



AQUIND Limited

PEIR CHAPTER 14

Marine Archaeology

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14 MARINE ARCHAEOLOGY

14.1 SCOPE OF THE ASSESSMENT

14.1.1 INTRODUCTION

14.1.1.1 This chapter provides the preliminary information regarding the environmental impacts on marine archaeology as a result of the Proposed Development.

14.1.1.2 This chapter outlines the potential impacts associated with the construction/installation, operation (including repair and maintenance) and decommissioning of the Proposed Development, as known at the time of publication. The marine archaeology assessment will consider the potential impacts associated with the following activities:

- Seabed preparation prior to cable laying, including clearance of obstacles and/or seabed features, and construction of pre-lay crossing structures over in-service cables;
- Laying marine cables using the following options dependent on type of seabed – plough, jet trenching, and/or mechanical trenching;
- Backfilling of cable trenches and/or installation of non-burial protection;
- Scour associated with the disturbances listed above; and,
- Use of anchors on vessels associated with the installation and operational phases of the project.

14.1.2 STUDY AREA

Marine Cable Corridor

14.1.2.1 The Entire Marine Cable Corridor extends from the Landfall at Eastney, near Portsmouth to Pourville in Normandy, France.

14.1.2.2 For the purposes of this chapter, the assessment is focussed on the Landfall and Marine Cable Corridor within the UK marine area (as this comprises the Proposed Development to be assessed). Where impacts arise as a result of the combination of the impacts of the Proposed Development and the impacts of projects in the UK marine area and/or other EEA states, these are also identified and will be assessed.

14.1.2.3 The Marine Cable Corridor encompasses the location of the Landfall and extends from Eastney, from MHS, out to the UK/France EEZ boundary line (see Figure 3.1. of Chapter 3 Description of the Proposed Development).

14.1.2.4 The Marine Cable Corridor is 500 m wide in water depths up to 10 m and then widens to 520 m in water depths > 10 m out to the UK/France EEZ boundary line.

Landfall

- 14.1.2.5 The marine cables will make Landfall through the use of HDD methods which will travel underneath the intertidal areas at Eastney from an exit/entry point in the marine environment approximately 1 km seaward from the transition joint bays located in the car park behind Fraser Range (Figure 3.3 in Chapter 3 Description of the Proposed Development). The intertidal area of Landfall up to MHWS at Eastney is included within the marine archaeology assessment for completeness, as HDD methods were not part of the design process during early design iterations.
- 14.1.2.6 HDD is now also proposed to be undertaken at Langstone Harbour to enable the cables to cross underneath Langstone Harbour from Portsea Island to the mainland (see Figure 3.9 of Chapter 3 Description of the Proposed Development). It is anticipated that no HDD works will occur within the marine environment of Langstone Harbour as the drilling will be underneath seabed of the harbour area. The entry/exit points of the drill will be located above the MHWS mark.
- 14.1.2.7 Chapter 3 Description of the Proposed Development provides further information on the HDD methodology at Langstone Harbour and is considered in Chapter 20 Heritage and Archaeology. Archaeological Study Area
- 14.1.2.8 A study area consisting of the Proposed Development (i.e. the Marine Cable Corridor and Landfall within the UK marine area) and an additional 2 km buffer area around the extent of the Proposed Development was used as the search area for obtaining records from relevant archive databases, hereafter referred to as the Archaeological Study Area ('ASA'). This wider search area is typical for this type of linear development. It allows for a greater understanding of the wider archaeological baseline environment, with the dual purpose of enabling any archaeological trends within the region to be recognised and to allow any heritage assets identified to be represented in a broader archaeological context. The location of the 2 km ASA is illustrated in Figure 14.1. Findings within the ASA onshore, beyond MHWS, are not reported within this chapter. Onshore archaeology is presented within Chapter 20 Heritage and Archaeology.

Scope

- 14.1.2.9 The area assessed in this report is defined by the extent of the Proposed Development, which is located within the UK marine area. The assessment area is delimited by the MHWS mark at the Landfall at Eastney to the north-west and the boundary of the UK/France EEZ seaward to the south-east (Figure 14.1).
- 14.1.2.10 The archaeological curator responsible for the marine archaeological resource, from MHWS to the 12 nmi limit are the Historic England ('HE') Marine Planning Unit, with specialist advice provided by the HE South East of England Science Advisor, with regard to activities undertaken as part of the project.

14.1.2.11 The Local Planning Authority (PCC), and associated County Council Archaeological curator from HCC also have oversight for the intertidal zone, between MHWS and MLWS.

14.2 LEGISLATION, POLICY AND GUIDANCE

14.2.1.1 This assessment has taken into account the current legislation, policy and guidance relevant to marine archaeology. More comprehensive details are provided in Appendix I of Appendix 14.1 Marine Archaeology Technical Report. A list of the most relevant legislations is recorded below.

14.2.2 LEGISLATION

International Legislation

14.2.2.1 The UK is a signatory and therefore subject to the following international agreements relating to the marine historic environment that are relevant to this section:

- European Convention on the Protection of the Archaeological Heritage (Valletta) 1992;
- International Council of Monuments and Sites ('ICOMOS') Charter on the Protection and Management of Underwater Cultural Heritage (1996) (the Sofia Charter);
- UNCLOS 1982; and
- UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001).

National Legislation

- Protection of Wrecks Act 1973: Section One and Two:
 - It is an offence to carry out certain activities in a defined area surrounding a wreck that has been designated, unless a licence for those activities has been obtained from the Government. There are no protected wrecks within the Proposed Development or ASA.
- Ancient Monuments and Archaeological Areas Act 1979 (as amended):
 - It is a criminal offence to carry out any works on, or near to, a Scheduled Monument without Scheduled Monument Consent. Both terrestrial and maritime sites, including wrecks, may be designated under this Act. There are no scheduled ancient monuments within the Proposed Development or ASA.
- Merchant Shipping Act 1995:
 - All wreck material recovered from UK waters must be declared to the Receiver of Wreck who acts to settle questions of ownership and salvage.

‘Wreck’ refers to all items of flotsam, jetsam, derelict and lagan found in or on the shores of the sea or any tidal water.

- Protection of Military Remains Act 1986:
 - This Act provides protection for the wreckage of military aircraft and designated military vessels. The Act provides for two types of protection: ‘protected places’ and ‘controlled sites’. Military aircraft are automatically protected, although vessels have to be specifically designated. The primary reasons for designation is to protect as a ‘war grave’ the last resting place of servicemen; however, the Act does not require the loss of the vessel to have occurred during the war. There are no protected places or controlled sites within the Proposed Development.

14.2.3 PLANNING POLICY

National Policy

- 14.2.3.1 Section 5.8 (Historic Environment) of the Overarching National Policy Statement for Energy (EN-1) sets out national policy for energy infrastructure, and the importance of archaeological assessment in the development process. This was adopted in July 2011, providing guidance for carrying out ES, which considers the impacts of the Proposed Development on the significance of any heritage assets, including the setting of the heritage assets.
- 14.2.3.2 The NPPF was first published by the DCLG in March 2012, replacing Planning Policy Statement 5. This has been revised in July 2018, implementing around 85 reforms announced previously through the Housing White Paper and other consultations. This Framework is relevant for the intertidal area and land above the MLWS.
- 14.2.3.3 Section 16 of the revised NPPF entitled ‘Conserving and enhancing the historic environment’ sets out the principal national guidance on the importance, management and safeguarding of heritage assets within the planning process. The aim of NPPF Section 16 is to ensure that Regional Planning Bodies and Local Planning Authorities, developers, and owners of heritage assets adopt a consistent and holistic approach to their conservation and to reduce complexity in planning policy relating to proposals that affect them. The government guidance provides a framework that:
- Recognises that heritage assets are an irreplaceable resource;
 - Requires applicants to provide proportionate information on the significance of heritage assets affected by the proposals and an impact appraisal of the proposed development on that significance;
 - Takes into account the desirability of sustaining and enhancing the significance of heritage assets and their setting;
 - Places weight on the conservation of designated heritage assets;

- 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; and
- Promotes the conservation of heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life for this and future generations.

