loops etc.

### Sensitivity of receptor

7.11.5 *Thistlemor* (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.11.6 Two magnetic anomalies with no associated seabed expression were identified as 7030 and 7196 and has been identified as ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.11.7 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.11.8 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.11.9 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.11.10 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.11.11 Pleistocene deposits are vulnerable to impact. The receptor does not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.11.12 There is potential for remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of impact

7.11.13 Magnitude of impact on marine heritage receptors have been assessed according to the criteria outlined in **Table 7-14**. The likely scale of seabed works associated with operational and maintenance phase works is likely to be small however potential impact on marine heritage receptors is possible given direct interaction with the seabed preparation to undertake repair activities (similar in nature to the construction techniques).

7.11.14 Construction activity (operational repair activities) has the potential to affect marine heritage receptors. This would be direct, long-term, continuous, and constitute a partial loss of marine heritage receptors within the area of impact.

7.11.15 The impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.16 The impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.17 The impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.18 The impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.19 The impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.11.20 The impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.11.21 The impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.11.22 The impact to potential remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

## Significance of effect

7.11.23 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impact of construction activities on marine heritage receptors.

7.11.24 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been recommended within the OCC. The AEZs are presented on Volume 3, Figure 7.5 of the ES and in **section 7.7**.

7.11.25 AEZs are not recommended at this time for features interpreted as being of moderate or low archaeological potential or small magnetic anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible. If any of these features are proposed to be directly impacted by the Proposed Development and micro-siting is not possible, then further assessment to ascertain the nature of the features may be required as per the direction of the OOWSI, which would direct archaeological works post-consent (including during the operational repair phase).

7.11.26 The commitment to undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix 7.5 of the ES) and Protocol for Archaeological Discoveries (PAD) (Volume 3, Appendix 7.6 of the ES) as per the mitigation measures set out in **Table 7-21** (and secured via the deemed Marine Licence (Document Ref. Volume 1, Appendix 3.1: Commitments Register)..

7.11.27 The significance of the effect on marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-25**. Note the significance of effect presented here is prior to application of any *further* mitigation.

**Table 7-25: Impact 3 Significance of effect**

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect (prior to the application of embedded mitigation measures) | Significance of Effect (following the application of embedded mitigation measures) |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Low adverse | Medium | **Minor** adverse significance (significant) | **No effect** |
| Two magnetic anomalies (7030 and 7196) | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| Debris 7027 | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| 23 anomalies considered to have high or moderate archaeological potential | Low adverse | High | **Moderate** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| Palaeolandscape features | Negligible adverse | High | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect (prior to the application of embedded mitigation measures) | Significance of Effect (following the application of embedded mitigation measures) |
|---|---|---|---|---|
| Palaeoenvironmental remains | Negligible adverse | Medium | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Pleistocene deposits | Negligible adverse | High | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Potential (unknown) remains of all periods | Low adverse | High | **Moderate** adverse significance (significant) | **N/A** |

7.11.28 If micro-siting is not possible around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be correct. Secondary mitigation measures including ground truthing investigations within the anomaly location to determine the nature and significance of the anomaly and the introduction of TEZs, AEZs, or archaeological watching briefs as appropriate to mitigate the impact of the development on the relevant receptors is anticipated to reduce the significance of effect to minor adverse (not significant).

## Further (Secondary) Mitigation and Residual Effect

7.11.29 An OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy. Any detailed site-specific WSI will be formalised through consultation with Historic England for each investigation undertaken as part of the mitigation strategy. The OOWSI and the final OWSI (including requirement for any detailed site specific WSIs) are secured via the requirements of the final Offshore CEMP, and ultimately the Deemed Marine Licence (Document Ref. Volume 1, Appendix 3.1: Commitments Register).

7.11.30 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. Additional hitherto unknown or unexpected cultural heritage and marine heritage receptors identified during the project stages will be reported utilising the project-specific PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), which is a contractor requirement via the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES).

7.11.31 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-

related activities within their extents. All AEZs will be agreed with the MMO via implementation of the OOWSI. AEZs around low potential anomalies are not recommended but those will be avoided by means of micro-siting.

7.11.32 If further marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore the implementation of a formal PAD, supported by an archaeological watching brief in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects no higher than minor adverse significance which is non-significant in EIA terms.

### Future Monitoring

7.11.33 Monitoring of the AEZs during operation and maintenance and decommissioning will be required to ensure that the remains within the determined AEZ limits remain undisturbed and that changes from anthropogenic activities are recorded appropriately as presented in the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5 of the ES).

## Impact 4: Indirect disturbance of features (Operational-repair and Operational-normal)

7.11.34 Indirect sediment disturbance impacts on marine heritage receptors could occur during maintenance activities (Operational-repair). Similarly, alteration of local currents resulting in scour (Operational-normal) could lead to indirect impacts i.e. the exposure of marine heritage receptors to physical, chemical or biological processes, resulting in a total or accelerated loss.

7.11.35 For context, the extent of potential scour associated with the proposed above seabed level rock protection (including crossing structures) has been determined to be minimal (Volume 3, Appendix 8.1: Sediment Source Concentrations and Assessment of Disturbance of the ES).

### Sensitivity of receptor

7.11.36 Thistlemor (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.11.37 Two magnetic anomalies with no associated seabed expression were identified as 7030 and 7196 and have been identified as potential ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.11.38 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.11.39 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor does not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.11.40 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.11.41 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.11.42 Pleistocene deposits are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.11.43 There is potential for remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of impact

7.11.44 The potential magnitude of impact on marine heritage receptors has been assessed according to the criteria outlined in **Table 7-14**. The construction activities outlined in the assumed maximum design scenario table (**Table 7-22**) have the potential to impact on marine heritage receptors during construction works.

7.11.45 If any marine heritage receptors are subject to increased sedimentation coverage, and this results in additional protection of the marine heritage receptor, as a result of the construction works, the marine heritage receptor could potentially benefit from the conditions by way of a higher level of preservation *in situ*.

7.11.46 Impacts of scour and exposure of previously buried marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

7.11.47 The potential impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.48 The potential impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.49 The potential impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.50 The potential impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.11.51 The potential impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.11.52 The potential impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**..

7.11.53 The potential impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.11.54 The potential impact to potential remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

## Significance of effect

7.11.55 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impact of operational and maintenance phase activities on marine heritage receptors.

7.11.56 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been established within the OCC. The AEZs are presented on Volume 3, Figure 7.5 of the ES and in **section 7.7**.

7.11.57 AEZs are not recommended at this time for features interpreted as being of moderate or low archaeological potential or small magnetic anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible. If any of these features are proposed to be directly impacted by the Proposed Development and micro-siting is not possible, then further assessment to ascertain the nature of the features may be required, as per the direction of the OOWSI, which would direct archaeological works post-consent.

7.11.58 The commitment to undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix 7.5 of the ES) and Protocol for Archaeological Discoveries (PAD) (Volume 3, Appendix 7.6 of the ES) as per the mitigation measures set out in **Table 7-21**. This will also be included within the principal commitments on the Deemed Marine Licence and within the Commitments Register (Volume 1, Appendix 3.1 of the ES).

7.11.59 The significance of the effect on marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-26**.

**Table 7-26: Impact 4 Significance of effect**

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect (prior to the application of embedded mitigation measures) | Significance of Effect (following the application of embedded mitigation measures) |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Low adverse | Medium | **Minor adverse** significance (not significant) | **No effect** |
| Two magnetic anomalies (7030 and 7196) | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| Debris 7027 | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| 23 anomalies considered to have high or moderate archaeological potential | Low adverse | High | **Moderate** adverse significance (significant) | **Minor adverse** significance (not significant) |
| Palaeolandscape features | Negligible adverse | High | **Minor adverse** significance (not significant) | **Minor adverse** significance (not significant) |
| Palaeoenvironmental remains | Negligible adverse | Medium | **Minor** adverse significance (not significant) | **Minor adverse** significance (not significant) |
| Pleistocene deposits | Negligible adverse | High | **Minor adverse** significance (not significant) | **Negligible adverse** significance (not significant) |
| Potential (unknown) remains of all periods | Low adverse | High | **Moderate** adverse significance (significant) | **N/A** |

7.11.60 If micro-siting is not possible around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be accurate. Secondary mitigation measures including ground truthing investigation within the anomaly location to determine the nature and significance of the anomaly and the introduction of TEZs, AEZs, or archaeological watching brief as appropriate to mitigate the impact of the development on the receptor is anticipated to reduce the significance of effect to minor adverse (not significant).

