PROPOSED NAVITUS BAY WIND PARK

PRELIMINARY ENVIRONMENTAL INFORMATION 3

CHAPTER 14
OFFSHORE ARCHAEOLOGY

SEPTEMBER 2013

NAVITUSBAY

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14.OFFSHORE ARCHAEOLOGY

14.1. Introduction

14.1. This chapter assesses the potential impacts on the marine historic environment arising from the construction, operation and maintenance ('O&M') and decommissioning phases of the offshore elements of the Navitus Bay Wind Park ('the Project'). For the purpose of this assessment, the Offshore Development Area comprises the following project elements: the Turbine Area and an Offshore Export Cable Corridor.

14.2. For details of the Project description used within this assessment refer to Chapter 2, Navitus Bay Wind Park Project.

14.3. Offshore archaeology includes: prehistoric archaeology (late Pleistocene fluvial sediments and modern seabed sediment), maritime archaeology (known and unknown wreck sites, shipping casualties/losses and isolated maritime artefacts or finds), and aviation archaeology (known and unknown aircraft crash sites, losses and isolated aircraft finds).

14.2. Legislation, Policy and Guidance

14.4. This section outlines the legislation, policy and guidance that is relevant to the assessment of the potential impacts on the marine historic environment. In addition, other national, regional and local policies are considered within this assessment where they are judged to be relevant and important to the Project.

14.2.1. International - Maritime archaeology on the continental shelf

14.5. The legal mandate for regulating and reporting maritime archaeology beyond the UK territorial sea (i.e. beyond 12 NM) is limited. Some regulation however, arises from the environmental controls placed on the regulated exploitation of natural resources. In particular, activities beyond the territorial sea may be subject to Environmental Impact Assessment ('EIA') under the European Union EIA Directives (85/337/EEC and 97/11/EC) and assessed under the terms of the Strategic Environmental Directive (2001/42/EC).

14.6. Other relevant legislation includes the United Nations Convention on the Law of the Sea 1982 (UNCLOS, 1982), the European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (the Valletta Convention) and the United Nations Educational, Scientific and Cultural Organisation's Convention on the Protection of the Underwater Cultural Heritage 2001 (UNESCO, 2001). Whilst the UK abstained in the vote on the latter Convention, the Government has publicly stated that it accepts the Rules of the Annex to the Convention, which sets out standards of practice applicable to maritime archaeological investigations.

14.2.2. National

Legislation

14.7. The legislation that applies to the assessment of impacts to offshore archaeology includes:

- The Protection of Wrecks Act (1973). Provision for the protection of wrecks and wreckage of historical, archaeological or artistic importance by way of individual site designation;
- The Protection of Military Remains Act (1986). Administered by the Ministry of Defence and makes provision for the protection of crashed, sunken or stranded military aircraft and vessels;
- The Ancient Monuments and Archaeological Areas Act (1979). Used to protect underwater sites (buildings, structures or works, caves or excavations, vehicles, vessels, aircraft or other movable structures of national importance) within the limits of the UK's territorial sea;
- National Heritage Act (2002). Gives English Heritage responsibility for marine archaeology below mean low water within England's territorial sea, allowing its management to become integrated;
- The Merchant Shipping Act (1995). Defines 'wreck' as anything which is found in or on the sea or washed ashore from tidal water;

- The Marine Works Regulations (Amended) (2011). Transposes the requirements of the European Community Environmental Impact Assessment (EIA) Directives (85/337/EEC and 97/11/EC) with respect to construction, both in or over the sea, and on or under the seabed into UK law;
- The Marine and Coastal Access Act (2009).

Policy

14.8. The Overarching National Policy Statement ('NPS') for Energy ('EN-1'), in-conjunction with the NPS for Renewable Energy Infrastructure ('EN-3'), provide the primary policy framework within which the Project would be assessed. EN-1 and EN-3 describe the requirements for applicants undertaking an impact assessment with regard to offshore archaeology (see Table 14.1).

14.2.3. Other guidance

14.9. The assessment methodology has been informed by the following specific guidance and best practice documents:

- Joint Nautical Archaeology Policy Committee (2008). Code of Practice for Seabed Developers sets out procedures for consultation between seabed developers and archaeologists beyond the remit of the formal EIA process;
- COWRIE (2007). Historic Environment Guidance for the Offshore Renewable Energy Sector;
- COWRIE (2010). Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector;
- English Heritage (2005). Wind Energy and the Historic Environment;
- English Heritage (1998). Identifying and Protecting Palaeolithic Remains; Archaeological - Guidance for Planning Authorities and Developers;
- Wessex Archaeology (2010c). Model Clauses for Archaeological Written Schemes of Investigation: Offshore Renewables Projects. Prepared on behalf of The Crown Estate.

14.3. Assessment Methodology

14.3.1. Study area

14.10. The study area included a 1 km buffer around the Offshore Development Area (the Turbine Area and Export Cable Corridor) and the landfall of the Offshore Export Cable Corridor buffered by 100 m above Mean High Water Springs ('MHWS'). In addition, consideration of the region covered by the South Coast Regional Environmental Characterisation ('South Coast REC') (James *et al*., 2010) survey lines and the extents of the adjacent aggregate licence were included. The buffering of the Offshore Development Area was to allow the identification and inclusion of archaeological sites outside but near the Turbine Area and Offshore Export Cable Corridor (Figure 14.1).

14.3.2. Consultation

14.11. This section provides information on the consultation undertaken to date, to inform this assessment. Advice and information provided by the consultees has shaped both the assessment methodology and the scope of the assessment. The organisations consulted and the subject of each contact is detailed in Table 14.2.

Table 14.1 Compliance with National Policy Statements	
Summary of NPS provision	Consideration in PEI
NPS EN-1: Part 5.8	
Paragraph 5.8.8: *"As part of the ES the applicant should provide a description of the significance of the heritage assets affected by the proposed development."*	The significance of prehistoric, maritime and aviation archaeological assets has been considered in the baseline and is a fundamental element of the impact assessment.
Paragraph 5.8.8: *"The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset."*	This assessment has considered a wide range of heritage assets and has taken forward to assessment those that are considered to be impacted by the Project.
Paragraph 5.8.8: *"As a minimum the applicant should have:* ➢ *Consulted the relevant Historic Environment Record and English Heritage;* ➢ *Assessed the heritage assets themselves using expertise where necessary according to the proposed development's impact."*	Historical records were obtained from all relevant HER's and from English Heritage's National Monuments Record. An archaeological baseline review, including the assessment of geophysical and geotechnical data, and the assessment of Project impacts on heritage assets forms the basis of this assessment.
Paragraph 5.8.9: *"Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation."*	This assessment includes a comprehensive desk-based review of archaeological assets within and beyond the Project boundary. This includes the archaeological assessment of geophysical and geotechnical fieldwork data.
Paragraph 5.8.10: *"The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents."*	A detailed technical study has informed an assessment of Project impacts on archaeological assets, within and beyond the Project boundary, which has informed the assessment of impacts.
NPS EN-3: Part 2	
Paragraph 2.6.140: *"Consultation with the relevant statutory consultees (including English Heritage) should be undertaken by the applicants at an early stage of the development."*	A series of consultative meetings have been held with English Heritage, the details of which are set out in the Consultation section.
Paragraph 2.6.141: *"Assessment should be undertaken as set out in Section 5.8 of EN-1. Desk-based studies should take into account any geotechnical or geophysical surveys that have been undertaken to aid the wind farm design."*	The requirements of EN-1 have been met in the development of this impact assessment. This has included the archaeological assessment of baseline historical data, and geophysical and geotechnical fieldwork data.
Paragraph 2.6.142: *"Assessment should also include the identification of any beneficial effects on the historic marine environment, for example through improved access or the contribution to new knowledge that arises from investigation."*	The archaeological review of data for this impact assessment has provided new information about and insights into the prehistoric, maritime and aviation archaeology of Christchurch and Poole Bays.
Paragraph 2.6.145: *"The avoidance of important heritage assets, including archaeological sites and historic wrecks, is the most effective form of protection and can be achieved through the implementation of exclusion zones around such heritage assets which preclude development activities within their boundaries. The boundaries can be drawn around either discrete sites or more extensive areas identified in the ES."*	The Project design of Navitus Bay Wind Park makes provisions for exclusion zones around all known wrecks and aircraft within the Project boundary. Therefore, the Project would avoid known archaeological sites.

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Study Area

Legend

- Turbine Area
- Offshore Export Cable Corridor
- Study Area

Fig. No.: Figure 14.1		**Date:** 08/08/2013
Author: NDU	**Checked:** SLE	**Approved:** SMF
Scale@A3: 1:175,000		**Revision No.:** B
Coordinate System: WGS 1984 UTM Zone 30N		**Data Sources:** SeaZone PMSS
Datum: WGS 1984	**Ref. No.:** 29823/35931/NDU	

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Table 14.2 Consultation		
Organisation and Date	Summary of Response	Where Addressed in PEI
English Heritage October 2011 Scoping Response.	The appendices should provide detailed descriptions of the methodologies and techniques employed to inform the appraisal framework used within the ES.	This chapter provides a detailed summary of the baseline environment and assessment of impacts. Further details will be provided within the archaeological technical report which will be provided in support of the Environment Statement that will form part of an application for development consent.
	In respect of the Rochdale Envelope, the ES should inform English Heritage what the alternatives were and why their impacts were judged to be less damaging for the historic environment.	The Project design parameters used to assess the Rochdale Envelope for archaeology were drawn from the Navitus Bay Project Description. The design parameters assessed represent the worst-case scenario for archaeological receptors. (See Chapter 2)
	The EIA must be fully informed by PPS5 Planning for the Historic Environment (or any subsequent planning policy advice published by Government).	The assessment process has been informed by the National Planning Policy Framework (2012) which supersedes Planning Policy Statement 5 and Planning Policy Guidance 20. It has also been informed by the provisions of the National Policy Statement for Energy (NPS EN-1) and National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (see Table 14.1).
	A complete desk-based assessment of the entire area within the proposed development envelope must be completed for the EIA, and the results must be corroborated by the geophysical/geotechnical survey data gathered to an archaeological standard that will support such analysis.	This chapter provides a detailed summary of the baseline environment and assessment of impacts. Further details will be provided within the Environment Statement thatw ill form part of an application for development consent.
	Should any [geophysical] anomalies indicate material of archaeological interest, they [should] be subject to Exclusion Zone[s], in agreement with English Heritage.	All geophysical anomalies assessed to be of high archaeological potential have been recommended for Exclusion Zones (‘EZs’) within the Impact Assessment.
	Any archaeological reports produced are required to be agreed by English Heritage prior to the development commencing. These reports also need to be deposited within the National Monuments Record (by submitting an EH OASIS form with a digital copy of the report. Notification of the completion of this form is to be sent to the relevant local authority for any aspect of the project that occurs within their area of responsibility for inclusion in the Historic Environment Record.	This is noted and at the point of submission of the Environmental Statement, archaeological technical reports will be deposited at the National Monuments Record. Relevant local authorities will be notified of the deposition of the report.
	The ES must set out how a formal Protocol for reporting archaeological discoveries will be produced.	Provision has been made in the mitigation measures proposed within this assessment for the implementation of a finds reporting protocol as part of the Project’s Written Scheme of Investigation (‘WSI’)

Table 14.2 Consultation		
	English Heritage does not believe that sufficient evidence has been presented in the Scoping Report to justify that in-combination effects in respect of archaeology and cultural heritage have been scoped out of the EIA.	This is noted and cumulative and in-combination impacts will be assessed within the Enviromental Statement that will form part of the application for development consent.
	English Heritage recommends that the methodologies produced to implement Historic Seascape Characterisation are employed to inform the preparation of the ES.	The relevant local HSCs were considered in developing the offshore archaeological baseline (refer to Baseline Environment section)
New Forest National Park Authority October 2011 Scoping Response.	Before any desk based assessment work takes place, as outlined in this document in relation to Cultural Heritage and archaeology, the NFNPA states that Eneco and its historic environment/archaeological consultant will need to discuss in detail the preparation of a written scheme of investigation. This is to ensure that all available information that would inform the preparation of the necessary documentation, leading to an appropriate mitigation strategy for the marine, maritime and terrestrial environments is formulated.	This is a terrestrial approach to the archaeological assessment. Offshore, a WSI will be produced after the desk-based assessment has been undertaken. The mitigation measures in respect of offshore archaeological receptors proposed in this assessment include the requirement to produce a WSI.
	NFNPA notes that the data from the recently completed New Forest RCZA has not been transferred into the County Historic Environment Record (HER). NFNPA states that this data source could be of material benefit to the consultant preparing any WSI and cultural heritage/archaeological reports.	The Rapid Coastal Zone Assessment ('RCZA') assessment data obtained directly from the NFNPA and used in the offshore archaeological assessment (see Section 14.4).
English Heritage, the statutory advisor for Cultural Heritage December 2011, 2012 and May 2013.	Proposed overall approach for the archaeological baseline review and assessment was presented and agreed.	This is presented within the Baseline Environment and Assessment Methodology sections of this chapter.
	Results of the archaeological baseline study up to that date were presented and, as part of the marine licensing process, the methodology for the acquisition of vibrocores for archaeological purposes was discussed and commented on by English Heritage.	Results of the archaeological baseline are presented within the 'Geotechnical review' and 'Baseline' Sections of this chapter.
	Results of archaeological baseline review, impact assessment and proposed mitigation were presented and proposed mitigation measures discussed and agreed.	This is presented within the Impact assessment section and Potential Mitigation section of this chapter.

14.3.3. The scope of assessment

14.12. The scope of this assessment has been developed on the basis of responses to the Scoping Opinion and the results of consultations with English Heritage. It is based on the guidance in respect of the seabed development and marine historic environment presented above.

14.13. The assessment presents the available evidence for submerged prehistoric, maritime and aviation archaeology within the Offshore Development Area as a whole and considers the potential for the presence of currently undiscovered archaeological sites and materials from all periods.

Archaeological receptors

14.14. Archaeological receptors potentially sensitive to effects resulting from the Project have been identified from three archaeological themes described in the baseline sections. They are:

- Prehistoric archaeology:
  - Late Pleistocene fluvial sediments (principally located in palaeochannels);
  - Modern seabed sediment (potentially containing reworked archaeological material).
- Maritime archaeology:
  - Known, charted wreck sites;
  - Recorded shipping casualties / losses;
  - Unknown, uncharted wreck sites;
  - Isolated maritime artefacts or finds.
- Aviation archaeology:
  - Known, charted aircraft crash sites;
  - Recorded aircraft losses;
  - Isolated aircraft finds.

14.3.4. Issues scoped out

14.15. All potential archaeological receptors have been considered in the baseline review, including known and charted shipwrecks (and all high and medium potential geophysical anomalies). However, shipwreck sites have been scoped out of the impact assessment because the Project's embedded mitigation makes a provision for the exclusion of these sites from Project activities (see the Embedded Mitigation section). The procedure for the exclusion will be reflected in the archaeological Written Scheme of Investigation ('WSI').

14.16. The potentential for Unexploded Ordnance (UxO) has been identified (see Chapter 2 Navitus Bay Wind Park) with respect to potential threat to construction activities. The potential risk to the project has been assessed. However, the EIA assesses the entire Turbine area and doesn't exclude these locations.

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Met Mast Boreholes & 2013 Vibrocores within the Site

Legend

- Turbine Area
- Offshore Export Cable Corridor
- 2010 Borehole location
- 2011 Met Mast Borehole Location
- 2013 Vibrocore Location
- Palaeochannels - South Coast REC
- Palaeochannels - South Coast MAREA

Fig. No.: Figure 14.2		**Date:** 08/08/2013
Author: NDU	**Checked:** SLE	**Approved:** SMF
Scale@A3: 1:200,000		**Revision No.:** B
Coordinate System: WGS 1984 UTM Zone 30N		**Data Sources:** SeaZone PMSS
Datum: WGS 1984	**Ref. No.:** 29823/35931/NDU	

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14.3.5. Impact assessment methodology

14.17. The overall methodology for this assessment is provided in Chapter 3, EIA Methodology. The assessment methodology was designed to evaluate potential changes to the baseline conditions of archaeological receptors that may result from construction, O&M and decommissioning activities associated with the offshore elements of the Project and to identify any significant impacts. More specifically, the assessment:

- Identifies archaeological receptors, Project effects (based on a Rochdale Envelope) and the environmental pathways between them;
- Assesses the sensitivity of archaeological receptors to the effects;
- Determines the magnitude of the effects on archaeological receptors;
- Considers the confidence in the predictions;
- Determines the level of significance of the impacts of the Project on archaeological receptors;
- Describes potential measures to mitigate adverse impacts.

14.18. The 'source-pathway-receptor' model was used in this assessment to identify potential effects of the Project and the routes or pathways through the environment which may link them to potentially sensitive archaeological receptors.