14.2.3.4 The UK MPS (2011) is the primary policy for preparing marine plans and determining marine licence applications (in the absence of adopted marine plans). This policy aims to contribute to the achievement of sustainable development and ensure that development aims to avoid harm to marine ecology and biodiversity.

Regional Policy

Regional Marine Plan

14.2.3.5 The MCAA 2009 is the primary legislation relevant to marine development plans. Marine plans presented under this legislation must be consistent with the MPS; Department for Environment, Food and Rural Affairs, 2011) and in accordance with other UK national policy, including the NPPF.

14.2.3.6 Under the MCAA, the UK was divided into marine planning regions, with an associated authority responsible for preparing a Marine Plan for that area. The Proposed Development is located within the South Marine Plan area – the South Inshore and South Offshore Plan, which was adopted in July 2018. This Marine Plan seeks to ensure a sustainable marine environment that will protect heritage assets.

Local Policy

Portsmouth City Council

14.2.3.7 The Portsmouth Plan (Portsmouth’s Core Strategy) (2012) PCC sets out the housing, employment and retail development the city needs to develop to 2027 and where this should be. The plan also sets out what infrastructure will be needed to enable this development to take place, together with how PCC plan to continue to protect the city's sensitive historic and natural environments. This Plan is relevant for the intertidal area and land above the MLWS.

14.2.4 GUIDANCE

14.2.4.1 This assessment was carried out in a manner consistent with available guidance as described below in chronological order of issue:

- Identifying and Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers (English Heritage (now HE), 1998);
- Managing Lithic Scatters: Archaeological Guidance for planning authorities and developers (English Heritage (now HE), 2000);

- Military Aircraft Crash Sites: Guidance on their significance and future management (English Heritage (now HE), 2002);
- The Code of Practice for Seabed Developers (Joint Nautical Archaeology Policy Committee and The Crown Estate, 2006);
- Historic Environment Guidance for the Offshore Renewable Energy Sector (COWRIE, 2007);
- Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now Historic England), 2008);
- Our Seas – A shared resource: High level marine objectives (DEFRA, 2009);
- Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (second edition) (English Heritage (now HE), 2011);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (COWRIE, 2011);
- Ships and Boats: Prehistory to Present: Designation Selection Guide (English Heritage (now HE), 2012);
- Standard and Guidance for Historic Environment Desk-based Assessment (Chartered Institute for Archaeologists, 2014, updated 2017);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (Bates, R. Dix, J. K., Plets, R., 2013);
- Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (English Heritage (now HE), 2015); and
- IEMA (2015). Shaping Quality Development.

14.3 SCOPING OPINION AND CONSULTATION

14.3.1 SCOPING OPINION

14.3.1.1 As detailed within Chapter 1 Introduction, a Scoping Opinion was received by the Applicant from PINS on 7 December 2018. The Scoping Opinion comments from PINS in relation to marine archaeology and how they have been addressed in this chapter of the PEIR are set out below in Table 14.1.

Table 14.1 - Scoping Opinion Responses

Consultee	Scoping Opinion Section/Page	Summary of Comment Received	How this has been addressed by the Applicant
PINS	Section 14.4 and Chapter 2	<p>The Inspectorate notes reference to a variety of surveys, including geophysical surveys, which could be used to inform the baseline and assessment of impacts to archaeological assets. Reference is also made to surveys that could inform post-consent data archaeological analysis. It is not clear if such surveys have been or will be undertaken with archaeological interpretation in mind, and this should be specified.</p> <p>The ES should clearly set out the methodology and processes followed with regard to the data analysis and interpretation undertaken to determine the significant of impacts. Sufficient information should be provided within the ES to determine the potential impacts of the Proposed Development.</p>	<p>Surveys were undertaken with archaeological interpretation in mind and are further discussed in Section 14.5 of this chapter and in Appendix 14.1 Marine Archaeology Technical Report.</p> <p>The method of assessments is described in Section 14.4 of this chapter.</p>
PINS	Paragraph 14.3.5	<p>The ES should clearly identify the proposed mitigation measures to be included in respect of marine archaeology. A WSI should steer the final design of the interconnector cable and appropriate mechanisms should be clearly laid out to deal with any finds during implementation. Mitigation measures including any Archaeological Exclusions Zones (AEZs) should be clearly identified. The ES should also explain how the</p>	<p>Mitigation measures such as AEZs, WSI and Protocol for Archaeological Discovery ('PAD') are discussed in Section 14.7 of this chapter.</p>

Consultee	Scoping Opinion Section/Page	Summary of Comment Received	How this has been addressed by the Applicant
		WSI, including any AEZs, are to be appropriately secured.	
PINS	Paragraphs 2.2.10 and 2.1.50	The Inspectorate notes reference in the Scoping Report to various preconstruction/post-consent ground condition surveys, geo-physical surveys or remotely operated vehicles (ROVs). Whilst this information would be gathered to inform any bathymetric changes, presence of UXOs, and monitor the works, such processes should also allow for archaeological analysis to inform final route selection prior to route clearance and installation and to identify any anomalies of known or possible archaeological interest are avoided in accordance with a defined mitigation strategy.	Acknowledged and mitigation will be covered within the ES.
PINS	N/A	The ES should clearly define the study area and Zone of Influence applied to the marine archaeology aspect chapter.	The study area is described within Section 14.1 of this chapter. The Zone of Influence is defined within Section 14.6.4 and Appendix 14.2 Marine Archaeology Cumulative Assessment Matrix.
PINS	N/A	Appropriate cross-referencing between this aspect chapter and other relevant aspects, such as physical processes, should be included in the ES.	This has been addressed within the PEIR chapter, and will be included in the ES.