## Further (Secondary) Mitigation and Residual Effect

7.11.61 An OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeological Written Scheme of Investigation of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy. A detailed site-specific WSI will be formalised through consultation with Historic England for each investigation undertaken as part of the mitigation strategy (see **paragraph**

**7.11.58**). The OOWSI and the final OWSI are secured via the deemed Marine Licence (Document Ref. Volume 1, Appendix 3.1: Commitments Register).

7.11.62 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. Additional hitherto unknown or unexpected cultural heritage and marine heritage receptors identified during the project stages will be reported utilising the project specific PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), which is a contractor requirement via the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES).

7.11.63 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-related activities within their extents. All AEZs will be agreed with the MMO via the implementation of the OOWSI. Low potential anomalies AEZs are not recommended but those will be avoided by means of micro-siting.

7.11.64 If further marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **Section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore, the implementation of a formal PAD, supported by an archaeological watching brief in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects no higher than **minor adverse significance** which is **non-significant** in EIA terms.

### Future Monitoring

7.11.65 Monitoring of the AEZs during operation and maintenance and decommissioning will be required to ensure that the remains within the determined AEZ limits remain undisturbed and that changes from anthropogenic activities or scour are recorded appropriately as presented in the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5 of the ES).

## 7.12 Assessment of Decommissioning Effects

7.12.1 The impacts of the decommissioning phase of the Proposed Development have been assessed. The impacts arising from the operation and maintenance phase of the Proposed Development are listed in **Table 7-22**, along with the maximum design scenario against which each impact has been assessed.

7.12.2 A description of the likely effect on receptors caused by each identified impact is given below.

## Impact 5: Indirect disturbance from scour during decommissioning (*in situ*)

7.12.3 Indirect sediment disturbance impacts on marine heritage receptors could occur during the decommissioning phase if the cable is left *in situ* together with the associated cable protection. Such impacts may be associated with alteration of local currents resulting in scour, that in turn leads to receptor impacts i.e. the exposure of marine heritage receptors to physical, chemical or biological processes, resulting in a total or accelerated loss.

7.12.4 For context, the extent of potential scour associated with the proposed above seabed level rock protection (including crossing structures) has been determined to be minimal (Volume 3, Appendix 8.1: Sediment Source Concentrations and Assessment of Disturbance of the ES).

### Sensitivity of receptor

7.12.5 *Thistlemor* (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.12.6 Two magnetic anomalies with no associated seabed expression were identified as 7030 and 7196 and have been identified as potential ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.7 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.8 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor does not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.9 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.12.10 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.12.11 Pleistocene deposits are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.12.12 There is potential for remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of impact

7.12.13 The potential magnitude of impact on marine heritage receptors has been assessed according to the criteria outlined in **Table 7-14**. The maximum design scenario table (**Table 7-22**) has been considered in this assessment of decommissioning phase effects. A precautionary assessment of the magnitude has been undertaken.

7.12.14 If any marine heritage receptors are subject to increased sedimentation coverage, and this results in additional protection of the marine heritage receptor, as a result of the construction works, the marine heritage receptor could potentially benefit from the conditions by way of a higher level of preservation *in situ*.

7.12.15 Impacts of scour and exposure of previously buried marine heritage receptors would be direct, long-term, continuous, and constitute a total or partial loss of marine heritage receptors within the area of impact.

7.12.16 The impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.17 The impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.18 The impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.19 The impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.20 The impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.21 The impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.22 The impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.23 The impact to potential remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

## Significance of effect

7.12.24 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impact of construction activities on marine heritage receptors.

7.12.25 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been established within the OCC. The AEZs are presented on Volume 3, Figure 7.5 and in **section 7.7**.

7.12.26 The implementation of AEZs during the earlier project phases would effectively maximise the distance of any rock protection from known heritage assets, mitigating the potential for indirect scour effects.

7.12.27 The commitment to undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix

7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES) and PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES) as per the mitigation measures set out in **Table 7-21**. This is included within the principal commitments on the Deemed Marine Licence (at draft) and within the Commitments Register (Volume 1, Appendix 3.1 of the ES).

7.12.28 The significance of the effect on marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-27**. Note the significance of effect presented here is prior to application of any *further* mitigation.

**Table 7-27: Impact 5 Significance of effect**

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect *(prior to the application of embedded mitigation measures)* | Significance of Effect *(following the application of embedded mitigation measures)* |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Low adverse | Medium | **Minor adverse** significance (not significant) | **No effect** |
| Two magnetic anomalies (7030 and 7196) | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| Debris 7027 | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| 23 anomalies considered to have high or moderate archaeological potential | Low adverse | High | **Moderate** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| Palaeolandscape features | Negligible adverse | High | **Minor adverse** significance (not significant) | **Negligible adverse** significance (not significant) |
| Palaeoenvironmental remains | Negligible adverse | Medium | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Pleistocene deposits | Negligible adverse | High | **Minor adverse** significance (not significant) | **Negligible adverse** significance (not significant) |
| Potential (unknown) remains of all periods | Low adverse | High | **Moderate** adverse significance (significant) | **N/A** |

7.12.29 If micro-siting is not possible (during the construction phase) around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be correct. Secondary mitigation measures including ground truthing investigation within the anomaly location to determine the nature and significance of the anomaly and the introduction of TEZs, AEZs, or archaeological watching brief as

appropriate to mitigate the impact of the development on the receptor is anticipated to reduce the significance of potential effect during the decommissioning phase (by virtue of being acceptable during the construction and operational and maintenance phases).

## Further (Secondary) Mitigation and Residual Effect

7.12.30 An OOWSI (Volume 3, Appendix 7.5 of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy. A detailed site-specific WSI will be formalised through consultation with Historic England for each investigation undertaken as part of the mitigation strategy. The OOWSI and the final OWSI are secured via the Deemed Marine Licence (c.f. Volume 1, Appendix 3.1: Commitments Register).

7.12.31 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. Additional hitherto unknown or unexpected cultural heritage and marine heritage receptors identified during the project stages will be reported utilising the project specific PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), which is a contractor requirement via the outline Offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES).

7.12.32 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-related activities within their extents (during the earlier construction phase and maintained through all project phases). All AEZs will be agreed with the MMO via the implementation of the OOWSI. AEZs around low potential anomalies AEZs are not recommended but those will be avoided by means of micro-siting.

7.12.33 If further marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore, the implementation of a formal PAD, supported by an archaeological watching brief in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects **no higher than minor adverse significance** which is **non-significant** in EIA terms.

## Future Monitoring

7.12.34 Monitoring of the AEZs during operation and maintenance and decommissioning (to be agreed with the MMO) will be required to ensure that the remains within the determined AEZ limits remain undisturbed and that any changes from

anthropogenic activities or scour are recorded appropriately as presented in the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5 of the ES).

## Impact 6: Direct impact from compression, penetration, or disturbance during decommissioning (removal of cable)

7.12.35 Cable removal activities are assumed (adopting a precautionary approach) to be very similar in characteristic to the equivalent construction activities. Notably, decommissioning activities would take place over the same footprint of activity as the previous phases of the project, and hence would not affect any new features of archaeological interest. For the purposes of presenting a precautionary assessment, this repeated footprint is not considered. Decommissioning (removal) activities may lead to degradation of marine heritage receptors via e.g. penetration, compression, direct disturbance through removal activities and the anchoring of vessels during the decommissioning phase.