Sensitivity of a receptor

14.19. The sensitivity of a receptor is a measure of its response following exposure to an effect, where a pathway exists between a source and the receptor. The sensitivity of archaeological receptors is determined by an assessment of each against the following effect-related variables:

- **Tolerance:** Is a measure of the susceptibility of the receptor to a particular effect of the Project;
- **Recoverability:** Is a measure of the ability of a receptor to return to a state close to that which existed before the activity or event (effect) that caused a change;
- **Value or importance:** Because archaeological material is the non-renewable and finite record of the human past it all has value. Its importance can, however, be relative and for this reason this assessment uses the term 'value' when expressing receptor sensitivity. Value is a measure of whether a receptor is rare, protected or threatened. Definitions of receptor sensitivity for archaeological receptors is shown in Table 14.3.

Table 14.3 Definitions of receptor sensitivity

Sensitivity	Definition
High	Receptor cannot tolerate or recover from project effects.
Medium	Receptor has low capacity to tolerate or recover from project effects.
Low	Receptor has some capacity to tolerate or recover from project effects.
Imperceptible	Receptor can tolerate or recover fully or almost fully from project effects.

Magnitude of effect

14.20. The magnitude of effect is an indication of the scale and direction of change (i.e. either positive or negative) in the environment and its potential effect on sensitive receptors that results from Project activities. There are three elements to magnitude:

- **Extent:** The area over which there is a potential for an effect to occur;
- **Duration:** The length of time that an effect is measured against;
- **Frequency:** A measure of how often an effect occurs compared to natural variation.

Extent

14.21. The direct effects for archaeological receptors arise as a direct result of the activities associated with the Project. It is therefore reasonable to propose that the extent of the effects of these activities on all archaeological receptors would be site-specific and limited to their immediate footprint.

14.22. Indirect effects - principally seabed scour and sediment deposition - are likely to be local to the activity or source that produces them, although the re-deposition of sediment may extend some distance downstream of the point of deposition.

Duration

14.23. The direct effects of Project activities on archaeological receptors would invariably be non-reversible and their effect upon the archaeological record can thus be described as permanent.

14.24. Indirect effects such as the destabilisation of sites and material due to seabed scour would manifest themselves over a period of time. Site destabilisation would initially lead to rapid decay or erosion and loss of archaeological material and information, followed by a slow process of site stabilisation during which material and information would continue to be lost, but at a slower rate. Any damage to archaeological material which is exposed on the seabed as an indirect result of Project activities would, however, also be non-reversible and permanent.

Frequency

14.25. The lack of certainty about the extent, location and distribution of archaeological sites and material from all receptor classes across the Offshore Development Area means that it is not possible to determine the frequency with which each receptor would be subject to the effects of Project activities. The effects of the Project would not necessarily affect archaeological receptors each time they occur.

14.26. It is therefore proposed that the frequency of the direct effects on archaeological receptors is likely to be intermittent, occurring regularly but not at all times during Project activities.

14.27. The assignment of a scale of magnitude of effects for each archaeological receptor class is based on the classifications shown in Table 14.4.

Table 14.4 Definitions for magnitude of effect

Magnitude	Definition
High	Permanent/irreversible changes, over the Offshore Development Area and beyond (i.e. offsite), to key characteristics or features of the archaeological record. Impact certain or likely to occur.
Medium	Permanent/irreversible changes, over the majority of the Offshore Dvelopment Area and potentially beyond, to key characteristics or features of the archaeological record. Impact certain or likely to occur.
Low	Permanent / irreversible changes, over a partial area, to key characteristics or features of the archaeological record. Impact would possibly occur.
Imperceptible	Changes to receptor are not expected to be detectable above natural variation and the impact is extremely unlikely.

Impact significance

14.28. Impact significance takes into account the sensitivity of a receptor and the magnitude of effect. This process is guided by the significance matrix illustrated in Figure 14.3. Project specific impacts that have either a high or moderate significance are considered to have a potential significant effect (as defined under the EIA Regulations) on archaeological receptors.

14.29. Mitigation measures are aimed at preventing, reducing or offsetting likely significant effect's of the Project where appropriate, to ensure that potential effects on any new archaeological sites or materials encountered during construction, O&M and decommissioning are minimised.

Magnitude of effect \ Sensitivity of a receptor	High	Medium	Low	Imperceptible
High	Major	Major OR Moderate	Moderate OR Minor	Negligible
Medium	Major OR Moderate	Moderate Minor	Minor	Negligible
Low	Moderate OR Minor	Minor	Minor	Negligible
Imperceptible	Negligible	Negligible	Negligible	Negligible

Figure 14.3 Significance of impact matrix

Likelihood

Prehistoric archaeology

14.30. The extent to which the effects of the Project may overlap with the location and distribution of submerged prehistoric archaeological sites and/or material is unknown and, to a large degree, unknowable.

14.31. Fluvial activity and a series of marine transgressions and regressions have shaped the sediments of the Offshore Development Area for much of the Quaternary. These processes will have resulted in the disturbance, movement and re-distribution of prehistoric artefacts and assemblages from their original or primary depositional contexts. There is thus a high potential for derived prehistoric archaeological finds to be present across the study area as a whole. However, whilst this potential exists, it is not possible to quantify or predict the volume or distribution of such artefacts.

14.32. There is some scope for predicting higher levels of confidence with respect to the coincidence of archaeological material with palaeochannel infill sediments.

14.33. On balance, however, in respect of prehistoric archaeological receptors in general a precautionary approach has been adopted in this assessment and a high uncertainty rating has been applied to prehistoric archaeological receptors. It is certain or near certain that prehistoric archaeological receptors would be affected by the Project.

Maritime archaeology

14.34. On the basis of the available historical data, a number of recorded shipping losses and maritime casualties may be present in the Offshore Development Area. In addition, wrecks for which there are no historical records and a range of isolated maritime-related or derived artefacts may also be present within the area that would be subject to the effects of the Project.

14.35. All of these maritime receptors lack accurate positional data, and there is also no certainty with respect to the extent or distribution of unknown wrecks and isolated artefacts. On this basis, maritime archaeological receptors must be attributed with a high degree of uncertainty. With regards to the likelihood that the Project would affect these receptors, this assessment suggests that it is probable (i.e. more than a 50% chance).

Aviation archaeology

14.36. As with maritime archaeological receptors above, the available historical data indicate that recorded aircraft losses and related, isolated aircraft finds are likely to be present in the Offshore Development Area.

14.37. There is, however, no certainty with respect to the full extent or distribution of these receptors and on this basis aviation archaeological receptors must be attributed with a high degree of uncertainty. With regards to the likelihood that the Project would affect these receptors, this assessment suggests that it is probable (i.e. more than a 50% chance).

14.3.6. Limitations and embedded mitigation

Limitations

14.38. This assessment is partially based on historical data obtained from third parties (for example, SeaZone for United Kingdom Hydrographic Office (UKHO) records and the English Heritage National Monuments Record). Every effort has been made to ensure the accuracy of these data at the time of issue.

Embedded mitigation

14.39. For the purposes of offshore archaeology, design-embedded mitigation makes provision for the application of construction exclusion zones around important archaeological features such as known and charted wrecks and all high and medium potential geophysical anomalies. The concept of exclusion zones has been agreed with English Heritage and incorporated into the site layouts. Known sites of archaeological interest will thus be excluded from Project activities.

14.40. A Written Scheme of Investigation ('WSI') will be submitted as part of the application. This document will detail the offshore archaeological mitigation strategy that would be followed throughout the lifetime of the Project. It would include the proposed extent of each archaeological exclusion zone, for agreement with English Heritage, and a plan for managing the exclusion zones during the life of the Project. It would also include a reporting protocol for the reporting of unexpected anthropogenic discoveries during Project activities through the Project's lifetime.

14.41. The WSI would draw upon the Model Clauses for Archaeological Written Schemes of Investigation: Offshore Renewables Projects produced for The Crown Estate (Wessex Archaeology, 2010c). The WSI would be developed in close consultation with statutory consultees and its provisions would be agreed by them, but will broadly comprise:

- An outline of the known and potential receptors that may be impacted by the Project;
- Roles and responsibilities in respect of offshore archaeology during Project activities;
- An account of activities that are to take place during the construction and operation and maintenance phases which have the potential to effect the archaeological record or inform baseline archaeological knowledge of the Offshore Development Area;
- Detailed methodologies for archaeological actions and involvement in Project activities.

14.42. The WSI is a live document that will be updated as information comes to light that may call for increased or decreased archaeological activity. It would provide details of the the archaeological actions required by consent, avoiding the need for detailed conditions to be included.

14.4. Baseline Environment

14.43. The following section details the baseline data gathering methodology for the assessment and data sources used.

14.4.1. Baseline data gathering methodology

Data sources

14.44. This section provides information on the wide range of primary and secondary desk-based sources which were consulted on to inform the offshore archaeological baseline and assessment. These included:

- United Kingdom Hydrographic Office ('UKHO') wreck and obstruction records provided by SeaZone Ltd;
- Archaeological sites and monuments records held in the National Monuments Record ('NMR'), and the Hampshire, Isle of Wight and Dorset Historic Environment Records ('HER');
- Admiralty Charts;
- Geophysical data and secondary sources related to the maritime history, submerged prehistory and the archaeology of the south coast;
- Results of the archaeological review of geophysical survey data collected in the Offshore Development Area;

- Geotechnical borehole data collected in 2010 and 2012 in Zone 7 and for the Navitus Bay metmast, and vibrocore data collected in 2013;
- Other, secondary sources dealing with the maritime history, submerged prehistory and archaeology of the south coast of England, Hampshire, the Isle of Wight, the New Forest and Dorset.

Review of historical sources

14.45. A desk-based review of the historic environment and archaeological information described above was conducted to create an archaeological baseline for the Offshore Development Area.

14.46. As far as possible the baseline data were reviewed and assessed in a Geographic Information System ('GIS') workspace, within which it was possible to plot the general distribution of known sites and to manipulate, compare and spatially review the data. Relevant, mainly secondary information that could not be mapped was used qualitatively, particularly to develop an understanding of the likelihood of there being unknown and unrecorded maritime archaeological sites and remains in the study area.

Review of historic seascape characterisations

14.47. There are two Historic Seascape Characterisations ('HSC') that encompass the Offshore Development Area:

- The Solent and Isle of Wight HSC (Pee *et al*., 2007);
- The Hastings to Purbeck and Adjacent Waters HSC (Maritime Archaeology Ltd and SeaZone, 2011).

14.48. The following Seabed Character Zones defined by Solent and Isle of Wight HSC which overlap wholly or partially with the Offshore Development Area were considered in the Navitus Bay archaeological assessment[1]:

- Christchurch
- The Needles
- Offshore Wight (South West)

14.49. In respect of the Hastings to Purbeck HSC the following national and regional HSC Character Types are relevant to the Project and were considered in the archaeological assessment:

- Palaeolandscape
- Cultural Topography (Marine)
- Navigation Activity
- Navigation Hazard
- Extractive Industry (Minerals)
- Ports and Docks

14.50. Both HSCs provided archaeological assessment with a broad area-based assessment of past and present human activity in and around the Offshore Development Area, which has in turn informed the overview of the marine and coastal historic environment presented below.

Archaeological review of geophysical data

14.51. Survey reports and seabed anomaly contact lists generated by the geophysical surveys undertaken were archaeologically reviewed. The seabed anomalies identified in the sidescan sonar data were incorporated into the Project GIS where they could be compared to the desk-based sources and assessed for their potential to be of archaeological interest. A number of geophysical surveys were undertaken in support of the Project, which have been used to inform this assessment. These are summarised in Table 14.5 below.

Table 14.5 Geophysical Survey Summary

Date	Survey Area	Deliverables
2010	ZAP Site (Zone 7 and cable route	- Sidescan sonar - Multibeam bathymetry - Magnetometer Line spacing in site of 500 m and along cable route between 50 and 100 m

[1] http://archaeologydataservice.ac.uk/archives/view/ehssolent_eh_2007/web_map.cfm?CFID=380&CFTOKEN=68C7B94F-EFC7-4A58-A29183673436FB1A

Table 14.5 Geophysical Survey Summary		
June 2011	Inshore cable route area	- Sidescan Sonar - Multibeam banthymetry - Magnetometer - Single beam echo-sounder - Sub-bottom profiler Full coverage
August 2011	Turbine Area and Lot Export Cable Corridor	- Sidescan Sonar - Multibeam bathymetry - Magnetometer - Single beam echo-sounder - Ultra high resolution seismic Full coverage
November 2012	Cable Landfall Infill	- Multibeam bathymetry Full coverage

14.52. Sidescan sonar surveys undertaken in Augst 2011 collected data that fully covered the Turbine Area and Offshore Export Cable Corridor. Survey line spacing varied between 50 and 150 metres, depending on water depth and a 20% overlap was achieved providing a minimum of 100% ensonification of the seabed. The sidescan sonar surveys were supported by detailed bathymetric surveys. Previous surveys did not achieve full coverage and so were used to support the more recent surveys and confirm seabed anomalies where the datasets overlapped.

14.53. A magnetometer was used to identify ferromagnetic objects within the area. This was towed as close to the seabed as possible (typically 7 – 8 m above the seabed). The data was logged and processed to identify any anomalies in the background magnetic field.

14.54. The geophysical assessment is based primarily on the sidescan sonar data with anomalies identified in the multibeam bathymetry and magnetometer data being used to enhance both the identification and assessment of the character and nature of these data.

14.55. Each sidescan sonar anomaly was assigned an archaeological potential rating, based on a) whether the object it represents is considered to be anthropogenic in origin and b) the degree to which it is considered to be of archaeological interest. The archaeological potential ratings used are defined in Table 14.6.

Table 14.6 Archaeological Potential Ratings	
Rating	Description
High	An anomaly representing an object or site of anthropogenic origin and of likely archaeological interest.
Medium	An anomaly representing an object or site of likely anthropogenic origin that requires further investigation in order to clarify its nature and establish its archaeological potential.
Low	An anomaly representing an object or site of possible anthropogenic origin and unknown archaeological interest that does not require further investigation. This could include modern anthropogenic debris such as fishing gear or anchors.

Geotechnical core log review

14.56. Core logs generated from the boreholes recovered in the two geotechnical ground investigations carried out to date and vibrocores acquired for archaeological purposes in March 2013 were assessed. These were subject to an initial, rapid desk-based review to a) establish whether sedimentary horizons of archaeological interest or potential are present in the samples and b) where present, to broadly characterise them (Figure 14.2).

14.4.2. Prehistoric archaeology

14.57. The presence of Palaeolithic hominins in the UK and on its continental shelf during the last approximately 1 million years has been closely linked to and determined by a series of global climatic cycles which have shaped and reshaped the prehistoric landscape of the UK, including the Offshore Development Area.

14.58. In considering the prehistoric archaeology of the Offshore Development Area, the seabed must be viewed as a submerged land surface that is an extension of the currently terrestrial portions of the UK's landmass. For

substantial periods of time since the earliest appearance of hominins in the UK this land surface was dry land, inhabited by a succession of floral and faunal communities and, intermittently, by hominins (James *et al.*, 2010).

14.59. Many seabed deposits in the English Channel are, therefore, not marine deposits, but submerged terrestrial deposits (Wenban-Smith 2002). These deposits, and the submerged land surface they are part of, will have been much modified in the period under discussion here by the fluvial processes, sub-aerial erosion and by repeated cycles of marine regression and transgression driven primarily by three global glacial periods, known in the UK as the Anglian (c.478,000-424,000 Before Present ('BP'), Wolstonian (c.380,000-135,000 BP) and Devensian (c.73,000-18,000 BP).

14.60. These extended periods of deep global cold saw much of the UK turned into an arctic wasteland, covered by massive ice sheets, which at their maximum extents covered much of mainland Britain and its continental shelf in ice up to 2 km thick (Wenban-Smith, 2002; Stringer, 2006).

14.61. These climatic cycles are central to understanding the prehistory of the UK for a number of important reasons. Firstly, they regulated the environment and had a profound effect on when hominin occupation was possible – the result being the abandonment and re-occupation of the UK by our ancestors at least seven times (Stringer, 2006). Secondly, the sub-aerial exposure of large areas of what is now the seabed surrounding the UK as a result of substantial falls in sea level both facilitated hominin movement between Europe and the UK and also provided environments rich in natural resources for hominin exploitation and occupation. Thirdly, these glacial and interglacial cycles led, by a range of processes, to the formation of the Quaternary sediments within which the archaeological record of the prehistoric hominin occupation of the UK is preserved. Lastly, the direct effects of these climatic cycles - erosion, sediment deposition and reworking, for example, have influenced the potential for the preservation of the archaeological record of the prehistoric hominin presence in and on the current seabed of the UK.

14.62. The surviving archaeological evidence of a prehistoric hominin and later a human presence in the UK takes the form, primarily, of lithic artefacts. Animal (and sometimes hominin or human) bones can also be part of this archaeological record, as can organic remains such as wood and plant material used by our ancestors for food, as tools or in shelters or other constructions, particularly in the more recent prehistoric past and where environmental conditions allow the preservation of such organic remains. This archaeological material, the evidence of the day daily activities of our ancestors, was left by them on and in the sediments which once constituted the terrestrial palaeolandscapes they occupied. Sometimes this material was preserved and protected by rapid burial in new sediments or deposits. At other times it was eroded, winnowed, reworked and redeposited by water or waves.