Consultee	Scoping Opinion Section/Page	Summary of Comment Received	How this has been addressed by the Applicant
Historic England ('HE')	Paragraph 2.1.8 (Marine Surveys) & 2.1.9	<p>HE acknowledges the resulting data capture as sufficient to inform the ES.</p> <p>They further point out that archaeological analysis and interpretation of survey data acquired post-consent is essential and should be programmed sufficiently ahead (e.g. 6 months) to inform final route selection prior to installation.</p>	Noted
HE	Paragraph 2.1.14 (seabed debris)	HE notes that archaeological assessment is to be completed prior to route clearance to ensure that any anomalies of known or possible archaeological interest are avoided in accordance with a defined mitigation strategy.	Noted
HE	Paragraph 2.1.27 and 2.1.39	<p>HE stresses the relevant attention that is to be given to ascertaining whether or not any known or unknown historic or archaeological features exist within any identifiable impact zone.</p> <p>Paragraph 2.1.50 explains that Horizontal Directional Drilling (HDD) will be conducted under Langstone Harbour from Portsea Island to the mainland and we must add that all such works are to be planned with full consideration of the historic environment. Therefore, any associated survey programmes required to inform HDD should be subject to archaeological interpretation and analysis in accordance with an agreed Written Scheme</p>	Noted

Consultee	Scoping Opinion Section/Page	Summary of Comment Received	How this has been addressed by the Applicant
		<p>of Investigation (WSI), as alluded to in paragraph 14.4.2. We note, however, that while marine licence consent is not necessarily required, adequate provision within any Development Consent Order (DCO) should allow for a WSI to address this aspect of the proposed project.</p>	
<p>Historic England</p>	<p>Paragraph 14.3.4</p>	<p>HE notes that geotechnical data acquisition that is sufficient to support palaeo-environmental analysis is also directly relevant to the preparation of the ES.</p> <p>HE also point out that the ES should clearly explain the processes and procedures for data analysis and interpretation that enables identification of possible impact that might be direct or indirect, negative or positive. Following this analysis, the ES should set out the full set of necessary mitigation measures, such as preparation of an archaeological WSI, should consent be obtained.</p> <p>HE adds that all relevant project documentation used by any project contractor or sub-contractor is to utilise a Protocol for Archaeological Discoveries and implement measures such as Archaeological Exclusion Zones, as and when necessary, in consultation with Historic England and/or relevant local curator.</p>	<p>Mitigation measures such as AEZs, WSI and Protocol for Archaeological Discovery ('PAD') are discussed in Section 14.7 of this chapter.</p>

Consultee	Scoping Opinion Section/Page	Summary of Comment Received	How this has been addressed by the Applicant
Maritime & Coastguard Agency		The MCA remind the consent holder to their obligations to report any recovered wreck material to the MCA Receiver of Wreck, and are required to take any recovered wreck to a UK port only.	Noted

14.3.2 CONSULTATION

14.3.2.1 Consultation is a key part of the DCO application process. Further consultation will be undertaken after views have been sought on the PEIR and as part of the project DCO application submission.

14.3.2.2 Full details of consultation undertaken to date and planned future consultation for all disciplines is presented within Chapter 5 Consultation.

14.4 METHODS OF ASSESSMENT

14.4.1.1 The assessment methodology used is based on the best practice professional guidance outlined by the Chartered Institute for Archaeologists' ('CIfA') Standard and Guidance for Historic Environment Desk-Based Assessment (2014, updated 2017).

14.4.2 CONSTRUCTION AND DECOMMISSIONING

14.4.2.1 The impacts identified with relevance for marine archaeology would in the main, occur during the construction phase of the Proposed Development. Impacts from decommissioning are anticipated to be similar to those during construction if infrastructure is removed from the seabed at the end of the Proposed Development's operational life. The marine themes relevant to marine archaeological baseline as assessed in this report are:

- Seabed prehistory (for example, palaeochannels and other features that contain prehistoric sediment, and derived early prehistoric artefacts e.g. stone tools);
- Seabed features, including maritime sites (such as shipwrecks and associated material including cargo, obstructions and fishermen's fasteners) and aviation sites (aircraft crash sites and associated debris); and
- Intertidal heritage assets.

14.4.3 OPERATION

14.4.3.1 Impacts resulting from the operation and maintenance of the project have been assessed on marine receptors relating to seabed prehistory and seabed features, as listed above in paragraph 14.4.2.1.

14.4.4 ASSET SENSITIVITY

14.4.4.1 In order to assess the potential impacts of a development upon the marine environment, EIAs typically adopt the conceptual approach known as the 'source-pathway-receptor' model. This approach is based on the identification of the source (i.e. the origin of a potential impact), the pathway (i.e. the means by which the effect of the activity could impact a receptor) and the receptor that may be impacted (e.g. known/potential heritage assets). For the significance of any given impact to be fully understood, the sensitivity of any receptors that may be impacted need to be considered. This section outlines how the sensitivity of marine heritage assets is ascertained.

14.4.4.2 The capability of a receptor to accommodate change and its ability to recover if affected is a function of its sensitivity. Receptor sensitivity is typically assessed via the following factors:

- Adaptability - the degree to which a receptor can avoid or adapt to an effect;
- Tolerance - the ability of a receptor to accommodate temporary or permanent change without significant adverse impact;
- Recoverability - the temporal scale over and extent to which a receptor will recover following an effect; and
- Value - a measure of the receptor's importance, rarity and worth.

14.4.4.3 Archaeological and cultural heritage receptors cannot typically adapt, tolerate or recover from physical impacts resulting in material damage or loss caused by development. Consequently, the sensitivity of each asset is predominantly quantified only by its value.

14.4.5 VALUE OF AN ASSET

14.4.5.1 Based on HE's Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now HE), 2008: 21), the significance of a historic asset 'embraces all the diverse cultural and natural heritage values that people associate with it, or which prompt them to respond to it'.

14.4.5.2 Within this chapter, significance is weighed by consideration of the potential for the asset to demonstrate the following value criteria:

- Evidential value - deriving from the potential of a place to yield evidence about past human activity;
- Historical value - deriving from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative;
- Aesthetic value - deriving from the ways in which people draw sensory and intellectual stimulation from a place; and
- Communal value - deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values but tend to have additional and specific aspects.

14.4.5.3 With regards to assessing the value of shipwrecks, the following criteria listed in English Heritage's Ships and Boats: Prehistory to Present - Designation Selection Guide (English Heritage (now HE), 2012) can be used to assess an asset in terms of its value:

- Period;
- Rarity;
- Documentation;

- Group value;
- Survival/condition; and
- Potential.

14.4.5.4 These aspects help to characterise each asset whilst also comparing them to other similar assets. The criteria also enable the potential to contribute to knowledge, understanding and outreach to be assessed.

14.4.5.5 The value of known archaeological and cultural heritage assets were assessed on a five-point scale using professional judgement informed by criteria provided in Table 14.2 below.

Table 14.2 - Criteria to assess the archaeological value of marine assets

Value	Definition
High	<p>Best known, only example or above average example and/or significant or high potential to contribute to knowledge and understanding and / or outreach. Receptors with a demonstrable international or national dimension to their importance are likely to fall within this category.</p> <p>Wrecked ships and aircraft that are protected under the Protection of Wrecks Act 1973, Ancient Monuments and Archaeological Areas Act 1979 or Protection of Military Remains Act 1986 with an international dimension to their importance, plus as-yet undesignated sites that are demonstrably of equivalent archaeological value.</p> <p>Known submerged prehistoric sites and landscapes with the confirmed presence of largely in situ artefactual material or palaeogeographic features with demonstrable potential to include artefactual and/or palaeoenvironmental material, possibly as part of a prehistoric site or landscape.</p>
Medium	<p>Average example and/or moderate potential to contribute to knowledge and understanding and / or outreach.</p> <p>Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.</p> <p>Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.</p>
Low	<p>Below average example and/or low potential to contribute to knowledge and understanding and/or outreach.</p>

Value	Definition
	<p>Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.</p> <p>Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.</p>
Negligible	<p>Poor example and/or little or no potential to contribute to knowledge and understanding and/or outreach. Assets with little or no surviving archaeological interest.</p>

14.4.6

IMPACT MAGNITUDE

14.4.6.1

The magnitude of an impact is defined by a series of factors including the spatial extent of any interaction, the likelihood, duration, frequency and reversibility of a potential impact. The definitions of the levels of magnitude used in this assessment are described in Table 14.3.

