Immingham Green Energy Terminal

TR030008

Volume 6

6.2 Environmental Statement

Chapter 15: Historical Environment (Marine)

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

September 2023

Infrastructure Planning

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The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

Immingham Green Energy Terminal

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6.2 Environmental Statement

Chapter 15: Historic Environment (Marine)

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15 Historic Environment (Marine)

15.1 Introduction

15.1.1 This chapter presents the findings of the assessment of the likely effects of the Project on the Historic Environment (Marine). This chapter covers the marine elements of the Project below mean high water springs ("MHWS").

15.1.2 For more details about the Project, including construction methodology, layout and life span, refer to **Chapter 2: The Project [TR030008/APP/6.2]**.

15.1.3 The following receptors have been taken forward as part of the assessment:

a. Seabed prehistory (for example, palaeochannels and other features that contain prehistoric sediment, and derived Palaeolithic artefacts e.g. hand axes).

b. Seabed features, including maritime receptors (such as shipwrecks and associated material including cargo, obstructions, and fishermen's fasteners) and aviation receptors (aircraft crash sites and associated debris).

c. Intertidal heritage receptors.

15.1.4 The interrelationships related to the potential effects on Historic Environment (Marine) and other disciplines are addressed in the following chapters:

a. **Chapter 14: Historic Environment (Terrestrial) [TR030008/APP/6.2]**.

b. **Chapter 16: Physical Processes [TR030008/APP/6.2]**.

15.1.5 This chapter is supported by the following appendices **[TR030008/APP/6.4]**:

a. **Appendix 15.A**: Marine Archaeology Technical Report.

b. **Appendix 15.B**: Archaeological Written Scheme of Investigation.

15.1.6 This chapter is also supported by the following figures **[TR030008/APP/6.3]**:

a. **Figure 15.1**: Site Location and Study Area.

b. **Figure 15.2**: Palaeogeographic features of archaeological potential.

c. **Figure 15.3**: Palaeogeographic feature data example – 7502.

d. **Figure 15.4**: Seabed features of archaeological potential.

e. **Figure 15.5**: Data examples of archaeological potential.

15.2 Consultation and Engagement

15.2.1 A scoping exercise was undertaken in August 2022 to establish the form and nature of the marine historic environment assessment, and the approach and methods to be followed. The Scoping Report records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria being applied in the assessment to identify and evaluate the likely significant effects of the **Project on the Historic Environment (Marine)** (**Appendix 1.A [TR030008/APP/6.4]**).

15.2.2 The report was submitted to the Planning Inspectorate ("PINS") with a request for a Scoping Opinion from them on behalf of the Secretary of State.

15.2.3 Following receipt of the Scoping Opinion (**Appendix 1.B [TR030008/APP/6.4]**) as to the information to be provided in the Environmental Statement ("ES") (see **Table 15-1**), there were no additional requirements identified by the Planning Inspectorate which must be taken into account as part of the ongoing Marine Historic Environment assessment. Having regard to the information presented within the Scoping Report (**Appendix 1.A [TR030008/APP/6.4]**), the Planning Inspectorate's Scoping Opinion (**Appendix 1.B [TR030008/APP/6.4]**) confirmed the Applicant's view that significant effects to the setting of marine cultural heritage receptors are unlikely and that impacts on marine archaeology as a result of disposal of dredge arisings are subject to a different regulatory regime. In this context, impacts from the disposal of dredged material have been scoped out as it will take place at already licensed marine disposal sites that have been characterised for this purpose. Accordingly, these matters have remained scoped out of consideration in the ES.

15.2.4 Statutory Consultation took place between 9 January and 20 February 2023 in accordance with the Planning Act 2008. The Applicant prepared a Preliminary Environmental Information Report ("PEI Report"), which was publicised at the consultation stage.

15.2.5 As a result of consideration of the responses to the first Statutory Consultation, the developing environmental assessments and through ongoing design-development and assessment, a series of changes within the Project were identified. A second Statutory Consultation took place between 24 May and 20 July in accordance with the Planning Act 2008 and a PEI Report Addendum was publicised to support the consultation.

15.2.6 The consultation undertaken with statutory consultees to inform this chapter, including a summary of comments raised via the formal scoping opinion (**Appendix 1.A [TR030008/APP/6.4])** and in response to the formal consultation and other pre-application engagement is summarised in **Table 15-1**. The full responses to consultation comments are included within the Summary of Consultation Responses document [**TR030008/APP/5.1**].

Table 15-1: Stakeholder consultation on Historic Environment (Marine)

Consultee	Reference/Date	Summary of Response	How comments have been addressed in this chapter
Planning Inspectorate	Scoping Opinion, 10 October 2022	The Scoping Report proposed to scope out impacts to the setting of marine archaeological and cultural heritage receptors, as given the existing industrial character of the Site, the Applicant considered it unlikely for there to be any material additional impacts on the setting of known and unknown heritage receptors during construction or operation. Given the context of the existing baseline environment, the Inspectorate agreed that significant effects to the setting of marine heritage receptors are unlikely to occur, and this matter was scoped out.	Noted, the assessment of impacts to the setting of marine cultural heritage receptors is scoped out.
	Scoping Opinion, 10 October 2022	The Scoping Report proposed to scope out impacts on marine archaeology as a result of disposal of dredge arisings, as this activity would take place at licensed marine disposal sites that have been characterised for this purpose, and any heritage conditions associated with the use of such sites would be adhered to. Given the receiving locations and regulatory regime in place, the Inspectorate agreed that this matter could be scoped out of the ES.	Noted, the impacts on marine archaeology as a result of disposal of dredge arisings are scoped out.
Historic England	Scoping Opinion, 10 October 2022	Historic England were in general agreement regarding the content of the Scoping Report (AECOM: August 2022) and the areas of the Historic Environment which are to be scoped in and out of the assessment. Historic England explained the importance of making sure that the area of the terrestrial and maritime heritage assessments abut or overlap so that no assets are missed and the setting of assets can be assessed as a whole.	The marine historic environment assessment has assessed the impact on heritage receptors up to MHWS (see **Paragraph 15.5.1**). This abuts the spatial limit of the terrestrial heritage assessment creating a continuous archaeological assessment across the study area, eliminating the potential for assets to be overlooked.
	Scoping Opinion, 10 October 2022	This development could, potentially, have an impact upon a number of designated and un-designated terrestrial and maritime heritage assets and their settings in the area around the site. In line with the advice in the	Response relevant to and addressed in the terrestrial heritage assessment (refer to