14.63. Although the submerged prehistoric archaeological record of the UK is currently very small, an ever-improving understanding of the extents and effects of the Pleistocene glaciations and interglacials, their relative sea level stands and associated marine transgressions and regressions, and the palaeoenvironment and palaeolandscapes that accompanied them, indicate that the potential for the presence of prehistoric archaeology sites and material in or on the seabed of the UK is generally high, but dependant on local conditions.

Geological context

14.64. The prehistoric archaeological potential of the Offshore Development Area will be strongly influenced by the local and regional geological context and Quaternary sedimentary history, and this is discussed below.

Seabed sediments

14.65. Offshore seabed surveys, undertaken in support of the Project, demonstrate that the seabed is generally flat and underlain entirely by Lower and Upper Cretaceous solid geology. These strata are overlain by superficial Quaternary deposits, which were laid down within the last 2.6 million years. In the last million years these deposits record the cyclical interplay between marine, non-marine and glacial sedimentation.

14.66. The review of borehole logs carried out by Fugure, as part of this study, showed that the solid geology was present between 0.3 m and 0.8 m from the surface of the seabed in all three sets of borehole cores recovered within the Offshore Development Area - BH3/3A, BH4/4A and BH5A/5B (Figure 14.4).

14.67. Similar findings were obtained from some of the vibrocore logs reviewed – VC1, 11, 14A and 21A, for example – but generally there is a greater depth of deposit overlying the solid geology in the vibrocores: a factor of their locations which were chosen to be within areas of the seabed believed to be underlain by palaeochannel features which are discussed in more detail below. The profile of palaeochannels identified in the Offshore Export Cable Corridor is shown in Figure 14.5.

14.68. Quaternary sediments are relatively scarce off the south coast of England, which is sediment starved in comparison with other regions of the UK's seabed. Across much of the region within which the Offshore Development Area is located, the solid geology is either covered by only a thin veneer is completely swept of seabed sediment. Hence, much of the region has solid geology at, or very close to, the seabed. Data collected for the Project, and the South Coast Regional Environmental Characterisation ('REC') and South Coast Marine Aggregate Regional Environmental Assessment ('MAREA') (EMU Ltd, 2010b), all indicate that the general seabed configuration of the region is of discontinuous, thin layers of coarse-grained sediment overlying bedrock and patches of sandier sediments overlying channel fills. The results of the borehole review described above corroborate this assessment.

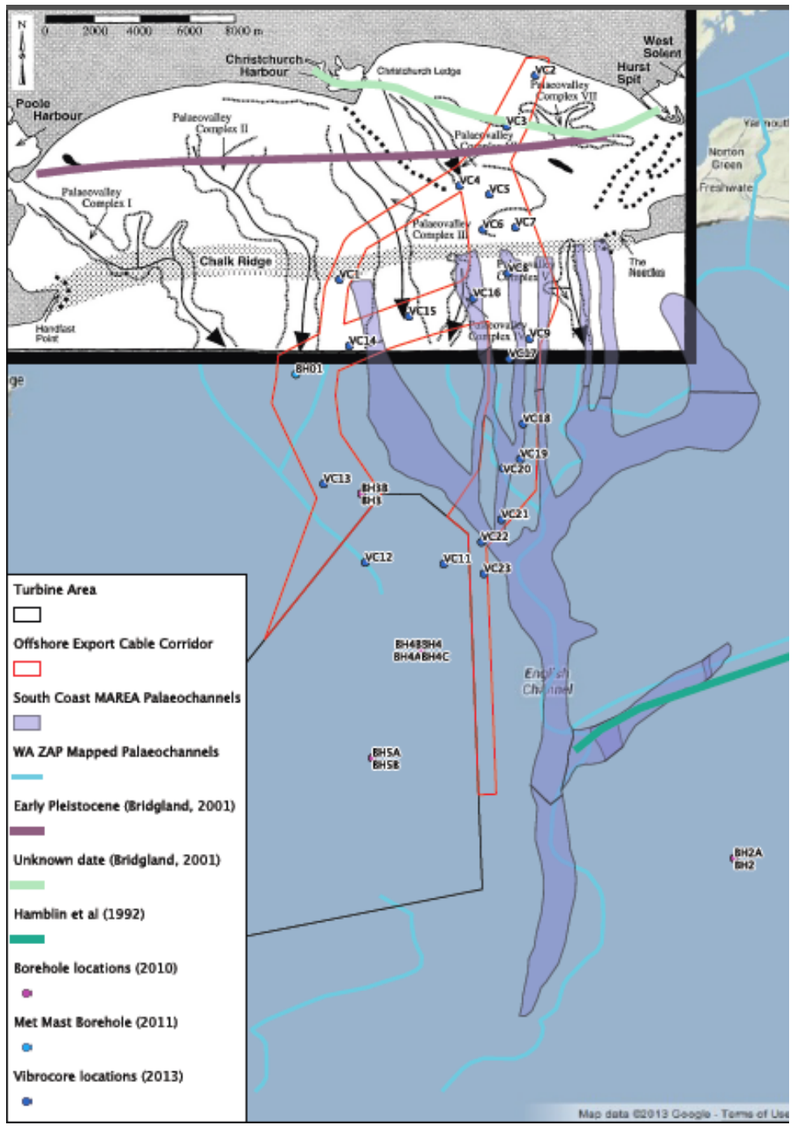

Figure 14.4 Potential distribution of palaeochannels in and adjacent to the Offshore Development Area, and the locations of the Zone 7 and met mast boreholes and 2013 vibrocores

(Sources: Hamblin *et al*., 1992; Velegrakis *et al*., 1999; Bridgland, 2001; EMU Ltd 2011b)

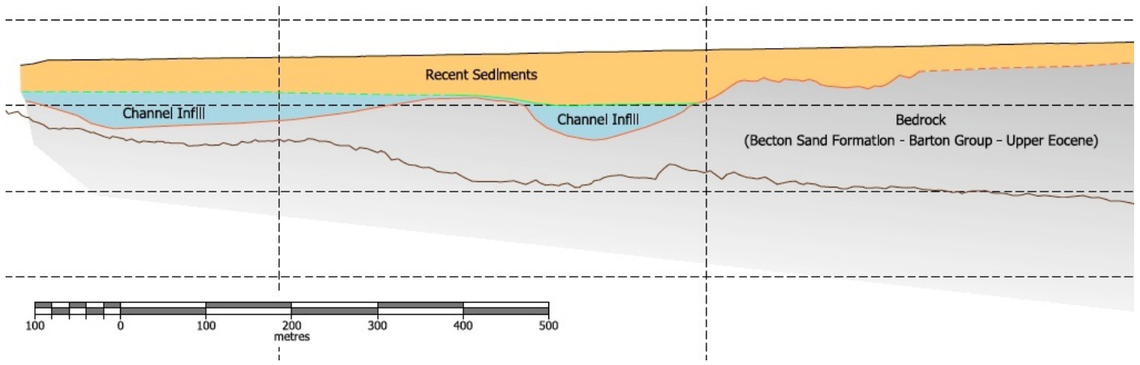

Figure 14.5 Profile of palaeochannels identified in proposed export cable corridor near landfall in Christchurch Bay in inshore data collected by Osiris Projects
(after Osiris Projects, 2011)

14.69. The sediments in the Offshore Development Area are sands, sandy gravels and gravels, with some silt in samples from the southern part of Christchurch Bay. Where mobile sediments occur within the region they are typically found in seafloor depressions and their thickness rarely exceeds 1 m.

14.70. This dearth of sediment in the area can also be ascribed in part to the development of Christchurch Bay during the Holocene marine transgression.

14.71. The exposed nature of the bay and the strong tidal currents caused by its connection with the Western Solent between 8,400-6,500 BP created strong tidal current scour in the eastern part of the bay. This has eroded away most of the late Devensian and early Holocene sediments deposited in the area (Velegrakis *et al*., 1999), leaving behind a largely immobile lag deposit of reworked deposits comprising poorly sorted cobbles, gravel and coarse sand (Kenyon and Belderson, 1969).

Palaeochannels

14.72. The Hampshire basin is drained by a number of rivers that rise in the surrounding Chalk downland and today debouch directly into the sea. For much of the Pleistocene, however, these rivers fed the so-called Solent River, which ran from west to east behind the substantial chalk ridge of the Isle of Wight-Purbeck anticline. The river flowed from Poole Harbour, across what is now Christchurch Bay and through the modern Solent, before turning south beyond the east coast of the Isle of Wight to join the English Channel (Wenban-Smith, 2001). Today all that remains of the palaeoriver's course is the modern Solent.

14.73. The demise of the palaeo-Solent river began c.135,000 BP during the Ipswichian interglacial (James *et al*., 2010), when a combination of glacial run-off and particularly high sea levels eroded and initially breached the Isle of Wight-Purbeck chalk ridge. This process was continued during the mid- to late Devensian when an extension of the River Frome may have cut a gap through the western part of the ridge (Velegrakis *et al*., 1999; SCOPAC, 2004). This fluvial breaching of the southern barrier of the Solent River system resulted in the abstraction of much of the upstream section of the river's catchment, which was subsequently channelled south, rather than east, across what were to become Poole and Christchurch Bays.

14.74. During the Holocene, the surviving portions of the chalk ridge were denuded and further eroded by rivers flowing southwards from its crest (Velegrakis *et alet al*., 1999).

14.75. Palaeochannels are an important landscape feature in the assessment of the prehistoric archaeological potential of any area of seabed because they are indicative of both routes for hominin or human movement and migration and also of resource rich portions of former terrestrial landscapes, to which hominins would have been drawn (Momber, 2011).

14.76. Across the Hampshire basin drainage there are extensive spreads of Pleistocene fluvial deposits concentrated in the valleys of the Frome, Stour, Avon and Test, in a great swathe along the south coast between Bournemouth and Southampton Water (Wenban-Smith, 2001) and in the submerged palaeochannels described by James *et alet al*. (2010) and EMU Ltd (2010b) to the east of the Isle of Wight. These deposits are known to contain Palaeolithic archaeological material and palaeoenvironmental information.

14.77. The descriptions by Velegrakis *et alet al*. (1999) of a number of palaeochannels identified in the vicinity of the Offshore Development Area and the results of the vibrocore review indicate that they are devoid of fine-grained alluvial deposits and lack gravel terraces, in marked contrast to the

inland portions of these channels and to other palaeochannels in the region, which are associated with extensive gravel terraces. This suggests that the channels in Christchurch and Poole Bays are younger than those recorded elsewhere, and document only late Devensian fluvial incision and sedimentation.

14.78. Velegrakis *et al*. (1999) have identified a number of southward trending palaeochannels in Poole and Christchurch Bays which probably form the upper reaches of the buried palaeovalleys to west of the island (see Hamblin *et al*. (1992) and Bridgland (2001)) and the remnants of some of the chalk ridge channels referred to above. The palaeovalley complexes numbered IV-VII by Velegrakis *et al* (1999) (Figure 14.3) are located within and south of Christchurch Bay in the area covered by the Offshore Development Area.

14.79. Of these, only palaeochannel complex VII, which is located in the north-eastern corner of Christchurch Bay and consists of a network of small infilled channels, contains sediment with any archaeological potential.

Summary of the prehistory of the UK

Cromerian Complex

14.80. The earliest current evidence for a hominin presence in the UK has been found in Cromer Forest-bed Formation sediments associated with the Bytham and Ancaster palaeo-rivers, which flowed from the Midlands across East Anglia and Norfolk and into the North Sea during the Cromerian interglacial (>780,000-c.478,000 BP).

14.81. Cromerian period archaeological evidence for hominins in the vicinity of the Offshore Development Area and comes from a series of sites in West Sussex, which include Boxgrove, Valdoe Quarry, Slindon Bottom and Penfolds Pit and which date to about half a million years ago and confirm a hominin presence in the south of England and on the exposed continental shelf off the south coast.

Anglian glaciation

14.82. The Cromerian was followed c.478,000 BP by the onset of the Anglian glaciation, the first and most extensive of the late Pleistocene glacial periods which was to hold the UK in its grip for more than 50,000 years. At the height of the Anglian global sea levels fell by as much as 130 m and the ice sheet which covered the UK extended as far south as the north Cornwall coast and the Thames Valley (Long *et al*., 1988; Wymer, 1999). The English Channel gradually dried out as the sea retreated, and became a terrestrial basin in which a number of river systems fed from both the UK and northern France were either resurrected or initiated (Hamblin *et al*., 1992). At the maximum extent of the Anglian ice the environment of the south of Britain, including the Offshore Development Area, was peri-glacial and a permanent hominid presence in the region for much of the Anglian is unlikely.

Hoxnian interglacial

14.83. The temperate Hoxnian interglacial (c.424,000-380,000 BP) followed the Anglian and although the Offshore Development Area was gradually inundated through the Hoxnian as the ice sheets melted and marine conditions were re-established in the English Channel. For tens of thousands of years the continental shelf off the south coast would have remained exposed and rich in natural resources attractive to hominins.

14.84. Lower Palaeolithic archaeological material has been found associated with lake deposits at Hoxne in Suffolk (Wymer, 1999) and the hominin skull from Thames gravel terraces at Swanscombe dates from the Hoxnian (Stringer, 2006).

14.85. In the region around the Offshore Development Area, large numbers of handaxes that 'seem to correlate with, or are no earlier than' the Hoxnian (James *et al*., 2010) have been found on Solent river terraces east of the Isle of Wight (Wenban-Smith *et al*., 2009). The South Coast REC suggests, however, that the potential for the recovery of *in situ* Hoxnian period assemblages from the current seabed of the south coast, including the Offshore Development Area, 'is comparatively low' (James *et al*., 2010).

Wolstonian glacial complex

14.86. The onset of a series of post-Anglian/pre-Devensian glacial cycles between c.380,000 and 130,000 BP, which are widely referred to as the Wolstonian Complex, saw a return to predominately glacial conditions across the UK and at the heights of three cold periods the Offshore Development Area was again exposed as a sub-aerial landscape.

14.87. Climatic conditions during the Wolstonian Complex would have provided a landscape of bare ground and heath within the Offshore Development Area that was suitable for hominin occupation or exploitation. Although there is some evidence for an intermittent hominin presence in the UK during the Wolstonian, in general, archaeological material from this important period, which covers the transition from the Lower to Middle Palaeolithic c.300,000 BP, is rare and was thus unlikely in the Offshore Development Area (see Buckingham *et al*., 1996; Schreve *et al*., 2002; Stringer, 2006).

Ipswichian interglacial

14.88. The Ipswichian interglacial (c.135,000-73,000 BP) which following the final Wolstonian glacial expression (c.180,000-135,000 BP) witnessed a very rapid rise in sea level to its highest level in more than 700,000 years (c.15 m above Ordnance Datum ('OD')) which quickly cut the UK off from continental Europe and inundated many low-lying areas of the current UK landmass (James *et al*., 2010). Thus, while the climate appears to have been similar to, or even slightly warmer than today (Barton, 2005; Stringer, 2006) and Middle Palaeolithic hominins are known to have occupied north-western Europe throughout this period, there is no evidence for a hominin presence in the UK (Wymer, 1999; Ashton and Lewis, 2002).

Devensian glaciation

14.89. The Devensian (c.73,000-18,000 BP) was the last glacial stage to occur before the current, Holocene climatic amelioration. As sea levels fell from their Ipswichian high stands during the early Devensian, the south of the UK, including the Offshore Development Area, was once again exposed as a sub-aerial landscape.

14.90. During the early Devensian the exposed landscape of the English Channel was inhabited by late Middle Palaeolithic Neanderthals. By c.31,000 BP Early Upper Palaeolithic anatomically modern humans (Homo sapiens) are known from evidence from Kent's Cavern near Torquay in Devon, for example (Housley *et al*., 1997; Boismier *et al*., 2003; Barton, 2005).

14.91. As the Devensian glacial maximum approached, intense cold all across northern Europe forced human populations to retreat southwards and a permanent hominin presence in that portion of the south of England not covered by ice and including the Offshore Development Area is unlikely until the post-Devensian ice retreat was underway after c.18,000 BP (EMU Ltd, 2010b).

14.92. In the south of England around the Offshore Development Area, the South Coast REC suggests that overall the potential for the recovery of Middle Palaeolithic material from the marine environment off the south coast of England is considered fairly low (James *et al*., 2010).

14.93. Following the Devensian glacial maximum (c.18,000 BP) southern Britain was rapidly re-colonised by Early Upper Palaeolithic modern humans and a large number of Upper Palaeolithic open sites are also known in southern Britain. These are often situated on hilltops and bluffs overlooking open country and include a site at Hengistbury Head which overlooked the exposed coastal plain which is now part of the Offshore Development Area (Barton, 1992). The exposed coastal plain off the south coast is likely to have been a generally favourable habitat for Upper Palaeolithic humans and their prey animals, albeit initially cold and prone to dust and sand blows. The area offered a combination of open grassland and fresh water in the various palaeoriver channels. There were raised vantage points like Hengistbury Head from which to hunt and the possibility of rock shelters or caves in cliff lines overlooking the Northern Palaeovalley (James *et al*., 2010). Thus, almost anywhere in modern marine zone of the south coast where buried post-glacial sediment survives, there is the potential for the survival of Upper Palaeolithic archaeological material.

