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Environmental Statement – Volume 1 – Chapter 14 Marine Archaeology

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

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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 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 considers 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 (and trials of cable installation tools) using the following options dependent on type of seabed – plough, jet trenching, and/or mechanical trenching;
- United Kingdom ('UK') Landfall works including the use of Horizontal Directional Drilling ('HDD') methods;
- Backfilling of cable trenches and/or installation of non-burial protection;
- Scour associated with/resulting from the activities above;
- Repair or replacement of cables during operation; and
- Use of anchors on vessels associated with the installation and operational phases of the Proposed Development.

14.1.2. STUDY AREA

14.1.2.1. The Entire Marine Cable Corridor extends from the Landfall at Eastney, 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 significant cumulative effects 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 European Economic Area ('EEA') states, these are also identified and assessed.

Landfall

- 14.1.2.3. 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 beyond 1 km (between Kilometre Point ('KP')1 – KP1.6) seaward from the Transition Joint Bays ('TJB') located in the car park behind Fraser Range (Figure 3.3 of the Environmental Statement ('ES') Volume 2 (document reference 6.2.3.3)). The intertidal area of Landfall up to Mean High Water Spring ('MHWS') at Eastney is included within the marine archaeology assessment for completeness.
- 14.1.2.4. HDD is also proposed to be undertaken at Langstone Harbour to enable the cables to cross underneath Langstone Harbour from Portsea Island to the mainland (see Sheet 2 of Figure 3.9 (shown in Section 7 of the map) of the ES in Volume 2 (document reference 6.2.3.9)). 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, with the entry and exit points of the drill located above the MHWS mark. It has been agreed with the Marine Management Organisation ('MMO') that this is considered to be an exempt activity that does not require a marine licence, subject to the conditions of Article 35 of Marine Licensing (Exempted Activities) Order 2011 (as amended). The Consultation Report provides further detail on this and other consultations (document reference 5.1).
- 14.1.2.5. Chapter 3 (Description of the Proposed Development) of the ES Volume 1 (document reference 6.1.3) provides further information on the HDD methodology at Langstone Harbour and is considered in Chapter 21 (Heritage and Archaeology) of the ES Volume 1 (document reference 6.1.21).

Marine Cable Corridor

- 14.1.2.6. The Marine Cable Corridor encompasses the location of the Landfall and extends from MHWS at Eastney, out to the UK/France Exclusive Economic Zone ('EEZ') Boundary Line (see Figure 3.1 of the ES Volume 2 (document reference 6.2.3.1)).
- 14.1.2.7. 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.

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 of the ES Volume 2 (document reference 6.2.14.1). Findings within the ASA onshore, beyond MHWS, are not reported within this chapter. Onshore archaeology is presented within Chapter 21 (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 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 nautical mile ('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. HE also provides archaeological advice to regulators on (deemed) marine licence applications between 12 nmi and the UK/France EEZ Boundary Line.
- 14.1.2.11. The Local Planning Authority ('LPA') (Portsmouth City Council ('PCC')), and associated County Council Archaeological curator from Hampshire County Council ('HCC') also have oversight for the intertidal zone, between MHWS and Mean Low Water Springs ('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) of Volume 3 of the ES (document reference 6.3.14.1). 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 United Nations Convention for the Law of the Sea 1982; and
 - UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001).

National Legislation

- Protection of Wrecks Act 1973: 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 footprint of 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, and;
- 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 footprint of 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 drafting an Environmental Statement ('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 National Planning Policy Framework ('NPPF') was first published by the Department for Communities and Local Government ('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. The NPPF 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 LPAs, 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.

Marine Policy

- 14.2.3.4. The Marine and Coastal Access Act (‘MCAA’) 2009 is the primary legislation relevant to marine development plans. Marine plans presented under this legislation must be consistent with the Marine Policy Statement (‘MPS’); (Department for Environment, Food and Rural Affairs (‘Defra’), 2011) and in accordance with other UK national policy, including the NPPF.
- 14.2.3.5. The UK MPS (2011) is the primary policy for preparing marine plans and determining marine licence applications seaward of MHWS (in the absence of adopted marine plans).
- 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 Marine Plan (Defra, July 2018). This Marine Plan seeks to ensure a sustainable marine environment that will protect heritage assets and is the primary policy document for marine developments in the South Plan area for marine licence applications (seaward of MWHS). The South Marine Plan, which

covers the spatial extent of the Proposed Development, was adopted in July 2018, and is the primary marine policy document.