Consultee	Reference/Date	Summary of Response	How comments have been addressed in this chapter
		National Planning Policy Framework (NPPF), Historic England would expect the ES to contain a thorough assessment of the likely effects which the proposed development might have upon those elements which contribute to the significance of these assets. Given the heights of the structures associated with the proposed development and the surrounding landscape character, this development is likely to be visible across a very large area and could, as a result, affect the significance of heritage assets at some distance from this site itself. Historic England would expect the assessment to clearly demonstrate that the extent of the proposed study area is of the appropriate size to ensure that all heritage assets likely to be affected by this development have been included and can be properly assessed.	**Chapter 14: Historic Environment (Terrestrial) [TR030008/APP/6.2])**.
	Statutory Consultation – January 2023	Historic England noted the proposed terrestrial and marine investigations and considered it premature to conclude environmental impacts in respect of marine and / or terrestrial archaeological remains/wrecks being classed as less than significant post-mitigation when sufficient survey and deposit modelling work has not yet been carried out/shared.	A full technical assessment of Project marine geophysical and available geotechnical survey data has been undertaken and supports the baseline enhancement for this chapter (**Appendix 15.A**).
		As noted in Historic England's scoping advice, it is important to regard the divide between marine and terrestrial as only the present day boundary and for investigations across this to be well integrated reflecting the shifting relationship through past centuries and millennia in which deposits were formed. Regarding marine surveys, we look forward to seeing the results of geophysical survey and deposit modelling to provide a more informed understanding both of ancient deposits/remains and the location, significance and importance of wrecks. Again it appears premature to cap the potential impact of capital dredging before this work is done since only with a sound undertaking of the resource potential can mitigation through exclusion areas, depth limits and excavation be modelled.	As above. An integrated approach to the marine and intertidal areas has been undertaken with AECOM throughout this chapter, particularly with reference to geoarchaeology and reference is made between this interrelationship and the requirement to read the terrestrial chapter (**Chapter 14: Historic Environment (Terrestrial) [TR030008/APP/6.2]**) alongside the marine chapter (see **Paragraph 15.6.9**).

15.3 Legislation, Policy and Guidance

15.3.1 **Table 15-2** presents the legislation, policy and guidance relevant to the marine historic environment assessment and details how their requirements have been met.

Table 15-2: Relevant legislation, policy and guidance regarding Historic Environment (Marine)

Legislation/Policy/Guidance	Consideration within the Environmental Statement
The Marine and Coastal Access Act 2009 ("MCAA") (Part 4) (Ref 15-21)	
Part 4 of the Marine and Coastal Access Act 2009 is relevant to marine development within English territorial waters, implementing a requirement for a marine licence for carrying out certain licensable marine activities (see **Section 15.3**). Whilst the MCAA regulates marine licensing for works at sea, section 149A of the Planning Act 2008 enables an applicant for a Development Consent Order ("DCO") to include within the Order a Marine Licence which is deemed to be granted under the provisions of the MCAA.	Information relevant to the marine licensing process is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**).
Protection of Wrecks Act 1973: Sections 1 and 2 (Ref 15-22)	
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 study area (see **Section 15.6**).
Ancient Monuments and Archaeological Areas Act 1979 Section 2 (Ref 15-23)	
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 study area (see **Section 15.6**).
Protection of Military Remains Act 1986 (Ref 15-24)	
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 reason for designation is to protect as a 'war grave' the last resting place of servicemen;	There are no protected places or controlled sites within the study area (see **Section 15.6**).

Legislation/Policy/Guidance	Consideration within the Environmental Statement
however, the Act does not require the loss of the vessel to have occurred during the war.	
Merchant Shipping Act 1995 (Ref 15-25)	
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. Any wreck material recovered during the Project will have to be reported to the Receiver of Wreck and stored and disposed of according to their instructions.	Enhanced baseline characterisation relevant to the Act has been undertaken (**Section 15.4**) and in principle mitigation measures, such as a Protocol for Archaeological Discoveries supports the requirements of the Act.
Treasure Act 1996 (Ref 15-26)	
Any material classed as treasure found during the Project must be reported to the Coroner. This includes gold and silver objects, groups of coins, and prehistoric base-metal assemblages. All information required by the Treasure Act (i.e., finder, location, material, date, associated items etc.) will be reported to the coroner within 14 days.	Enhanced baseline characterisation relevant to the Act has been undertaken (**Section 15.4**) and in principle mitigation measures, such as a Protocol for Archaeological Discoveries supports the requirements of the Act.
National Policy Statement for Ports ("NPSfP") (Ref 15-5)	
The NPSfP recognises the importance of the historic environment and that the construction, operation and decommissioning of port infrastructure has the potential to result in adverse impacts on it (Section 5.12.1). Therefore, the significance of heritage assets and the extent of the impact of the proposed development on the significance of any heritage assets has to be understood (Section 5.12.9). Both designated heritage assets and undesignated heritage assets have to be considered, and the setting of a heritage asset also has to be taken into account. The NPSfP advises that the ES should include: • a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. As a minimum, the applicant should have consulted the relevant HER and assessed the heritage assets themselves using expertise where	Information relevant to the policy has been undertaken including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).

Legislation/Policy/Guidance	Consideration within the Environmental Statement
necessary according to the proposed development's impact. (Section 5.12.6); • appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation (Section 5.12.7); • consideration of the possibility of damage to buried features from underwater disposal of dredged material (Section 5.12.8); and • an assessment of the extent of the impact of the proposed development on the significance of any heritage assets affected (Section 5.12.9). The NPSfP also advises that the assessment should take account of other relevant UK policies and plans, including the Marine Policy Statement (MPS) and any existing marine plans provided for by the MCAA 2009 (Section 4.1.1).	
National Planning Policy Framework ("NPPF") (Ref 15-17)	
As part of the NPPF, a core planning principle is to conserve heritage receptors in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations (Ministry of Housing, Communities and Local Government, 2021). Section 16 of the 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 NPPF does not contain specific policies for nationally significant infrastructure projects, but it may be a material consideration in DCO applications (Ref 15-16, para. 5)	Information relevant to the policy is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
North East Lincolnshire Local Plan 2013 to 2032 (Ref 15-18)	
The North East Lincolnshire Local Plan, adopted in 2018, recognises the significant role the historic environment plays in providing a "sense of community identity and local distinctiveness, and enhance the aesthetic, social and cultural quality of life available to residents" (p. 218). Policy 39 "*Conserving and enhancing the historic environment' states that Proposal for*	Information relevant to the policy is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).