### Sensitivity of receptor

7.12.36 *Thistlemor* (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.12.37 Two magnetic anomalies with no associated seabed expression were identified as 7030 and 7196 and has been identified as ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.38 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.39 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.40 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.12.41 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.12.42 Pleistocene deposits are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.12.43 There is potential for remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of impact

7.12.44 Magnitude of impact on marine heritage receptors have been assessed according to the criteria outlined in **Table 7-14**. The scale of seabed works associated with cable removal is outlined in the assumed maximum design scenario table (**Table 7-22**) and Volume 1, Chapter 3: Project Description of the ES. The activities have the potential to impact marine heritage receptors.

7.12.45 Impacts of construction activity effects potentially affecting marine heritage receptors would be direct, long-term, continuous, and constitute a partial loss of marine heritage receptors within the area of impact.

7.12.46 The impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.47 The impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.48 The impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.49 The impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.50 The impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.51 The impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**..

7.12.52 The impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.53 The impact to potential remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

## Significance of effect

7.12.54 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impact of construction activities on marine heritage receptors.

7.12.55 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been recommended within the OCC. The AEZs are presented on Volume 3, Figure 7.5 of the ES and in **section 7.7**.

7.12.56 AEZs are not recommended at this time for features interpreted as being of moderate or low archaeological potential or small magnetic anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible. If any of these features are proposed to be directly impacted by the Proposed Development and micro-siting is not

possible, then further assessment to ascertain the nature of the features may be required, as per the direction of the OOWSI, which would direct archaeological works post-consent.

7.12.57 The commitment to undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES) and PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES) as per the mitigation measures set out in **Table 7-21**. This is also included within the principal commitments on the Deemed Marine Licence and within the Commitments Register (Volume 1, Appendix 3.1 of the ES).

7.12.58 The significance of the effect on marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-28**. Note the significance of effect presented here is prior to application of any *further* mitigation.

**Table 7-28: Impact 6 Significance of effect**

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect *(prior to the application of embedded mitigation measures)* | Significance of Effect *(following the application of embedded mitigation measures)* |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Low adverse | Medium | **Minor** adverse significance (significant) | **No effect** |
| Two magnetic anomalies (7030 and 7196) | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| Debris 7027 | Low adverse | High | **Moderate** adverse significance (significant) | **No effect** |
| 23 anomalies considered to have high or moderate archaeological potential | Low adverse | High | **Moderate** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| Palaeolandscape features | Negligible adverse | High | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Palaeoenvironmental remains | Negligible adverse | Medium | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Pleistocene deposits | Negligible adverse | High | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Potential (unknown) remains of all periods | Low adverse | High | **Moderate** adverse significance (significant) | **N/A** |

7.12.59 If micro-siting is not possible around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be correct. Secondary mitigation measures including ground truthing investigations within the anomaly location to determine the nature and significance of the anomaly and the introduction of TEZs, AEZs, or archaeological watching briefs as appropriate to mitigate the impact of the development on relevant receptors is anticipated to reduce the significance of effect to minor adverse (not significant).

## Further (Secondary) Mitigation and Residual Effect

7.12.60 An OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy. A detailed site-specific WSI will be formalised through consultation with Historic England for each investigation undertaken as part of the mitigation strategy. The OOWSI and the final OWSI are secured via the deemed Marine Licence (c.f. Volume 1, Appendix 3.1: Commitments Register).

7.12.61 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. Additional hitherto unknown or unexpected cultural heritage and marine heritage receptors identified during the project stages will be reported utilising the project specific PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), which is a contractor requirement via the outline offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES).

7.12.62 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-related activities within their extents. All AEZs will be agreed with the MMO via the implementation of the OOWSI. Low potential anomalies AEZs are not recommended but those will be avoided by means of micro-siting.

7.12.63 If further marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore, the implementation of a formal PAD, supported by an archaeological watching brief in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects no higher than minor adverse significance which is non-significant in EIA terms.

## Future Monitoring

7.12.64 Monitoring of the AEZs during any decommissioning activities will be required to ensure that the remains within the determined AEZ limits remain undisturbed and that changes from anthropogenic activities are recorded appropriately. The specific requirements and implementation of decommissioning phase monitoring will be principally dictated by the decommissioning plan and the associated EIA that will be prepared prior to decommissioning activities.

# Impact 7: Indirect disturbance from scour during decommissioning (removal of cable)

7.12.65 Decommissioning activities will cause local disturbance of the seabed which could contain potential marine heritage receptors. Disturbance may result from removal of the cable and cable protection infrastructure. The decommissioning activities may lead to the exposure of marine heritage receptors to physical, chemical or biological processes and indirectly causing or accelerating their loss.

## Sensitivity of receptor

7.12.66 *Thistlemor* (wreck 7028; **A63**) is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.12.67 Two magnetic anomalies with no associated seabed expression identified as 7030 and 7196 and have been identified as ferrous debris. The remains associated with these anomalies are vulnerable to impact. The receptors would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.68 Debris 7027 is vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.69 A further 23 anomalies were identified within the OCC that are considered to have high or moderate archaeological potential. The receptor does not recover once impacted. The sensitivity of the receptor would be between **high** and **low** and would depend upon the type of remains causing the anomaly (see **Table 7-20**).

7.12.70 Palaeolandscape features are vulnerable to impact. The receptor would not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the potential hominin activity.

7.12.71 There is potential for further palaeoenvironmental remains within the OCC. The receptor would not recover once impacted. The sensitivity of the receptor is **medium**.

7.12.72 Pleistocene deposits are vulnerable to impact. The receptor does not recover once impacted. The sensitivity of the receptor is **high to medium** depending on the survival of the features and their connection with the palaeolandscape features and potential hominin activity.

7.12.73 There is potential for remains of all periods. If present within the OCC, the receptor would not recover once impacted. The sensitivity of the receptor would

be between **high** and **low** and would depend upon the type of remains identified (see **Table 7-20**).

## Magnitude of impact

7.12.74 The potential magnitude of impact on marine heritage receptors has been assessed according to the criteria outlined in **Table 7-14**. The potential decommissioning works (e.g. as outlined in the assumed maximum design scenario table - **Table 7-22**) have the potential to impact on marine heritage receptors.

7.12.75 Impacts arising from these decommissioning activities potentially affecting marine heritage receptors would be indirect (and direct), long-term, continuous, and constitute a partial loss of marine heritage receptors within the area of impact.

7.12.76 The potential impact to *Thistlemor* (wreck 7028; **A63**) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.77 The potential impact to two magnetic anomalies (7030 and 7196) is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.78 The potential impact to Debris 7027 is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.79 The potential impact to the 23 anomalies considered to have high or moderate archaeological potential is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

7.12.80 The potential impact to palaeolandscape features is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.81 The potential impact to palaeoenvironmental remains is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.82 The potential impact to Pleistocene deposits is predicted to be of localised spatial extent and long-term duration. The magnitude is **negligible adverse**.

7.12.83 The impact to potential remains of all periods is predicted to be of localised spatial extent and long-term duration. The magnitude is **low adverse**.

## Significance of effect

7.12.84 The embedded mitigation measures as outlined in **section 7.8** aim to avoid and mitigate direct and permanent impact of decommissioning activities on marine heritage receptors.

7.12.85 Based on the characterisation of the existing environment and the identification of known and potential heritage assets a total of five AEZs have been recommended within the OCC. The AEZs are presented on Volume 3, Figure 7.5 of the ES and in **section 7.7**. Note AEZs will apply through all project phases, including the decommissioning phase.

7.12.86 AEZs are not recommended at this time for features interpreted as being of moderate or low archaeological potential or small magnetic anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible. If any of these features are proposed to

be directly impacted by the Proposed Development and micro-siting is not possible, then further assessment to ascertain the nature of the features may be required as per the direction of the OOWSI, which would direct archaeological works post-consent.

