



Rampion Offshore Wind Farm



ES Section 13 – Marine Archaeology

RSK Environmental Ltd

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13 MARINE ARCHAEOLOGY

13.1 Introduction

13.1.1 This section of the Environmental Statement (ES) presents the results of a marine archaeology desk based assessment and geophysical survey analysis undertaken for the proposed Rampion Offshore Wind Farm (the Project). The section assesses the significance of the known marine archaeology resources within the offshore development footprint, cable route corridor and landfall (the Offshore Project), and the archaeological potential of these areas.

13.1.2 The location of the proposed development is shown on Figure 2a.1.

13.1.3 This section is supported by the following technical appendices:

- Appendix 13.1: Archaeological Assessment of Geophysical Data – Rampion Wind Farm Met Mast, Moore Marine Services Ltd, February 2012;
- Appendix 13.2: Marine Archaeological Assessment of Rampion Offshore Wind Farm, Moore Marine Services Ltd, November 2011;
- Appendix 13.3: Marine Archaeological Assessment of Rampion Offshore Wind Farm, Moore Marine Services Ltd, April 2012; and
- Appendix 13.4: Gazetteer of marine heritage assets

13.1.4 The locations of the marine heritage assets are shown on Figure 13.1.

13.2 Legislation and Policy Context

13.2.1 The following summarises the statutory legislation relating to the marine historic environment and relevant to this section:

13.2.2 **Ancient Monuments and Archaeological Areas Act (1979):** It is a criminal offence to carry out any works on or near to a Scheduled Monument without Scheduled Monument Consent. Both terrestrial and maritime sites, including wrecks, may be designated under this Act.

13.2.3 **Protection of Wrecks Act (1973):** It is an offence to carry out certain activities in a defined area surrounding a wreck that has been designated unless a licence for those activities has been obtained from the Government. There are no protected wrecks within the development area.

13.2.4 **Protection of Military Remains Act (1986):** Protects all aircraft that have crashed in military service and enables the Ministry of Defence to designate vessels wrecked while in military service as protected places or controlled sites. There are no protected places or controlled sites within the Study Area.

- 13.2.5 Merchant Shipping Act (1995): All wreck material recovered from UK waters must be declared to the Receiver of Wreck who acts to settle questions of ownership and salvage. 'Wreck' refers to all items of flotsam, jetsam, derelict and lagan found in or on the shores of the sea or any tidal water.
- 13.2.6 The overarching National Policy Statement (NPS) for Energy (EN-1) (July 2011) sets out, in section 5.8, policy in relation to energy developments and the historic environment.
- 13.2.7 Section 5.8.8 instructs that "As part of the ES the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. 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.
- 13.2.8 Section 5.8.10 goes on to direct that "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."
- 13.2.9 Section 5.8.14 instructs that "There should be a presumption in favour of the conservation of designated heritage assets (this can include protected wrecks)."
- 13.2.10 Section 5.8.15 direct that "Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development".
- 13.2.11 The National Policy Statement for Renewable Energy Infrastructure (EN-3) provides additional policy relating to offshore wind farm impacts and the historic environment (section 2.6.137 – 2.6.146). This additional policy identifies that the generic requirements in relation to the historic environment provided in NPS (EN-1) extend to heritage assets that exist offshore and within intertidal areas.
- 13.2.12 EN-3 directs the decision maker to be satisfied that offshore wind farms and associated infrastructure have been designed sensitively taking into account known heritage assets and their status. The avoidance of heritage assets (section 2.6.145) including archaeological sites and historic wrecks, can be achieved through the implementation of archaeological exclusion zones.
- 13.2.13 EN-3 also identifies that applicants can request that in granting consent the decision maker allows for micro-siting to be undertaken within a specified tolerance. This would allow for changes to be made to the precise location of infrastructure during construction so that account can be taken of the discovery of any unforeseen marine heritage assets, or in the event that previously known marine heritage assets have been wrongly located or where the position of a known marine heritage asset has changed slightly as a result of coastal processes.

13.2.14 Other policy applicable to marine archaeology is set out below:

13.2.15 **National Planning Policy Framework (NPPF):** Outlines government policy on the treatment of the historic environment (including both undesignated and designated sites) within the local planning process.