Table 14.3 - Classification of magnitude of impact

Magnitude	Definition
High	<p>Complete or comprehensive physical damage or changes to the character of the asset.</p>
Medium	<p>Considerable changes that affect the character of the asset, resulting in considerable physical damage.</p>
Low	<p>Minor change that partially affects the character of the asset, resulting in some physical damage.</p>
Negligible	<p>Very minor or negligible change to the character of the asset, with no or negligible physical damage leading to an imperceptible change to the baseline.</p>

14.4.7 SIGNIFICANCE CRITERIA

14.4.7.1

The significance of effect has been assessed by comparing the sensitivity of the receptor against the magnitude of impact. Residual effects (i.e. those remaining after mitigation measures) have been taken into consideration and have been assessed. The overall significance will be assessed using the significance matrix shown in Table 14.4 and described in Chapter 4 EIA Methodology. Any effect that is moderate, minor or negligible is not considered significant in this assessment.

Table 14.4 - Significance matrix

		Value/Sensitivity			
		High	Medium	Low	Negligible
Magnitude/ Scale of Change	High	Major	Major to Moderate	Moderate	Negligible
	Medium	Major to Moderate	Moderate	Minor to Moderate	Negligible
	Low	Moderate	Minor to Moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

14.4.8 LIMITATIONS

14.4.8.1

This chapter provides preliminary information as it relates to the Proposed Development to date and to data currently available and gathered at this point of the assessment process.

14.4.8.2

The information contained herein is intended to inform consultation responses at this stage. A more detailed assessment of potential significant impacts as a result of the Proposed Development on identified sensitive receptors will be undertaken at subsequent stages to inform the ES.

14.4.8.3

The information in respect of construction installation methods presented within Chapter 3 Description of the Proposed Development is the most recent emerging information on the most likely construction methods for the Proposed Development. As the design and construction methods for the Proposed Development are still evolving at the time of writing of this chapter, not all of the proposed construction methods have been assessed. Accordingly, assessments within this PEIR do not give consideration to the following methods described in Chapter 3 Description of the Proposed Development:

- Use of flotation pits to enable installation vessels to approach closer to shore;
- Grounding of installation vessels on the seabed at low tide; and
- Use of a TSHD vessel to create the trench for pre-lay installation.

14.4.8.4 Any gaps in information identified at this stage will be considered and addressed along with specific mitigation measures as part of the assessments for the production of the ES.

14.5 BASELINE ENVIRONMENT

14.5.1.1 The baseline resource of cultural heritage and marine archaeology, which includes known wrecks and obstructions, identified geophysical receptors, the potential for further maritime and aviation archaeological receptors, potential seabed prehistory, intertidal heritage assets and historic seascape character has been set out in the Marine Archaeology Technical Report presented in Appendix 14.1 (Wessex Archaeology, October 2018). The full gazetteer of anomalies is also presented in Appendix 14.1.

14.5.2 DATA SOURCES

14.5.2.1 The baseline has been established from desk-based sources and field survey work. The following data sources were consulted to compile the baseline element of the assessment:

- The UKHO data for charted wrecks and obstructions;
- Geophysical survey datasets acquired by MMT;
- Geotechnical datasets acquired by MMT and In Situ Site Investigation;
- The National Record of the Historic Environment ('NRHE') maintained by HE, comprising data for terrestrial and marine archaeological sites, find spots and archaeological events;
- The National Heritage List for England maintained by HE, comprising data of designated heritage assets including sites protected under the Protection of Military Remains Act 1986 and the Protection of Wrecks Act 1973;
- The Portsmouth and Hampshire County Council Historic Environment Records ('HER'), comprising a database of all recorded terrestrial and marine archaeological sites, find spots and archaeological events within the county and offshore;
- The Historic Seascape Characterisation ('HSC') report for the Solent and waters off the Isle of Wight (Hampshire and Wight Trust for Maritime Archaeology (HWTMA), Bournemouth University and Southampton University, 2007);
- Relevant mapping including Admiralty Charts, British Geological Survey ('BGS'), Ordnance Survey and historic maps; and
- Relevant documentary sources and grey literature held by Wessex Archaeology, and those available through the Archaeological Data Service and other websites.

Desk based assessment

- 14.5.2.2 This report is supported by a Geographic Information System ('GIS') using ArcGIS 10.5, incorporating the positional information of the various data sources listed above, allowing the data to be spatially analysed. The data were subsequently compiled into gazetteers of the prehistoric, maritime and aviation, and intertidal resources within the ASA; these were used to inform the assessment of geophysical and geotechnical data.
- 14.5.2.3 Within this assessment, the gazetteers for the marine and intertidal datasets are compiled and presented in Universal Transverse Mercator ('UTM') Zone 30 North projected from a World Geodetic System ('WGS') 1984 datum.
- 14.5.2.4 Information relating to the marine heritage that did not include location or positional information were also used to inform the marine archaeological baseline assessment where relevant.
- 14.5.2.5 Further information on the key themes relevant to the marine archaeology baseline is described in Section 3.2 of Appendix 14.1.

Geophysical and geotechnical survey analysis

- 14.5.2.6 The geophysical and geotechnical data were acquired by MMT, including SBP, MBES, SSS, magnetometer survey and vibrocores and Cone Penetration Tests ('CPTs'). The geophysical survey was carried out between November 2017 and March 2018. Further details on the equipment used is presenting in Section 3.3 of Appendix 14.1.
- 14.5.2.7 The geophysical data sets were individually assessed for quality and their suitability for archaeological purposes rated following criteria presented in Appendix 14.1. All data sets apart from magnetometer data were rated as generally 'good', the latter being rated as 'average'.

14.5.3 MARINE CABLE CORRIDOR AND ASA

Seabed Prehistory

- 14.5.3.1 A number of palaeogeographic features of archaeological potential have been identified within the Marine Cable Corridor within the UK marine area. The assessment of the SBP data shows that the shallow geology within this area can largely be described as predominantly clay bedrock with localised channel systems and palaeovalleys cut into its surface. These latter features have the potential to contain *in situ* and derived archaeological material and palaeoenvironmental material.
- 14.5.3.2 Table 14.5 summarises the potential for seabed prehistory assets and their respective value base on the criteria described in Section 14.4.

Table 14.5 - Value of seabed prehistory assets

Asset Type	Definition	Value
Potential in situ prehistoric sites	Primary context features and associated artefacts and their physical setting (if found)	High
	Known submerged prehistoric sites and landscape features with the demonstrable potential to include artefactual material.	High
Potential submerged landscape features	Other known submerged palaeolandscape features and deposits likely to date to periods of prehistoric archaeological interest with the potential to contain in situ material.	High
Potential derived prehistoric finds	Isolated discoveries of prehistoric archaeological material discovered within secondary contexts.	Medium
Potential palaeoenvironmental evidence	Isolated examples of palaeoenvironmental material.	Low
	Palaeoenvironmental material associated with specific palaeolandscape features or archaeological material	High

Seabed Features: Maritime

- 14.5.3.3 There are currently no sites within the ASA that are subject to statutory protection from the Protection of Wrecks Act 1973, the Protection of Military Remains Act 1986 or the Ancient Monuments and Archaeological Areas Act 1979; the three legislative acts that could be used to protect marine archaeological sites.
- 14.5.3.4 There are two known wreck sites within the Proposed Development (i.e. the Marine Cable Corridor within the UK marine area) which have been classified as A1 anomalies (features of anthropogenic origin of archaeological interest), illustrated in Figures 14.2 and 14.3 and detailed in Section 5 of Appendix 14.1 (Wessex Archaeology, 2018; paragraphs 5.4.4 & 5.4.6) and identified as anomalies **70184** and **70193**.