14.2.3.7. Objective 8 of the South Marine Plan is “*to identify and conserve heritage assets that are significant to the historic environment*”. Policy S-HER-1 seeks to ensure that development proposals do not have an adverse impact on marine and coastal heritage assets, regardless of their designation status. Therefore, any development proposals that may impact the “significance of heritage assets should demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate compromise or harm” to assets.

14.2.3.8. Further detail and consideration on how the proposals for the Proposed Development meet the requirements of these policies is presented within the Planning Statement (document reference 5.4) that accompanies the Application.

Local Policy

Portsmouth City Council ('PCC')

14.2.3.9. The Portsmouth Plan (Portsmouth’s Core Strategy) (2012) 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.

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 ('CIfA'), 2014, updated 2017);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (Bates, R. Dix, J. K., Plets, R., 2013); and,
- Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (English Heritage (now HE), 2015).

14.3. SCOPING OPINION AND CONSULTATION

14.3.1. SCOPING OPINION

14.3.1.1. As detailed within Chapter 5 (Consultation) of the ES in Volume 1 (document reference 6.1.5), a Scoping Opinion was received by the Applicant from the Planning Inspectorate ('PINS') on 7 December 2018. The Scoping Opinion comments from PINS in relation to marine archaeology and how they were addressed is set out in Table 1 in Appendix 14.2 (Marine Archaeology Consultation Responses) of the ES in Volume 3 (document reference 6.3.14.2). Key items that were addressed included:

- Assessment Methodology: any surveys carried out to inform the baseline and assessment of impacts to archaeological assets should be assessed by qualified archaeologists.
- Archaeological Written Scheme of Investigation ('WSI'): the ES should clearly identify the proposed mitigation measures.
- Post-consent data analysis and interpretation: pre-construction/post-consent ground condition surveys, geophysical or remote operated vehicle ('ROV') surveys should allow for archaeological analysis to inform final route selection prior to route clearance and installation. These works should allow for the identification of potential archaeological anomalies, and appropriate mitigation implemented.

14.3.2. PEIR CONSULTATION

14.3.2.1. Consultation on the Preliminary Environmental Information Report ('PEIR') was undertaken between February and April 2019. All of the comments received from the consultation are presented in Table 2 in Appendix 14.2 (Marine Archaeology Consultation Responses) however the key items that were discussed included:

- Installation methodology at the Landfall site: the requirement for a programme of investigation should be considered to assess the potential of archaeological deposits;
- Mitigation measures for pre-installation clearance, preparation works, installation and operation work: suitable mitigation measures should be developed in consultation with the archaeological curator and clearly outlined in a WSI; and
- The design and construction methods for the Proposed Development need to be fully determined to properly assess the potential impacts on cultural heritage.

14.3.3. POST-PEIR CONSULTATION

14.3.3.1. Further consultation with key stakeholders has been undertaken. This was to ensure all impacts are assessed. The key items that have been discussed are presented in Table 14.1 below.

Table 14.1 – Summary of post-PEIR consultation

Consultee	Date (Method of Consultation)	Discussion
MMO	1 August 2019 Teleconference	Review and discussions on the draft deemed Marine Licence ('dML')
Historic England	24 July 2019	Review and feedback on the dML.
Historic England	27 August 2019 Email	Review and feedback on the Applicant's response to PEIR comments. This feedback was used to inform this chapter (see Table 2 in Appendix 14.2) and the Outline WSI in Appendix 14.3 (Outline WSI) in Volume 3 of ES (document reference 6.3.14.3).
MMO	19 September and 02 October 2019 Email	MMO are content with approach to cumulative assessment and requested one new coastal project to be added to long list.
Historic England	24 September 2019 Email	Consultation with HE on draft Outline WSI. Feedback received from HE which has informed the Outline WSI in Appendix 14.3 (Outline WSI).