Holocene interglacial

14.94. Around 11,000 BP the UK was once again plunged into sub-Arctic conditions by a sharp drop in global temperatures known as the Younger Dryas. The south of England became a dry cold desert abandoned by its human population (James *et al*., 2010). A thousand years later temperatures recovered rapidly with the onset of the Holocene interglacial.

14.95. At some stage during the Younger Dryas the Late Upper Palaeolithic stone tool kit was replaced by a new stone tool industry characterised by microliths, and known today as the Mesolithic. Between c.10,000 and 6,000 BP semi-nomadic Mesolithic groups spread out from temperate continental refugia into north-eastern Europe and into the UK. Many of these groups are likely to have settled on the UK's exposed continental shelf to exploit the rich marine resources the coastal margins, salt marshes and estuaries

offered (Momber, 2011). Rising Holocene sea levels gradually forced these Mesolithic groups to gradually retreat towards the current coast (Momber, 2000) and by the end of the Mesolithic, c.6,000 BP, sea levels were only a few metres below their current stand.

14.96. The UK mainland around the Solent is rich in Mesolithic sites which range in date from the earliest re-colonisation of the UK after the Younger Dryas to the 5th millennium BC. James *et al*. (2010) record that some of the south coast Mesolithic sites are known to extend into the intertidal zone and beyond and it must be assumed that many more sites abandoned by Mesolithic groups ahead of sea level rise may be preserved in or on the modern seabed off the south coast.

14.97. These sites indicate the potential for the survival, in the vicinity of the Offshore Development Area, of Mesolithic sites and materials in submerged or near-submerged contexts where appropriate conditions exist.

Prehistoric archaeological potential

14.98. The summary above indicates that prehistoric archaeological material can be expected in the Offshore Development Area from any period during which the seabed of the south coast was sub-aerially exposed and the UK is known to have been inhabited by hominins (and, latterly, humans).

14.99. The potential for *in situ*, undisturbed archaeological sites and materials within the Quaternary sediments of the Offshore Development Area is, however, considered to be low.

14.100. The greatest potential for the survival of Quaternary deposits in the region west of the Isle of Wight is in the network of late Pleistocene palaeochannels. The vibrocore review suggests that where channel fills have survived they are sands and gravels, indicative of fairly high energy fluvial environments. Archaeological material in these contexts is likely to be reworked and in secondary context.

14.101. Elsewhere channel deposits have been scoured out and reworked into a veneer of lag deposits spread across much of the Offshore Development Area by both fluvial and marine erosion.

14.102. This does not mean that prehistoric archaeological material will not be present in the Offshore Development Area. The presence of archaeological sites and artefact find spots on land in the vicinity of the Offshore Development Area and from a range of prehistoric periods, suggests that similar sites and materials are likely to have been present on the exposed palaeo-landsurface which now comprises the seabed of the Offshore Development Area.

14.103. While these sites may have been reworked and dispersed by water and waves, their more robust artefactual content is likely to have survived in secondary context within the seabed and superficial sediments across the area.

14.104. To summarise, known prehistoric sites and findspots along the south coast and in the vicinity of the Offshore Development Area are proxy evidence of past human activity on the now-inundated former coastal plain and suggest a potential for archaeological material to be found within the Offshore Development Area. However, the substantial fluvial and marine processes of the mid- to late Devensian and Holocene that have acted on the seabed of the Offshore Development Area suggest that the discovery of *in situ* archaeological material is unlikely and material is more likely to be found in secondary or derived contexts.

14.4.3. Maritime archaeology

14.105. By the end of the Mesolithic (c.6,000 BP) the Offshore Development Area had been inundated and was a fully marine environment. Any human activity in the area after this date can thus be expected to be of a maritime nature and related to the human use and exploitation of the sea.

14.106. Maritime archaeological sites and materials can be defined as the physical remains of boats and ships that have been wrecked, sunk or have foundered, and may also be those artefacts which rest upon the seabed as the result of being jettisoned or lost overboard (for example, anchors, cannon or fishing gear). Infrastructure to support seafaring and/or the exploitation of marine resources (wharfs, slipways, etc.) is also generally considered to be part of the maritime archaeological record.

14.107. Although the full extent of the UK's shipwreck and maritime archaeological record is not known, large numbers of wreck sites are known and accurately charted in UK waters, and an even greater number of shipping casualties are recorded in documentary sources. Despite the potential size of the UK's

maritime archaeological record, however, specific knowledge of the record is low, particularly deeper into the past.

14.108. The Offshore Development Area is traversed by a number of important historic shipping routes into the harbours at Poole, Christchurch and Southampton (see Wessex Archaeology, 2004b), and was thus a focus of a good deal of shipping activity.

14.109. Further offshore maritime casualties will also be scattered widely across the UK's territorial sea and continental shelf, such as in the area occupied by the Turbine Area. In these offshore areas maritime casualties were likely to be the result of poor weather and/or sea state, accident, collision or wartime activity.

14.110. The maritime archaeological record of the Offshore Development Area has been considered in terms of the following broad temporal phases which are based on the likely relative importance and special interest of archaeological sites and materials (Wessex Archaeology, 2008a):

- Before AD 1508;
- Post-medieval (1508-1815);
- Modern (post-1815).

14.111. There are currently 56 wreck sites protected in UK waters protected under Section 1 of the Protection of Wrecks Act (1973) (see www.mcga.gov.uk). Although there are two designated wrecks each in Poole and Christchurch Bays (James *et al*., 2010), there are no designated sites within the Turbine Area or Offshore Export Cable Corridor.

14.112. The Ministry of Defence ('MOD') makes the provision to protect crashed, sunken or stranded military aircraft and vessels under the Protection of Military Remains Act (1986). There are currently no wrecks within the Offshore Development Area designated under the Act. The nearest designated wrecks are those of HMS Acheron (1940), HMS Swordfish (1940) and SS Mendi (1917) which lie between 11 and 23 km to the east of the Offshore Development Area. It is important to be aware, however, that there are at least two wrecks in the Offshore Development Area which although not currently legally protected are eligible for designation under the terms of the Act.

14.113. The maritime archaeological potential of the south coast of England has been addressed at a regional level by both the South Coast REC (James *et al*., 2010) and MAREA (EMU Ltd, 2010), which were both used to inform this report. The review of maritime archaeology below has also been informed by two recent documents published by English Heritage: Ships and Boats: Prehistory to 1840 (English Heritage, 2012a) and Designation Selection Guide - Ships and Boats: Prehistory to Present (English Heritage, 2012b).

Early prehistoric (Palaeolithic – Mesolithic)

14.114. There is currently no evidence in the UK for maritime archaeological remains pre-dating the start of the Holocene (c. 12,000 BP), nor is there evidence for the waterborne movement of hominins and early humans between the UK and continental Europe during pre-Holocene interglacials (English Heritage, 2012a), but this cannot be taken as proof absolute of a lack of maritime activity around the UK during the Palaeolithic.

14.115. Although the potential for the survival of evidence of early prehistoric maritime activity in the UK would be very low given the entirely organic nature of any such craft and the effects on the archaeological record of repeated marine transgressions and associated fluvial activity across much of the period represented by the Palaeolithic, the technology and expertise required to construct small craft (logboats, for example) was certainly available by the Mesolithic, if not earlier.

14.116. The first archaeological evidence to suggest the use of watercraft in the UK dates to the Mesolithic (c.10,500-6,000 BP) (see for example Cobb, 2007 and Van de Noort, 2011).

14.117. The geographical position of the Offshore Development Area in relation to a number of major Holocene river valleys and estuaries suggest that Mesolithic maritime activity in the area was likely. The earliest maritime remains will probably date to the late Mesolithic, but prior to the last marine transgression. Watercraft from this period are likely to have been used in the rivers and estuaries of the Offshore Development Area, for coastal journeys, fishing expeditions and possibly longer journeys in favourable conditions.

Neolithic and Bronze Age (c. 4,000–700 BC)

14.118. Direct archaeological evidence for the human exploitation of marine resources and maritime activity in the UK during the Neolithic is limited to a number of logboat finds (see Johnstone, 1980; Wilkinson and Murphy, 1995; Bradley *et al*., 1997). That these craft were used for fishing and were capable of journeying onto the open sea is suggested by faunal evidence from shell middens at Neolithic sites which contain the bones of deep water fish (Ellmers, 1996).

14.119. Evidence for maritime trade during the Neolithic is indicated by the discovery on the UK mainland and in the Western Isles of Scotland of porcellanite stone axes manufactured in Ireland (Breen and Forsythe, 2004).

14.120. Although there are a handful of terrestrial Neolithic finds near the Offshore Development Area, none of these are maritime in nature (EMU Ltd, 2010).

14.121. Archaeological evidence from the Bronze Age (c.2,400–700 BC) suggests an established maritime trade and the transport of cargoes of prestige goods. For example, Scandinavian amber was being transported across the North Sea to the UK, and Whitby jet was being carried by boats to the south coast and the Continent (Needham, 2009). Other maritime finds from around the UK include a collection of Middle Bronze Age objects of Continental origin from Langdon Bay, Dover (Fenwick and Gale, 1998), tin ingots, and a bronze object from Sicily at a designated site at Salcombe in Devon (English Heritage 2012a), and material found at the coastal site of Hengistbury Head in Dorset across Christchurch Bay from the Offshore Development Area (Cunliffe, 1990). Together these finds reinforce the evidence for a thriving and extensive sea-borne transport, trade and exchange network across much of north-west Europe, including the UK, during the Bronze Age.

14.122. The proximity of the study area to Hengistbury Head and its position on what appear to be Bronze Age trade routes along the south coast suggest that the area would have been seen a good deal of maritime activity during the Bronze Age and there is the potential for remains of such vessels to be present in the Offshore Development Area (James *et al*., 2010).

Iron Age and Roman (700 BC–500 AD)

14.123. Extensive maritime activities around the UK during the Iron Age (c.700 BP-43 AD) and during the Roman occupation of Britain (43-410 AD) are well documented, and there is good evidence of regular trade in goods from the Continent (Milne, 1990). The Iron Age trading port at Hengistbury Head near the Offshore Development Area (Cunliffe, 1990) has produced numerous artefacts of European origin, providing concrete evidence of extensive pre-Roman cross-Channel contact.

14.124. Although no archaeological evidence of local vessels is yet known from the UK, a distinct tradition of substantial, sea-going vessel – known as the 'Romano-Celtic' type – was being developed in north-western Europe during the later Iron Age (Marsden, 1994), a number of examples of which have been found in the UK (see Marsden, 1994; Nayling and McGrail, 2004; Rule and Monaghan, 1993).

14.125. The major maritime find from the area around the Offshore Development Area is a large logboat, (now in the Poole Museum) capable of carrying passengers and bulky cargo which was discovered off Brownsea Island in Poole Harbour and is radiocarbon dated to 295 ± 50 BC (James *et al*., 2010).

14.126. There is, however, the potential for vessels from this period to have been lost in the Offshore Development Area. This is suggested by evidence from the Hamworthy Peninsula near Poole that during the Roman period the area was a supply base for trade in continental goods such as wine from northern Italy and fine pottery from Armorica (EMU Ltd, 2010), by a Roman amphora fragment found in the approach to Poole Harbour, a Late Iron Age anchor and chain from Bulberry Camp near Wareham (James *et al*., 2010), by portions of a 'burnt and mud-buried Roman ship' discovered in Christchurch Harbour in 1910 (English Heritage, 2012a) and by a 19th century record of a Roman vessel being found during dredging in Southampton Water.

14.127. Taken together the evidence suggests substantial Iron Age and Roman maritime traffic across the Offshore Development Area. It is likely that many more vessels of this period were lost than the available archaeological evidence suggests, which increases the potential that currently undiscovered remains from this period are present in the area.

Medieval (500–1508 AD)

14.128. Maritime activity increased and diversified during the early medieval period due, in part, to Saxon and Viking raiding, the intensification of regional trade and migration that followed, and the growth of a number of major ports on the UK coast, including Portsmouth and Southampton (Hutchinson, 1997; Friel, 2003).

14.129. Despite a dearth of direct archaeological evidence for early medieval seafaring, there are historical records which demonstrate that within the region around the Offshore Development Area places like Portsmouth Harbour were heavily used from the sixth century AD by cross-Channel shipping traffic (EMU Ltd, 2010)) and that a Saxon trading 'wic' developed on the shores of the River Itchen near Southampton – known as Hamwic, and for roughly 150 years was the principal port for the Kingdom of Wessex (Williamson, 1998; Hamerow, 2002). Closer to the Offshore Development Area, Christchurch (originally known as Twynham) was founded in c.AD 650 and quickly developed into one of the most important ports in Saxon England because it was easily reached from Europe and the River Avon, on the banks of which it was built, was navigable as far as Salisbury (Stannard, 1999).

14.130. While there are very few known remains of Anglo-Saxon and Viking vessels, historical sources like the Anglo-Saxon Chronicle (896/897 AD) indicate that these vessels were common and in widespread use in the waters along the south coast, and were certainly passing over the Offshore Development Area as they entered or left the Solent and the other ports of the area, Christchurch and Poole. The level of shipping passing through the area during this period is high enough to suggest that there is significant potential for archaeological remains to exist within the Offshore Development Area.

14.131. The Norman conquest in 1066 established new international trade links, with an increasing trade in European wine into the UK, for example (Woodman, 1997) and a rapid growth in textile and food exports (Kermode, 1998). Maritime trade and sea-borne warfare continued to be extremely important to England during the late medieval period with the Crown's huge territorial possessions in France and extensive and burgeoning international trade networks requiring considerable shipping fleets.

14.132. This growth in trade had an impact on the growth of the south coast ports with ports like 'Southampton, Bristol, [and] London favoured [as] points of transit' (Friel 2003). In the twelfth century Southampton was almost exclusively involved in the wine trade between Gascony and England, but by the fifteenth century the port had expanded its trading links to include Italian city states, notably Genoa (Wheatley, 1990; Maritime Archaeology Ltd, 2007).

14.133. Within the UK the remains of only three late medieval merchant vessels are known. One of these, the so-called Studland Bay wreck, was discovered in 1984 and is now designated under the Protection of Wrecks Act (1973). The wreck lies in the approaches to Poole Harbour, across the bay from the Offshore Development Area. On the basis of artefacts recovered from the wreck and its hull typology, it is believed to date to between 1480 and 1520 (Gutierrez, 2003; English Heritage, 2012a). The presence of this wreck highlights the continuing use of the Poole and Christchurch Bay area by shipping during the late medieval period, the international nature of much of this shipping, and also the potential for wrecks of this period to survive in the marine environment in close proximity to the Offshore Development Area.

14.134. The level of medieval maritime activity along the south coast of England suggests that the potential presence of shipwrecks of this period in the Offshore Development Area is high.

Post-medieval (1509-1815 AD)

14.135. The growth of commercial maritime trade which began during the late medieval period continued and expanded in the post-medieval period. This was the period during which European maritime trade, including the UK, expanded to encompass the globe as the colonies of the New World were carved out and the newly discovered sea route to the east provided Europe with vast new territories and markets (Sutton, 2000).

14.136. The expansion in maritime trade resulted in the re-development of small harbours and ports and the construction of new ones (Jackson, 1983). Local to the Offshore Development Area, Southampton grew into the pre-eminent south coast port towards the end of this period, whilst Portsmouth expanded in its role as one of the UK's largest naval ports and dockyards (Rodger, 2004). Although the other local ports like Christchurch and Poole

declined, shipping activity in the region was substantial throughout the post-medieval period.

14.137. Linked to the increase in activity was an increase in maritime casualties. Friel (2003) estimates that during the eighteenth century 3-5 percent of ships were lost every year. According to Maritime Archaeology Ltd (2007) this equates to over a quarter of the active shipping during this period. In the region surrounding the Offshore Development Area they indicate that approximately 313 wrecks were recorded in the area surrounding the Isle of Wight and 243 in the Portland area.

14.138. This suggests a regional high maritime archaeological potential for this period; something borne out by examples of early post-medieval wrecks in the area such as the Tudor period Santa Lucia (1567) and Mary Rose (1545) in the Solent, the Swash Channel Wreck outside Poole Harbour dated to the early 17th century and the later 18th and 19th century wrecks of HMS Assurance (1738) and HMS Pomone (1811) off the Needles on the Isle of Wight.

14.139. Although none of these wrecks, and only a small portion of the total number of casualties referred to above, are located in the Offshore Development Area (see SeaZone and NMR Sections below), the massive regional increase in shipping activity during the post-medieval suggests an increased likelihood of wrecks from this period on any particular portion of the seabed.