Legislation/Policy/Guidance	Consideration within the Environmental Statement
development will be permitted where they would sustain the cultural distinctiveness and significance of North East Lincolnshire's historic urban, rural and coastal environment by protecting, preserving and, where appropriate, enhancing the character, appearance, significance and historic value of designated and non-designated heritage assets and their settings" (p.220). Furthermore, *"Where a development proposal would affect the significance of a heritage assets (whether designated or non-designated), including any contribution made to its setting, it should be informed by proportionate historic environment assessment and evaluations".* This is undertaken by: • *"identifying all heritage assets likely to be affected by the proposal;* • *explain the nature and degree of any effect on elements that contribute to their significance and demonstrating how, in order of preference, any harm will be avoided, minimised, or mitigated;* • *provide a clear explanation and justification for the proposal in order for the harm to be weighed against public benefits; and,* • *demonstrate that all reasonable efforts have been made to sustain the existing use, find new uses, or mitigate the extent of the harm to the significance of the asset; and whether the works proposed are the minimum required to secure the long-term use of the asset."*	
UK Marine Policy Statement ("MPS") (Ref 15-14)	
The MPS was adopted by all UK Administrations in March 2011 as part of a new system of marine planning then being introduced across UK seas. The statement facilitates the formulation of Marine Plans, ensuring that marine resources are used in a sustainable way in line with high level marine objectives. Under the MCAA, England was divided into marine planning regions, with an associated authority responsible for preparing a Marine Plan for that area. The MPS sets out the framework for preparing Marine Plans and	Information relevant to the plan's policy is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).

Legislation/Policy/Guidance	Consideration within the Environmental Statement
making decisions affecting the marine environment. The MPS also states that Marine Plans must ensure a sustainable marine environment that will protect heritage receptors. The relevant Marine Plan for the Project is the relevant Marine Plan is the *East Inshore Marine Plan* (Ref 15-4)	
East Inshore Marine Plan (Ref 15-4)	
The Marine Management Organisation (MMO) have divided the inshore and offshore waters around England into 11 plan areas for which marine plans are to be produced. The proposed development is within the East Inshore Marine Plan Area which has been adopted as of April 2014. The East Inshore Marine Plan Policy SOC2 states that proposals that may affect heritage receptors should demonstrate, in order of preference: • that they will not compromise or harm elements which contribute to the significance of the heritage asset; • how, if there is compromise or harm to a heritage asset, this will be minimised; • how, where compromise or harm to a heritage asset cannot be minimised, it will be mitigated against; or • the public benefits for proceeding with the proposal if it is not possible to minimise or mitigate or compromise the harm to the heritage asset.	Information relevant to the plan's policy is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
Managing Lithic Scatters: Archaeological Guidance for planning authorities and developers (Ref 15-6)	
Guidance for planning authorities and developers in case of the discovery of archaeologically significant lithic material.	Assessment has been undertaken following guidance note.
Military Aircraft Crash Sites: Guidance on their significance and future management (Ref 15-7)	
This provides archaeological guidance regarding the significance and future management of military aircraft crash sites. It outlines the importance of aircraft crash sites and indicates that they should be considered	Assessment has been undertaken following guidance note (**Section 15.4**).

Legislation/Policy/Guidance	Consideration within the Environmental Statement
where they are affected by development proposals.	
The Code of Practice for Seabed Developers (Ref 15-15)	
This voluntary code provides a framework for seabed developers similar to the principles found in current policy and practice on land. The aim of the Code is to ensure a best practice model for seabed development. The Code offers guidance to developers on issues such as risk management and legislative implications.	Information relevant to the guidance note is provided including assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (Ref 15-8)	
This document aims to support best practice and decision-making for managing aspects of the historic environment.	Information relevant to the guidance note is provided including assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
Our Seas – A shared resource: High level marine objectives (Ref 15-3)	
A set of objectives agreed by the UK Government, Northern Ireland Executive and Welsh Assembly Government in order to achieve desirable outcomes for the UK marine area as a whole.	Information relevant to the guidance note is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (Ref 15-9)	
This document provides guidance for good practice in environmental archaeology, and advice on the applications and methods of environmental archaeology within archaeological projects.	Information relevant to the guidance note is provided including assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
Ships and Boats: Prehistory to Present: Designation Selection Guide (Ref 15-10)	
This guide outlines the selection criteria used when designating ships and boats that are part of the archaeological resource.	Assessment undertaken following guidance note (**Section 15.3** and **Section 15.4**).
Standard and Guidance for Historic Environment Desk-based Assessment (Ref 15-2)	
This guidance seeks to define good practice for the execution and reporting of desk-based assessment, in line with the by-laws of the Chartered Institute for Archaeologists. The standard and guidance was formally adopted as	Assessment undertaken following guidance note (**Section 15.3** and **Section 15.4**).

Legislation/Policy/Guidance	Consideration within the Environmental Statement
approved practice at the Annual General Meeting of the Institute held on 14 October 1994. This revision recognises the new Chartered status of the Institute.	
Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (Ref 15-11)	
These notes were prepared as part of the Aggregates Levy Sustainability Fund's ("ALSF") dissemination of heritage information, based on the assessment of a number of ALSF projects. It provides basic information for the characterisation of wreck sites and submerged prehistoric landscapes.	Information relevant to the guidance note is provided including design, mitigation and enhancement measures (**Section 15.7**).
Dredging and Port Construction: Interaction with Features of Archaeological or Heritage Interest (Ref 15-19)	
This guidance document is intended to promote the development of good practice for dredging and port construction in relation to underwater cultural heritage.	Information relevant to the guidance note is provided including assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).
Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Ref 15-12)	
This guidance covers the use of geoarchaeology in understanding the archaeological record.	Information relevant to the guidance note is provided including design, mitigation and enhancement measures (**Section 15.7**).
The Assessment and Management of Marine Archaeology in Port and Harbour Development (Ref 15-13)	
This guidance provides practical advice on assessing the impact of port and harbourdevelopment in England upon the intertidal and marine historic environment. It is relevant to port and harbour owners, operators, developers and contractors, regulatory authorities, curators, archaeological consultants/contractors and other stakeholders. The document aims particularly at providing advice for environmental assessments required for new development projects, it does not address routine port operations or activities covered under existing Harbour Orders.	Information relevant to the guidance note is provided including enhanced baseline assessment of the marine historic environment (**Section 15.4**) and assessment of potential impacts (**Section 15.8**) and mitigation (**Section 15.7**).

15.4 Assessment Methodology

15.4.1 The Environmental Impact Assessment ("EIA") has followed the methodology set out in **Chapter 5: EIA Approach [TR030008/APP/6.2]**.

15.4.2 The importance of marine cultural heritage receptors has been established using criteria based on Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (Ref 15-8) and Ships and Boats: Prehistory to Present: Designation Selection Guide (Ref 15-10).