7.12.87 The commitment to undertake further archaeological works throughout all phases of the Proposed Development is required by the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES) and PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES) as per the mitigation measures set out in **Table 7-21**. This will also be included within the principal commitments on the Deemed Marine Licence and within the Commitments Register (Volume 1, Appendix 3.1 of the ES).

7.12.88 The significance of the effect on marine heritage receptors taking into account the application of embedded mitigation measures is outlined below in **Table 7-29**.

**Table 7-29: Impact 7 Significance of effect**

| Key receptor | Magnitude of impact | Sensitivity of the receptor (worst-case) | Significance of Effect *(prior to the application of embedded mitigation measures)* | Significance of Effect *(following the application of embedded mitigation measures)* |
|---|---|---|---|---|
| *Thistlemor* (wreck 7028; **A63**) | Low adverse | Medium | **Minor** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| Two magnetic anomalies (7030 and 7196) | Low adverse | High | **Moderate** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| Debris 7027 | Low adverse | High | **Moderate** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| 23 anomalies considered to have high or moderate archaeological potential | Low adverse | High | **Moderate** adverse significance (significant) | **Negligible adverse** significance (not significant) |
| Palaeolandscape features | Negligible adverse | High | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Palaeoenvironmental remains | Negligible adverse | Medium | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Pleistocene deposits | Negligible adverse | High | **Minor** adverse significance (not significant) | **Negligible adverse** significance (not significant) |
| Potential (unknown) remains of all periods | Low adverse | High | **Moderate** adverse significance (significant) | **N/A** |

7.12.89 If micro-siting is not possible around known anomalies with high or moderate archaeological potential, the Significance of Effect assessed prior to the application of embedded mitigation measures would be accurate. Secondary mitigation measures including ground truthing investigation within the anomaly location to determine the nature and significance of the anomaly and the introduction of TEZs, AEZs, or archaeological watching brief as appropriate to mitigate the impact of the development on the receptor is anticipated to reduce the significance of effect to minor adverse (not significant).

## Further (Secondary) Mitigation and Residual Effect

7.12.90 An OOWSI (Volume 3, Appendix 7.5 of the ES) is appended to inform the general mitigation strategy and the options developed as part of the strategy. The mitigation strategy will need to be agreed with Historic England. A detailed site-specific WSI will be formalised through consultation with Historic England for each investigation undertaken as part of the mitigation strategy. The OOWSI and the final OWSI are secured via the Deemed Marine Licence (c.f. Volume 1, Appendix 3.1: Commitments Register).

7.12.91 Confirmed locations of identified marine heritage receptors are informed by the assessment of geophysical data and desk-based research. Additional hitherto unknown or unexpected cultural heritage and marine heritage receptors identified during the project stages will be reported utilising the project specific PAD (Volume 3, Appendix 7.6: Protocol for Archaeological Discoveries of the ES), which is a contractor requirement via the outline Offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES). Per the PAD, the Retained Archaeologist, following consultation with HE, may trigger additional targeted mitigation measures, the details of which are laid out within the OOWSI (Volume 3, Appendix 7.5: Outline Offshore Archaeology Written Scheme of Investigation of the ES).

7.12.92 Best practice favours the preservation *in situ* of archaeological remains, therefore the ideal preferred mitigation for archaeological remains is avoidance. For the Proposed Development, AEZs have been proposed that prohibit development-related activities within their extents (including for the decommissioning phase). All AEZs will be agreed with the MMO through the OOWSI. Low potential anomalies AEZs are not recommended but those will be avoided by means of micro-siting.

7.12.93 If further marine archaeology receptors are identified during post-application/post-consent investigations, these will be subject to the same mitigation measures as set out in **section 7.8**. Therefore, residual impacts will be the same as for known heritage assets. In the event of unforeseen impact to potential sites offshore, the implementation of a formal PAD, supported by an archaeological watching brief in sensitive areas will ensure that any finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved. The precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred. However, it is anticipated that the appropriate application of these additional mitigation measures, specifically tailored to the significance of a discovery, will result in residual effects no higher than minor adverse significance which is non-significant in EIA terms.

### Future Monitoring

7.12.94 Monitoring of the AEZs during operation and maintenance and decommissioning will be required to ensure that the remains within the determined AEZ limits remain undisturbed and that changes from anthropogenic activities are recorded appropriately as presented in the outline Offshore CEMP (document reference 7.9) and OOWSI (Volume 3, Appendix 7.5 of the ES).

## 7.13 Cumulative Environmental Assessment

7.13.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Proposed Development together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 1, Appendix 5.3: CEA Screening Matrix of the ES). Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

7.13.2 The Maritime Archaeology CEA methodology has followed the methodology set out in Volume 1, Chapter 5: EIA methodology of the ES. As part of the assessment, all projects and plans considered alongside the Proposed Development have been allocated into 'tiers' reflecting their current stage within the planning and development process.

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

7.13.3 This tiered approach is adopted to provide a clear assessment of the Proposed Development alongside other projects, plans and activities.

7.13.4 The CEA also considers the Proposed Development and the anticipated National Grid Electricity Transmission (NGET) substation (which will be implemented by NGET and thus, does not form part of the Proposed Development) together. This is because the NGET substation will be required for the connection of the Proposed Development to the national grid.

7.13.5 The specific projects, plans and activities scoped into the CEA, are outlined in **Table 7-30**. The locations of such projects, plans and activities are presented on Figure 1.2 within Volume 1, Appendix 5.3: CEA Screening Matrix of the ES.

**Table 7-30: List of cumulative developments considered within the CEA**

| Project | Status | Distance from Proposed Development (nearest point, km) | Description | Dates of Construction (if available) | Dates of Operation (if available) | Overlap with the Proposed Development? |
|---|---|---|---|---|---|---|
| **Tier 1** | | | | | | |
| Celtic Interconnector | Under Construction | Crosses OCC | 700 MW high-voltage direct current submarine power cable under construction between the southern coast of Ireland and the north-west coast of France.<br><br>The UK elements of the Celtic Interconnector comprise:<br>• A submarine cable within the UK EEZ approximately 211km in length placed on or beneath the seabed. It passes approximately 30km west of the Isles of Scilly and approximately 75km west of Land's End, but does not enter UK Territorial Waters.<br>• Secondary rock protection using rock placement (if required), where target depth of cable lowering is not fully achieved or at cable crossings, with a linear extent of between 0km and 80km or 0 to 270 tonnes.<br>• A fibre optic link shall be laid along the cable route for operational control, communication and telemetry purposes. | 2024-2026 | 2027 | No construction overlap, however there will be operational overlap with the Proposed Development |
| White Cross Floating Offshore Windfarm | Permitted | 7.8, with the OCC overlapping / directly adjacent | Proposed offshore windfarm located in the Celtic Sea with a capacity of up to 100MW. The Windfarm Site is located | 2028-2029 | 2029+ | Potential for construction and operational |

| Project | Status | Distance from Proposed Development (nearest point, km) | Description | Dates of Construction (if available) | Dates of Operation (if available) | Overlap with the Proposed Development? |
|---|---|---|---|---|---|---|
| | | to the White Cross Cable Corridor. | over 52km off the North Cornwall and North Devon coast (west-north-west of Hartland Point), in a water depth of 60m – 80m. The Windfarm Site covers 50km2.<br>The current wind turbine design envelope for the project is a WTG capacity of 12-24 MW, 6-8 three bladed horizontal axis turbines with a rotor diameter of 220-300 m. | | | overlap with the Proposed Development |
| Shellfish Cultivation Pilot at Seaweed Farm | Permitted | 1 | Algapelago Marine Limited intend to trial a shellfish cultivation pilot to establish the commercial feasibility of shellfish cultivation at their existing site in Bideford Bay. The shellfish pilot study will last four years, to enable species to reach full market size. Two species are in scope for the cultivation pilot trials: i) Mytilus edulis - spat sourced from natural settlement and ii) Pecten maximus - spat sourced from Scallop Ranch Ltd. The pilot trial is anticipated to run from August 2024 - August 2028.<br><br>Infrastructure: algapelago intend to install 4 x 200m submerged longlines for the propagation of shellfish. All infrastructure will be deployed within algapelago's existing licenced area. | N/A | 2024-2028 | Temporal overlap for the operational phase of the project with the construction phase of the Proposed Development |
| **Tier 2** | | | | | | |
| N/A | | | | | | |