14.3.3.2. The Consultation Report provides further detail on consultations undertaken (document reference 5.1).

14.3.4. IMPACTS SCOPED INTO THE ASSESSMENT

14.3.4.1. The following impacts have been agreed to be scoped into the assessment:

- Direct and indirect impacts on known and unknown assets (including potential seabed prehistory receptors, maritime and aviation receptors, A2 geophysical anomalies) during construction and decommissioning;

- Direct and indirect impacts on known and unknown assets (including potential seabed prehistory receptors, maritime and aviation receptors) during operation (including repair and maintenance); and
- Direct impacts on known and potential seabed prehistory receptors, and maritime and aviation receptors from use of anchors by vessels during construction, operation and decommissioning.

14.3.4.2. Sections 14.4.2 and 14.4.3 provide further information relating to the above impacts during construction, operation (including repair and maintenance) and decommissioning of the Proposed Development.

14.3.4.3. Information relating to the assessment of Historic Seascape Character is provided in Appendix 14.1 (Marine Archaeology Technical Report).

14.4. ASSESSMENT METHODOLOGY

14.4.1.1. The assessment methodology used is described below and is based on the best practice professional guidance outlined by the ClfA Standard and Guidance for Historic Environment Desk-Based Assessment (2014, updated 2017). Further detail on the methodology and surveys undertaken to inform the assessment are presented in (Marine Archaeology Technical Report).

14.4.1.2. The impacts identified with relevance for marine archaeology would in the main, occur during the construction stage 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 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.

14.4.1.3. Impacts resulting from the operation, repair and maintenance of the Proposed Development have been assessed on marine receptors relating to seabed prehistory and seabed features, as listed above in paragraph 14.4.1.2.

14.4.2. ASSET SENSITIVITY

14.4.2.1. This section outlines how the sensitivity of marine heritage assets is ascertained.

14.4.2.2. 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.

14.4.2.3. 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.

14.4.3. VALUE OF AN ASSET

14.4.3.1. 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'*.

14.4.3.2. 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.

14.4.3.3. 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.

14.4.3.4. 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.

14.4.3.5. The value of known archaeological and cultural heritage assets were assessed using professional judgement informed by criteria provided in Table 14.2 below.

Table 14.2 – Summary of post-PEIR consultation

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. 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> <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>

Value	Definition
Negligible	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.

14.4.4. IMPACT MAGNITUDE

14.4.4.1. 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	Complete or comprehensive physical damage or changes to the character of the asset.
Medium	Considerable changes that affect the character of the asset, resulting in considerable physical damage.
Low	Minor change that partially affects the character of the asset, resulting in some physical damage.
Negligible	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.

14.4.5. SIGNIFICANCE CRITERIA

14.4.5.1. 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.

14.4.5.2. The overall significance will be assessed using the matrix shown in Table 14.4. Effects deemed to be significant for the purpose of assessment are those which are described as 'major' and 'moderate/major'. In addition, 'moderate' effects can also be deemed as significant. Whether they do so shall be determined by a qualitative analysis of the specific impact and will be based on professional judgement. If/where this is the case, the basis for any judgement will be outlined.

Table 14.4 – Significance matrix

		Value/Sensitivity			
		High	Medium	Low	Negligible
Magnitude/ Scale of Impact	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

14.4.6. ASSUMPTIONS AND LIMITATIONS

14.4.6.1. Assessment has been undertaken based on the information provided within Chapter 3 (Description of the Proposed Development) of the ES Volume 1 (document reference 6.1.3) and using the worst case design parameters presented in Appendix 3.2 (Marine Worst Case Design Parameters) and 3.8 (Programme Onshore and Marine) of the ES in Volume 3 (document references 6.3.3.2 and 6.3.3.8). How these parameters are relevant for worst case scenarios for marine archaeology is presented in Section 14.6.

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 (Marine Archaeology Technical Report). 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 United Kingdom Hydrographic Office ('UKHO') data for charted wrecks and obstructions;
- Geophysical survey datasets acquired for the Project (2018);
- Geotechnical datasets acquired for the Project and *in situ* Site Investigation (2018);

- 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 PCC and HCC 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 (Marine Archaeology Technical Report).