Data and Information Sources

15.4.3 Current baseline conditions have been determined by a desk-based review of available information.

15.4.4 The main desk-based sources of information that have been reviewed to inform the current baseline description within the vicinity of the Project include:

a. United Kingdom Hydrographic Office ("UKHO") wreck database.

b. Historic England's National Record of the Historic Environment ("NRHE").

c. North East Lincolnshire Council ("NELC") Historic Environment Records ("HER").

d. Various online resources including the British Geological Survey ("BGS") Geology of Britain Viewer.

e. Historic Seascape Characterisation ("HSC") using the consolidated HSC national database (Ref 15-16).

f. Historical maps and Ordnance Survey maps.

g. Relevant primary and secondary sources in Wessex Archaeology's own library and those available through the Archaeology Data Service and other websites. Both published and unpublished archaeological reports relating to excavations and observations in the area around the study area were reviewed.

15.4.5 The baseline relating to both seabed prehistory and seabed features such as maritime and aviation receptors, has been developed through archaeological analysis of geophysical datasets.

15.4.6 An intertidal walkover survey was attempted at low tide on 25 October 2022, but unsafe ground conditions prevented access. Alternative approaches have therefore been used to inform the ES baseline, consisting of an aerial photography assessment.

15.4.7 An aerial photography assessment was undertaken in June 2023. This assessed records, consisting of aerial photographs, held by Historic England. A search request was submitted to the Historic England archives (ref: AP/139117) for all aerial photographs held which covered any part of the 500m Study Area, submitted as a shape file. The search returned a total of 110 vertical photographs, 17 oblique photos and 19 military oblique photographs.

15.4.8 The physical photographs and the digital copies were visually assessed, in conjunction with the marine gazetteer in order to identify any potential unidentified heritage assets in the intertidal zone and to further quantify the presence of any known assets.

Geophysical assessment methodology

15.4.9 A full methodology for the geophysical data assessment is provided in **Appendix 15.A [TR030008/APP/6.4]**.

15.4.10 The baseline relating to both seabed prehistory and seabed features such as maritime and aviation receptors, has been developed through archaeological analysis of geophysical survey data comprising sub-bottom profiler ("SBP"), sidescan sonar ("SSS"), magnetometer ("Mag.") and multibeam echosounder ("MBES") data sets.

15.4.11 In summary, geophysical datasets consulted during this assessment include:

a. Geophysical survey datasets and survey report produced by ABPmer (Ref 15-1) (**Appendix 15.B [TR030008/APP/6.4]**); and

b. Relevant background mapping from the area (BGS 1989, admiralty charts received from UKHO).

15.4.12 All available geophysical datasets were conducted independently of one another. This inevitably leads to the possibility of any one object being the cause of numerous anomalies in different datasets and potentially overstating the number of archaeological features in the exploration area.

15.4.13 To address this, the anomalies were grouped together; allowing one ID number to be assigned to a single object for which there may be, for example, a UKHO record, a MBES anomaly and multiple SSS anomalies (ID numbers beginning with 7, **Figures 15.4 – 15.5 [TR030008/APP/6.3]**).

15.4.14 Once all the geophysical anomalies and desk-based information were grouped, they were classified based on their archaeological potential. For anomalies located on the seabed, these are classified and discriminated as per the criteria in **Table 15-3**. The discrimination codes are included in the legends of **Figures 15.2 – 15.5 [TR030008/APP/6.3]**.

Table 15-3: Criteria discriminating relevance of identified features to The Project

Overview classification	Discrimination	Criteria
Archaeological	P1	Feature of probable archaeological interest, either because of its palaeogeography or likelihood for producing palaeoenvironmental material
Archaeological	P2	Feature of possible archaeological interest
Archaeological	A2_h	Anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature

Overview classification	Discrimination	Criteria
Archaeological	A2_I	Anomaly of likely anthropogenic origin but interpretation if uncertain; may be of archaeological interest or a natural feature
Archaeological	A3	Historic record of possible archaeological interest with no corresponding geophysical anomaly

15.4.15 The geophysical data were assessed to identify anomalies of archaeological potential relating to maritime and aviation activity. Due to the proximity of the area to the modern port workings, many of the receptors identified are likely to represent modern features and as such would not be of interest from an archaeological perspective (**Figure 15.4 [TR030008/APP/6.3]**).

15.4.16 A number of records from the UKHO, NRHE and HER sources are located outside the area of geophysical survey but within the wider Study Area of the Baseline Technical Report (**Appendix 15.A [TR030008/APP/6.4]**), both are retained in the baseline (ID numbers beginning with 2, **Figure 15.4 [TR030008/APP/6.3]**).

Determining Significance of Effects

Receptor Sensitivity

15.4.17 In order to assess the potential impacts of a development upon marine cultural heritage, the conceptual approach known as the 'source-pathway-receptor' model is adopted. 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 receptors). For the significance of any given impact to be fully understood and for appropriate mitigation to be proposed, the sensitivity of any marine cultural heritage receptors that may be impacted need to be considered. This section outlines how the sensitivity of marine cultural heritage receptors is ascertained.

15.4.18 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:

a. Adaptability - the degree to which a receptor can avoid or adapt to an effect.

b. Tolerance - the ability of a receptor to accommodate temporary or permanent change without significant adverse impact.

c. Recoverability - the temporal scale over and extent to which a receptor will recover following an effect.

d. Value - a measure of the receptor's importance, rarity and worth.

15.4.19 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 receptor is predominantly quantified only by its value. In cases where site-specific baseline data is not available, a precautionary approach is typically adopted, and potential receptors are considered high sensitivity

Value of a Receptor

15.4.20 Based on Historic England's Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (Ref 15-8), the significance of a historic receptor *"embraces all the diverse cultural and natural heritage values that people associate with it, or which prompt them to respond to it."*

15.4.21 Within this chapter, value is weighed by consideration of the potential for the receptor to demonstrate the following value criteria:

a. Evidential value – deriving from the potential of a place to yield evidence about past human activity.

b. 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.

c. Aesthetic value – deriving from the ways in which people draw sensory and intellectual stimulation from a place.

d. 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.

15.4.22 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 (Ref 15-10) can be used to assess a receptor in terms of its value:

a. Period

b. Rarity

c. Documentation

d. Group value

e. Survival/condition

f. Potential

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

15.4.24 The value of known archaeological and cultural heritage receptors were assessed on a four-point scale using professional judgement informed by criteria provided in **Table 15-4** below.

Table 15-4: Criteria to assess the archaeological value of marine receptors

Value	Definition
High	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; and • 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.
Medium	Average example and/or moderate potential to contribute to knowledge and understanding and/or outreach; • 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; and, • Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.
Low	Below average example and/or low potential to contribute to knowledge and understanding and/or outreach; • 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; and, • Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.
Negligible	Poor example and/or little or no potential to contribute to knowledge and understanding and/or outreach. Receptor with little or no surviving archaeological interest.