- 14.5.3.5 Two other receptors which may be of anthropogenic origin were also identified as A1 anomalies and are illustrated in Figures 14.4 and 14.5 (the debris scatter **70204** and the large magnetic anomaly **70018**).
- 14.5.3.6 Anomaly **70184** is an area of wreckage measuring 103.4 x 40.1 x 0.8 m, associated with UKHO record 20073 of the steamship *Corbet Woodall*, which sank while *en route* from South Shields to Poole on 30 May 1917 after detonating a mine laid by the German submarine UC 36. The wreck has been identified on the MBES data as an irregular area of numerous mounds within a slight depression (Wreck Sheet 1 of Appendix 14.1).
- 14.5.3.7 During the last recorded survey of the wreck, the wreckage was only identified on the magnetometer data and therefore considered to be buried. This indicates periodic burial and exposure of the wreck due to seabed processes. The remains of this vessel are classed as a dangerous wreck, now amended to 'dead' (with referencing to whether the wreck is considered to be a navigational hazard, rather than the presence of the wreck).
- 14.5.3.8 Anomaly **70193** is a broad area of debris measuring 73.5 x 65.8 x 2.6 m, thought to be associated with the UKHO record 20024 of a well broken up, unidentified steam ship. On the SSS data, the feature is identified as an area of numerous dark reflectors with height (Wreck Sheet 2 of Appendix 14.1).
- 14.5.3.9 This wreck is charted and included in the UKHO database (ID 20024) as the wreckage of an unidentified steamship, reported in 1974 as possibly a World War I ('WWI') coaster. It is reported to be orientated east to west and is much broken up and rusted. The wreck is last reported to have been surveyed in 1997, with the highest points being the two boilers which stood about 15 feet high. The remains of this vessel are classed as a dangerous wreck.
- 14.5.3.10 In addition to the wrecks mentioned above, there are two additional features illustrated in Figures 14.4 and 14.5 that have been classified as A1 anomalies, and therefore of high value, within the Proposed Development.
- 14.5.3.11 Anomaly **70204** is a large debris field, measuring 50x 23m comprising numerous dark reflectors with heights of up to 1.4 m (Figure 14.6). The feature does not look particularly distinct on the sonar data and, as such, the boundaries are hard to discern. However, the feature corresponds with a very large magnetic anomaly measuring, indicating significant amounts of ferrous material. It is possible the feature represents an area of modern anthropogenic debris. However, given the size of the feature and the magnetic amplitude, it is possible the feature represents a dispersed wreck site in which no coherent structure remains and, as such, has been given an A1 discrimination.

- 14.5.3.12 Anomaly **70018** is a very large magnetic anomaly. This indicates a significant amount of ferrous debris that is buried or has no surface expression (Figure 14.7). As with anomaly **70204**, it is possible the feature represents an area of modern anthropogenic debris. However, as the magnetic amplitude suggests significant amounts of ferrous material, it is possible the feature represents a buried wreck site and, as such, has been given an A1 discrimination.
- 14.5.3.13 The remaining 383 anomalies have an A2 discrimination, which is defined as features of uncertain origin, but of possible archaeological interest (see Appendix IV of Appendix 14.1 for full list of anomalies).
- 14.5.3.14 Recorded Losses can be considered as an indication of the potential for archaeological maritime remains to exist within the ASA and the type and number of wrecks that could be present. These records relate to vessels reportedly lost or for which no physical wreck remains have ever been identified. Table 14.6 shows the distribution of these documented losses according to the date of loss for those records whose positions fall within the ASA. Details regarding these losses are presented in Appendix VI of Appendix 14.1.

Table 14.6 - Recorded Losses based on NRHE and HER data

Period	Number of Losses
Medieval	-
Post-medieval	7
19th century	30
Modern	37
Unknown	30
Total	104

- 14.5.3.15 Recorded Losses are predominantly reported to have stranded in coastal areas, around Eastney Fort/ Point and Dean and Horse Sands. Other areas mentioned include Langstone Harbour, Fort Cumberland, Owers Light Vessel and Selsey Bill, roughly covering 20 km of coastline. The majority of losses wrecked at or foundered at Horse and Dean Sand, Hampshire, with Langstone Harbour being the second most numerous wrecking location. Both locations are Maritime Named Locations.

14.5.3.16 In general, Recorded Losses paint a vibrant picture of the types of voyages being undertaken around the coast of Portsmouth and Hampshire County. The losses across the area generally represent 19th and 20th century vessels, including those involved in international trade. The sailing ships of the 19th century lost at Portsmouth predominantly feature cargo sailing vessel, crafts, schooners, and a few brigs and ketches.

Seabed Features: Aviation

14.5.3.17 There are no known aircraft crash sites within the ASA. Nonetheless, there is the potential for aircraft or aircraft-related debris to exist on the seafloor within the Proposed Development. Given the identified potential of the area for military aircraft crashes, particularly relating to World War II ('WWII'), the likelihood would be for any aircraft crash to be of military origin, which would be protected under Protection of Military Remains Act 1986 and therefore would be of high value. This would include both Allied and Axis aircraft and would relate to both complete aircraft wrecks and debris scatters.

14.5.3.18 There are 21 Recorded Losses for aircraft casualties listed by the NRHE within the ASA, although it is not confirmed if material relating to the crash sites has been discovered within the area, hence their inclusion as Recorded Losses. Details regarding these aircraft are provided in Appendix VII of Appendix 14.1.

14.5.3.19 The aircraft were lost during WWII and comprise of seven British Hurricane MK I type fighters; seven British Spitfire MK I type fighters; two British Typhoon type fighter bombers; a Shark MK II torpedo-bomber, a Roc MK I fighter; a Hampden MK I bomber; a Halifax MK II bomber and a Blenheim MK IV fighter.

14.5.3.20 Seventeen of these aircraft are recorded as having been lost off Selsey Bill, Sussex with the remaining four records recorded as being lost off Eastney, Portsmouth. These records illustrate the potential for hitherto unknown aircraft remains to exist on the seafloor within the ASA.

14.5.4 LANDFALL

14.5.4.1 The proposed Landfall is located at Eastney beach at the south-eastern edge of Portsea Island, and the eastern end of a c.3.5 km continuous stretch of coast extending from Southsea Castle eastwards to Fort Cumberland. The proposed Landfall location was expected to come ashore close to Fraser Range (a disused naval gunnery school and RADAR testing facility) and the Southsea Leisure Park. However, further optioneering has taken place, and it is now proposed that the marine cables will make Landfall through the use of HDD methods which will travel underneath the intertidal areas at Eastney from an exit/entry point in the marine environment approximately 1 km seaward from the transition joint bays located in the car park behind Fraser Range.

14.5.4.2 The intertidal walkover survey was undertaken during the early stages of the design before further engineering investigations proposed the use of HDD as a method at the Landfall.

Walkover Survey

14.5.4.3 A walkover survey was carried out by Wessex Archaeology staff on the 14 August 2018, along the length of the intertidal zone up to the MHWS, covering the potential landing position at the time of the Proposed Development. The area was staked out using a Leica Net rover GS08+ with a CS10 console system. This was then photographed, and a walkover survey carried out on the falling spring tide.