| Project | Status | Distance from Proposed Development (nearest point, km) | Description | Dates of Construction (if available) | Dates of Operation (if available) | Overlap with the Proposed Development? |
|---|---|---|---|---|---|---|
| **Tier 3** | | | | | | |
| The Crown Estate's Celtic Sea Floating Offshore Wind Leasing Round 5 - Project Development Area 3 (PDA3) | Future planned development | Overlaps with portion of the offshore cable corridor | PDA3 sits within English Governance and is one of three suitable PDAs identified within the Celtic Sea for floating offshore wind development, each of which having a potential capacity of up to 1.5 GW. Currently in the early stages of the project, the schedule for PDA3 is unknown. | N/A<br>(Currently in the early stages of the project, the schedule for PDA3 is unknown, however, pre-consent surveys are planned as follows:<br>• Geophysics: summer 2023 / summer 2024<br>• Shallow geotechnical: summer 2024<br>• Digital aerial surveys for birds and marine mammals: 2 years from September 2023<br>• Metocean: 1 year of data acquisition with deployments planned for spring 2024) | N/A | As the schedule for PDA3 is currently unknown, there is the potential for construction and operational phases to overlap with the Proposed Development. |

## Scope of Cumulative Effects Assessment

7.13.6 The cumulative effects presented and assessed in this section have been based on the Project Design Envelope set out in Volume 1, Chapter 3: Project Description of the ES as well as the information available on other projects and plans. The maximum design scenario as described for the Proposed Development (see **Table 7-22**) has been assessed cumulatively with the following other projects/plans:

- Celtic Interconnector;
- White Cross Floating Offshore Windfarm;
- Shellfish Cultivation Pilot at Bideford Bay Seaweed Farm; and
- The Crown Estate's Celtic Sea Floating Offshore Wind Leasing Round 5 - Project Development Area 3 (PDA3).

7.13.7 The CEA has considered the Proposed Development, alongside the NGET substation to be developed at the existing Alverdiscott Substation Site. The assessed design of NGET substation has been based upon a combination of reasonable worst-case parameters, as detailed within Volume 1, Chapter 3: Project Description of the ES. The development area for the NGET substation would comprise up to 3.8 ha of land. Within that area it is assumed that the substation itself will occupy a footprint of approximately 2.8 ha, with a maximum height of 15 m, excluding connecting tower structures. If further information is available for the proposal before the Proposed Development receives development consent, the Applicant will review the information and provide any update needed to the CEA.

## Cumulative Effects Assessment

7.13.8 A description of the significance of cumulative effects upon maritime archaeology and cultural heritage receptors arising from construction, operation and maintenance and decommissioning is given below.

### Construction

#### Tier 1 Projects

7.13.9 Impacts from the Celtic Interconnector, the Shellfish Cultivation Pilot at the Bideford Bay Seaweed Farm, and White Cross Floating Offshore Windfarm have the potential to impact on the same marine archaeology and cultural heritage receptors where the developments cross, overlap, or run adjacent. Cumulative impacts could be direct, through impacts on the same receptors from penetration or compression and impacts during seabed preparation, and indirect via potential changes to sediment processes and the geomorphology of the seabed.

7.13.10 Until the final design and layouts of the Tier 1 projects are confirmed, there will remain uncertainty in the precise nature and extent of any cumulative direct impacts, and the magnitude of those impacts will not be fully understood until after the potential heritage asset has been encountered and the impact has potentially occurred. However similar uncertainty is inherent to all marine archaeological assessments (where unknown heritage assets could be discovered).

7.13.11 The Bideford Bay Seaweed Farm Shellfish Cultivation Pilot will operate on the same footprint as the existing seaweed farm and thus there is limited potential for new cumulative impact, given the presence and operation of the existing seaweed farm (which already includes direct seabed interactions within its existing footprint). That said, and adopting a precautionary approach, the Shellfish Cultivation Pilot at the Bideford Bay Seaweed Farm has the potential to directly impact on two palaeolandscape units relevant to the Proposed Development, a fine-grained deposit (7510) and an erosional surface (7511). The installation of proposed longlines could disturb or remove deposits within the work's (existing) footprint and could change the local geomorphology - potentially exposing the features to erosional forces (adopting a worst case scenario). This would act as further degradation of the palaeolandscape features in combination with potential impacts from the Proposed Development. Overall, the magnitude of the impact is moderate adverse, and the sensitivity of the receptors is medium to high, depending on their survival. A WSI and a PAD will be developed across the Proposed Development and similar measures are assumed for the Shellfish Cultivation Pilot (as part of e.g. their marine licence constraints) if activities have been deemed to have potential for impact on local geomorphology. The adherence to these documents will ensure that the exposure of any known and hitherto unknown marine archaeology receptors will be properly mitigated and reported; the cumulative effect is, therefore, assessed to be of minor adverse significance.

7.13.12 The Celtic Interconnector and the White Cross Floating Offshore Windfarm projects have undergone detailed EIA which included consideration of marine archaeology and offshore heritage features. Suitable mitigation measures have been or will therefore be provisioned and implemented for the individual sites in isolation. Mitigation measures common to all projects include AEZs around known offshore archaeology and cultural heritage receptors, geophysical and geotechnical surveys, and protocols for unexpected discoveries. Therefore, any direct physical cumulative impacts are not expected to exceed those already assessed for the Proposed Development and are considered negligible and not significant in EIA terms.

7.13.13 The scale of any potential indirect sediment scour has been assessed and determined within the Physical Processes assessments (Volume 3, Chapter 8: Physical Processes of the ES) to be very modest and negligible in deep waters. Review of the relevant project Environmental Statement reports finds that construction activities for the Celtic Interconnector and the White Cross Floating Offshore Windfarm may result in increases in suspended sediment concentrations and localised scour only; however, these activities would be of limited spatial extent and frequency and unlikely to interact with sediment plumes (or scour) from the Proposed Development. Following installation (associated with all projects) the turbidity levels are expected to return to baseline rapidly (less than a couple of tidal cycles). It is anticipated that any disturbed seabed material will concentrate along the respective installation routes, settling close to where it is mobilised and remaining *in-situ*.

7.13.14 The burial of marine archaeology receptors could also occur which would potentially have a beneficial impact as this would afford features additional protection. Any cumulative sediment disturbance and deposition leading to indirect impacts on marine archaeology receptors during the construction phase of the Tier 1 Projects and the Proposed Development is predicted to result in very minor loss or detrimental alteration to one or more characteristics, composition or attributes of the marine archaeology receptors. The cumulative effect is predicted

to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that any such impact would affect receptors indirectly. The magnitude of associated impact is considered to be low adverse or low beneficial.

7.13.15 Furthermore, the implementation and adherence to the respective WSIs and PADs that are/will be developed across these Projects and the Proposed Development, will ensure that the exposure of any known and hitherto unknown marine archaeology receptors will be properly mitigated and reported. The Celtic Interconnector has the potential to impact two receptors: two magnetic anomalies (7157 and 7158). Assuming that the receptors are not directly impacted during the preparation for or the construction of the Celtic Interconnector corridor and the Proposed Development, the cumulative significance is not deemed any greater than the assessment of the Proposed Development in isolation.