13.2.16 **West Sussex County Structure Plan adopted on 25 October 2004:** Policies specific to the protection and management of the historic environment are contained in these documents, in line with the advice of NPPF.

Guidance Notes and Standards

13.2.17 The work reported in this section has been undertaken within the requirements of the Institute for Archaeologists Standards and Guidance documents and Code of Conduct. Relevant guidance has also been referred to where appropriate. This guidance includes:

- Identifying and Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers, English Heritage 1998;
- Environmental Archaeology, English Heritage 2002;
- Military Aircraft Crash Sites: Archaeological guidance on their significance and future management, English Heritage 2002;
- Wind Energy and the Historic Environment, English Heritage 2005;
- Climate Change and the Historic Environment, English Heritage 2007;
- The Code of Practice for Seabed Developers, Joint Nautical Archaeology Policy Committee (JNAPC), 2006;
- Historic Environment Guidance for the Offshore Renewable Energy Sector, Wessex Archaeology Ltd, (2007) (published by Collaborative Offshore Wind Research into the Environment (COWRIE);
- Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy, Oxford Archaeology (2008) (published by COWRIE); and
- Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector EMU Ltd (2011) (published by COWRIE).

Scoping and consultation

13.2.18 Initial consultation on the Project was carried out via the Rampion Offshore wind farm Scoping Document (E.ON/RSK, September 2010). Responses received are presented in the Infrastructure Planning Commission (IPC) Scoping Opinion report (IPC, October 2011).

13.2.19 The information, advice and comments received during the scoping process with regard to marine heritage issues are summarised in Table 13.1.

Table 13. 1: Scoping and consultation responses

Date	Consultee	Summary of issues	Sections where addressed
11/10/10	East Sussex County Council	Marine archaeology, sea floor geophysics and geotechnical studies required	Archaeological analysis of geophysics data included in this section.
		Archaeology to cover array, cable corridor and onshore	Heritage assessment addresses the array and cable corridor in this section and the onshore effects in Chapter 25.
		It is recommended that if the IPC (<i>now PINS</i>) wish to seek additional information on wrecks, it is advised that the applicant consult Dr Peter Marsden at the Shipwreck & Coastal Heritage Centre in Hastings	The Shipwreck and Coastal Heritage Museum was consulted but no additional data to that provided by the NRHE and UKHO were obtained.
11/10/10	English Heritage	Marine archaeology should not be scoped out	Included in this section
		Archaeology should be considered during the geophysical seabed surveys. Archaeologists should have input to survey planning	Archaeological analysis of geophysics data included in this section.

13.2.20 The scope of the assessment was modified accordingly to take account of the above consultee responses and the opinions of the IPC, the findings of which were reported in a Draft ES and subject to stakeholder consultation.

Pre-application Consultation

13.2.21 Statutory consultees were sent copies of the Draft ES and other stakeholders were given information on where the document could be downloaded from a web address. Several stakeholders responded to the Section 42 consultation and modifications have been made to this section in respect of the following main comments received:

- Requirement for E.ON to commit to the production of an Archaeological Written Scheme of Investigation (AWSI), the contents of which should include:
 - Commitment and methods for maintaining communications with English Heritage as the project moves into detailed design;
 - Commitment to integrate the results of the geotechnical data (when available) with the geophysical data to allow comment on the palaeochannels present across the site; and
 - Commitment to include archaeological investigation objectives within the design of any future geophysical or geotechnical surveys.
- Better clarity in the use of terminology within the assessment in respect of the AWSI and reporting (Archaeological Exclusion Zones and Archaeological Reporting Protocol);
- Carry out data quality assurance work on the geophysical survey data; and
- Consideration of the information in the Regional Environmental Characterisation (REC) Report (relating to aggregate dredging) to assist in the compilation of the cumulative impacts section.

13.2.22 Comments on the AWSI are addressed in Section 13.6, while those relating to quality assurance have been carried out and are reflected in slight changes to locations for known archaeology in Figure 13.1. Information from the REC has been considered in the baseline review (Section 13.4).

13.2.23 Full details of the consultation process and associated outcomes can be referenced in the Consultation Report (Document 5.1).