Geophysical and geotechnical survey analysis

- 14.5.2.6. The geophysical and geotechnical data were acquired for the Project, including Sub Bottom Profile ('SBP'), Multi Beam Echo Sounder ('MBES'), Side Scan Sonar ('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 (Marine Archaeology Technical Report).

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 (Marine Archaeology Technical Report). All data sets apart from magnetometer data were rated as generally ‘good’, the latter being rated as ‘average’. The data sets are considered to provide full and effective coverage of the Marine Cable Corridor.

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 <i>in situ</i> 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 <i>in situ</i> 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 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 of the ES Volume 2 (document reference 6.2.14.2 and 6.2.14.3) and detailed in Section 5 of Appendix 14.1 (Marine Archaeology Technical Report) 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 of the ES Volume 2 (document references 6.2.14.4 and 6.2.14.5), (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 50 x 23 m comprising numerous dark reflectors with heights of up to 1.4 m (Figure 14.6 of the ES Volume 2, document reference 6.2.14.6). 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 of the ES Volume 2, document reference 6.2.14.7). 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 V 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 (Marine Archaeology Technical Report).

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 be 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 (Marine Archaeology Technical Report).
- 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 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 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 at a location approximately 1 -1.6 km seaward, some distance from the TJBs located in the car

park behind Fraser Range (see Figure 3.3 of the ES Volume 2, document reference 6.2.3.3).

- 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. The results are presented here for completeness and to inform an enhancement of the archaeological baseline. Further details of the intertidal heritage potential are provided in Section 6 of Appendix 14.1 (Marine Archaeology Technical Report).

Walkover Survey

- 14.5.4.3. A walkover survey was carried out by Wessex Archaeology staff on the 14 August 2018.
- 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 (Marine Archaeology Technical Report).
- 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 consists 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). This clearly indicates the historic importance of this stretch of coastline during past conflicts, especially naval actions (and more recently aerial combat in WWII) and the lengths taken to protect important historic naval infrastructure at Portsmouth. Chapter 21 (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. In the absence of the Proposed Development and the survey data collected thus far, the future baseline in relation to marine archaeology would be less well informed. 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 pre-construction/post-consent ground condition

surveys, geophysical surveys or ROVs will also be undertaken and will update the existing baseline where appropriate. Whilst this information would be gathered to inform any bathymetric changes, presence of Unexploded Ordnance ('UXO'), and monitor the works, where practicable, such processes will 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').
- 14.5.5.4. 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. Appendix 14.4 (Marine Archaeology Cumulative Assessment Matrix) of the ES Volume 3 (document reference 6.3.14.4) 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 14.7 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), and the worst-case methods considered in terms of impacts to seabed surface and sediment depth are described in the following paragraphs and informed by Appendix 3.2 (Marine Worst Case Design Parameters).

14.6.2. EMBEDDED MITIGATION

- 14.6.2.1. With regards to the archaeological resource, international best practice and government policy favours preservation *in situ*. Early on in the optioneering process, the design principles to narrow down the suitable landfall locations and identify the Marine Cable Corridor, included, where possible, avoiding known wrecks.
- 14.6.2.2. In addition, throughout the duration of the geotechnical surveys, preliminary logs based on through core liner descriptions, were made available to Wessex Archaeology for initial review to identify cores comprising deposits of archaeological interest. These cores were retained and later split open and recorded under supervision of a geoarchaeologist. Sub-samples were taken from any deposits considered to have geoarchaeological potential. Stage 1 geotechnical assessment was carried forward to Stage 2 geoarchaeological recording of targeted cores with high potential, allowing for Stage 3 sub-sampling and palaeoenvironment assessment to be recommended for any future geoarchaeological investigations.