Impact Magnitude

15.4.25 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 15-5**.

Table 15-5: Classification of magnitude of impact

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

Significance Criteria

15.4.26 The significance of effect will be assessed by comparing the value 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 15-6**. Any effect that is Minor to Moderate, Minor or Negligible is not considered significant in this assessment.

Table 15-6: Significance matrix

		Value			
		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

Limitations and Assumptions

15.4.27 The information presented in this assessment reflects the proposed parameters and design for the Project as described in **Chapter 2: The Project [TR030008/APP/6.2]**.

15.4.28 The geophysical data were assessed to identify features of archaeological potential relating to maritime and aviation activity. Due to the proximity of the area to the active, modern port workings, many of the objects identified may represent modern features and as such would not be of interest from an archaeological perspective. However, this cannot be confirmed without visual inspection; as such, they have been retained as a precautionary measure.

15.4.29 The assessment has been undertaken based on the following assumptions:

a. Data used to compile this report consists of secondary information derived from a variety of sources. The assumption is made that the secondary data, as well as that derived from other secondary sources, are reasonably accurate.

b. The records held by the UKHO, NRHE, local HERs and the other sources used in this assessment are not a record of all surviving cultural heritage receptors, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these sources does not inhibit the subsequent discovery of historic environment receptors that are, at present, unknown.

15.5 Study Area

15.5.1 The study area is the area over which potential direct and indirect effects of the Project that may occur during construction and operation. Direct effects on marine cultural heritage receptors are confined to within the footprint of the Project i.e. the construction works and dredging (e.g. **Figure 15.1 [TR030008/APP/6.3]**). Indirect effects are those that may arise due to wider changes in the estuary flow and sedimentary regime and any change to the estuary morphology as a result of the Project.

15.5.2 The study area for the marine archaeology topic comprises the footprint of the marine works associated with the Project and a 500m buffer zone. This has been used to capture relevant data on designated and non-designated marine archaeological receptors that may be impacted by the Project, and to provide the necessary context for understanding archaeological potential and heritage significance of the relevant receptors.

15.5.3 Within this general study area, a geophysical study area comprised the footprint of the marine works associated with the Project and a 100m buffer zone. In this area geophysical data were assessed to better understand the geological context of the Site and also to allow for any features which may require an archaeological exclusion zone (“AEZ”) to be identified with the 100m buffer.

15.6 Baseline Conditions

Current Baseline

15.6.1 This section describes the baseline environmental characteristics within the study area with specific reference to marine cultural heritage and marine archaeology.

Marine Cultural Heritage Receptors

15.6.2 Marine cultural heritage receptors located within the study area can be characterised as comprising four fundamental categories:

a. Seabed prehistory.

b. Maritime archaeology.

c. Aviation archaeology.

d. Intertidal heritage receptors.

Seabed Prehistory

15.6.3 The underlying solid geology is Upper Cretaceous Chalk. Locally there are two formations: Flamborough Chalk and Burnham Chalk. The younger Flamborough Chalk has identifiable bedding surfaces, distinct marl bands and is without flint. The underlying Burnham Chalk, along the eastern part of the Site, is thinly bedded and laminated and contains continuous flint bands. The Port of Immingham is located at a point where the Burnham Chalk Formation is not covered by the Flamborough Chalk Formation.

15.6.4 The chalk surface is characterised by a highly fractured zone created by glacial and periglacial processes and overlain by Pleistocene deposits of Glacial Till. These glacial and post-glacial sequences are subsequently overlain by fine-grained (Clay and Silt) Tidal Flat Deposits.

15.6.5 Beyond areas of industrial development, the area comprises Holocene peats, estuarine alluvium, and tidal flat deposits of sands, silts, and clays.

15.6.6 Assessment of the geophysical data within the study area resulted in a total of four features of palaeogeographic interest (shown on **Figure 15.2 [TR030008/APP/6.3]**). These are summarised as follows:

a. A total of one channel (**7502**) and 2 possible peat outcrops (**7501** and **7503**) were assigned a P1 archaeological rating; and

b. One channel (**7500**) has been assigned a P2 archaeological rating.

15.6.7 As terrestrial features interpreted as being deposited during periods of likely human occupation, those features given a P1 archaeological rating are considered of high archaeological potential. The feature with a P2 discrimination is considered of medium archaeological potential due to the uncertainty of whether any fill of paleoenvironmental or archaeological interest remains.

15.6.8 The results of the onshore geological work presented in **Chapter 14: Historic Environment (Terrestrial) [TR030008/APP/6.2]** found no clear evidence for the suspected palaeochannel identified in this assessment. However, evidence for peat deposits scattered throughout the area of survey was found, comparable to this assessment, indicating that at one time marsh land extended out beyond the current coastline.

Maritime, Aviation and Intertidal Archaeology

15.6.9 The marine archaeological and cultural heritage receptors listed in the NRHE, the UKHO wreck database and the NELC HER that are located within the study area are listed in **Table 15-7** and shown on **Figure 15.4 [TR030008/APP/6.3]**. The section below presents a summary of the baseline.

Table 15-7: Known Marine Cultural Heritage Receptors

WA ID	External References	Type	Description	Easting	Northing
2001	UKHO 65126	Obstruction	Octagonal obstruction shown on aerial photography	520765	415966
2002	UKHO 65127	Obstruction	Octagonal obstruction shown on aerial photography	520788	416015
2003	UKHO 8576; HER MNL1473; NRHE 908340	Wreck	Possible remains of craft recorded between 1991 and 1999. No details are known, and it was listed as dead in 2004	520808	415999
2004	UKHO 65124	Obstruction	Rectangular obstruction shown on aerial photography	520823	415903
2005	UKHO 65128	Obstruction	Octagonal obstruction shown on aerial photography	520826	415994
2006	UKHO 73629	Wreck	Shown on Humber 8, April 2009 Edition.	520832	416009
2007	UKHO 65125	Obstruction	Cigar shaped obstruction shown on aerial photography	520833	415905
2008	UKHO 8507; HER MNL1476; NRHE 907859	Wreck	The HVITVEIS. A Norwegian schooner, built in 1915, which foundered following a collision with the Danish registered SS *Ulla* en route from Goole to Rouen with a cargo of coal.	522073	416696

WA ID	External References	Type	Description	Easting	Northing
2009	HER MNL4434	Anti-submarine defence	Site of World War 1 anti-submarine defences, off Stallingborough Haven. This is the westernmost of three in the Humber, known as the 'Inner Boom'. This consisted of a line of dolphins and nets in the water.	Polygon	
WA = Wessex Archaeology					

15.6.10 Maritime archaeological sites can be considered to comprise two broad categories;

a. The remains of vessels that have been lost as a result of stranding, foundering, collision, enemy action and other causes.

b. Sites that consist of vessel-related material.