13.3 Assessment Methodology

Study area and scope

13.3.1 A marine heritage asset study area (MASA) has been used for the collection of baseline data within the proposed wind farm (Project) area. This includes the areas of the wind farm site and export cable, as well as a 2km buffer as illustrated on Figure 13.1. This section relates to offshore effects only. The onshore effects of the Project (i.e. the visual impacts on terrestrial heritage assets) are considered in Section 26 – Landscape and Visual Impacts. The export cable landfall effects are also considered in Section 25 - Archaeology and Cultural Heritage.

Desk based assessment

13.3.2 The sources consulted as part of the desk-based assessment (DBA) were as follows:

- Records of wrecks and obstructions collated by *SeaZone* from the UK Hydrographical Office records;
- Records from the National Record of the Historic Environment (NRHE), held by English Heritage (EH), of known wrecks, documented losses, and archaeological finds;
- Records of Protected and Controlled Sites under the Protection of Military Remains Act held by the Ministry of Defence (MoD);
- Records of Protected Wrecks held by English Heritage;
- Various secondary sources relating to the palaeo-environment with specific reference made to submerged palaeo-landscapes and coastal change;
- Historic Environment Records maintained by local authorities, in this case West Sussex County Council;
- Archaeological Data Services website for protected and non-protected wreck sites and other maritime sites (www.ads.ahds.ac.uk);
- Maritime and Coastguard Agency website for a list of protected wrecks and designated military remains (www.mca.gov.uk);
- MAGIC website for protected wrecks, scheduled monuments and registered battlefields (www.magic.gov.uk); and
- Osiris geophysical survey data (2010).
- South Coast Regional Environmental Characterisation (REC) project report.

Geophysical Survey Analysis

13.3.3 The aim of the review of the geophysical data collected across the Project area and cable corridor was to analyse the acquired data for the presence of possible archaeological features or anomalies that may be impacted by later construction works. Geophysical survey operations took place from the period 4th May to 19th August 2010 and 15th to 25th September 2011. The survey was undertaken using Osiris Projects dedicated survey vessels, MV Freja, MV Lia and MV Chartwell. High-resolution side-scan sonar, swath multi-beam, single beam bathymetry and magnetometer data were acquired along all survey lines, in order to accurately map the seabed within the wind farm area. Main survey lines were run at 50m centres, with cross lines at 750m centres. The archaeological

assessment reviewed the following techniques: Side scan sonar, marine magnetometer and sub bottom profiler.

- 13.3.4 Dual frequency 100 and 445 kHz (low and high) side scan sonar data were recorded simultaneously during the preliminary survey. The survey provided imagery of the seafloor with all anomalous seafloor features evident in the record. The high frequency data were considered to be of sufficiently high quality to allow for the identification and location of any seafloor anomalies, which may be considered to be of cultural heritage significance.
- 13.3.5 The sub bottom profiler data provided indications as to the stratigraphic sequence of the seafloor. It is useful in the identification of seafloor features such as palaeochannels and palaeolandscapes. The data acquired during this survey were of sufficient quality to allow for the identification of any such features.

Gazetteer

- 13.3.6 The data from the NRHE, UK Hydrographic Office (UKHO) and geophysical contacts has been compared and where data overlap (in terms of wreck name and/ or location) a 'grouped ID' has been allocated. Where the UKHO and NRHE data both record a wreck at the same location or by the same name it is assumed to be the same marine heritage asset. In some cases the geophysical contacts directly correspond to the same location as a recorded wreck, and it has again been assumed that the contact relates to the recorded wreck. It is, however, possible that in some cases more than one wreck lies in close proximity. This has been taken into account when considering appropriate mitigation strategies.
- 13.3.7 The gazetteer is included as Appendix 13.4 of this ES.

Identification and Assessment of Impacts

- 13.3.8 The potential physical impacts of the proposed development have been assessed by comparing the area of seabed required for the development against the location and importance of the known marine heritage assets. The significance of physical impacts is therefore a consideration of the relative importance of the asset in relation to the magnitude of impact of the proposed development. Physical impacts are defined as any physical change to the heritage resource.

Receptor Importance

- 13.3.9 The relative importance of each receptor has been determined to provide a framework for comparison between different sites. The categories of importance do not reflect a definitive level of importance or value of a site, but a provisional one based on a range of factors, primarily the reliability of the recorded data and secondly the evidential, historical, aesthetic and communal heritage values of the asset. When combined, these factors offer representations of the importance (or

significance) of a given resource and provide an analytical tool that can inform later stages of assessment and the development of appropriate mitigation.