14.5.4.4 No new archaeological features or objects were identified within the survey area.

Intertidal Heritage Assets

14.5.4.5 There is a total of two records (WA 1000 & WA 1001) relating to archaeological sites, artefacts, material and standing remains within the intertidal zone (to MHWS) of the Proposed Development at the landfall of Eastney Beach. These records have been derived from the NRHE and HER archives and more information is presented in Appendix IX of Appendix 14.1.

14.5.4.6 The two records refer to prehistoric findspots that no longer exist at the locations provided. WA 1000 consists of a prehistoric handaxe, whilst WA 1001 consist of a Roman coin of Victorinus, dating to AD268-271.

14.5.4.7 A specific note is made here with reference to the concentration of military defence features present within the wider (intertidal) area (including Fort Cumberland) clearly indicates the historic importance of this stretch of coastline during past conflicts, especially naval actions (and more recently aerial combat in WW II) and the lengths taken to protect important historic naval infrastructure at Portsmouth. Chapter 20 Heritage and Archaeology presents the findings of the onshore archaeological potential.

14.5.5 FUTURE BASELINE

14.5.5.1 Baseline data has been obtained from the collation of existing information and also from the results of surveys commissioned specifically for the Proposed Development. The existing baseline is informed by data that is 'current' and a future baseline is informed by an extrapolation of the currently available data by reference to policy and plans, other proposal applications and expert judgement.

14.5.5.2 Information is constantly being updated and data is therefore time dependent. All the data and information required to define the baseline for this chapter is located in Section 14.5. In addition, various preconstruction/post-consent ground condition surveys, geo-physical surveys or ROVs will also be undertaken and will update the existing baseline. Whilst this information would be gathered to inform any bathymetric changes, presence of UXOs, and monitor the works, such processes should also allow for archaeological analysis to inform the final route selection prior to construction and to identify any anomalies of known or possible archaeological interest.

14.5.5.3 Future baseline conditions are also considered through a WSI which includes industry-standard mechanisms such as a Protocol for Archaeological Discoveries ('PAD'). In addition, further information to the existing environmental conditions may evolve where there is linkage to and/or reliance upon other projects/plans being implemented prior to the construction of the Proposed Development under assessment. Section 14.6 identifies the projects/plans that are ongoing, projects that are approved but uncompleted, and also includes projects that are planned and/or which are reasonably foreseeable. Consideration of these projects is undertaken through cumulative effects assessment in Section 14.6 and in doing so, their ability to modify the existing baseline is also considered.

14.6 IMPACT ASSESSMENT

14.6.1.1 This section describes the effects on marine archaeology which might potentially occur from the construction, operation and decommissioning of the Proposed Development. This assessment considers the methods described within Chapter 3 Description of the Proposed Development except those activities listed in Section 14.4.8.

14.6.2 CONSTRUCTION

Damage to Known and Unknown Assets from Direct Impacts

14.6.2.1 All seabed assets have the potential to be damaged or destroyed if they are directly impacted during seabed preparation or construction activities. Furthermore, all damage to archaeological sites or material is permanent and recovery is limited to stabilisation or re-burial, limiting further impact. There is no potential for the recoverability of any seabed assets if they are affected following a direct impact. As such, all wrecks, aircraft, associated material and debris and seabed prehistory should be regarded as having high sensitivity.

- 14.6.2.2 Direct impacts to marine archaeology are likely to occur during the construction phase of the Proposed Development upon the archaeological receptors that have been identified in Section 14.5 of this chapter and any potential archaeology within the Proposed Development. Impacts resulting in negative effects upon archaeological assets as part of construction works are those involving contact with the seabed and/or the removal of seabed sediments. Marine archaeological receptors with height, such as shipwrecks, may also be impacted by activities that occur within the water column.
- 14.6.2.3 Construction activities that may lead to direct physical impacts include:
- Seabed preparation prior to cable laying, including clearance of obstacles and/or seabed features, and construction of crossing structures over in-service cables;
 - Dredging or mass flow excavation in areas where sandwaves and ripples are present;
 - Laying marine cables using the following options dependent on type of seabed – plough, jet trenching, and/or mechanical trenching;
 - Backfilling of cable trenches and stabilisation of unburied marine cables;
 - Placement of non-burial protection on the seabed; and
 - Use of anchors or jack-up legs on vessels associated with the installation, maintenance and decommissioning phases of the project.
- 14.6.2.4 Activities considered here refer to direct impacts associated with seabed preparation, construction, operational and decommissioning activities undertaken within the area of the Proposed Development. Direct impacts associated with construction works are considered to arise as a result of seabed preparation, cable installation/ protection and seabed contact by construction vessels through jack-ups or anchors.
- 14.6.2.5 Any negative effects upon marine archaeological receptors would be permanent and irreversible.
- 14.6.2.6 As such, the magnitude of direct impacts on known and potential seabed assets as part of construction activities, if they were to occur, would be high.
- 14.6.2.7 Due to the fragile and non-renewable nature of seabed assets on and/ or under the seabed, any effects have the potential to be permanent and negative. All A1 anomalies and currently unknown archaeological sites are considered as high sensitivity assets. As a result, if appropriate mitigation is not applied, both the sensitivity and the magnitude of direct impacts on such resources would result in major negative effects considered to be significant. However, following the application of appropriate mitigation, as outlined in Section 14.7, the effects would be reduced to negligible for all A1 anomalies and moderate negative for unknown archaeological sites and assets and therefore, not significant.

14.6.2.8 For all A2 anomalies, there is insufficient data to assess the value of each individual anomaly at this point. As such, all A2 anomalies must be considered to potentially have archaeological value, to a greater or lesser degree and, in accordance with the precautionary principle, and in EIA terms, are considered as high value assets. As a result, if appropriate mitigation is not applied, both the sensitivity and the magnitude of direct impacts on such resources would result in major negative effects considered to be significant. Following the application of the appropriate mitigation however, any effects resulting from the Proposed Development would be negligible and not considered significant.

14.6.2.9 Without any mitigation, impacts on known potential seabed history receptors, could result in significant major negative effects. However, mitigation applied through further investigation will result in a significant major positive effect through contributing to the knowledge base of seabed prehistory assets.

Damage to Known and Unknown Assets from Indirect Impacts

14.6.2.10 The indirect effects upon the known and potential marine archaeological assets considered here are those which occur as a result of changes to hydrodynamic and sediment transport regimes, where these changes have occurred as a consequence of activities and structures associated with the construction activities. These impacts may occur from the clearance of areas of sandwaves and large ripples during route preparation but may also occur through sediment deposition or the placement of cable protection on the seabed. Construction activities that may create indirect physical impacts include:

- Dredging by means of TSHD or mass flow excavation in areas where sandwaves and ripples are present; and,
- Scour associated with the disturbance from construction activities and structures.

14.6.2.11 Indirect impacts may affect marine archaeological baseline conditions where they result in the increased exposure or burial of marine archaeological assets. The increased exposure of marine archaeological assets has the potential to cause erosion and deterioration to the assets. Conversely, should assets be subject to increased sedimentation and burial, they may, in turn, benefit from conditions which afford higher levels of preservation.