Modern (post-1815)

14.140. During the 19th century the UK reached the height of its global power, with the largest empire in the world. To service the needs of the empire a vast merchant and military shipping fleet was required.

14.141. At the start of the modern period, coastal and international maritime trade were dominated by wooden sailing vessels (Lavery, 1991). Rapid industrialisation in the 18th and 19th centuries revolutionised shipbuilding, however, introducing innovations that were to precipitate fundamental changes in maritime technology during the course of the 19th century. By the end of the century the advent of the steam engine, the introduction of iron hulls and the development of the screw propeller had wrought major transformations on ships and shipping (Lambert, 2001). These technological changes encouraged the construction of larger, self-propelled vessels and the 19th century witnessed a significant increase in the volume of shipping traffic in the waters of the UK as steam power was quickly put to use (EMU Ltd, 2010).

14.142. Population growth, much of it in urban centres, and burgeoning industry demanded a huge maritime trade capacity to supply both foodstuffs and raw materials. Such was the demand that according to Friel (2003) by the early twentieth century one quarter of the world's seaborne trade was passing through UK ports. This phenomenal growth in shipping is reflected in the large number of shipping casualties recorded along the south coast during the modern era (Maritime Archaeology Ltd, 2007).

14.143. The two World Wars also left a marked shipwreck legacy in the region, including within the Offshore Development Area. 29 charted wrecks recorded by SeaZone in the Offshore Development Area are World War I or II casualties.

14.144. These wrecks include three (3) Royal Navy vessels (HMS John Mitchell (1917), HMS Eleanor (1918) and HMS Sargasso (1943)) and it is important to be aware that such military wrecks, even if not currently legally protected, are eligible for designation under the terms of the Protection of Military Remains Act 1986.

14.145. The increasing incorporation of metal structural elements into vessel design during this period means that wrecks for the 19th and early 20th centuries are often more visible on the seabed than their wooden predecessors. This greater visibility is reflected in the increased number of known wrecks (i.e. those that have been located on the seabed) for the period under discussion, in contrast to the periods discussed previously (see the discussion of the geophysical survey results below).

14.4.4. Aviation archaeology

14.146. Thousands of military and civilian aircraft casualties have occurred in UK waters since the advent of powered flight in the early 20th century. The bulk occurred during World War II and most are concentrated off the south and south-east coasts of England (Wessex Archaeology, 2008b).

14.147. Although the records of aircraft losses at sea are extensive, they are seldom tied to an accurate position and most have only a general location ascribed

to them. This complicates any assessment of the likely presence of aircraft wreckage on or in any particular area of the seabed.

14.148. The ephemeral nature and relatively small size of aircraft wrecks has historically also made these remains difficult to find and characterise during seabed and geophysical surveys. However, on the evidence of a number of recent archaeological reports the identification of these wrecks is becoming common as survey technology and data quality improve, and data review methods develop (see Wessex Archaeology, 1997, 2003, 2006, 2008b).

14.149. All military aircraft are also automatically protected under the terms of the Protection of Military Remains Act (1986) and may not be disturbed without a licence from the Ministry of Defence.

14.150. The Offshore Development Area lies in an area with an aviation history that goes back to early years of powered human flight in the UK.

14.151. Early aircraft casualties which could lie within the Turbine Area or Offshore Export Cable Route[2] are shown in Table 14.7.

Table 14.7 Pre-WWII aircraft casualties in vicinity of Offshore Development Area

Aircraft type	Serial No	Date of loss	Fate/description
De Havilland DH60G Gipsy Moth	G-AAFL	11/08/1929	Crashed or was ditched off Bournemouth.
Fairey IIIF	S1828	24/02/1936	Crashed and sank near the Needles

14.152. The counties surrounding the Offshore Development Area – East Dorset, Hampshire and the Isle of Wight – have an important World War II aviation history. At the height of the war there were, for example, 12 airfields and Advanced Landing Grounds in and around what is now the New Forest National Park.

14.153. There were also a number of important aircraft factories in the region surrounding the Offshore Development Area, including Supermarine (the manufacturers of the Spitfire) at Eastleigh near Southampton, and Airspeed and De Havilland at Christchurch[3]. During World War II these airfields and factories, together with other strategic facilities like the Whiteways Torpedo Works near Weymouth, the Royal Navy cordite factory near Poole Harbour and the ports at Southampton, Portsmouth and Portland were easily accessible to German bombers based in Northern France. Their strategic nature ensured consistent German offensive operations against them and against both terrestrial and maritime targets in the period 1940–1944 (James *et al.*, 2010). Southampton, Portsmouth, Bournemouth and Weymouth were all the target of repeated air raids: between 1940 and 1944 Bournemouth suffered more than fifty air raids[4], Southampton fifty-seven[5] and Weymouth forty-eight[6].

14.154. Shipping convoys entering and leaving Portland and the Solent were also regularly targeted by German aircraft. Of relevance to this study is Convoy CW9 which was attacked by 160 German bombers and fighter aircraft on 8 August 1940 it passed through the Offshore Development Area and approached The Needles. Three Royal Air Force (RAF) squadrons came to the convoy's defence, but by the end of the battle only four ships were undamaged, seven had been sunk, including the Coquetdale which is known to lie within the Offshore Development Area. Two German and one RAF fighter were reported to have crashed into the sea off The Needles[7].

14.155. The sum total of all this wartime activity is a potentially large collection of aircraft wrecks in the vicinity of the Offshore Development Area.

14.156. There is only a single charted aircraft wreck within the Offshore Development Area: a RAF Armstrong Whitworth Whitley bomber (UKHO 19432) recorded in the Offshore Export Cable Corridor.

14.157. Since 2005 there have been three reports, through the British Marine Aggregate Producers Association (BMAPA) Protocol for the Reporting of

[2] (http://daveg4otu.tripod.com/hampshireairfields/)

[3] http://daveg4otu.tripod.com/ah1900/manu.html
[4] http://www.wintonforum.co.uk/qp/charminsterswar.htm
[5] http://www.plimsoll.org/Southampton/Southamptonatwar/southamptonsblitz/default.asp
[6] http://wykeregisjun.co.uk/resources/world-war-ii/bombing-of-dorset
[7] http://www.theneedlesbattery.org.uk/ww1ww2.php

Finds of Archaeological Interest, of aircraft fragments found in aggregate dredged from Licence Areas 127 and 137, which lie adjacent to the Offshore Development Area (see Figure 14.1). These finds provide further evidence of the potential aircraft wreck record on the seabed in the area.

14.158. Although concrete evidence for aircraft wrecks is limited, there are extensive records from a number of sources of aircraft losses at sea in the vicinity of the Turbine Area and Export Cable Route Corridor.

14.159. In addition to the record of the Whitley bomber cited above, the NMR also records three further aircraft casualties in the vicinity of the Offshore Development Area. These recorded losses of three fighter aircraft, shown in Table 14.8, fall within two Named Locations, both within Christchurch Bay (one to the west and one to the east of the Offshore Export Cable Route Corridor) and both roughly 2.8 km distant from the boundary of the Export Cable Corridor (see Figure 14.5).

14.160. The Isle of Wight HER contains records of three further aircraft casualties (see Figure 14.5 and Table 14.9), the given position of one of which (MIW6485) lies within the Turbine Area.

14.161. A German Messerschmitt and a RAF Bristol Beaufighter are recorded lost off The Needles in the New Forest Rapid Coastal Zone Assessment.

14.162. Although only one of the recorded positions listed in Tables 14.6 and 14.7 above is within the Offshore Export Cable Corridor, all the given locations for these aircraft casualties are approximate and there is thus the potential for one or more of these wrecks to lie within the Offshore Export Cable Corridor.

14.163. A further 85 World War II aircraft casualties, and 11 post-war casualties drawn from the Hampshire, Dorset and Isle of Wight casualty databases[8] are in the vicinity of the Offshore Development Area. These records are not tied to geographic positions and their inclusion in the archaeological assessment was based on the descriptions of the loss locations and includes those aircraft listed as lost at sea west of the Isle of Wight. Many of these aircraft wrecks have the potential to be located within the Turbine Area or Offshore Export Cable Corridor.

14.164. No aircraft wrecks were identified in the data collected and/or reviewed by the South Coast REC (James *et al*., 2010) and MAREA (EMU Ltd, 2010). However, two anomalies (NB1040 and NB1129) identified in the geophysical data collected in the Offshore Export Cable Corridor may be aircraft remains.

14.165. Since the end of World War II, the region around the Offshore Development Area has remained an aviation hub. In addition to the international airports at Southampton and Bournemouth, there are many smaller airfields in the region, as well as a number of RAF airfields. The combined Hampshire, Dorset and Isle of Wight databases[9] identify 11 post-war aircraft casualties with the potential to be located within the Offshore Development Area. The details of these casualties are provided in PMSS 2012.

[8] http://daveg4otu.tripod.com/

[9] http://daveg4otu.tripod.com/

Table 14.8 WWII aircraft casualties listed in nmr in vicinity of Offshore Development Area					
Hob_UID	Name	Location	Description	Easting	Northing
1319510	Hurricane Mk I P3310	Off Christchurch	Damaged by return fire from Do 17s and abandoned. 14 August 1940	421180	91070
1343100	Spitfire Mk VI BS115	4 miles off Christchurch	Ditched at sea on 22 August 1943	421180	91070
1341063	Typhoon Mk IB MN857	Off Keyhaven	Ditched at sea after engine failure.	428589	91440

Table 14.9 WWII aircraft casualties listed in Isle of Wight HER in vicinity of Offshore Development Area					
Hob_UID	Name	Location	Description	Easting	Northing
MIW6485	Dornier Do215 or Junkers Ju88, F6+DK	10 miles southwest of the Needles.	Shot down on 2 September 1940. Possibly a Do215, but more likely a Ju88 from unit 2(F)/122 which was recorded as an unclaimed loss that day. Four killed.	418600	73200
MIW6260	Heinkel He111 6N+GK	West of the Needles.	From unit KG100. Crashed into the sea west of Needles on July 7 1941. Four killed	427000	85000
MIW6261	Heinkel He111 1G+AP	West of the Needles.	Also from unit KG100. Crashed into the sea west of Needles on July 7 1941. Five killed	427000	85000

575000

600000

5600000

5575000

NL1

NL2

NL3

NL4

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Archaeological Records in the Study Area

Legend

- Turbine Area
- Offshore Export Cable Corridor
- NMR Recorded Loss
- Dorset HER Record
- IoW HER Record
- UKHO Wreck
- UKHO Obstruction

Fig. No.: Figure 14.6		**Date:** 08/07/2013
Author: NDU	**Checked:** SLE	**Approved:** SMF
Scale@A3: 1:200,000		**Revision No.:** B
Coordinate System: WGS 1984 UTM Zone 30N		**Data Sources:** SeaZone PMSS Dorset HER IoW HER UKHO
Datum: WGS 1984	**Ref. No.:** 29823/35931/NDU	

0 2 4 6 NM

0 5 10 Km

N

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14.4.5. Known and recorded wrecks

14.166. Information with respect to known ship- and aircraft wrecks, related finds and recorded shipping losses within the Offshore Development Area was obtained from SeaZone, the NMR, the Isle of Wight and Dorset HERs, the New Forest National Park Authority and the Hampshire Archaeology and Historic Buildings Record.

SeaZone

14.167. There are 91 wrecks recorded by SeaZone within the study area and 19 seabed obstructions (Figure 14.6). 19 records are located in the Turbine Area (Figure 14.7), of which 16 are identified as wrecks, including one aircraft and the remainder is obstructions. Two of the wrecks and one of the obstructions are listed as 'dead' which means that they are no longer believed to be present on the seabed at the given co-ordinates. The remainder is either considered by the UKHO to be 'live' or have not been assigned a status and should be assumed to be present in or on the seabed.

14.168. Twelve of the 15 SeaZone records in Offshore Export Cable Corridor are wrecks, including one aircraft (Figure 14.8). The remainder are obstructions. Two of the wrecks are 'dead' and one, a modern cabin cruiser lost in 1993 is marked as 'lift', which implies that it has been removed from the seabed. The remaining wrecks and all of the obstructions are either 'live' or have not been assigned a status by the UKHO and should be assumed to be present in or on the seabed.

National Monuments Record

14.169. There are 20 NMR recorded positions and four Named Locations in the study area. Fourteen of the recorded positions are within the boundaries of the Offshore Development Area: 10 in the Turbine Area and four in the Offshore Export Cable Corridor (Figures 14.6, 14.7 and 14.8).

14.170. Twelve of these records are shipwrecks, one is the World War II Whitley bomber which was discussed in the aviation archaeology section above, and one is an unidentified seabed obstruction reported by fishermen, which may be a wreck. All but two of the wrecks are known to be modern, 20th century casualties, mostly dating from World Wars I and II. Many of these records are common to the SeaZone dataset, a reflection of the original source of the NMR data.

14.171. The four Named Location polygons within the study area together contain records of 15 shipping and aircraft casualties ranging from an unnamed sloop wrecked between Lymington and Christchurch in 1742 to three World War II RAF fighter aircraft. It is important to remember that in relation to Named Locations the remains of none, some, or all of these ships and aircraft may be present within the limits of the respective polygons. It is also important to remember that records listed in the two Named Locations which lies outside the boundary of Offshore Development Area, could be encountered within the Offshore Cable Export Corridor.

Isle of Wight HER

14.172. The Isle of Wight HER lists 20 casualties in the study area, 12 of which lie within the boundaries of the Offshore Development Area (Figure 14.6). Most of the Isle of Wight HER records are the same as those in the SeaZone dataset, and many also correspond with the NMR records: a reflection of their common source. Three aircraft losses are recorded by the HER in the study area - two at the same position outside and east of the Offshore Export Cable Corridor, but one potentially inside the north eastern corner of the Turbine Area.

Dorset HER

14.173. There are only five maritime records listed in the Dorset HER within the study area (Figure 14.6), including two wrecks which are not in the other datasets reviewed: the Rosa (1866) and the Herman Julius (1818). The position given for the latter is on the coast at Highcliff, west of Export Cable Corridor Landfall. The position given for the Rosa is within the Offshore Export Cable Corridor, although the accuracy of this position is not known.

New Forest National Park Authority

The Rapid Coastal Zone Assessment ('RCZA') data provided by the New Forest National Park Authority contains 191 records within the study area. Only nine are maritime records and all fall within the boundaries of the Offshore Export Cable Corridor. These records all refer to wrecks which have been noted in the preceding datasets.

580000 590000 600000

5600000 5590000 5580000

NB1109 NB1023 NB1040 NB1048 NB1038 NB1170 NB1044 NB1030 NB1037 NB1046 NB1047 NB1026 NB1036 NB1028 NB1031 NB1032 NB1042 NB1001 NB1039 NB1024 NB1043 NB1027 NB1035 NB1017 NB1041 NB1045 NB1034 NB1033

SUBMARINE

Tidal Levels referred to Datum of Soundings

Place	Lat N	Long W	Heights in metres above datum MHWS	MHWN	MLWN	MLWS	Datum and remarks
Hurst Point	50°42'	1°33'	2·7	2·3	1·4	0·7	1·83m below Ordnance Datum (Newlyn)
Freshwater	50 40	1 31	2·6	2·3	1·5	0·8	1·83m below Ordnance Datum (Newlyn)
Ventnor	50 35	1 12	3·9	3·2	1·7	1·0	2·44m below Ordnance Datum (Newlyn)
Sandown	50 39	1 09	4·1	3·3	1·7	0·8	2·44m below Ordnance Datum (Newlyn)
Ryde	50 44	1 07	4·6	3·8	1·9	0·8	2·74m below Ordnance Datum (Newlyn)
Cowes	50 46	1 18	4·2	3·5	1·8	0·8	2·59m below Ordnance Datum (Newlyn)
Portsmouth	50 48	1 07	4·7	3·8	1·9	0·8	2·73m below Ordnance Datum (Newlyn)
Selsey Bill	50 43	0 47	5·2	4·3	1·8	0·6	2·90m below Ordnance Datum (Newlyn)
Nab Tower	50 40	0 57	4·5	3·8	2·1	0·8	
Bognor Regis	50 47	0 40	5·7	4·3	1·7	0·5	3·05m below Ordnance Datum (Newlyn)

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Archaeological Records in the Turbine Area

Legend

- Turbine Area
- Offshore Export Cable Corridor
- NMR Recorded Loss
- Dorset HER Record
- UKHO Wreck
- UKHO Obstruction
- Geophysical Anomaly High
- Geophysical Anomaly Medium
- Geophysical Anomaly Low

Fig. No.: Figure 14.7		**Date:** 08/07/2013
Author: NDU	**Checked:** SLE	**Approved:** SMF
Scale@A3: 1:100,000		**Revision No.:** B
Coordinate System: WGS 1984 UTM Zone 30N		**Data Sources:** SeaZone PMSS Dorset HER NMR UKHO
Datum: WGS 1984	**Ref. No.:** 29823/35934/NDU	

0 1 2 3 NM

0 3 6 Km

N

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580000 590000 600000

5620000

5610000

5600000

NB1061
NB1049
NB1063
NB1133
NB1050
NB1067
NB1069
NB1068
NB1132
NB1131
NB1127
NB1129
NB1058
NB1109
NB1053
NB1052
NB1023
NB1170
NB1040
NB1048
NB1038
NB1046
NB1047
NB1026

BOURNEMOUTH
CHRISTCHURCH
CHRISTCHURCH BAY
POOLE BAY
DOLPHIN SAND
OVERFALLS
SUBMARINE

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Geophysical Anomalies

Legend

- Turbine Area
- Offshore Export Cable Corridor
- NMR Recorded Loss
- Dorset HER Record
- IoW HER Record
- UKHO Wreck
- UKHO Obstruction
- Geophysical Anomaly High
- Geophysical Anomaly Medium
- Geophysical Anomaly Low

Fig. No.: Figure 14.8		**Date:** 08/08/2013
Author: NDU	**Checked:** SLE	**Approved:** SMF
Scale@A3: 1:100,000		**Revision No.:** B
Coordinate System: WGS 1984 UTM Zone 30N		**Data Sources:** SeaZone PMSS Dorset HER IoW HER UKHO
Datum: WGS 1984	**Ref. No.:** 29823/35935/NDU	

0 1 2 3 NM

0 3 6 Km

N

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Hampshire AHBR

14.174. The Hampshire Archaeology and Historic Buildings Record contains only one maritime record within the Offshore Development Area - a record of the wreck of the Caroline Susan, a British motor launch lost on the Dolphin Banks in 1940. This wreck is also listed in most of the other datasets reviewed.