7.13.16 The corridor for the export cables associated with the White Cross Floating Offshore Windfarm is expected to overlap or run parallel to the Proposed Development to the south of the isle of Lundy. This would have the potential to impact 48 heritage receptors, 41 known magnetic anomalies (7032-7041, 7043-7059, 7061-7064, 7066-7068, 7073-7079) and seven seabed anomalies (7042, 7060, 7065, 7069-7072). Assuming that the anomalies are not directly impacted during the preparation for or the construction of the White Cross Floating Offshore Windfarm corridor and the Proposed Development (principally ensured by microrouting avoidance), then direct impacts would be avoided. There remains the potential for construction works to affect the local geomorphology, resulting in indirect effects via increased burial or erosion at the asset sites. Construction activities for the White Cross Offshore Windfarm may result in increased suspended sediment concentrations and localised scour; however, these activities would be of highly limited spatial extent and frequency and unlikely to interact with sediment plumes from (or scour associated with) the Proposed Development. The significance of effect would be dependent on the type of receptor impacted and the footprint of impact, however the lack of potential interaction of impact generating mechanisms means that the cumulative significance is deemed no greater than the assessment of the Proposed Development in isolation.

7.13.17 Impacts to known wrecks would be mitigated through the implementation of AEZs in the identified Tier 1 projects and the Proposed Development; therefore, no cumulative impacts are identified in relation to these receptors.

## Tier 2 Projects

7.13.18 There are no Type 2 projects expected to cause cumulative effects for marine archaeology and cultural heritage.

## Tier 3 Projects

7.13.19 Impacts from The Crown Estate's Celtic Sea Floating Offshore Wind Leasing Round 5 - Project Development Area 3 (PDA3) have the potential to impact on the same five known marine archaeology and cultural heritage receptors in this area, i.e. two known magnetic anomalies (7088, 7089) and three seabed anomalies (7086, 7087, 7090) as well as hitherto unknown archaeological receptors.

7.13.20 Potential impacts on these archaeological receptors could be direct, through impacts from penetration or compression during maintenance activities, and indirect, as a result of geomorphological changes from seabed disturbance. When considered in isolation and, assuming the application of appropriate mitigation,

potential cumulative physical impacts on individual receptors are only considered to be of potential negligible or minor adverse significance.

7.13.21 However, when receptors are considered collectively on a regional scale, multiple impacts may be considered additive, and therefore of cumulative adverse significance. For example, it is possible that unique aspects of former landscapes, or of the *in-situ* maritime and aviation archaeological resource, may be lost as a result. In addition, if a site is damaged or destroyed, comparable sites elsewhere may increase in importance due to greater rarity and any future direct impacts will be of greater significance. Therefore cumulative impacts to marine cultural heritage and archaeology receptors including palaeolandscape features, palaeoenvironmental remains, Pleistocene deposits, and potential remains from all periods have the potential to correspond to a slight increase in the magnitude of impact (compared to the Proposed Development in isolation). Direct physical impact could have a moderate to major increase in the magnitude of impact dependent on the size of the receptor and how much of the receptor is impacted, albeit considered unlikely (given baseline surveys undertaken). Increased erosional activity by contrast would be expected to have only slight increase in the magnitude of impact on receptors. There is no new or additional mitigation proposed in response to potential cumulative effects; the existing outline offshore WSI framework and existing (committed) mitigation approaches for the Proposed Development are deemed the most appropriate suite of measures to efficiently minimise and mitigate any potential for impacts.

7.13.22 Impacts to known wrecks would be mitigated through the implementation of AEZs in the identified Tier 3 projects and the Proposed Development; therefore, no cumulative impacts are identified in relation to these receptors.

## Operation and Maintenance

### Tier 1 Projects

7.13.23 Impacts from the Celtic Interconnector, the Shellfish Cultivation Pilot at the Bideford Bay Seaweed Farm and White Cross Floating Offshore Windfarm have the potential to impact on the same marine archaeology and cultural heritage receptors where the developments cross, overlap, or run adjacent. Cumulative impacts would be direct, through impacts on the same receptors from penetration or compression and impacts during maintenance activities, and indirect via potential changes to the geomorphology of the seabed.

7.13.24 The scale and potential for operation and maintenance impacts from all Tier 1 Projects and from the Proposed Development are much reduced compared to the Construction Phase. Cumulative operation and maintenance phase impacts to marine cultural heritage and archaeology receptors (including palaeolandscape features, palaeoenvironmental remains, Pleistocene deposits, and potential remains from all periods) are anticipated to correspond to a theoretical increase in the magnitude of direct physical impacts (relative to the Proposed Development in isolation). However, any such increase is unlikely to change the magnitude rating in EIA terms compared to the relevant Proposed Development Operation and Maintenance impact assessment in isolation. Increased erosional activity would be expected to have only slight potential for increase to the magnitude of impact on the receptors relative to the Proposed Development in isolation. Overall there are no new pathways for impact identified and no predicted potential increases to impact significance as a result of cumulative effects.

7.13.25 Impacts to known wrecks would be mitigated through the implementation of AEZs in the identified Tier 1 projects and the Proposed Development; therefore, no cumulative impacts are identified in relation to these receptors.

### Tier 2 Projects

7.13.26 There are no Type 2 projects expected to cause cumulative effects for marine archaeology and cultural heritage.

### Tier 3 Projects

7.13.27 Impacts from The Crown Estate's Celtic Sea Floating Offshore Wind Leasing Round 5 - Project Development Area 3 (PDA3) have the potential to impact on the same marine archaeology and cultural heritage receptors given the developments are expected to be located broadly adjacent. Potential impacts on archaeological receptors could be direct, from penetration or compression during (presumed highly infrequent) maintenance activities, and indirect, as a result of potential geomorphological changes from seabed disturbance.

7.13.28 The scale and potential for cumulative operation and maintenance impacts is much reduced compared to the Construction Phase. The significance of effect would be dependent on the type of receptor impacted and the type of impact. The PDA3 shared export cable is expected to cross the Proposed Development however details of route are not available at this time. Consideration of potential for impact on archaeological receptors associated with that export cable will form part of the future EIA for the PDA3 development(s). Data and increased understandings of the offshore historic environment gathered as part of the Proposed Development will benefit these later PDA3 assessments.

7.13.29 Cumulative impacts to marine cultural heritage and archaeology receptors (including palaeolandscape features, palaeoenvironmental remains, Pleistocene deposits, and potential remains from all periods) are anticipated to correspond to a theoretical increase in the magnitude of direct physical impacts (compared to the Proposed Development in isolation). However, any such increase is unlikely to change the magnitude rating in EIA terms compared to the relevant Proposed Development Operation and Maintenance impact assessment in isolation. The significance of effect would be dependent on the type of receptor impacted and the type of impact as the details of the Tier 3 projects are currently not well advanced. Increased erosional activity would be expected to have a negligible increase in the magnitude of impact on the receptors given the small spatial scale of effect, and minimal overlap and / or cumulative potential. Overall there are no new pathways for impact identified and no predicted potential increases to impact significance as a result of cumulative effects.

7.13.30 Impacts to known wrecks would be mitigated through the implementation of AEZs in the identified Tier 3 projects and the Proposed Development; therefore, no cumulative impacts are identified in relation to these receptors.

## Decommissioning

### Tier 1 Projects

7.13.31 Impacts from the Celtic Interconnector, the Shellfish Cultivation Pilot at the Bideford Bay Seaweed Farm and White Cross Floating Offshore Windfarm have

the potential to impact on the same marine archaeology and cultural heritage receptors where the developments cross, overlap, or run adjacent. Cumulative impacts would be direct, through impacts on the same receptors from penetration or compression and impacts during decommissioning activities, and indirect via potential changes to the geomorphology of the seabed.

7.13.32 Details of decommissioning timings and methodologies across all Tier 1 projects are unknown at this stage. Broadly the spatial extent and duration of works will be reduced in comparison to respective construction activities. Decommissioning plans should have regard for other projects in the vicinity, however it is unlikely that cumulative decommissioning effects will occur given activities will be operating in 'already disturbed' locations. Local characterisations afforded by the relevant construction and operation and maintenance activities (for all Tier 1 projects) will provide an increased understanding of the local archaeological environments, which will further assist in designing any relevant mitigation strategies during the decommissioning phase. Overall, it is assessed that the cumulative significance of any effect on marine archaeology receptors during the decommissioning phase is minor adverse (not significant).

7.13.33 Impacts to known wrecks would be mitigated through the implementation of AEZs in the identified Tier 1 projects and the Proposed Development; therefore, no cumulative impacts are identified in relation to these receptors.