15.6.11 Vessel-related material includes (but is not limited to) equipment lost overboard or deliberately jettisoned, such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound. Shipwrecks on the seabed provide an insight on the types of vessels used in the past, the nature of shipping activity in the wider area and the changing usage of the marine environment through different periods. Such remains are considered more likely in sediments which promote the preservation of wreck sites (e.g. finer grained sediments that are not subject to high levels of mobility), particularly where such sediments have seen limited, recent disturbance.

15.6.12 There are no sites within the study area 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 principal statutes that could be used to protect marine archaeological sites.

15.6.13 There are three records of wrecks in the defined study area. Records **2006** and **2008** are wrecks still considered to be located on the seabed. Record **2008** is the wreck of the Norwegian schooner *Hvitveis* that was built and sank in 1915. Record **2006** is unknown. Records **2003** was an unknown wreck that was listed as dead in 2004 i.e. it has not been detected by repeated surveys, although wreck material may still exist at this location. Finally, records **2003** and **2006** may be located in the intertidal zone.

15.6.14 There is the potential for further unknown wreck material to exist. However, the Port of Immingham was constructed in the early 20th century. This suggests that there is lower potential for pre-20th century wreck material to survive within the Project area, both due to a relatively smaller level of maritime activity prior to the construction of the Port and due to the extensive dredging, that has taken place on the adjacent seabed both during construction and since.

15.6.15 A total of 162 features have been identified from the archaeological assessment of geophysical data as being of possible archaeological potential within the study area, defined as follows:

a. 74 A2_h anomalies (anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature).

b. 88 A2_I anomalies (anomaly of possible anthropogenic origin but interpretation is uncertain; may be anthropogenic or a natural feature).

15.6.16 No A1 or A3 anomalies have been identified from the archaeological assessment.

15.6.17 These features include anomalies from magnetometer, multi-beam echo sounder and sidescan sonar data, or a combination of the three. Full details can be found in **Section 3** of **Appendix 15.A [TR030008/APP/6.4]** to this ES and illustrated in **Figure 15.4 [TR030008/APP/6.3]** and **Figure 15.5 [TR030008/APP/6.3]** to this ES.

15.6.18 Intertidal features located below MHWS and above mean low water springs ("MLWS") comprise 'obstructions' and dolphins and large debris from 20th century port activity (**2001**, **2002**, **2004**, **2005** and **2007**) (**Figure 15.4 [TR030008/APP/6.3]**).

15.6.19 The NELC HER lists the site of a First World War anti-submarine boom (**2009**). This is the westernmost of three such defences in the Humber and was known as the 'Inner Boom'. It consisted of a line of dolphins and nets in the water.

15.6.20 The Aerial photography assessment did not identify any new or potential heritage assets in the intertidal zone. The majority of the aerial photographs were taken at high tide, or concentrated primarily on the terrestrial port, making identification of further assets difficult.

15.6.21 Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence is divided into three primary time periods based on major technological advances in aircraft design, namely: pre-1939; 1939-1945; and post-1945. Although there are currently no known aircraft crash sites located within the study area, there is the potential for the discovery of previously unknown aircraft material. This is highlighted by the recorded loss of a Halifax MK III, that ditched off Immingham in October 1944. There is particularly high potential for the discovery of aircraft from 1939-1945. There were numerous airfields and local anti-aircraft installations in the vicinity of the Project during the Second World War, with Royal Air Force (RAF) Goxhill and RAF North Killingholme being particularly proximate. Further, the RAF Air Sea Rescue Services are known to have attempted numerous rescues of aircrew from crashed aircraft in the Humber Estuary during the Second World War (Ref 15-20). The remains of crashed military aircraft are protected under the Protection of Military Remains Act 1986 and cannot be disturbed without a licence.

Future Baseline

15.6.22 In the absence of the Project there would be no change to known and potential archaeological marine cultural heritage receptors beyond those caused by natural physical processes and natural deterioration. Physical effects to marine receptors are considered below in terms of likely impacts and effects.

15.7 Development Design and Impact Avoidance

Embedded Mitigation Measures

15.7.1 The Project has been designed, as far as possible, to avoid and minimise impacts and effects to marine cultural heritage through the process of design development, and by embedding mitigation measures into the design.

15.7.2 This consisted of the development of design iterations towards fewer berths, leading to reduced overall area where direct physical impacts to marine cultural archaeology and cultural heritage receptors may develop.

Standard Mitigation Measures

15.7.3 The following mitigation measures, set out within an Outline Written Scheme of Investigation (see **Appendix 15.B [TR030008/APP/6.4]**) have been considered as part of the design development of the Project:

a. Avoidance of known marine cultural heritage receptors (e.g. AEZs).

b. Geoarchaeological and geophysical data assessment for baseline enhancement.

c. Protocol for Archaeological Discoveries.

Archaeological Exclusion Zones

15.7.4 The primary mitigation for the protection of known archaeological receptors is avoidance. This is commonly achieved through the implementation and monitoring of AEZs, which are proposed for identified high value seabed receptors of anthropogenic origin (i.e. A1 classified geophysical anomalies).

15.7.5 The Assessment and Management of Marine Archaeology in Port and Harbour Development (Ref 15-13) states that AEZs are formed by establishing a buffer around the known extents of sites for which the available evidence suggest that there could be archaeological material present on the seabed. The mitigation will establish appropriately sized AEZs around receptors which have been considered to be of high archaeological potential, in consultation with the Archaeological Curators (Historic England). 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 would be part of this mitigation.

Geoarchaeological and geophysical data assessment for baseline enhancement

15.7.6 Geophysical surveys undertaken to support the project design, would also be assessed by a suitably qualified archaeological contractor to support baseline enhancement and identification of unknown marine cultural heritage receptors.

15.7.7 Similarly, the geoarchaeological assessment of any future marine borehole logs obtained as part of this detailed design ground investigation would also be undertaken to enhance the baseline understanding of submerged palaeolandscapes, particularly in relation to the four identified P1 and P2 receptors.

Protocol for Archaeological Discoveries ("PAD")

15.7.8 If previously unknown sites or material are encountered during the different phases of the Project, measures would be taken to reduce the level of impact. In order to provide for these unexpected discoveries a PAD would be adopted. A PAD is a system for reporting and investigating unexpected archaeological discoveries encountered during construction activities, with a Retained Archaeologist providing guidance and advising on the implementation of the PAD.