14.6.3. CONSTRUCTION

Damage to Known and Unknown Assets from Direct Impacts

- 14.6.3.1. 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.
- 14.6.3.2. Direct impacts to marine archaeology are likely to occur during the construction stage 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.
- 14.6.3.3. Construction activities that may lead to direct physical impacts include:
- Seabed preparation prior to cable laying, including:
 - Clearance of obstacles and/or seabed features, involving pre-lay grapnel run for clearance of seabed debris;
 - Boulder removal by ploughing and/or grabs;
 - Clearance of areas of sandwaves and ripples;
 - Deposit of dredged material;
 - Placement of rock and/or installation of mattresses to level out uneven seabed prior to cable installation;
 - Construction of crossing structures over in-service cables; and
 - Excavating HDD entry/exit pits (maximum depth 3 m) by means of a barge mounted or marinated long-reach excavator, or Mass Flow Excavator ('MFE').
 - Trialling of cable burial tools and the laying and installation of Marine Cables, comprising two bundled pairs of cables typically 50 m apart, 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, including tubular protection, mattresses, rock placement and grout/rock bags;

- Landfall operations including marine works to install HDD ducts, excavation of HDD pits and installation of cable protection; and
- Use of jack-ups and vessels associated the construction, maintenance and decommissioning phases of the project, including impacts associated with jack up legs, anchor spreads and grounding of installation vessels on the seabed at low tide.

14.6.3.4. Any negative effects upon marine archaeological receptors from direct impacts associated with construction activities would be permanent and irreversible. As such, the magnitude of direct impacts on known maritime and aviation receptors, and potential seabed features as part of construction activities, if they were to occur, would be **high**.

14.6.3.5. All A1 receptors and currently unknown archaeological sites are considered as **high** sensitivity receptors.

14.6.3.6. 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 are considered as **high** value assets.

14.6.3.7. 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**.

14.6.3.8. Impacts on known and potential seabed prehistory receptors, such as potential *in situ* prehistoric sites and submerged landscape features, could result in major effects, as these are considered as **high** value assets. However, for the majority of the Proposed Development, burial depths are anticipated to be between 1 and 3 m, and therefore too shallow to penetrate the depths within the sediment at which submerged landscapes may be present. In addition, should potential seabed prehistoric features be impacted, the footprint of a linear installation such as the Proposed Development on these extensive landscape features will be minimal, and therefore the magnitude of direct impacts on such resources would be **low**, resulting in **moderate negative** effects considered to be **not significant**.

Damage to Known and Unknown Assets from Indirect Impacts

14.6.3.9. 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 non-burial cable protection on the seabed. Construction activities that may create indirect physical impacts include:

- Dredging in areas where sandwaves and ripples are present, potentially resulting in changes to local hydrodynamics;
- Disposal of dredged material (beyond KP 21), the installation of cables (between KP 0 and 21) and excavation of HDD entry exit pits, potentially resulting in increased sediment transport regimes; and
- Scour associated with the disturbance from construction activities and structures.

- 14.6.3.10. 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.
- 14.6.3.11. The magnitude of effect of indirect impacts to marine archaeological receptors during construction is expected to be **low**. Following an assessment of the local hydrodynamic and sediment transport regime, review of data available from similar projects and a numerical modelling (based on a realistic worst-case scenario) assessment, Chapter 6 (Physical Processes) of the ES in Volume 1 (document reference 6.1.6) concludes that effects on the sediment transport regime are **minor to moderate** and therefore, **not significant**.
- 14.6.3.12. For construction activities within the nearshore area (within KP 21), the worst-case scenario assessed within Chapter 6 (Physical Processes) is dredging/excavation of the HDD pits and cable installation activities. The analysis presented indicates that during these activities suspended sediment concentrations ('SSC') may exceed anticipated background levels locally (i.e. concentrations are estimated to reach 200 mg/l within 2 km of the cable trench), however these concentrations will only persist for a few hours and will soon reduce as suspended sediments deposit on the seabed and / or are transported in the direction of the prevailing flow. Concentrations are likely to reduce to levels considered to be within natural variation within a few days.
- 14.6.3.13. Beyond KP 21, the worst-case scenario assessed is disposal of dredged material and although peak SSC values (1000 mg/l) observed at the point of disposal will exceed background levels, these concentrations will reduce quickly (within hours). Beyond 1 km from release, the passive plume which is transported beyond this is likely to be transported in the direction of the prevailing tidal flow out to a worst-case distance of 25 km, however concentrations within these plumes are predicted to be up to approximately 20 mg/l; analogous concentrations to those observed during higher energy events (i.e. during storm conditions).
- 14.6.3.14. In nearshore areas, any coarse material mobilised from HDD works or cable installation activities will deposit rapidly (i.e. within several hundred metres of the cable trench). Finer sediment will be dispersed across a greater spatial extent, transiently depositing throughout the tidal cycle. However, due to the volumes of