14.6.2.12 The magnitude of effect of indirect impacts to marine archaeological receptors during construction is expected to be low. Chapter 6 Physical Processes suggests that it is not anticipated that there will be a significant impact on sediment mobility as a result of the installation of marine cables and that the installation of cable protection will only lead to insignificant localised changes in sediment movement.

14.6.3 OPERATION (INCLUDING REPAIR AND MAINTENANCE)

- 14.6.3.1 Operational effects will be limited to those arising from repair, maintenance or any monitoring that may be required. Potential effects on marine heritage assets during the operation of the Proposed Development could include direct effects such as re-burial of cables, repair / replacement of cables, placement of additional cable protection, anchors or jack-ups being used for any maintenance activities (although these are likely to be minimal), and indirect effects such as changes in local scouring and sedimentation patterns. The heritage asset receptors most at risk of direct effects are those closest to the final Marine Cable Route alignment.
- 14.6.3.2 Any operation works to be carried out will have a relatively small and defined footprint. With the implementation of the embedded mitigation measures set out in Section 14.8 the significance of any direct or indirect effects on marine archaeology assets will be reduced significantly and the effect predicted to be minor and not significant.
- 14.6.3.3 There is also potential for direct effects on a number of palaeo-channels, however for the majority of the Proposed Development, burial depths are anticipated to be between 0.6 and 5.1 m, and therefore too shallow to penetrate the depths within the sediment at which submerged landscapes may be present. In addition, should the palaeo-channels be impacted, the footprint of a linear installation such as the Proposed Development on these extensive landscape features will be minimal, so the effect is predicted to be minor and not significant.
- 14.6.3.4 Similarly, the implementation of embedded mitigation measures on submerged prehistory will further reduce the significance of potential direct effects.

14.6.4 DECOMMISSIONING

- 14.6.4.1 As with construction activities, decommissioning activities have the potential to affect archaeological assets either directly or indirectly. However, what infrastructure will be decommissioned and the methodology for doing so is not currently known but will be agreed prior to the commencement of decommissioning works.
- 14.6.4.2 If the marine cables are left buried however, likely significant effects from decommissioning will be avoided. If the marine cables are to be removed at decommissioning this assessment assumes that impacts from decommissioning activities are of a similar nature to construction activities and would be of a similar or lesser scale, and therefore not likely to be significant.

14.6.5 CUMULATIVE EFFECTS ASSESSMENT

- 14.6.5.1 The following section assesses how other plans or projects in the region of the ASA may result in cumulative impacts to marine archaeological assets with the Proposed Development.

- 14.6.5.2 The potential for cumulative effects has been considered from the list of projects/plans within the vicinity of the Proposed Development that have the potential to give rise to cumulative effects within Appendix 14.2 Marine Archaeology Cumulative Assessment Matrix for the construction, operation and decommissioning stages of the project.
- 14.6.5.3 The direct and indirect cumulative impacts on marine archaeological receptors is limited by the location and extent of sensitive receptors. Due to embedded mitigation such as the implementation of Archaeological Exclusion Zones ('AEZ's), reporting protocols and other best-practice elements in the WSI most effects will be avoided, particularly to known receptors identified on/in/beneath the seabed.
- 14.6.5.4 The Zol for cumulative assessment is considered to be the spatial extent of the Marine Cable Corridor within the UK marine area.
- 14.6.5.5 As detailed in Chapter 28 Cumulative Effects, the CEA is to be undertaken with regards to PINS Advice Note Seventeen – Cumulative Effects Assessment (PINS, 2015). The list of projects presented in Appendix 14.2 Cumulative Effects Assessment Matrix has been refined for marine archaeology as follows:
- First, a spatial assessment was conducted. Any project identified in the long list of projects falling within the Zol was screened in for further consideration; and
 - A temporal, scale and nature-based assessment was conducted for those projects where a potential spatial overlap was identified.
- 14.6.5.6 The Proposed Development is sufficient distance from nearly all of the projects/plans listed in Appendix 14.2. For those other projects/plans that are in close proximity or that intersect the Proposed Development, there is no temporal overlap between the projects/plans and the Proposed Development of any activities that might result in impacts. Accordingly, no projects/plans were progressed to detailed cumulative effects assessment as no significant direct and indirect cumulative effects are currently predicted.

14.6.6 **TRANSBOUNDARY IMPACTS**

- 14.6.6.1 With regards to impacts on the marine archaeology in other European Member States, in this case France, the potential impacts of the Proposed Development in the UK marine area are unlikely to lead to any significant transboundary effects. Chapter 8 Intertidal and Benthic Ecology suggests that although there is the potential for a sediment plume to extend into French waters, transboundary impacts are not currently considered to have the potential to be significant.

14.7 PROPOSED MITIGATION

14.7.1 CONSTRUCTION, OPERATION AND DECOMMISSIONING

Avoidance

- 14.7.1.1 The primary mitigation for the protection of known archaeological assets is avoidance. This is achieved through the implementation and monitoring of AEZs, which are proposed for identified high value seabed features of anthropogenic origin (i.e. A1 classified geophysical anomalies).
- 14.7.1.2 The mitigation will establish appropriately sized AEZs around receptors which have been considered to be of high archaeological potential, in consultation with HE. These areas would be out of bounds to construction activities and to anchoring. Monitoring of any AEZs to ensure there is no disturbance to them will be part of this mitigation.
- 14.7.1.3 The four AEZs currently proposed are presented in Figures 14.2 to 14.5 and represent 100 m radius AEZs around the identified extent of the seabed feature. This buffer has been selected to account for the large dimensions (over 50 m in length) and magnetic readings of the identified assets.
- 14.7.1.4 In addition, for possible features of anthropogenic origin (A2), AEZs are not typically proposed, but avoidance through micro-siting of the cable route, where possible, is recommended in the first instance.

Reduction

- 14.7.1.5 Reduction of impact can be achieved by means of appropriate mitigation identified through potential opportunities for further investigation of assets (e.g. during UXO survey and clearance works).
- 14.7.1.6 Further investigations mean that these anomalies can either have their archaeological value removed, if they prove to be of non-anthropogenic nature or modern, or their value as archaeological assets confirmed. If their value is confirmed, in which case mitigation in the form of either avoidance (which may be enacted by the implementation of an AEZ or through remedying or offsetting measures as identified through a WSI which includes industry-standard mechanisms such as a PAD).

Offsetting and recovery

- 14.7.1.7 In cases where avoidance is either inappropriate or impossible, the damage to archaeological assets should be offset. In the case of seabed prehistoric features, this can be achieved by undertaking a palaeoenvironmental assessment of deposits with high geoarchaeological potential, principally peat deposits. Pollen and macrofossil assessment, supported by radiocarbon dating, will provide information on age and vegetation history of the terrestrial environment, providing a landscape context to any prehistoric activity within the area. Recovery of artefacts and/or other archaeological receptors should be a final resort, when all other mitigation has failed. Any recovery should be completed under the supervision of an appropriately qualified and experienced marine archaeologist. Recovery methods will be identified through the WSI. Due to the vast differences in practice and implementation between these methods, each will be covered by a specific Method Statement agreed in consultation with the Archaeological Curator and approved by the MMO where the method statements are required by a deemed Marine Licence condition.