15.7.9 The PAD also makes provision for the implementation of temporary exclusion zones around areas of possible archaeological interest, for prompt archaeological advice, and, if necessary, for archaeological inspection of important features prior to further activities in the vicinity. The PAD provides a mechanism to comply with the Merchant Shipping Act 1995, including notification of the Receiver of Wreck, and accords with the Code of Practice for Seabed Developers (Ref 15-15) and The Assessment and Management of Marine Archaeology in Port and Harbour Development (Ref 15-13).

15.8 Assessment of Likely Impacts and Effects

15.8.1 This section identifies the potential likely effects on the marine cultural heritage receptors as a result of the construction and subsequent operation of the Project which have been identified.

15.8.2 These impacts are associated with:

a. Construction of jetty infrastructure.

b. Capital dredging.

15.8.3 The Physical Processes assessment (**Chapter 16: Physical Processes [TR030008/APP/6.2]**) was consulted to assess the damage to known and unknown receptors from indirect impacts.

15.8.4 Cumulative impacts on marine cultural heritage receptors that could arise as a result of other developments and activities in the Humber Estuary have been considered as necessary as part of the cumulative impacts and in-combination effects assessment (see **Chapter 25: Cumulative Effects and In-Combination Assessment [TR030008/APP/6.2]**).

Construction

15.8.5 This section contains an assessment of the potential impacts to marine archaeology and cultural heritage receptors as a result of the construction phase of the Project (see **Chapter 2: The Project [TR030008/APP/6.2]**). The assessment of impacts on the historic marine environment considers the entire extent of the Project and is considered a 'worst-case' scenario in terms of potential impacts.

15.8.6 The following impact pathways have been assessed:

a. Direct impacts on known and potential marine cultural heritage receptors as a result of construction and capital dredging.

b. Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes.

15.8.7 Any direct impacts to marine cultural heritage receptors are likely to occur during capital dredging activities at the berth and marine piling (see **Chapter 2: The Project [TR030008/APP/6.2]**). Impacts resulting in negative effects upon marine archaeology and cultural heritage receptors as part of dredging or marine piling works (for example) are those involving contact with the seabed and/or the removal of seabed sediments.

15.8.8 Nine A2_h anomalies intersect with the Approach Trestle piling design (7017, 7031, 7034, 7050, 7051, 7053, 7072, 7100, 7115), a further A2_h anomaly (7144) is located between the Jetty Head and Dolphins and should be considered for precautionary inspection if likely to be close to construction activities (**Figure 15.4 [TR030008/APP/6.3]**).

15.8.9 Two palaeogeographic features of archaeological interest are recorded intersecting with the Approach Trestle (7500, 7501) (**Figure 15.2 [TR030008/APP/6.3]**).

15.8.10 There are examples of A2_l anomalies within or close to the proposed dredge pocket and pocket side (7143, 7145, 7141). They represent buried, small magnetic anomalies and may have archaeological potential (**Figure 15.4 [TR030008/APP/6.3]**).

15.8.11 Any adverse effects, i.e. physical damage, upon marine cultural heritage receptors from direct impacts associated with dredging and marine piling would be permanent and irreversible. As such, the magnitude of direct impacts on known and potential marine cultural heritage receptors, and potential seabed prehistory features as part of construction and capital dredging activities, if they were to occur, would be high.

15.8.12 As a result, if appropriate mitigation is not applied, both the high sensitivity (see **Paragraph 15.4.19**) and the high magnitude of impact on such resources would result in a **major adverse** significant effect. This is considered to be **significant** in EIA terms.

15.8.13 The assessment of changes to hydrodynamics and sedimentary processes predicts a **low/negligible** exposure to change (**Chapter 16: Physical Processes [TR030008/APP/6.2]**), the magnitude of indirect impacts to marine cultural heritage receptors during the construction phase is expected to be negligible. Similarly, impacts from construction vessel movements are considered to be localised and temporary, and the magnitude of change is assessed as negligible.

15.8.14 Therefore, the high sensitivity of potential receptors and negligible magnitude of indirect impacts on such resources will result in **negligible** effects, considered **not significant**.

Operation

15.8.15 This section contains an assessment of the potential impacts to marine cultural heritage receptors as a result of the operational phase of the Project. The following impact pathways have been identified:

a. Direct impacts on known and potential marine cultural heritage receptors and deposits of archaeological importance as a result of operational activities and maintenance dredging.

b. Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes.

15.8.16 As maintenance dredging, if required, will take place in areas where the impact has already occurred for the capital dredge during the construction phase, there is unlikely to be further impact. Therefore, the magnitude of direct impacts on such resource would result in **negligible** effects, considered **not significant**.

15.8.17 As a result of the assessment of changes to hydrodynamics and sedimentary processes which predicts a **low/negligible** exposure to change (**Chapter 16: Physical Processes [TR030008/APP/6.2]**), the magnitude of indirect impacts to marine cultural heritage receptors during the operation phase is expected to be negligible. Similarly, impacts from construction vessel movements are considered to be localised and temporary, and the magnitude of change is assessed as negligible.

15.8.18 Therefore, the high sensitivity of potential receptors and negligible magnitude of indirect impacts on such resources will result in **negligible** effects, considered **not significant**.

Decommissioning

15.8.19 The DCO will not make any provision for the decommissioning of the main elements of the marine infrastructure above and below water level. This is because the jetty, jetty head, loading platforms, access ramps and jetty access road would, once constructed, become part of the fabric of the Port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. It is anticipated that plant and equipment on the jetty topside would be decommissioned in parallel with the decommissioning of the related landside elements. On this basis, potential effects on the marine historic environment have been scoped out of the EIA.

15.9 Mitigation and Enhancement Measures

15.9.1 Mitigation measures are described within a WSI and will be secured within the Deemed Marine Licence which forms Schedule 3 of the **draft DCO [TR030008/APP/2.1]**. An Outline WSI is included as **Appendix 15.B [TR030008/APP/6.4]** to this ES. The final WSI will need to take account of any relevant matters emerging through the ongoing detailed design process and any relevant matters emerging through the examination of the DCO application.

15.9.2 The following measures – which will be included in the WSI - are designed to mitigate any predicted adverse effects upon seabed receptors from direct impacts. The mitigation measures are designed to either avoid, reduce or offset any damage/disturbance occurring as a result of the Project upon known receptors, and to establish the presence of unknown sites.

AEZs

15.9.3 As no A1 anomalies have been identified for this assessment, no AEZs are currently recommended for the Project. Any A1 anomalies discovered during the works (e.g. through the PAD - see **Paragraph 15.7.8** of this chapter) then this mitigation will be used.