sediment likely to be liberated into the water column and significant dispersion of fine sediment, it is considered that deposition will be negligible with sediments quickly resuspended and redistributed under the forcing of tidal flows. Beyond KP 21, sediment deposition from disposal activities will be local to the point of release, with deposits of coarser sediments potentially observed of between 10 mm and 1.5 m, with greater deposition likely across an area of a few hundred metres, relative to the release site, extending in the direction of the prevailing flow at the time of release. Again, finer sediments will be redistributed and any deposition outside the Marine Cable Corridor will be transient and negligible, with any settled material being quickly redistributed under the forcing of tidal flows.

14.6.3.15. As a result, if appropriate mitigation is not applied, both the **high** sensitivity and the **low** magnitude of indirect impacts on such resources would result in **moderate negative** effects considered to be **not significant**.

14.6.4. OPERATION (INCLUDING REPAIR AND MAINTENANCE)

14.6.4.1. Operational effects will be limited to those arising from cable repair/ replacement, installation of additional cable protection, 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; and
 - Anchors or jack-ups being used for any maintenance activities (although these are likely to be minimal).
- Indirect effects such as changes in local scouring and sedimentation patterns.

14.6.4.2. The heritage asset receptors most at risk of direct effects are those closest to the final Marine Cable Route alignment and it is assumed that these areas will already have been subject to potential impacts from the original construction activities assessed in Section 14.6.3. The magnitude of direct impacts on known maritime and aviation receptors, and potential seabed features as part of operational activities, if they were to occur, would be **low to medium**, while these receptors considered to be of **high** sensitivity. As a result, if appropriate mitigation is not applied, both the sensitivity and the magnitude of direct impacts on such resources would result in **moderate to major negative** effects considered to be **significant**.

14.6.4.3. The magnitude of indirect impacts from changes in scour and sedimentation on known maritime and aviation receptors, and potential seabed features as part of operational activities, if they were to occur, would be **low**. As a result, if appropriate mitigation is not applied, both the **high** sensitivity and the **low** magnitude of indirect

impacts on such resources would result in **moderate negative** effects, which are considered to be **not significant**.

14.6.5. DECOMMISSIONING

14.6.5.1. As with construction activities, decommissioning activities have the potential to affect archaeological assets either directly or indirectly. The Marine Cables will be designed, manufactured and installed for a minimum service life of 40 years. 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.

14.6.5.2. 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 are likely to be **not significant**.

14.7. CUMULATIVE EFFECTS ASSESSMENT

14.7.1. INTER-PROJECT EFFECTS

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

14.7.1.2. 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 14.4 (Marine Archaeology Cumulative Assessment Matrix) for the construction, operation (including repair and maintenance) and decommissioning stages of the Proposed Development.

14.7.1.3. It has generally been considered that the potential for cumulative effects will be greatest during the construction phase of the Proposed Development. Decommissioning is assumed to have similar (or lesser) impacts than construction. In the event that cables need to be repaired or maintained, the activities required to undertake the works are considered similar to the effects that may arise during construction although much lower in magnitude due to the considerable reduced scale and shorter duration of works.

14.7.1.4. As detailed in Chapter 29 (Cumulative Effects) of the ES Volume 1 (document reference 6.1.29), this assessment has been undertaken with regards to PINS Advice Note Seventeen – Cumulative Effects Assessment (PINS, 2019). The locations of projects within this list in relation to the Proposed Development are illustrated in Figures 29.1 to 29.5 of the ES Volume 2 (document references 6.2.29.1, 6.2.29.2, 6.2.29.3, 6.2.29.4 and 6.2.29.5). This included major projects (offshore wind farms, interconnector cables, oil and gas), aggregate dredging projects, dredging and

disposal projects, and coastal projects. This long list was agreed with the MMO (see Table 14.1). The long list has been refined for marine archaeology as follows:

- Firstly, a spatial assessment was conducted. Any project identified in the long list of projects falling within the Zone Of Influence ('ZOI') was screened in for further consideration; and,
- A temporal, scale and nature-based assessment was then conducted for those projects where a potential spatial overlap was identified.