### Tier 2 Projects

7.13.34 There are no Type 2 projects expected to cause cumulative effects for marine archaeology and cultural heritage.

### Tier 3 Projects

7.13.35 Impacts from The Crown Estate's Celtic Sea Floating Offshore Wind Leasing Round 5 - Project Development Area 3 (PDA3) have the potential to impact on the same marine archaeology and cultural heritage receptors given the developments are expected to be located broadly adjacent. Potential impacts on archaeological receptors could be direct, from penetration or compression during decommissioning activities, and indirect, as a result of potential geomorphological changes from seabed disturbance.

7.13.36 Details of decommissioning timings and methodologies for PDA3 projects are unknown at this stage. Broadly the spatial extent and duration of works will be reduced in comparison to respective construction activities. All decommissioning plans should have regard for other projects in the vicinity, however it is unlikely that cumulative decommissioning effects will occur, given activities will be operating in 'already disturbed' locations. Local characterisations afforded by the relevant construction and operation and maintenance activities (for PDA3 projects and the Proposed Development) will provide an increased understanding of the local archaeological environment, which will further assist in designing any relevant mitigation strategies during the decommissioning phase(s). Overall, it is assessed that the cumulative significance of any effect on marine archaeology receptors associated with the decommissioning phase is minor adverse (not significant).

# 7.14 Transboundary Effects

7.14.1 A screening of transboundary impacts has been carried out and any potential for significant transboundary effects with regard to maritime archaeology from the Proposed Development upon the interests of other states has been assessed as part of this ES.

7.14.2 The potential transboundary impacts assessed within Volume 1, Appendix 5.2: Transboundary Screening of the ES are summarised below:

- Geomorphological change as a result of e.g. pre-lay activities, jetting during cable laying and cable repairs may change the local hydrodynamic and sedimentary processes. This change may cause affected receptors to be exposed to physical or chemical degradation. Disturbance from geomorphological change within the UK EEZ may have an impact on any marine archaeological and cultural heritage receptors within the French EEZ.
- Direct change to receptors located adjacent to or within the immediate boundary of the UK EEZ.

7.14.3 The impacts would be direct, via penetration or compression during construction and maintenance activities, and indirect, as a result of scour from seabed disturbance. The significance of effect would be dependent on the type of receptor impacted and the type of impact which is not clear at this time.

7.14.4 The equivalent level of environmental surveys are being undertaken within the French jurisdiction (equivalent to those undertaken in UK waters) i.e. SBP, SSS, Mag and MBES surveys. Detailed archaeological review and geotechnical investigations will also be carried out to identify features of archaeological interest in French waters. The significance of any impact on these features from activities in UK waters will be assessed and mitigated through a mitigation framework adopted for French waters that would be of equal robustness compared to the OOWSI that is in place for the UK development. Thus where appropriate micro-routing will be undertaken in the proximity of the UK EEZ boundary (to allow avoidance of any identified features of proximity in French waters) and other strategies would be used if micro-routing is not possible.

7.14.5 In summary, given the Proposed Developments' commitment to develop archaeological mitigation strategies along the entire Project length, no residual significant impacts (following mitigation strategies) are anticipated.

# 7.15 Inter-related Effects

7.15.1 Inter-relationships are the impacts and associated effects of different aspects of the Proposed Development on the same receptor. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases.
- Receptor led effects: Assessment of the scope for all relevant effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor.

7.15.2 A description of the likely interactive effects arising from the Proposed Development on marine cultural heritage and archaeology is provided in Volume 4, Chapter 5: Inter-related effects of the ES.

# 7.16 Summary of Impacts, Mitigation Measures and Monitoring

7.16.1 Information on maritime archaeology within the study area was collected through desktop review, site surveys and consultation.

7.16.2 **Table 7-31** presents a summary of the impacts, measures adopted as part of the Proposed Development and residual effects in respect to marine cultural heritage and archaeology. The impacts assessed include:

- Direct impact through sediment removal during seabed preparation, penetration, compression, and disturbance during seabed preparation, laying of cables, the anchoring of jack-up barges and other construction vessels, and laying of rock protection over cable crossings;
- Indirect impacts upon known and potential marine archaeological receptors as a result of changes to sedimentation and erosion patterns;
- Direct impact by penetration, compression and disturbance effects during repair activities at the cable corridor and through the effects of jack-up barges and anchoring of maintenance vessels;
- Indirect impacts causing disturbance of sediment containing potential marine heritage receptors during maintenance activities (Operational-repair), or from alteration of local currents resulting in scour (Operational-normal);
- Indirect impacts causing disturbance of sediment containing potential marine heritage receptors from leaving the cable and cable protection infrastructure *in situ;*
- Direct impacts by penetration, compression and disturbance through removal activities and the anchoring of vessels during the decommissioning phase; and
- Indirect impacts causing disturbance of sediment containing potential marine heritage receptors from removal of the cable and cable protection infrastructure.

7.16.3 It is concluded that there will be no significant effects arising from the Proposed Development during the construction, operation and maintenance or decommissioning phases. The exception to this being potentially significant adverse impact from disturbance of currently unknown features, which cannot ever be fully discounted (the nature of discovery may be impactful). Any such disturbance is considered unlikely to occur following the extensive Proposed Development surveys that have been undertaken, and the significance of any such impact would be moderated as far as possible by the OOWSI and PAD mechanisms that are in place, however the risk is still acknowledged.

7.16.4 **Table 7-32** presents a summary of the cumulative impacts, mitigation measures and residual effects. The cumulative impacts assessed include:

- Direct impact through sediment removal during seabed preparation, penetration, compression, and disturbance during seabed preparation, laying

of cables, the anchoring of jack-up barges and other construction vessels, and laying of rock protection over cable crossings, and

- Indirect impacts causing disturbance of sediment containing potential marine heritage receptors during maintenance activities (Operational-repair), or from alteration of local currents resulting in scour (Operational-normal), leaving the cable and cable protection infrastructure *in situ* during decommissioning, and removing the cable and cable protections.

7.16.5 Overall, it is concluded that there will be no significant cumulative effects from the Proposed Development alongside other projects/plans.

7.16.6 The following transboundary impacts have been identified in regard to effects of the Proposed Development:

- Geomorphological change as a result of pre-lay activities, jetting during cable laying and cable repairs may change the local hydrodynamic and sedimentary processes. This change may cause affected receptors to be exposed to physical or chemical degradation. Disturbance from geomorphological change within the UK EEZ may have an impact on any marine archaeological and cultural heritage receptors within the French EEZ.
- Direct change to receptors located adjacent to or within the immediate boundary of the UK EEZ.