A2 anomalies

15.9.4 For anomalies assigned an A2 archaeological classification, especially A2_h anomalies (**Appendix 15.A [TR030008/APP/6.4]**), no AEZs are currently recommended. However, avoidance of these anomalies by micro-siting will be carried out, if possible, if they are directly impacted by the Project. If micro-siting is not possible, then further appraisal and investigation to ascertain the nature of the anomalies would take place.

15.9.5 Further investigations would mean that anomalies can either have their archaeological value removed, if they prove to be natural features or modern, or their value as archaeological receptors confirmed. If their value is confirmed, 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 PAD (see **Paragraph 15.9.4** of this chapter).

15.9.6 The agreed WSI will detail the agreed mitigation that will be in place during the construction of the Project. The implementation of a WSI is the mitigation, rather than the document itself. The WSI has been and will continue to be developed in line with Historic Environment guidance for Port and Harbour development (Ref 15-13). The WSI is based on the measures recommended in this chapter and will be subject to approval by the Archaeological Curator (Historic England) through the application examination process.

15.9.7 In cases where avoidance is either inappropriate or impossible, the damage to archaeological receptors would be offset, generally by more extensive study, excavation or survey of the receptor. Any mitigation strategy will be identified within the WSI and any recommended methods will be covered by a specific Method Statement, approved by the Archaeological Curator (Historic England), should they be implemented.

15.9.8 Where suitable for archaeological assessment, further geophysical surveys undertaken in advance of the development commencing, for example for the purposes of detailed design, that require magnetometer data (e.g., unexploded ordnance ("UXO") survey) will also be assessed by a suitably qualified archaeological contractor. This will allow for the identification of any additional ferrous features of archaeological potential within the Project, as well as to confirm the presence of ferrous material at the location of features identified during this assessment.

Palaeogeography

15.9.9 The appraisal of geophysical data resulted in the identification of a total of four features of palaeogeographic interest within the study area, intersecting with the proposed open-piled approach trestle. Mitigation measures to offset physical effects to palaeogeographic receptors are discussed below. These features are summarised as follows:

a. One channel (7502) and two possible peat outcrops (7501 and 7503) were assigned a P1 archaeological rating.

b. One channel (7500) has been assigned a P2 archaeological rating.

15.9.10 As terrestrial features interpreted as being deposited during periods of likely human occupation, those features given a P1 archaeological classification are considered of high archaeological potential. Those features with a P2 classification are considered of medium archaeological potential.

15.9.11 For the purposes of the detailed design of the marine elements of the project, further ground investigation work is programmed to take place. Appropriate archaeological advice has been provided on how that investigation can provide samples of benefit to ongoing archaeological considerations in synergy with the Outline WSI (**Appendix 15.B [TR030008/APP/6.4]**).

15.9.12 A geoarchaeological assessment of any future marine borehole logs obtained as part of this detailed design ground investigation will be undertaken, especially in respect of any logs that contain organic deposits for dating purposes. This will aid in refining the interpretation and therefore help determine the archaeological potential of the area.

PAD

15.9.13 As discussed in **Paragraphs 15.7.8** and **15.7.9**, if previously unknown sites or material are encountered during the different phases of the Project, a PAD will be adopted to reduce the level of impact on unexpected discoveries. The PAD is a system for reporting and investigating unexpected archaeological discoveries encountered during construction activities, with a Retained Archaeologist providing guidance and advising on the implementation of the PAD.

15.10 Assessment of Residual Effects

Construction

15.10.1 The assessment considered two impact pathways from the construction phase in detail. These addressed the potential for direct and indirect impacts on known and potential heritage receptors from construction activities and from capital dredging.

15.10.2 No AEZs are currently recommended for the Project. With regards potential maritime and aviation receptors (e.g. A2_h anomalies), avoidance through micro-siting, where possible, is typically proposed. Where this is not possible additional measures to establish the nature of potentially impacted anomalies is recommended.

15.10.3 With the adoption of the appropriate mitigation (**Table 15-8**) any effects resulting from the Project would be **negligible** and considered **not significant**. Therefore, no further mitigation is required.

15.10.4 Should seabed prehistory receptors be confirmed at the Site, a **positive** effect could be achieved through contributing to the knowledge base of seabed prehistory receptors, for example through geophysical and geoarchaeological assessment.

Operation

15.10.5 The assessment considered two impact pathways from the operation phase in detail. These addressed the potential for direct and indirect impacts on known and potential heritage receptors from maintenance dredging and operational activities.

15.10.6 Any maintenance dredging works to be carried out during the operational phase (if required) will have a relatively small and defined footprint, and significant impacts would have already likely occurred during the construction phase. With the implementation of the appropriate mitigation measures set out above the significance of any direct or indirect effects on marine archaeology will be **negligible** and considered **not significant**. Therefore, no further mitigation measures are required.

Decommissioning

15.10.7 As set out in **Paragraph 15.8.19**, the DCO would not make any provision for the decommissioning of the marine infrastructure above and below water level. No impacts were therefore considered for the decommissioning phase.

15.11 Summary of Assessment

15.11.1 A summary of the impact pathways that have been assessed, the identified residual effects and level of confidence is presented in **Table 15-8** of this Chapter.

Table 15-8: Summary of potential impact, mitigation measures and residual effects

Receptor	Impact Pathway	Pre-mitigation Impact Significance	Mitigation Measure	Residual Effects	Confidence
Construction Phase					
Known marine cultural heritage receptors	Direct impacts on known and potential marine cultural heritage receptors and deposits of archaeological importance as a result of construction and capital dredging	**Major adverse**	Geophysical and geoarchaeological assessment of project survey data. Then, avoidance of known and potential receptors, implementation of AEZs where deemed appropriate and reduction via a PAD and specific measures agreed within a WSI for A2 anomalies within the construction footprint.	**Negligible positive (as long as geotechnical data are retained, analysed, and reported on by qualified geoarchaeologist)**	High
Potential marine cultural heritage receptors					
Known marine cultural heritage receptors	Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes.	**Negligible**	-	**Negligible**	High
Potential marine cultural heritage receptors		**Negligible**	-	**Negligible**	High

Receptor	Impact Pathway	Pre-mitigation Impact Significance	Mitigation Measure	Residual Effects	Confidence
Operational Phase					
Known marine cultural heritage receptors	Direct impacts on known and potential marine cultural heritage receptors from maintenance dredging	**Negligible**	-	**Negligible**	High
Potential marine cultural heritage receptors					
Known marine cultural heritage receptors	Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes.	**Negligible**	-	**Negligible**	High
Potential marine cultural heritage receptors		**Negligible**	-	**Negligible**	High

15.12 References

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