14.8 RESIDUAL EFFECTS

- 14.8.1.1 Following the implementation of AEZs, all known marine archaeological assets identified as A1 geophysical anomalies will be avoided. Accordingly, following the application of this mitigation, the effects from direct impacts would be reduced to negligible for all A1 anomalies and moderate negative for unknown archaeological sites and assets and therefore, not significant.
- 14.8.1.2 In addition, for possible features identified as A2 geophysical anomalies AEZs are not typically proposed, but avoidance through micro-siting of the cable route, where possible, is recommended in the first instance. Following the application of the appropriate mitigation, any effects resulting from direct impacts of the Proposed Development would be negligible and not considered significant.
- 14.8.1.3 Accordingly, as presented in Table 14.7 below, residual effects on marine heritage assets during the construction, operation and decommissioning of the Proposed Development are not anticipated to be significant.
- 14.8.1.4 With regards to indirect impacts, as presented in Table 14.7, residual effects on marine heritage assets are anticipated to be not significant.

Table 14.7 - Direct and indirect impacts summary

Project Phase	Potential Impact	Receptor	Magnitude	Sensitivity	Significance	Mitigation	Significance of Residual Effect
Construction & Decommissioning	Direct disturbance to the seabed causing damage to receptors (potentially caused by; seabed preparation; cable laying; dredging; cable burial methods and/or cable protection; and use of anchors by vessels)	Known and potential seabed prehistory receptors	High	High	Major negative	Further investigation by means of geoarchaeological assessment of geotechnical samples.	Major positive (as long as samples are retained, analysed and reported on by a qualified geoarchaeologist)
		Known and recorded maritime receptors and aviation receptors (A1s)	High	High	Major negative	Implementation of AEZs	Negligible
		Geophysical anomalies of possible anthropogenic origin (A2s)	High	High	Major negative	Micro-siting of cable route; further investigation through potential opportunities, where possible, for diver and ROV survey; archaeological watching briefs	Negligible

Project Phase	Potential Impact	Receptor	Magnitude	Sensitivity	Significance	Mitigation	Significance of Residual Effect
						during clearance of A2s.	
		Currently unknown archaeological sites and artefacts	High	High	Major negative	Implementation of AEZs; WSI (and any supporting activity-specific Method Statements, and PAD)	Moderate
	Indirect disturbance to receptors (caused by dredging; cable burial methods and/or cable protection)	Indirect impact to known and potential seabed prehistory receptors; maritime receptors; and aviation receptors (caused by changes to the hydrodynamic and sedimentary regimes due	Low	Low - High	Minor to Moderate negative	No mitigation is recommended	-

Project Phase	Potential Impact	Receptor	Magnitude	Sensitivity	Significance	Mitigation	Significance of Residual Effect
		to spoil removal and sediment redistribution)					
Operation (including repair and maintenance)	Direct disturbance to receptors (caused by re-burial of cables, repair / replacement of cables, additional cable protection, anchors or jack-ups)	Direct impact to known and potential seabed prehistory receptors; maritime receptors; and aviation receptors.	Low - Medium	High	Moderate to Major negative	Implementation of AEZs; WSI (and any supporting activity-specific Method Statements), and PAD	Negligible
	Indirect disturbance to receptors (caused by additional cable protection used during repair and maintenance,	Indirect impact to known and potential seabed prehistory receptors; maritime receptors; and aviation	Low	High	Moderate negative	No mitigation is recommended	-

Project Phase	Potential Impact	Receptor	Magnitude	Sensitivity	Significance	Mitigation	Significance of Residual Effect
	where burial is not possible)	receptors (caused by potential scour and plume effects resulting in increased protection to, or deterioration through erosion)					
Construction, Operation & Decommissioning	Use of anchors by vessels	Direct impacts to known and potential seabed prehistory receptors; maritime receptors; and aviation receptors.	Low - Medium	Low - High	Minor to Major/Moderate negative	No mitigation is recommended	-

14.9 SUMMARY AND CONCLUSION

BASELINE

- 14.9.1.1 The potential impacts to marine archaeology from the construction, operation and decommissioning of the Proposed Development have been established via a desk-based assessment of existing records and datasets gathered from geophysical and geotechnical surveys, to determine the baseline of known and possible archaeological receptors.
- The baseline resource of cultural heritage and marine archaeology included the assessment of the following receptors;
- Known wrecks and other seabed features identified assessment of geophysical datasets;
 - The potential for further maritime and aviation archaeological receptors;
 - Potential seabed prehistory;
 - Intertidal heritage assets; and
 - Historic seascape character.
- 14.9.1.2 A number of palaeogeographic features of archaeological potential for seabed prehistory have been identified within the Proposed Development. The assessment shows that the shallow geology within the Proposed Development can largely be described as predominantly clay bedrock with localised channel systems and palaeovalleys cut into its surface. These latter features have the potential to contain in situ and derived archaeological material and palaeoenvironmental material. Through the process of geoarchaeological assessment new knowledge has been gathered, highlighting one core location which preserves a peat unit, which may be of palaeoenvironmental and archaeological interest.
- 14.9.1.3 Currently, no maritime or aviation sites within the Proposed Development are subject to statutory protection. A total of 387 seabed features have been identified within the Proposed Development. Two features have been identified as records of wreck sites, whilst another two features may be of anthropogenic origin. The two wrecks consist of steamship Corbet Woodwall (UKHO_20073) and a broken up unidentified steamship (UKHO_20024). The remaining 383 anomalies are of uncertain origin, but of possible archaeological interest.
- 14.9.1.4 A total of 125 Recorded Losses have been documented within 2 km of the Proposed Development. These losses correspond to wrecks which are known to have been lost or are associated with locations named locations and navigational hazards, such as Dean and Horse Sand. There are also 21 Recorded Losses of aircraft casualties, comprising a variety of British fighters.
- 14.9.1.5 Two records referring to prehistoric find spots have been recorded within the intertidal area, up to MHWS.

IMPACT ASSESSMENT

- 14.9.1.6 As archaeological and cultural heritage receptors are finite and cannot recover, any physical impacts to them upon them would be permanent and potentially significant. However, it is expected that significant effects can be mitigated through a series of embedded and additional mitigation strategies, including avoidance of known sites. It is judged that residual effects of physical impacts are likely to be of minor or negligible significance.
- 14.9.1.7 No significant cumulative effects have yet been identified for marine archaeological receptors.
- 14.9.1.8 No significant transboundary effects have yet been identified for marine archaeological receptors.

MITIGATION

- 14.9.1.9 Adequate and appropriate mitigation measures have been recommended to ensure that the archaeological value of the baseline within this report is maintained. All known wreck sites will be avoided, and features of possible archaeological interest will be avoided where possible. A protocol will be agreed to mitigate construction effects in the event of any unexpected archaeological discoveries during installation. Infrastructure will be micro-sited and temporary AEZs will be implemented to prevent invasive activities impacting identified locations of cultural heritage interest. A WSI setting out the methodology for all proposed mitigation strategies will be prepared in consultation with the MMO and HE.

RESIDUAL EFFECTS

- 14.9.1.10 Following implementation of mitigation measures, overall residual effects are to result in major positive or minor to negligible significance

CONCLUSION

- 14.9.1.11 Overall no significant residual effects were identified as a consequence of the Proposed Development (as described in Chapter 3 Project Description and Section 14.4.8) and no significant cumulative effects were predicted with other projects.

14.10 ASSESSMENTS AND SURVEYS STILL TO BE UNDERTAKEN

- 14.10.1.1 The further work and next steps to be completed for the ES include:
- Further consultation as required; and
 - Updating the information presented above to reflect the final design parameters and should any relevant new literature or guidance become available.

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