7.16.7 Overall, it is concluded that there will be no significant transboundary impacts from the Proposed Development.

**Table 7-31: Summary of environmental effects**

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| Direct impact through seabed disturbance during route preparation, penetration, compression, and disturbance activities, laying of cables, the anchoring of jack-up barges and other construction vessels, and laying of rock protection over cable crossings | ✓ | × | × | OFF03, OFF29, OFF30, OFF31, OFF32 and OFF33 (see **Table 7-21**) | *Thistlemor* (wreck 7028; **A63**) | C: Medium | No Change | C: No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Two magnetic anomalies (7030 and 7196) | C: High | No Change | C: No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Debris 7027 | C: High | No Change | C: No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | 23 anomalies considered to have high or moderate archaeological potential | C: High | No Change | C: No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Palaeo-landscape features | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Palaeo-environmental remains | C. Medium | Low Adverse | C. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Negligible Adverse (not significant) | None |
| | | | | | Pleistocene deposits | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse | None |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| | | | | | | | | | | (not significant) | |
| | | | | | Potential (unknown) remains of all periods | C. High | High Adverse | C. Major Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | C. Moderate Adverse (significant) (By definition disturbance to unknown features could be significant. Note considered unlikely to occur following the extensive Proposed Development surveys undertaken prior to construction however the risk of unknown and impactful discovery remains) | Assessment of inadvertent archaeological discoveries as part of the PAD may put in place AEZs which would need to be monitored for the life of the project. |
| Indirect impacts upon known and potential marine archaeological receptors as a result of changes to sedimentation and erosion patterns | ✓ | ✓ | ✓ | OFF03, OFF29, OFF30, OFF31 and OFF32 (see **Table 7-21**) | *Thistlemor* (wreck 7028; **A63**) | C. Medium<br>O. Medium<br>D. Medium | C. No Change<br>O. No Change<br>D. No Change | C. No effect<br>O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Two magnetic anomalies (7030 and 7196) | C. High<br>O. High<br>D. High | C. No Change<br>O. No Change<br>D. No Change | C. No effect<br>O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Debris 7027 | C. High<br>O. High<br>D. High | C. No Change<br>O. No Change<br>D. No Change | C. No effect<br>O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| | | | | | 23 anomalies considered to have high or moderate archaeological potential | C. High<br>O. High<br>D. High | C: Low Adverse<br>O. Low Adverse<br>D. Low Adverse | C: Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Palaeo-landscape features | C. High<br>O. High<br>D. High | C. Negligible Adverse<br>O. Negligible Adverse<br>D. Negligible Adverse | C: Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Palaeo-environmental remains | C. Medium<br>O. Medium<br>D. Medium | C: Negligible Adverse<br>O. Negligible Adverse<br>D. Negligible Adverse | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Pleistocene deposits | C: High<br>O: High<br>D: High | C: Negligible Adverse<br>O. Negligible Adverse<br>D. Negligible Adverse | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| | | | | | Potential (unknown) remains of all periods | C: High<br>O: High<br>D: High | C: Low Adverse<br>O. Low Adverse<br>D. Low Adverse | C. Moderate Adverse<br>O. Moderate Adverse<br>D. Moderate Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | C. Minor Adverse<br>O. Minor Adverse<br>D. Minor Adverse (not significant) | None |
| Direct impact by penetration, compression and disturbance effects during repair activities at the cable corridor and through the effects of jack-up barges and anchoring of maintenance/ decomissioning vessels | × | ✓ | ✓ | OFF03, OFF29, OFF30, OFF31, OFF32 and OFF33 (see **Table 7-21**) | *Thistlemor* (wreck 7028; **A63**) | O. Medium<br>D. Medium | O. No Change<br>D. No Change | O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Two magnetic anomalies (7030 and 7196) | O. High<br>D. High | O. No Change<br>D. No Change | O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Debris 7027 | O. High<br>D. High | O. No Change<br>D. No Change | O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | 23 anomalies considered to have high or moderate archaeological potential | O. High<br>D. High | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Negligible Adverse<br>D. Negligible Adverse (not significant) | None |
| | | | | | Palaeo-landscape features | O. High<br>D. High | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Negligible Adverse<br>D. Negligible Adverse | None |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| | | | | | | | | | | (not significant) | |
| | | | | | Palaeo-environmental remains | O. Medium<br>D. Medium | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse (not significant) | None |
| | | | | | Pleistocene deposits | O. High<br>D. High | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse (not significant) | None |
| | | | | | Potential (unknown) remains of all periods | O: High<br>D: High | O. Low Adverse<br>D. Low Adverse | O. Moderate Adverse<br>D. Moderate Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse (not significant) | None |
| Indirect impacts causing disturbance of sediment containing potential marine heritage receptors during maintenance activities (Operational-repair), or from | × | ✓ | ✓ | OFF03, OFF29, OFF30, OFF31 and OFF32 (see **Table 7-21**) | *Thistlemor* (wreck 7028; **A63**) | O. Medium<br>D. Medium | O. No Change<br>D. No Change | O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Two magnetic anomalies (7030 and 7196) | O. High<br>D. High | O. No Change<br>D. No Change | O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |
| | | | | | Debris 7027 | O. High<br>D. High | O. No Change<br>D. No Change | O. No effect<br>D. No effect | None | N/A | Monitoring of AEZs throughout the life of the project |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| alteration of local currents resulting in scour (Operational-normal), leaving the cable and cable protection infrastructure *in situ* during decommissioning, and removing the cable and cable protections | | | | | 23 anomalies considered to have high or moderate archaeological potential | O. High<br>D. High | O. Low Adverse<br>D. Low Adverse | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Palaeo-landscape features | O. High<br>D. High | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Palaeo-environmental remains | O. Medium<br>D. Medium | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Pleistocene deposits | O: High<br>D: High | O. Negligible Adverse<br>D. Negligible Adverse | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | OFF26 and OFF27 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |
| | | | | | Potential (unknown) remains of all periods | O: High<br>D: High | O. Low Adverse<br>D. Low Adverse | O. Moderate Adverse<br>D. Moderate Adverse<br>(significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | O. Minor Adverse<br>D. Minor Adverse<br>(not significant) | None |

**Table 7-32: Summary of cumulative environmental effects**

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| | **Tier 1** | | | | | | | | | | |
| Direct impact through sediment removal during seabed preparation, penetration, compression, and disturbance during seabed preparation, laying of cables, the anchoring of jack-up barges and other construction vessels, and laying of rock berm over cable crossings | ✓ | × | × | OFF03, OFF29, OFF30, OFF31 and OFF32 (see **Table 7-21**) | Palaeo-landscape features | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Palaeo-environmental remains | C. Medium | Low Adverse | C. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Pleistocene deposits | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Potential (unknown) remains of all periods | C. High | High Adverse | C. Major Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | C. Moderate Adverse (significant) (By definition disturbance to unknown features could be significant. Note considered unlikely to occur following the extensive Proposed Development surveys undertaken prior to construction however the risk of | Assessment of inadvertent archaeological discoveries as part of the PAD may put in place AEZs which would need to be monitored for the life of the project |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| | | | | | | | | | | unknown and impactful discovery remains) | |
| Indirect impacts causing disturbance of sediment containing potential marine heritage receptors during maintenance activities (Operational-repair), or from alteration of local currents resulting in scour (Operational-normal), leaving the cable and cable protection infrastructure *in situ* during decommissioning, and removing the cable and cable protections | ✓ | ✓ | ✓ | OFF03, OFF29, OFF30, OFF31 and OFF32 (see **Table 7-21**) | Palaeo-landscape features | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Palaeo-environmental remains | C. Medium | Low Adverse | C. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Pleistocene deposits | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Potential (unknown) remains of all periods | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | **Tier 2** | | | | | | | | | | |
| No cumulative projects identified | | | | | | | | | | | |
| | **Tier 3** | | | | | | | | | | |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| Direct impact through sediment removal during seabed preparation, penetration, compression, and disturbance during seabed preparation, laying of cables, the anchoring of jack-up barges and other construction vessels, and laying of rock berm over cable crossings | ✓ | × | × | OFF03, OFF29, OFF30, OFF31 and OFF32 (see **Table 7-21**) | Palaeo-landscape features | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Palaeo-environmental remains | C. Medium | Low Adverse | C. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Pleistocene deposits | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Potential (unknown) remains of all periods | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| Indirect impacts causing disturbance of sediment containing potential marine heritage receptors during maintenance activities (Operational-repair), or from alteration of local currents resulting in scour (Operational-normal), leaving the cable and | ✓ | ✓ | ✓ | OFF03, OFF29, OFF30, OFF31 and OFF32 (see **Table 7-21**) | Palaeo-landscape features | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Palaeo-environmental remains | C. Medium | Low Adverse | C. Minor Adverse (not significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Pleistocene deposits | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26 and OFF27 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |
| | | | | | Potential (unknown) remains of all periods | C. High | Low Adverse | C. Moderate Adverse (significant) | OFF26, OFF27 and OFF28 (see **Table 7-21**) | C. Minor Adverse (not significant) | None |

| Description of Impact | Phase[a] | | | Embedded Mitigation | Receptor | Sensitivity of receptor | Magnitude of impact | Significance of Effect | Further Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | | | |
| cable protection infrastructure *in situ* during decommissioning, and removing the cable and cable protections | | | | | | | | | | | |

# 7.17 References

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