Table 13.2: Criteria for determining Receptor Importance

Importance of Receptor	Equivalent To
Very High/ High (International/ National)	Protected Wreck Site
Medium (Regional)	Live wreck site Geophysical anomalies of high potential (e.g. 'wreck') Recorded Wreck not confirmed by survey
Low (Local)	Obstruction/ Dead wreck Geophysical anomalies of low potential (e.g. 'debris')
Negligible	Dead foul/ obstruction, dead wreck Geophysical anomaly of negligible potential (e.g. cable)
Uncertain	Documented losses Geophysical anomalies of uncertain potential

Magnitude of Impact

13.3.10 The magnitude of any impact has been assessed according to the scale set out in Table 13.3.

Table 13.3: Criteria for determining the magnitude of impact

Magnitude of Change	Description of Change
High	Complete destruction of site or feature; Change to the site or feature resulting in a fundamental change in our ability to understand or appreciate the resource and its historical context or setting.
Medium	Change to the site or feature resulting in an appreciable change in our ability to understand or appreciate the resource and its historical context or setting.
Low	Change to the site or feature resulting in a small change in our ability to understand or appreciate the resource and its historical context or setting.
Negligible	Negligible or no material change to the site or feature; No real change in our ability to understand or appreciate the resource and its historical context or setting.
Uncertain	Sites or features for which there is insufficient information to determine impacts.

Significance of Impact

13.3.11 The significance of impact has been assessed by comparing the importance of the heritage asset against the magnitude of the impact. The significance of impact has been quantified according to the criteria summarised in Table 13.4.

Table 13.4: Criteria for determining the significance of impact

Magnitude of change	Receptor Importance					
	Very High	High	Medium	Low	Very Low	Uncertain
High	Severe	Major	Moderate	Moderate	Minor	Uncertain
Medium	Major	Major or Moderate	Moderate	Minor	Minor	
Low	Moderate	Moderate or Minor	Minor	Minor or Neutral	Neutral	
Negligible	Minor	Minor or Neutral	Neutral	Neutral	Neutral	
Uncertain	Uncertain					

13.3.12 Factors affecting the significance of impact include:

- The proportion of the site or feature affected;
- The integrity of the site or feature; impacts may be reduced if there is pre-existing damage or disturbance of a site; and
- The nature, potential and heritage value of a site or feature.

13.3.13 Severe and major impacts are considered to be significant in Environmental Impact Assessment terms. In EN-1 and NPPF terminology severe impacts are equivalent to total loss or substantial harm.

13.3.14 Moderate and minor impacts are not significant in EIA terms. In EN-1 and NPPF terminology major and moderate impacts are equivalent to less than substantial harm.

13.3.15 Neutral impacts are not significant in EIA terms and are not considered to cause any harm or loss of significance in EN-1 or NPPF terminology.

Definitions, Uncertainty and Technical Difficulties Encountered

13.3.16 The validity of marine heritage data varies greatly, according to the source of the data. The following definitions are used, relating to the source of data, with a description of the relative reliability of the data:

- **Live Wreck:** This is used in this section to describe a marine heritage asset that has a good provenance, but which is not protected by legislation. These assets have normally been identified by diver survey, confirmed by the geophysical data interpretation or noted as 'live' in the UKHO data. These data are considered to be reliable and these sites are of medium or low importance;

- **Recorded Wreck:** This usually refers to the site of a wreck that has been reported in the past but that has not been resurveyed. This data is considered to be reasonably reliable and to indicate that the site is of uncertain importance;
- **Dead Wreck:** This is used in this section to describe a recorded wreck that recent surveys have failed to identify. Dead wrecks may have dispersed on the seabed, have a poor provenance, or in some cases may have been salvaged. This data is considered to be reasonably reliable and to indicate that the site is of uncertain importance;
- **Documented (or Recorded) Losses:** These are documentary references to the loss of a vessel (or military aircraft) for which an arbitrary grid reference has been provided, as only an approximate position was known at the time of the loss. This data is not reliable and sites are of uncertain importance, as they may relate to a 'live' wreck but could equally relate to a dead wreck or a wreck that has no known or an incorrect provenance or identification; and
- **Obstructions:** This is a general reference to reports of fishermen's fasteners, fould and obstructions. These are recorded as guides to navigation and listed in Kingfisher Charts Obstruction Book General and charted by the UKHO. They may relate to seabed wreck material, but can also be natural in origin or refer to modern seabed debris or unknown snags on fishermen's nets or lines. 'Live' and 'Dead' in this context is the same as the terminology used to reference wreck sites, above. Obstructions are generally reliably located, but vary from only low to negligible importance as they are rarely distinctly identified as a wreck site (treated as live wrecks).