- 14.7.1.5. Given the highly localised nature of direct impacts on marine archaeological assets, the ZOI for cumulative assessment is considered to be the spatial extent of the Marine Cable Corridor within the UK Marine Area.
- 14.7.1.6. There is potential for indirect impacts to occur upon known and potential marine archaeology and cultural heritage receptors as a result of changes to hydrodynamic and sediment transport regimes, during the construction stage of the Proposed Development and / or the decommissioning stages of all considered projects. Direct and indirect physical impacts on cultural heritage receptors and marine archaeology, due to similar effects from different elements of the Proposed Development, or in combination with those from other activities will in most cases be limited by the location and extent of sensitive receptors. Due to proposed mitigation detailed in Section 14.8 (and Appendix 14.3 Outline WSI) such as the implementation of Archaeological Exclusion Zones ('AEZs'), 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.
- 14.7.1.7. The potential for impact increases as the distance between sites decreases, and therefore there is higher potential relating to AQUIND Interconnector (France), National Grid IFA2 and Rampion Wind Farm Extension. Rampion Wind Farm Extension is in the very early stages of planning and no information regarding timescales is currently available. Construction is due to be completed for IFA2 by 2020. In addition, Chapter 6 (Physical Processes) indicates that indirect effects, such as scour, are very localised, and therefore even AQUIND Interconnector (France) is unlikely to cause any significant cumulative indirect effects with IFA2.
- 14.7.1.8. Discrete archaeological sites and unknown sites encountered by chance during construction, will be too small to be subject to impact interactions arising from combined effects of the Proposed Development with other developments and activities in the area.
- 14.7.1.9. The Proposed Development is a sufficient distance from nearly all of the projects/plans listed in Appendix 14.4 (Marine Archaeology Cumulative Assessment Matrix). 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 (i.e.

Stage 3 and 4 assessment) as direct and indirect cumulative effects are currently predicted as **not significant**.

- 14.7.1.10. No significant cumulative effects on marine archaeological receptors are foreseen to arise from the construction, operation (including repair and maintenance) or the decommissioning of the Proposed Development.

14.7.2. INTRA-PROJECT EFFECTS

As detailed in Chapter 4 (EIA Methodology) of the ES Volume 1 (document reference 6.1.4), Chapter 29 (Cumulative Effects) presents consideration of potential intra-project effects on marine archaeological receptors.

14.7.3. TRANSBOUNDARY EFFECTS

- 14.7.3.1. With regards to effects 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. Direct impacts resulting from the Proposed Development are expected to be confined to the Marine Cable Corridor, and therefore are not predicted to result in transboundary effects.
- 14.7.3.2. With regards indirect effects, effects to local hydrodynamic and sediment transport regime (as identified in Chapter 6 (Physical Processes)) are not predicted to be significant. Although sediment plumes from construction activities are likely to extend in to French waters, the impacts from suspended sediment plumes and resultant deposition of sediment is not predicted to result in any significant effects on French archaeological receptors. Therefore, transboundary effects are considered as **not significant**.

14.8. PROPOSED MITIGATION

Avoidance

- 14.8.1.1. The primary mitigation for the protection of known archaeological assets is avoidance. This is achieved through the implementation and monitoring of AEZ's, which are proposed for identified high value seabed features of anthropogenic origin (i.e. A1 classified geophysical anomalies).
- 14.8.1.2. The mitigation will establish appropriately sized AEZs around receptors which have been considered to be of high archaeological potential, in consultation with HE, and in agreement with the MMO (as part of the deemed Marine Licence ('dML') requirements). Intrusive construction activities including the use of vessel anchors will not be undertaken within the AEZs. As part of this mitigation, where required, methods will be established for the monitoring of AEZs. This mitigation will be secured through implementation of the WSI as described within the Outline WSI presented in Appendix 14.3 (Outline WSI), Sections 7.2 and 9.