14.4.6. Ancient Monuments and Archaeological Areas

14.175. There are no scheduled ancient monuments protected under the Ancient Monuments and Archaeological Areas Act (1979) in the Offshore Development Area.

14.4.7. Geophysical anomalies

14.176. A total of 2,177 seabed anomalies were identified by the archaeological review of the sidescan sonar data collected in the Offshore Development Area by Fugro and Osiris Projects in 2011 and 2012. Two thousand of the anomalies were assessed to be geological or non-archaeological in nature and thus not of archaeological interest. These anomalies were not considered further in the archaeological assessment.

14.177. In total, 177 anomalies were assessed to be of archaeological interest. Fifteen were rated as being of high archaeological potential in the Turbine Area and 11 in the Offshore Export Cable Corridor, (refer to 'Baseline Environment') (Figures 14.7 and 14.8). All shipwrecks identified in the geophysical data have been given a high archaeological potential rating and would be subject to construction exclusion zones based on the size of each site.

14.178. In addition to the high potential anomalies the geophysical data review also identified seven and 13 anomalies rated as medium and 23 and 108 of low potential in the Turbine Area and Offshore Export Cable Corridor respectively (refer to the Baseline Environment section). All anomalies ascribed a medium archaeological potential rating would be subject to construction exclusion zones.

14.179. Anomalies ascribed a high or medium archaeological potential are considered further in the following sections. Anomalies ascribed a low archaeological potential rating are not considered to require investigation as their archaeological character and importance cannot be further determined. They are also not discussed further in the archaeological assessment. Their presence on the seabed should, however, be noted during construction.

High archaeological potential anomalies: The Turbine Area

14.180. All 15 anomalies identified in the Turbine Area and ascribed a high archaeological potential rating are shipwrecks. All were identified in the sidescan sonar and their presence corroborated in the multibeam bathymetry data. The position of each anomaly is shown on Figure 14.7 and each is listed, with the proposed exclusion zone applied, in Table 14.10.

Table 14.10 High Archaeological potential anomalies: The Turbine Area

PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1023	590844	5602206	10.9	4.3	0.9	Debris	50 m	Debris believed to be a possible shipwreck. True size of anomaly not clear but size, shape and form strongly suggest a collapsed shipwreck. No corresponding records for the site in the SeaZone, NMR and other local data sources.
NB1032	583253	5591722	75	20	-	Wreck	75 m	Norwegian coasting steamer Start, sunk by U-58 in December 1917. Sidescan sonar image shows a clear but heavily deteriorated shipwreck. Contacts in the area surrounding the wreck which could be debris associated with the site. Classified as 'live' by SeaZone. NMR record 61 m west of the centre of the wreck.
NB1033	584545	5583661	37.5	26	-	Wreck	75 m	Anomalies within 17 m of each other. Both associated with wreck believed to be the Hartley (sank 1924). Sidescan sonar image of poor quality but substantial wreck structure clearly visible. SeaZone classifies the site as 'live'. NMR record.
NB1034	584552	5583646					50 m	
NB1035	585009	5588264	116	58	-	Wreck	100 m	Unknown wreck. Sidescan sonar image shows metal shipwreck. Listed by SeaZone as a non-dangerous and 'live'. Approximately 170 m north-east of the centre point of NB1035 the NMR has a record for the Italian steamer, Gallia, torpedoed on 24 October 1917. NB1035 almost certainly the Gallia.
NB1036	586134	5593642	136	50	-	Wreck	100 m	Everleigh. Sidescan sonar data shows the wreck to be largely intact with clearly visible deck structure. Upright on the seabed with some debris close to the main wreck structure. Anomaly corresponds within a few metres to the 'live' SeaZone position for the Everleigh. The NMR position for the wreck is approximately 217 m north east of the actual centre point of the wreck. Everleigh lost after being torpedoed in February 1945. The fact that she was armed means that munitions should be expected to be present on the wreck.
NB1037	587613	5597528	88	30	-	Wreck	75 m	Baron Garioch. Wreck is heavily deteriorated with little surviving coherent structure. Listed by SeaZone as 'live'. Isle of Wight HER includes a record of this wreck, positioned just over 50m south west of the centre point of the anomaly. An armed British steamer sunk on 28 October 1917. Munitions are known to be present at the stern of the wreck.

Table 14.10 High Archaeological potential anomalies: The Turbine Area

PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1039	588250	5591693	220	137.5	-	Wreck	150 m	Widely scattered and dispersed wreck site, thought to be the remains of the Albert C Field. Canadian steamer sunk by aerial torpedo on 18 June 1944. Lost while carrying a cargo of 2,500 tons of ammunition. The midship debris field is reportedly littered with munitions. Wreck classified as 'live' by SeaZone. A NMR record exists approximately 105 m north west of the anomaly.
NB1041	588490	5586094	67	38	-	Wreck	75 m	Possible wreck of the Neree. Belgian steam trawler lost in February 1926. Sidescan sonar image shows upstanding structure at the southern end of the wreck. SeaZone lists the wreck as 'live'. South Coast REC (James et al., 2010) reports a wreck (WA7536) approximately 300m south-east of NB1041.
NB1042	588943	5591875	68.5	33	-	Wreck	75 m	Possibly wreck of the Brittania, a World War I U-boat casualty. Sidescan sonar image covers two lines of data so the midship section of the wreck is obscured. Wreck appears to be largely collapsed. Classified by SeaZone as 'live' and described as broken up and buried. A NMR record 100m north-west of the wreck described simply as 'remains of a craft' may refer to this wreck.
NB1043	589702	5586972	97.5	34	-	Wreck	100 m	Unidentified wreck with 'live' SeaZone record Geophysical data show what must be a metal wreck which is largely collapsed and partially buried.
NB1044	591580	5597210	57.5	15.5	-	Wreck	75 m	Corresponds with the SeaZone position of the wreck of HMS Sargasso. The Isle of Wight HER record for the Sargasso is 750 m north east of the wreckage and SeaZone position. Sargasso used as a Dan layer in the 9th Minesweeping Flotilla. Sank on 6 June 1943 after hitting a mine. The wreck has been identified as the Sargasso from the presence of a number of Dan markers onboard. Small arms ammunition of World War II vintage has been noted on the site by divers.
NB1045	592141	5586809	115	50	-	Wreck	100 m	Possibly the wreck of the Coquetdale. Almost entirely collapsed but easily identifiable as a shipwreck. Coincides with the UKHO charted position for what is thought to be the Coquetdale which was one of three wrecks within the area lost on 8 August 1940 in a German air attack.

Table 14.10 High Archaeological potential anomalies: The Turbine Area

PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1047	587524	5594942	26	6.5	-	Wreck	50m	Unidentified wreck with little coherent surviving structure. No charted wreck at this position and anomaly not associated with a SeaZone, NMR or any other historical record. Identity of this wreck has not been possible to determine.
NB1048	589363	5600022	19.5	13.5	-	Wreck	50m	Large seabed object, possibly a wreck, which falls within the water column or nadir of a sidescan sonar line and is thus difficult to describe. No charted wreck at this position on the seabed, and the anomaly is not associated with a SeaZone, NMR or any other historical record. The identity and full nature of this anomaly has thus not been possible to determine.

SeaZone and Other Records Not Seen in Geophysical Data

14.181. In addition to the wrecks which were identified in the geophysical data, the following charted wrecks and recorded losses recorded as being in the Turbine Area were not seen in the data:

- The wreck of HMS John Mitchell, a steam drifter lost while in Admiralty service in November 1917 and listed by SeaZone and the Isle of Wight HER in the north east of the Turbine Area;
- The wreck of the Hazlewood near the western boundary of the Turbine Area;
- A modern Apache aircraft loss also in the west of the Turbine Area.

14.182. Neither 'dead' SeaZone wreck (SZ_5 and SZ_12) was seen in the geophysical data.

14.183. Care would be exercised in the vicinity of these positions during construction.

High archaeological potential anomalies: Offshore Export Cable Corridor

14.184. All 11 high potential anomalies in the Offshore Export Cable Corridor appear to be shipwrecks and were identified in the sidescan sonar and corroborated in the multibeam bathymetry and/or magnetometer data. The position of each anomaly is shown on Figure 14.8 and each is listed in Table 14.11.

SeaZone and other records not seen in geophysical data

14.185. In addition to the wrecks which were identified on the seabed, the following charted wrecks and recorded losses were not seen in the geophysical data from the Offshore Export Cable Corridor:

- The wreck of the Buyron Bestum;
- The Caroline Susan, a motor yacht presumed mined in 1940.

Medium archaeological potential anomalies: The Turbine Area

14.186. A total of seven contacts rated as being of medium archaeological potential were identified in the geophysical data from the Turbine Area. The positions of these anomalies are shown on Figure 14.7 and each is listed in Table 14.12.

Medium archaeological potential anomalies: Offshore Export Cable Corridor

14.187. Thirteen contacts rated as being of medium archaeological potential were identified in the data from the Offshore Export Cable Corridor is described below. The positions of these anomalies are shown on Figure 14.8 and each is listed in Table 14.13.

Table 14.11 High archaeological potential anomalies: Offshore Export Cable Corridor

PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1038	588063	5601225	50	21	-	Wreck	50m	May be the wreck of the steam coaster Braedale, which sank in rough seas on 16 October 1932. Sidescan sonar shows wreck is largely collapsed, although it retains a ship-like shape. The boilers and engine of this vessel are visible at the stern. There are SeaZone, NMR and Isle of Wight HER records for the wreck of the Braedale, none of whose positions coincide precisely with the site on the seabed.
NB1040	588318	5601314	10	5	-	Wreck	50m	Approximately 260 m east of the Braedale and may be debris from it. May also be a separate wreck, although its dimensions (7 m by 4.5 m) suggest that it is too small for this. Anomaly, clearly anthropogenic in origin and there is evidence of structure standing proud of the seabed with associated scour and accumulation of sediment. This assessment believes that it is unlikely that NB1040 is related to the Braedale, and suggests instead that given its size, it may be the remains of an aircraft. The Isle of Wight HER contains a record (MIW6485) for a German Dornier Do215 or Junkers Ju88, the reported position of which is just over 1km east of NB1040. If NB1040 is an aircraft wreck it is automatically protected under the terms of the Protection of Military Remains Act, and may not be disturbed in any way, except under licence issued by the Ministry of Defence.
NB1046	594052	5595269	108	38	-	Wreck	100m	NB1046 and NB1117 both represent the same iron or steel shipwreck thought to be the remains of HMS Eleanor. Armed steamship torpedoed on 12 February 1918 while carrying a cargo of mines, depth charges and other munitions. Sidescan sonar image shows the wreck to be in two distinct sections, both of which are collapsed. SeaZone record coincides almost exactly with NB1046. NB1117 is 10 m to the east. The Dorset HER contains a record for the Eleanor, 150m south east of the wreck. The identification of this wreck in the records as the Eleanor is based on the cargo of mines and depth charges which still remain on the site. This wreck should be treated with extreme caution.
NB1117	594061	5595272	141.7	39.4	1			

Table 14.11 High archaeological potential anomalies: Offshore Export Cable Corridor

PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1050	596478	5611960	10.2	4.5	1.1	Wreck	50m	Large seabed mound possibly indicative of a buried feature. 100 m from the unreliable SeaZone position of the Jgena, the wreck of a modern leisure yacht (lost in 1967) classified by the UKHO as 'dead'. Both the Dorset and Isle of Wight HERs give a position for the wreck, some 140 m south east of the SeaZone position, and approximately 230 m south east of NB1050. The NMR does not list the wreck.
NB1058	587623	5607491	10	2	0.8	Debris	50m	Large distinctive reflector. Size and shape of the feature and the acoustic shadow strongly suggest that it is a shipwreck. Any superstructure is obscured by shadow, but what appears to be the hull looks relatively intact. If this is a wreck, it is a small vessel, possibly a yacht. There are no charted features in the vicinity of this anomaly, nor are there wreck records in SeaZone, the NMR or the HERs.
NB1067	593727	5610707	32.6	10	2.1	Wreck	100m	Possibly the remains of the Fenna. The anomaly is located at the SeaZone and New Forest Rapid Coastal Zone Assessment positions for the Fenna and appears from the sidescan sonar image to be a broken up wreck. Wooden schooner built in 1863 and lost in 1881. She was carrying a cargo of railway lines, barrels of iron and cases of glass and this cargo is still preserved on the wreck. The site has been under investigation by the Hampshire and Wight Trust for Maritime Archaeology (HWTMA) for a number of years and the sidescan sonar image of the wreck compares favourably with the archaeological site plan produced by the Trust.
NB1109	586820	5605022	8.6	3	1.1	Wreck	50m	Anomaly 8.6 m long and 3 m wide. Size and location suggest that it may be the remains of the Lady Mira, a modern yacht which sank after a collision in 1993. The UKHO position given by SeaZone is 135 m east of NB1109.
NB1127	595536	5606070	13.5	12.1	_	Wreck	50m	Large area of shadow with what appears to be a buoy riser visible. The sidescan sonar image is unclear as it lies on the edge of a survey line but this anomaly is potentially a buoyed wreck.

Table 14.11 High archaeological potential anomalies: Offshore Export Cable Corridor								
PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1129	586334	5607534	160	30	-	Wreck	150m	Scattered angular debris would suggest this is the aircraft whose charted position is 125m to the east.
NB1170	595137	5602730	67.3	13.7	-	Wreck	100m	Large area of what appears to be scattered debris with associated magnetic anomaly with an intensity of 316nT (nanotesla). The sidescan image of the site shows very little structure visible on the seabed, but this seabed feature may represent a shipwreck where the associated large magnetic anomaly suggests the presence of items such as cannon and anchors on the seabed.

Table 14.12 Medium archaeological potential anomalies: Turbine Area								
PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1001	593209	5591240	11.5	1.1	0.6	Anchor	25m	Pronounced thin curvilinear feature. Feature appears to double back and cross over itself, suggesting a discarded length of cable. It could also represent the visible edge of further buried material.
NB1017	588168	5586464	9	1.6	0.3	Debris	25m	Large mound, potentially indicative of a buried feature.
NB1024	590997	5589806	4.4	2.3	0.8	Debris	25m	Large reflector in association with smaller linear feature. Feature appears to be of anthropogenic origin and could represent the visible element of further buried material.

Table 14.12 Medium archaeological potential anomalies: Turbine Area								
PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1026	591382	5594973	4	4	0.1	Debris	25m	Oblong, lozenge-shaped contact. Almost certainly anthropogenic in origin, the feature could represent a sheet of material on the seabed or the top of a larger buried structure.
NB1027	592067	5586895	7	5.2	0.5	Debris	25m	Large incoherent anomaly extending into the acoustic shadow. The contact lies approximately 110 m from the wreck of the Coquetdale and may be related to the wreck.
NB1028	592580	5594745	4	3.6	0.4	Debris	25m	Three distinct parallel reflectors, each 4 m in length and approximately 1.8 m apart. Associated with an area of scour and is 0.4 m in height. The anomaly appears to be anthropogenic in origin and the regularity of the reflectors suggests that is a single structure.
NB1030	593108	5595625	3.9	1.4	0.5	Debris	25m	Curvilinear feature, with seabed indicative of partial burial. To the east of the anomaly there is a smaller feature which appears to be related. The topography of the seabed suggests that there could potentially be further associated material buried in the vicinity.