13.3.17 Obstructions, foul ground and fishermen's fasteners reported in the UKHO data as 'dead' – i.e. those sites that have, on survey, been disproved, have not been included in the gazetteer.

13.3.18 The data reported are generally considered to be reliable, however, the following limitations are noted:

- There may be a lack of dating evidence for assets;
- Buried wrecks could be present within the development area that have not been recorded by NRHE or UKHO data and which were not identified by the geophysical survey;
- The locational information for the known marine heritage assets may not always be reliable, assets on the seabed can be moved slightly by coastal processes; and
- The locational information for the known marine heritage assets may not always be accurate as wreck sites can be dispersed on the seabed.

Geophysical Data Quality

- 13.3.19 The data analysed have been reviewed by an appropriately qualified specialist marine archaeology consultant, and is considered to be of a suitable high quality to allow for the location and preliminary identification off seafloor and sub seafloor features that may be of marine archaeology significance.
- 13.3.20 Marine magnetometry provides a means of detecting for the presence of ferrous materials. A number of factors, such as size of the anomaly and proximity of the seafloor, determine the accuracy of the equipment. The marine magnetometer used during this survey was towed in tandem with the side scan sonar. This ensured that the magnetometer was always in close proximity to the seafloor and was capable of recording the presence of everything but the smallest of ferrous metals.
- 13.3.21 Whilst not commonly used as a reconnaissance tool, the bathymetric data associated with the preliminary survey were reviewed for the presence of seafloor undulations which may be indicative of the presence of potential cultural heritage. The bathymetric data recorded during the survey were of sufficient quality to allow for the recognition of such features.

Impact Assessment

- 13.3.22 The limitations of an impact assessment of the proposed development include:
- The lack of clarity surrounding the extent of some sites which makes it difficult to provide a precise assessment of potential impact; and
 - The possibility that unknown sites will be encountered during construction.
- 13.3.23 The development of mitigation strategies takes these points into consideration.

13.4 Environmental Baseline

- 13.4.1 The data discussed below includes all marine heritage assets recorded within the MASA (including the 2km buffer). All of the marine heritage assets described below are located on Figure 13.1, and labelled according to the RSK ID, prefixed below. This also relates all of the recorded assets to the gazetteer, Appendix 13.4.

Designated Heritage Assets

Protection of Wrecks Act (PWA) (1973)

- 13.4.2 There are no protected wrecks within the MASA. The nearest Protected Wreck is the Brighton Marina wreck (RSK IDMA1).

Protection of Military Remains Act (PMRA) (1986)

13.4.3 There are no protected military sites within the Area of Search.

Non-designated Heritage Assets

Live wreck sites

13.4.4 There are 28 live wreck sites within the MASA, these are:

- MA50 Tycho, NRHE wreck and obstruction data and UKHO data;
- MA51 Marie Marguerite, NRHE and UKHO wreck data;
- MA53 Leachs Romance, NRHE and UKHO wreck data;
- MA56 Plagenturm, NRHE and UKHO wreck data and geophysics contact;
- MA57 Wreck (wrongly identified as Ikeda in the NRHE record) NRHE and UKHO wreck data and geophysics contact;
- MA61 City of Waterford, NRHE and UKHO wreck data and geophysics contact;
- MA62 Lulonga, NRHE and UKHO wreck data;
- MA64 Ikeda, NRHE and UKHO wreck data;
- MA65 Quail, NRHE and UKHO wreck data and geophysics contact;
- MA66 Trawler, NRHE and UKHO wreck data and geophysics contact;
- MA68 HMS Keryado, NRHE and UKHO wreck data and geophysics contact;
- MA69 Wreck (wrongly identified as Porthkerry in the NRHE record) NRHE and UKHO wreck data;
- MA70 Porthkerry, NRHE and UKHO wreck data;
- MA72 Remains of a cargo vessel, NRHE and UKHO wreck data and geophysics contact;
- MA74 Stanwold, NRHE and UKHO wreck data and geophysics contact;
- MA75 Remains of a trawler, NRHE and UKHO wreck data and geophysics contact;
- MA76 Remains of a vessel, NRHE and UKHO wreck data;