14.8.1.3. The four AEZs (**70184, 70193, 70204, 70018**) 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.

14.8.1.4. 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. This mitigation will be secured through implementation of the WSI as described within Appendix 14.3 (Outline WSI), Sections 7.3 and 9.

Reduction

14.8.1.5. 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).

14.8.1.6. 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, secured and identified through a WSI which includes industry-standard mechanisms such as a PAD. An Outline WSI is presented in Appendix 14.3 (Outline WSI) and Section 7.4 and Sections 9 of the WSI describes these measures.

Offsetting and recovery

14.8.1.7. 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 (see Section 9.6 of Appendix 14.3).

14.8.1.8. 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. If required, recovery methods will be identified through the WSI, (see Sections 11 and 12). 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 dML condition.

14.9. RESIDUAL EFFECTS

- 14.9.1.1. Following the application of appropriate mitigation described in Section 14.8, including the implementation of AEZs, all known marine archaeological assets identified as A1 geophysical anomalies will be avoided. Accordingly, following the application of this mitigation, any residual 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**
- 14.9.1.2. As no AEZs are currently being recommended for A2 anomalies, avoidance through micro-siting of the cable route, where possible, is recommended in the first instance. If there is potential for them to be impacted by the development, they will need to be assessed on a case-by-case basis, in order to accurately position the site and effectively confirm its character. Following the application of the appropriate mitigation, any effects resulting from the Proposed Development would be negligible and considered **not significant**.
- 14.9.1.3. Without any mitigation, impacts on known potential seabed history receptors, could result in moderate 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.
- 14.9.1.4. Any operation works to be carried out will have a relatively small and defined footprint. With the implementation of the appropriate mitigation measures set out above 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**.
- 14.9.1.5. 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 anticipated to be **not significant**.
- 14.9.1.6. 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 – Summary of Effects for Marine Archaeology

Potential Impact	Receptor	Magnitude	Sensitivity	Significance of effect	Mitigation	Significance of Residual Effect
Construction & Decommissioning						
Direct disturbance to the seabed causing damage to receptors	Known and potential seabed prehistory receptors	Low	High	Moderate	Further investigation by means of geoarchaeological assessment of geotechnical samples.	Not significant (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	Implementation of AEZs	Not significant
	Geophysical anomalies of possible anthropogenic origin (A2s)	High	High	Major	Micro-siting of cable route; further investigation through potential opportunities, where possible, for diver and ROV survey; archaeological	Not significant

Potential Impact	Receptor	Magnitude	Sensitivity	Significance of effect	Mitigation	Significance of Residual Effect
					watching briefs during clearance of A2s.	
	Currently unknown archaeological sites and artefacts	High	High	Major	Implementation of AEZs; WSI (and any supporting activity-specific Method Statements, and PAD)	Not significant
Indirect disturbance to receptors	Known and potential seabed prehistory receptors; maritime receptors; and aviation receptors (caused by changes to the hydrodynamic and sedimentary regimes due to spoil removal and sediment redistribution)	Low	High	Moderate	No mitigation is recommended	Not significant

Potential Impact	Receptor	Magnitude	Sensitivity	Significance of effect	Mitigation	Significance of Residual Effect
Operation (including repair and maintenance)						
Direct disturbance to receptors	Known and potential seabed prehistory receptors; maritime receptors; and aviation receptors.	Low - Medium	High	Moderate to Major	Implementation of AEZs; WSI (and any supporting activity-specific Method Statements), and PAD	Not significant
Indirect disturbance to receptors	Known and potential seabed prehistory receptors; maritime receptors; and aviation receptors (caused by potential scour and plume effects resulting in increased protection to, or deterioration through erosion)	Low	High	Moderate	No mitigation is recommended	Not significant
Use of anchors by vessels	Direct impacts to known and potential seabed prehistory receptors; maritime receptors; and aviation receptors.	Medium	High	Moderate to Major	Implementation of AEZs; WSI (and any supporting activity-specific Method Statements, and PAD)	Not significant

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