Table 14.13 Medium archaeological potential anomalies: Offshore Export Cable Corridor								
PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1049	595863	5612377	9	6.4	0.4	Debris	25m	Large area of seabed disturbance, potentially due to a buried or partially buried anthropogenic feature.

Table 14.13 Medium archaeological potential anomalies: Offshore Export Cable Corridor

PMSS ID	Position co-ordinates (WGS84)		L (m)	W (m)	H (m)	Classification	EZ (m radius)	Notes
	Easting	Northing						
NB1052	594075	5603482	2.4	1.4	0.2	Debris	25m	Large area of seabed disturbance in association with scattered reflectors (ignore Fugro measurements).
NB1053	594249	5602890	6	2.8	0.3	Debris	25m	Large depression/mound - unable to reconcile as unable to determine from which direction the image was collected.
NB1061	594187	5618009	7.9	1.4	-	Debris	25m	Large unidentifiable guitar shaped contact, potentially cable/chain.
NB1063	595069	5611862	9.9	2.1	0.9	Debris	25m	Large linear reflector with right angle to the north, pronounced height and associated seabed disturbance.
NB1065	593766	5610744	3.5	1.2	0.1	Debris	25m	All possible pieces of debris related to the wreck of the Fenna. The former three anomalies lies between 20 m and 50 m south west of the southern edge of the wreck, while the latter two are 30 m and 55 m to the north east and east of the site respectively.
NB1066	593793	5610733	2.1	1.2	0.2	Debris		
NB1131	593708	5610677	9	7	-	Debris		
NB1132	593688	5610667	7	4	-	Debris		
NB1133	593679	5610668	13	4	-	Debris		
NB1068	592011	5610437	13.2	-	-	Debris	25m	Same isolated piece of substantial linear debris, 15 m long and with associated seabed disturbance.
NB1069	592017	5610433	3.7	2.6	0.4	Debris		
NB1153	593986	5595302	2.3	0.4	-	Debris	25m	Potential debris from HMS Eleanor.

Maritime and aviation archaeological characterisation and site preservation potential

14.188. The review of the maritime history of the region suggests that there is the potential for the remains of maritime losses in the Offshore Development Area for all periods since c.10,000 BP, although this is not reflected in the known shipwreck record, which is heavily biased towards wrecks from the last 150 years, a number of which have been identified in the geophysical data from the Offshore Development Area.

14.189. The general lack of seabed sediment in the Offshore Development Area means that the ideal burial conditions required for the preservation of earlier wrecks are largely absent in the area and it is unlikely that well-preserved wooden wrecks would be encountered. Instead, the remains of any early wrecks would be low profile sites identifiable from scatters on the seabed of the more resistant items on board - cannon, anchors, etc. Such sites are often difficult to identify in geophysical data, and there are only a few examples in the high and medium potential anomalies, described above, which may be evidence of earlier shipwrecks.

14.190. The interest and importance of maritime archaeological sites and materials can be broadly summarised as follows:

- Very little is known about the watercraft and ships of the pre-medieval period and archaeological evidence for them is so rare that any material dating from this long span of time is likely to be of special archaeological interest if discovered within the Turbine Area or Offshore Export Cable Corridor.
- Post-medieval wrecks, dating to the period 1509-1815 represent the Tudor and Stuart periods, the English Civil War, the Anglo-Dutch Wars, the American of Independence and the French Revolutionary Wars. Such wrecks are relatively rare and would be of particular interest if found in the Turbine Area or Offshore Export Cable Corridor.
- Modern wrecks of the 19th and 20th centuries and aircraft crash sites are both more recent and more common in the archaeological record, but continue to contribute to our understanding of the major changes in maritime technology precipitated by the Industrial Revolution. Discrimination may be required in determining the historical and archaeological importance of each vessel, if discovered in the Turbine Area or Offshore Export Cable Corridor. Any military aircraft is automatically protected by the Protection of Military Remains Act.

14.5. Impact Assessment

14.5.1. Realistic Worst Case Scenario

14.191. Relevant design parameters defining the 'Rochdale Envelope' for the Project, have been used to describe the Realistic Worst Case Scenarios ('RWCSs') for each potential effect identified on offshore archaeology.

14.192. Table 14.14 sets out the construction, operation and decommissioning phases of the Project relevant to archaeological receptors and the worst case parameters underpinning the assessment.

Table 14.14 Realistic worst case scenario relevant to the Offshore Archaeology Impact Assessment

Potential effect	Realistic worst case scenario	Rationale
Construction		
Sediment removal associated with seabed preparation for gravity base foundation placement	Foundations: Maximum of 218 x 37.5 m diameter gravity base structures ('GBS') for turbine foundations. Foundations: Maximum of 3 x 45 m GBS for Offshore Substations Platform ('OSP'). Foundations: Maximum of 1 x 4 m monopile for meteorological mast ('met mast'). Maximum volume of sediment removal = 622,400 m^3 Comprising 610,400 m^3 for turbine foundations and 12,000 m^3 for OSP foundations. Assuming depth of bed preparation of 2 m.	Gravity base foundations are likely to have the greatest potential to affect archaeological receptors as they have the largest footprint of any foundation option and require greatest extent of bed preparation prior to installation, compared to other foundation options (e.g. monopile foundations). Any archaeological material in this sediment would either be destroyed or its context lost through disturbance and re-deposition elsewhere on the seabed.
Seabed disturbance resulting from deployment of jack-up vessel legs installation	Foundations: Installation of a maximum of 221 space frame foundations (218 turbine foundations, 3 OSP foundations and 1 x 4 m monopile for met mast foundation). Jack up barge: Maximum of 8 legs per jack up barge, with spud can of maximum diameter 4 m and maximum depth 4 m. Seabed disturbance: Maximum seabed disturbance per spud can of 50 m^3 = 400 m^3 per jack-up barge.	Space frame foundations may require up to four jack-up actions per space frame and turbine installation, resulting in a maximum of 872 jack-up operations for turbine foundation installation, 12 jack-up operations for OSP installation and 1 jack-up operations for met mast installation. Other foundation options likely to require fewer jack-up operations. Jack-up legs would affect seabed sediments every time they are deployed and thus have the potential to physically affect archaeological receptors.
Seabed disturbance resulting from deployment of vessel moorings associated with construction activities	Vessel anchors: Anchors would be raised and re-deployed at 100 – 200 m distances along the Inter-array, Inter-substation and Offshore Export Cable Corridor.	Cable laying barges would deploy a maximum of eight heavy anchors in an array around the vessel to enable accurate positioning. These anchors would leave a series of scars on the seabed.

Table 14.14 Realistic worst case scenario relevant to the Offshore Archaeology Impact Assessment

Potential effect	Realistic worst case scenario	Rationale
Disturbance of archaeological features through cable installation	Inter-array cables: Maximum of 296 km associated with turbine foundations and back-up connections (redundancy loops). Maximum cable length surface laid and requiring protection 22.1 km, equating to a maximum of 154,700 m^2 cable protection. Assessment takes an assumed cable burial depth of 3 m and maximum construction width of 5 m. Total maximum seabed sediment disturbed = 4,110,000 m^3	Maximum length of Inter-array cabling required and installed based upon use of 5 Megawatt (MW) turbine would result in maximum disturbance to archaeological receptors. Disturbance assumes a maximum of 3 m burial depth as a worst case.
	Inter-substation cables: Maximum of 70 km of inter-substation cabling with a two circuit inter-connection (maximum of 35 km for a single cable connection). 5.4 cable length surface laid and requiring cable protection, equating to a maximum of 37,800 m^2 cable protection. Assessment takes an assumed cable burial depth of 3 and maximum width of seabed affected of 5 m. Total maximum seabed sediment disturbed = 969,000 m^3	Maximum length of Inter-substation cabling required and installed based upon maximum of three OSPs would result in maximum disturbance to archaeological receptors. Disturbance assumes a maximum of 3 m burial depth as a worst case.
	Export cables: Maximum length of 210 km export cable, based upon maximum of 6 x 132 kV export cables (35 km each). Assessment takes an assumed cable burial depth of 3 and maximum width of seabed affected of 5 m Maximum width of seabed affected (per cable) of 5 m Total maximum seabed sediment disturbed = 3,150,000 m^3	132 kV solution requires a greater number of export cables than other voltages assessed (e.g. 275 kV). Disturbance assumes a maximum of 3 m burial depth as a worst case.
	Installation of up to of 50% of export cable length may be installed via jetting technique in combination with other cable laying techniques.	50% jetting assessed as this releases more sediment than other installation techniques, but due to the nature of the seabed, this would only be used in the northern half of the Offshore Export Cable Corridor.

Table 14.14 Realistic worst case scenario relevant to the Offshore Archaeology Impact Assessment

Potential effect	Realistic worst case scenario	Rationale
Dumping of gravity base spoil on seabed	Foundations: Maximum of 218 x 37.5 m diameter GBS for turbine foundations. Foundations: Maximum of 3 x 45 m GBS for OSP. Foundations: Maximum of 1 x 4 m monopile for met mast.	Modelling considers an area of ground preparation of 2,000 m^2 x 2 m deep per foundation, based on 45 m diameter GBS as a worst case assessment, with all dredged spoil being deposited within the Turbine Area. Other foundations options would require less bed preparation.
Operation and maintenance		
Seabed scour around foundations and unburied cables	Foundations: Maximum of 218. All three types of foundation have been considered: 218 x 8 m monopiles; 218 x 37.5 m GBS; 218 x (4 x 3.5 m pin piles).	Scour forms differently around different shapes, and therefore all three types of foundation have been considered. Space frame foundations consider both local scour associated with pin piles and more global scour around the jacket base.
Decommissioning		
Disturbance to archaeological receptors through removal of all structures associated with the Project	Removal of all structures associated with the Project (including 218 foundations, towers and nacelles, 3 x OSP, 1 x met mast and associated scour protection). Buried cables remain *in situ*	Removal of all structures may disturb buried archaeological material in the surrounding sediment. A Decommissioning Plan would be agreed with the relevant government department at the point of decommissioning. At present, decommissioning assumes removal of all structures above the seabed.

14.5.2. Effect pathways -Construction

14.193. The direct effects during constuction, including: seabed preparation and foundation installation, ploughing and jetting for cable installation and the deployment of jack-up vessel legs and other vessel moorings, described in terms of realistic worst case scenario in Table 14.14, would affect any archaeological receptors within the footprints of these activities. Effects may occur as a result of the removal or disturbance of sediments and/or through direct contact with and damage to archaeological material.

14.194. Sediment deposition resulting from the preparation of the seabed for turbine foundations has the potential to bury archaeological material, and as such may have a beneficial or positive effect on receptors.

14.5.3. Effect Pathways - Operation

14.195. As an indirect effect, seabed scour around turbine foundations and unburied cables, during operation, has the potential to affect archaeological receptors through erosion. This can expose buried archaeological material and lead to its destruction, dispersal and loss. These pathways between effects and

receptors exclude known and charted wrecks and all high and medium potential geophysical anomalies which, as part of the embedded mitigation, would be subject to exclusion zones and thus not affected by Project activities.

14.196. The following sections detail the impact assessment undertaken with consideration of the potential effect pathways (refer to RWCS) and the resulting potential impacts on archaeological receptors identified.

14.5.4. Impact Assessment: Prehistoric archaeology

14.197. The known prehistory of the south coast region suggests the potential for a long prehistoric archaeological record in the Offshore Development Area. However, the physical processes - particularly fluvial and marine - to which late Pleistocene land surfaces and sediment deposits have been subject, suggest that there is limited potential in the Offshore Development Area for the survival of *in situ*, undisturbed archaeological sites and material.

14.198. The geophysical and geotechnical data collected for the Project suggest that undisturbed archaeological material is most likely to survive in Late Pleistocene fluvial sediments in the palaeochannels in the Offshore Development Area. Elsewhere, prehistoric archaeological material is likely to be encountered in secondary, or reworked contexts within the modern seabed sediment.

Late Pleistocene Fluvial sediments

14.199. The fluvial processes of the late Pleistocene resulted in the creation of palaeochannels in the Offshore Development Area and the deposition of alluvial sediments and peats within these channels. Where these sediments have survived the Holocene marine transgression there is the potential for them to contain surfaces and deposits on and in which primary context Late Devensian and early Holocene archaeological material may be present.

Sensitivity

14.200. Such material, where it exists must be regarded to be of potential national and international importance in understanding the UK and Europe's prehistoric human populations. Palaeochannel deposits in the Offshore Development Area should, therefore, be regarded as a high value receptor. Where palaeochannel features are affected by activities related to the Project there is the potential for an interaction between effects and this prehistoric archaeological receptor. Due to their non-renewable and finite nature, late Pleistocene fluvial sediments would not recover from the direct effects of the Project, such as foundation or cable installation, where these coincide with the receptor. This receptor would also not be able to recover from the effects of seabed scour where the effect and receptor coincide. Where such interactions occur they may result in a permanent change to the receptor. The sensitivity of prehistoric archaeological receptors to Project effects is assessed to be **high**.

Magnitude of Effect

14.201. It is certain or near certain that this receptor will be affected by the Project and where this occurs the effects would generally be negative and irreversible and result in a permanent change to the receptor. However, the direct effects of the Project on late Pleistocene fluvial sediments would be limited to the footprint of construction, operation and maintenance and decommissioning activities and the extent of these effects on this receptor can thus be considered to be local. The magnitude of effects has been assessed to be **medium** (see Table 14.15).

Impact Significance

14.202. The impact significance of these effects, based on the assessment matrix in Figure 14.3 and with consideration of the importance of such archaeological material, is assessed to be **major** and therefore **Significant**.

14.203. However, if appropriate and adequate mitigation measures are applied through the WSI (refer to 'Embedded Mitigation'), which are of necessity largely compensatory, it is anticipated that the impacts of the Project on late Pleistocene fluvial sediments would be minimised.

Modern seabed sediments

14.204. The Holocene marine transgression of the Offshore Development Area resulted in the wholesale reworking of sediments and deposits laid down during the Devensian. The lighter fraction of these deposits was winnowed out and a lag deposit of sand and gravel left behind. This material makes up the modern seabed, which is spread in a thin veneer across parts of the

Offshore Development Area. Within these seabed sediments are prehistoric archaeological materials such as lithic artefacts and bone.

Sensitivity

14.205. Although in secondary or disturbed contexts, this archaeological material nevertheless has the potential to provide valuable information on patterns of early Mesolithic, Devensian, and potentially earlier human land use and demography. Prehistoric archaeological material in modern seabed sediments should thus be regarded as a moderate value receptor. Where modern seabed sediments are affected by activities related to the Project there is the potential for an interaction between effects and the prehistoric archaeological material they contain. Although this receptor would be unable to recover from these effects, this archaeological material has already been reworked by past marine and fluvial processes which means that the direct effects of the Project, such as foundation or cable installation are unlikely to adversely affect this material beyond moving it. For the same reasons, the exposure of derived material as a result of indirect effects like seabed scour is not of the same degree of concern, as would be the case for *in situ*, primary context archaeological deposits.

14.206. Thus, although this receptor is unable to return to its pre-impact state after being affected by Project activities, its moderate archaeological value means that it can be regarded as a receptor of **medium** sensitivity to the effects of the Project.

Magnitude of Effect

14.207. It is certain or near certain that this receptor would be affected by the Project and where this occurs the effects would generally be irreversible and result in a permanent change to the receptor. These direct effects would, however, be limited to the footprint of Project activities and the extent of these effects on this receptor can thus be considered to be local. The magnitude of effects has been assessed to be **low** (see Table 14.15).

Impact Significance

14.208. The impact significance of these effects is assessed to be **minor** and therefore **Not Signifcant.**

14.209. However if appropriate mitigation measures are applied through the WSI, this will futher reduce the potential impacts of the Project on modern seabed sediments.

14.5.5. Impact Assessment: Maritime archaeology

14.210. The value assigned to a wreck site is to a large degree site specific. A vessel may have historical importance at a local, national or international level as a result of its association with a historical event or figure. Wartime losses, or a vessel whose sinking was associated with a loss of life, may have a level of importance directly associated with that loss of life. Vessels which are key to or representative of specific periods of maritime development may also be regarded as important. Alternatively a vessel may have a level of archaeological importance based on the rarity of its representation within the maritime archaeological record and/or its cargo. Wrecks which are regarded to be of special interest may be designated under the Protection of Wrecks Act 1973, or the Protection of Military Remains Act 1986.

14.211. The differing levels of importance assigned to wrecks are not necessarily dictated by age. However, in an attempt to provide a few generalisations regarding the age and special interest of vessels, the Composite Timeline (Wessex Archaeology, 2008a) and the two English Heritage maritime Introductions to Heritage Assets (English Heritage, 2012a; 2012b) were consulted throughout this assessment.