- MA77 Remains of a vessel, NRHE and UKHO wreck data and geophysics contact;
- MA78 Glenarm Head, NRHE and UKHO wreck data and geophysics contact;
- MA79, Cargo vessel, NRHE and UKHO wreck data and geophysics contact;
- MA81 HMS Minion, NRHE and UKHO wreck data and geophysics contact;
- MA120 Pentrych, UKHO wreck data and geophysics contact;
- MA123 Ingo, UKHO wreck data and geophysics contact;
- MA125 Ny-Eeasteyr, UKHO wreck data and geophysics contact;
- MA143 Geophysical contact described as 'wreck' – no recorded wreck attributed;
- MA154 Geophysical contact described as 'wreck' – no recorded wreck attributed;
- MA155 Geophysical contact, may relate to UKHO wreck data (foul ground); and
- MA156 Geophysical contact, may relate to UKHO wreck data (German aircraft).

Recorded wreck sites

13.4.5 There are 51 wreck sites within the area of search recorded by the NRHE or UKHO, where no collaborative data exists.

- | | |
|--------------------------------------|--------------------------------|
| • MA52 Unknown vessel | • MA58 Wreck |
| • MA71 Possible remains of Bombardon | • MA73 HMS Laforey |
| • MA80 Remains of a German aircraft | • MA83 Cargo vessel |
| • MA84 Vessel | • MA85 Wreck |
| • MA86 Dalhousie (possibly) | • MA87 Wreck |
| • MA89 Fisher Lass | • MA91 Del Rio |
| • MA92 Wreck | • MA93 Tigger |
| • MA94 Pagenturm | • MA95 Wreck |
| • MA96 Broadhurst | • MA97 Silver Spray |
| • MA98 G-AZWZ German aircraft | • MA100 Wreck |
| • MA101 Wreck | • MA102 Wreck |
| • MA103 Clan MacMillan | • MA104 Aristos |
| • MA105 Iclander | • MA106 Zeester (possibly) |
| • MA108 Glenarm Head | • MA109 Gerlen |
| • MA110 wreck | • MA111 Wreck |
| • MA112 Lornaston | • MA113 Wreck |
| • MA114 Holme Force (possibly) | • MA115 Wreck |
| • MA116 London trader (possibly) | • MA117 Glendinning (possibly) |

- MA118 Wreck
- MA121 Vasco
- MA124 Wreck
- MA127 Maaslust
- MA129 Girlvine
- MA131 Miown
- MA133 Wreck
- MA157 Aluminium aircraft
- MA119 Sabrina
- MA122 Aircraft
- MA126 Arrogant
- MA128 Fortuna
- MA130 Wreck
- MA132 Wreck
- MA134 Indiana

Dead wreck sites

13.4.6 There are 5 wrecks where the UKHO notes that survey has failed to locate the wreck:

- MA63 Wreck, UKHO notes nothing found during intensive search;
- MA88 St Anne, UKHO notes nothing found during intensive search within 400m of position;
- MA90 Wreck, UKHO note no obstruction found, deleted;
- MA99 Wreck, UKHO notes nothing found during intensive search within 400m of position; and
- MA107 Wreck, UKHO records nothing found.

Obstructions

13.4.7 There are 10 records for 'obstructions' that have not been conclusively interpreted as wrecks:

- MA54, NRHE data;
- MA55, NRHE data;
- MA59, NRHE data;
- MA60, NRHE data;
- MA67, NRHE data;
- MA82, NRHE data as obstruction, UKHO record as possible wreck;
- MA155 UKHO record (the geophysical survey of Section 3 identified a side scan sonar contact adjacent to this site which indicates that it is a wreck site);
- MA156, UKHO record;
- MA158, UKHO record; and
- MA159, UKHO record.