Shipping casualties and recorded losses

Sensitivity

14.212. The relative potential importance of the various periods into which the recorded shipping casualties within the Offshore Development Area fall has been discussed already. The archaeological potential and value of these recorded shipping casualties would thus vary from wreck to wreck. Due to this variability and the non-renewable nature of maritime archaeological sites, recorded shipping casualties must be regarded as a high value receptor. As the location of recorded shipping casualties in the Offshore Development Area is not known, these sites cannot be excluded in advance from the effects of Project activities. This receptor thus has the potential to be affected by activities such as seabed preparation for turbines and cable ploughing and jetting, and by the indirect effects of seabed scour. Where

such interactions occur, this receptor would be unable to tolerate the effects, resulting in a permanent change. Except in the case of sediment deposition, which is likely to leave this receptor unaffected or positively affected, recorded shipping casualties would also not be able to recover from the effects of the Project, where effects and receptor coincide. Shipping casualties and recorded losses should therefore be regarded as a receptor of **high** sensitivity.

Magnitude of Effect

14.213. The direct effects of Project activities on this receptor would be local in extent and largely confined to the footprint of these activities. Where these effects coincide with this receptor, however, they would generally be negative and irreversible and result in a permanent change to the receptor. The magnitude of effects on shipping casualties and recorded losses has been assessed to be **low** (see Table 14.15).

Impact Significance

14.214. Taking into account the non-renewable nature of maritime archaeological sites the impact significance of these effects is assessed as **moderate** and therefore S**ignificant**.

14.215. However, the implementation of appropriate and adequate mitigation measures through the WSI are expected to minimise the potential impacts to shipping casualties and recorded losses.

Unknown, uncharted wreck sites

14.216. The biases in the records of both charted wrecks and documented shipping casualties towards vessels lost after the mid-18th century have already been discussed, as has the potential for the presence within the Offshore Development Area of unknown watercraft and vessels dating from the Mesolithic to the modern day.

Sensitivity

14.217. A significant proportion of these wreck sites would pre-date the consistent keeping of casualty records and on that basis (i.e. their age and rarity) unknown, uncharted wrecks as a group can be considered to be of special archaeological interest and should be regarded as a high value receptor. Where Project activities affect this receptor - whether directly or indirectly – it would be unable to tolerate such effects, resulting in a permanent change. Except in the case of sediment deposition, which is likely to leave this receptor unaffected or positively affected, unknown, uncharted wrecks will not be able to recover from the effects of the Project, where effects and receptor coincide. Due to the fact that the number and location of this receptor is unknown, these sites cannot be excluded in advance from the effects of Project activities and there is, consequently, the potential for them to be affected by Project activities. Taken together with their potentially greater archaeological value, this means that unknown, uncharted wrecks should be regarded as a receptor of **high** sensitivity.

Magnitude of Effect

14.218. The direct effects of Project activities on this receptor would be local in extent and largely confined to the footprint of these activities. Where these effects coincide with this receptor, however, they would generally be negative and irreversible and result in a permanent change to it. Given the lack of any certainty with respect to the extent of this receptor, this assessment has a high uncertainty and is considered probable to occur. Based on these variables, the magnitude of effects on unknown, uncharted wrecks has been assessed to be **low** (see Table 14.15).

Impact Significance

14.219. Taking into account the potential for unknown wreck sites to be affected by the Project, combined with their potential archaeological value, the impact significance of these effects is assessed to be **moderate** and therefore **Significant**.

14.220. However, the implementation of appropriate and adequate mitigation measures, through the WSI, such as the reporting of finds followed by the possible implementation of exclusion zones, would have the effect of excluding such previously unknown or uncharted wrecks from construction activities once found. It is therefore anticipated that potential imapcts would be minimised.

Isolated maritime finds

14.221. This receptor comprises isolated or derived maritime artefacts which are likely to be of limited archaeological importance. However the occurrence of a number of seemingly isolated artefacts within a particular area can indicate historical shipping routes or maritime battlegrounds, for example, or may suggest the presence of a hitherto unknown wreck site and on this basis, isolated maritime finds are regarded as a moderate value receptor.

Sensitivity

14.222. Although isolated maritime finds are likely to be widely spread across the Offshore Development Area, they would be unable to tolerate Project activities and would be unable to recover from changes caused by Project effects. Isolated maritime finds must thus be regarded as a receptor of **medium** sensitivity.

Magnitude of Effect

14.223. The effect of the Project on isolated maritime artefacts, should they occur, would be largely limited to activity footprints and would thus be local in extent. Where effects do occur they would generally be negative and irreversible and result in a permanent change to the receptor. As it is impossible to define the extent or distribution of this receptor, the presence of isolated maritime finds must be regarded with a high degree of uncertainty but should be considered probable to occur. The magnitude of effect on this receptor is therefore assessed as **low** (see Table 14.15).

Impact Significance

14.224. The impact significance of these effects is assessed to be **minor** and therefore **Not Significant**.

14.225. However, the implementation of mitigation measures such the reporting of finds, through the WSI, would ensure that such material, where encountered, is reported, conserved and studied. The significance of impacts on this receptor is therefore anticipated to be further reduced.

14.5.6. Impact Assessment: Aviation archaeology

14.226. The importance of aircraft crash sites is outlined in Military Aircraft Crash Sites (English Heritage, 2002), as discussed above. They not only have significance for remembrance and commemoration, but also have an implicit heritage value as historic artefacts, providing information on the aircraft itself and also the circumstances of its use and loss (English Heritage, 2002). Furthermore, all military aircraft wrecks are automatically protected under the Protection of Military Remains Act 1986.

Recorded aircraft losses

14.227. There are four recorded aircraft losses listed by the NMR within the Offshore Development Area, and the potential, as discussed above, for many more such wrecks to be present in the area. These sites are likely to be of special archaeological interest and because they are military aircraft will be automatically protected by the Protection of Military Remains Act 1986 should they be located. Consequently recorded aircraft losses must be considered as a high value receptor.

Sensitivity

14.228. Because the location of recorded aircraft losses in the Offshore Development Area is not known, these sites cannot be excluded in advance from the effects of Project activities. This receptor thus has the potential to be affected by Project activities and by the indirect effects of seabed scour. Where such interactions occur, this receptor would be unable to tolerate the effects, resulting in a permanent change. Except in the case of sediment deposition, which is likely to leave this receptor unaffected or positively affected, recorded aircraft losses would also not be able to recover from the effects of the Project, where effects and receptor coincide.

14.229. Although the positions of these sites are not known, the relatively short span of time since they were deposited on the seabed suggests that wreckage should be expected to survive in some form within the Offshore Development Area. Taken together with their significance for remembrance and commemoration, recorded aircraft losses should be regarded as a receptor of **high** sensitivity.

Magnitude of Effect

14.230. The direct effects of Project activities on this receptor would be local in extent and largely confined to the footprint of these activities. Where effects coincide with this receptor, however, they would generally be negative and irreversible and result in a permanent change. The magnitude of effects on recorded aircraft losses has been assessed to be **low** (see Table 14.15).

Impact Significance

14.231. Taking into account the potential for aircraft wrecks to be affected by the Project, combined with the potential value of such finds the impact significance of these effects is assessed to be **moderate** and therefore **Significant**.

14.232. However, as was the case for recorded shipping losses, the implementation of appropriate mitigation measures, through the WSI, including mechanisms for reporting finds and implementing construction exclusion zones around the remains of aircraft are expected to minimise potential impacts.

Isolated aircraft finds

Sensitivity

14.233. Isolated aircraft finds would consist of derived, aircraft-related artefacts which may be of limited archaeological importance as isolated objects. However the occurrence of a number of seemingly isolated artefacts within a particular area may indicate areas of World War II airborne battles. Alternatively they may indicate the presence of a recorded but uncharted aircraft crash site. On this basis, isolated aircraft finds are regarded as a moderate value receptor. Isolated aircraft finds would be unable to tolerate Project activities, where receptor and effects coincide, resulting in a permanent change in the receptor. Except in the case of sediment deposition, which is likely to leave this receptor unaffected or positively affected, isolated aircraft finds would not be able to recover from the effects of the Project, where effects and receptor coincide.

14.234. It is thus suggested that isolated aircraft finds be regarded as a receptor of **medium** sensitivity.

Magnitude of Effect

14.235. The effect of the Project on isolated aircraft finds, should they occur, would be largely limited to activity footprints and will thus be local in extent. Where effects do occur they would generally be negative and irreversible and result in a permanent change to the receptor. As it is impossible to define the extent or distribution of this receptor, the presence of isolated maritime finds must be regarded with a high degree of uncertainty but should be considered probable to occur. The magnitude of effect on this receptor has been assessed to be **low** (see Table 14.15).

Impact Significance

14.236. The impact significance of these effects is assessed to be **minor** and therefore **Not Significant**.

14.237. The implementation of mitigation measures such the reporting of finds, through the WSI, will ensure that such material, where encountered, is reported, conserved and studied, thereby reducing the significance of impacts on this receptor.

Table 14.15 Summary of magnitude of effects for offshore archaeological receptors

Receptor	Effect	Extent	Duration	Frequency	Magnitude of Effect
Prehistoric Archaeology					
Late Pleistocene Fluvial Sediments	Direct	Site-specific	Permanent	Intermittent	Medium
	Indirect	Local	Permanent	Intermittent	
Modern Seabed Sediments	Direct	Site-specific	Permanent	Intermittent	Low
	Indirect	Local	Permanent	Intermittent	
Maritime Archaeology					
Shipping Casualties and Recorded Losses	Direct	Site-specific	Permanent	Intermittent	Low
	Indirect	Local	Permanent	Intermittent	
Unknown, Uncharted Wreck Sites	Direct	Site-specific	Permanent	Intermittent	
	Indirect	Local	Permanent	Intermittent	
Isolated Maritime Finds	Direct	Site-specific	Permanent	Intermittent	
	Indirect	Local	Permanent	Intermittent	
Aviation Archaeology					
Recorded Aircraft Losses	Direct	Site-specific	Permanent	Intermittent	Low
	Indirect	Local	Permanent	Intermittent	
Isolated Aircraft Finds	Direct	Site-specific	Permanent	Intermittent	
	Indirect	Local	Permanent	Intermittent	

14.6. Potential mitigation

14.238. Known shipwreck sites and high and medium potential geophysical anomalies have been scoped out of the impact assessment because the embedded mitigation measures makes a provision for the exclusion of these sites from Project activities. The procedure for the exclusion would be reflected in the archaeological WSI, a document which will be submitted as part of the application for development consent. The WSI will detail the offshore archaeological mitigation strategy that would be followed throughout the lifetime of the Project.

14.239. The content of the WSI for the Project would be developed in close consultation with and agreed by statutory consultees. The application of the WSI would ensure that potential impacts to archaeological receptors are minimised.

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Glossary

TERM	DEFINITION
Anglian glaciation	Probably greatest glaciation that the UK Britain experienced during the Pleistocene, the Anglian glaciation started c. 478,000 years ago, and ended c.424,000 BP. It is estimated that the Anglian ice sheet, which diverted the Thames onto something like its present course was up to 1,000 m thick and reached as far south as London and Bristol.
Anthropogenic	Caused or produced by humans.
Archaeology	The study of past human societies, through the recovery and analysis of the material remains and environmental data they have left behind.
Artefact	An object formed or made by humans.
Cromerian Interglacial	A major interglacial dating from c.780,000 to 478,000 years ago and named from the fossil rich Cromer Forest Bed formation.
Devensian	The most recent glacial period or ice age, the Devensian started c. 73,000 years ago, and ended with the onset of the Holocene (see below). The Devensian ice sheets reached their maximum extent roughly 26-21,000 years ago, and covered much of the UK, in places up to a mile thick.
Fluvial	Processes associated with rivers and streams and the deposits and landforms they create. When the rivers or streams are associated with glaciers, ice sheets or ice caps, the terms glaciofluvial or fluvioglacial are used.
Glaciation	A period of time, usually thousands of years long, marked by colder global temperatures and glacier and ice sheets advances.
Historic Environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged.
Holocene	A geological epoch which began c.11,000 years ago and which continues to the present.
Hominin	A new term used to describe what used to be call a hominid; a creature that paleoanthropologists have agreed is human or a human ancestor. This includes all of the Homo species (Homo sapiens, H. ergaster, H. rudolfensis), all of the Australopithecines (Australopithicus africanus, A. boisei, etc.) and other ancient forms like Paranthropus and Ardipithecus.
Hoxnian	The interglacial between the Anglian and Wolstonian glaciations and dated to c.424, 000 to 380,000 years ago.
Interglacial	Periods of global warming between glaciations or ice ages. (We are currently in the Holocene interglacial.)
Ipswichian	An interglacial period dated to between c. 135,000 and 73,000 years ago.
Magnetometer	An instrument used to measure the strength or direction of magnetic fields. In a maritime archaeological context this can provide evidence of ferrous objects such as wrecks, anchors, cannon, etc. on or in the seabed.
Marine transgression	Occurs when an influx of the sea covers areas of previously exposed land. It is usually associated with rises in sea level during interglacial periods.
Mesolithic	The period of prehistoric human technological development following the Palaeolithic and characterized by the use of microlithic stone tools. The Mesolithic (or Middle Stone Age) in the UK began c.11,500 years ago at about the same time as the start of the Holocene, and ended c. 5,500 years ago with the introduction of Neolithic farming.
Multibeam bathymetry	A sonar system which instead of using a single beam of sound uses multiple simultaneous beams in a swath.

TERM	DEFINITION
Named Location	A term used by the NMR to describe aggregations at a single, arbitrary position of one or more maritime records for which no other grid reference or position is available. These positions reflect the general loss locations of ships or aircraft, usually drawn from descriptions in the documentary records, or the indicative positions of seabed finds and do not (except by chance) relate to the position of the physical remains of the sites on the seabed which they list.
Neanderthal	A now-extinct group of the genus Homo. Homo neanderthalensis occupied much of Europe from at least 350,000BP, and disappeared by c. 32,000BP.
Palaeo-	A prefix meaning 'old' or 'ancient' and used in reference to ancient or past environments or landscapes (e.g., palaeochannels - ancient river courses).
Palaeolithic	The earliest of the three divisions of the Stone Age, dating from the first use of stone tools c.2.6 million years ago to the appearance of microlith-using hunter-gatherers at the start of the Mesolithic (c.11,500 years ago).
Pleistocene	The epoch covering the period c.2.5 million to 11,000 years ago.
Prehistoric	The period of human history pre-dating written records. Archaeological study of which is based on material remains/artefacts that survive into the present.
Primary context	Archaeological material undisturbed and remaining in the form or positions in which it was originally deposited.
Quaternary	The most recent of the three periods of the Cenozoic Era, the Quaternary spans the last roughly 2.5 million years, and includes the Pleistocene and Holocene Epochs.
Radiocarbon dating (^{14}C)	A radiometric dating method based on measuring the observed abundance of a naturally occurring radioactive carbon isotope (^{14}C) and its decay products in a sample, using known decay rates.

TERM	DEFINITION
Regional Environmental Characterization (REC)	Series of regional surveys commissioned by the Marine Aggregate Levy Sustainability Fund to develop understanding of the UK's submerged habitats and heritage. Regional Environmental Characterizations have being produced for the South Coast, the Outer Thames region, the East Coast, and around the Humber.
Samian ware	A fine red Roman pottery.
Secondary context	Archaeological material that has moved, or been moved from where it was first deposited as a result of subsequent human activity or the actions of natural agents like water.
Sidescan sonar	A sonar system used to create an image of large areas of the sea floor.
Sub-bottom seismic	A method for profiling the upper layers of the seabed using powerful, low frequency echo-sounders.
Vibrocores	A coring technique in which a core tube is driven into sediment by the force of gravity, enhanced by vibration energy.
Wolstonian	A middle Pleistocene glacial stage dating to between c.380,000 and 130,000 years ago, and which includes three distinct periods of glaciation.

Abbreviations

TERM	DEFINITION
AD	Anno Domini
AHBR	Archaeology and Historic Buildings Record
BC	Before Christ
BGS	British Geological Survey
BP	Before Present
CBA	Council for British Archaeology
COWRIE	Collaborative Offshore Wind Research into the Environment
EZ	Exclusion Zone
GBS	Gravity Base Structure
GIS	Geographic Information System
HER	Historic Environment Record
HMS	His/Her Majesty's Ship
HSC	Historic Seascape Characterisation
HWTMA	Hampshire and Wight Trust for Maritime Archaeology
MAREA	Marine Aggregate Regional Environmental Assessment
MHWS	Mean High Water Spring
MW	Megawatt
NB	Navitus Bay
NFNPA	New Forest National Park Authority
NL	Named Location
NMR	National Monuments Record
NPS	National Policy Statement
OASIS	Online AccesS to the Index of archaeological investigationS
OD	Ordnance Datum
OSP	Offshore Substation Platforms
PDS	Project Design Statement
PPS	Planning Policy Statement
RAF	Royal Air Force
RCZA	Rapid Coastal Zone Assessment
REC	Regional Environmental Characterisation
ROV	Remotely Operated Vehicle
SCOPAC	Standing Conference on the Problems Associated with the Coastline
SEA	Strategic Environmental Assessment
UKHO	United Kingdom Hydrographic Office
UxO	Unexplained Ordnance
VC	Vibrocore
WWI / WWII	World War One / World War Two