Documented Losses

- 13.4.8 There are 48 documented losses recorded by the NRHE at a grid reference within the Project study area, which cannot be reconciled with any of the live wreck sites. These have been included in the baseline, but none have a good provenance and some may not be within the development area.

Geophysical Anomalies

- 13.4.9 Of the geophysical contacts interpreted as potentially relating to marine archaeology, 22 can be reconciled to a 'live' wreck location (some of which include the allocation of multiple contacts to a single recorded wreck). The remainder relate to cables and debris referenced below.
- 13.4.10 Two geophysical contacts recorded as 'wreck' cannot be reconciled with any recorded wreck location, and have been included in the list of 'live' wrecks based on their interpretation.
- 13.4.11 There are 10 geophysical contacts recorded that relate to modern cables: MA 137 – 140, MA 144 – 149.
- 13.4.12 There are 4 geophysical contacts recorded that relate to debris, rather than any specific wreck site: MA135, MA136, MA141 and MA142.
- 13.4.13 There are 4 geophysical contacts that have been identified from a review of the finer scale data collected during a geophysical survey of the meteorological mast area. These have all been interpreted as being geological in origin (MA 150-153).
- 13.4.14 Review of additional geophysical survey data from 2011 identified four wreck sites, and one possible wreck site all of which are referenced above. (MA68, MA101, MA107, MA115 and MA155).
- 13.4.15 Geophysical survey data interpreted by the geophysical contractor Osiris, also attributes contacts to known wreck locations, and these cross references are noted in the gazetteer (Appendix 13.4). Three additional potential wreck locations (MA 157-159) have been added to the gazetteer as a result of the Osiris review because they relate to contacts that could not be attributed to any known wreck location.

*Areas of Archaeological Potential*Wrecks and Aviation Losses

- 13.4.16 There is the potential for the remains of vessels within the Project area dating from the Mesolithic period (8,500- 4,000 BC) to the modern day. The English Channel was one of the busiest traffic routes in England before the 15th century, and maritime activity continued to expand thereafter, with a dramatic increase from the Post-medieval period. In addition, the area was a focus for military activity during the two World Wars. The high numbers of recorded wrecks,

obstructions and documented losses indicate the potential for future discoveries in the MASA.

- 13.4.17 Given the close proximity of the south coast to the Continent, and the presence of strategic targets such as Southampton, Portsmouth and Dover the study area was a significant focus for both military and commercial aviation activity throughout the 20th century, particularly during the Second World War.

Prehistoric Archaeology

- 13.4.18 The current sea bed presents an area which has previously been exposed at times of lower sea level. These former surfaces would have been available for hominids to traverse and exploit leaving similar prehistoric material as found in present-day terrestrial settings. Although often associated with fluvial environments, these sites may have been many miles from the sea at the time they were being exploited by our ancestors
- 13.4.19 The development area was not covered by glacial ice during the Anglian, Wolstonian or Devensian glacial maximums, and therefore the area has the potential to preserve prehistoric remains from the earliest periods of human occupation. From the Late Upper Palaeolithic to the Mesolithic, sea-levels rose, but for much of the period the Project area would have been dry land and habitable. There is potential to discover archaeological material along palaeo-valleys and below and within the palaeo-valley infill sediments, all currently below the present LWM. Artefact assemblages from this period have been found 'in situ' off the coast of the Isle of Wight and could be present within the Project area offshore, near-shore or intertidal areas.
- 13.4.20 By the end of the Mesolithic, the Project area would have been submerged and thus any artefacts and evidence from the Neolithic onwards will be of a maritime nature only.
- 13.4.21 A shallow buried channel feature was identified by geophysics in the northwest of the Project site. The bedrock surface lies at a maximum of 5m below sea level within this feature. There is potential that this feature may contain cultural heritage deposits within the channel infill sediments.

13.5 Predicted Impacts

The Rochdale Envelope

- 13.5.1 The known marine archaeological interest in the Project site area, including the cable corridor has been charted, and during the construction, operation and decommissioning phases of the project these features will be avoided as far as possible. It is possible that unknown archaeological features are present in the MASA. Impacts to archaeological features would tend to be as a result of direct effects (they are disturbed on the seabed by anchors, foundation or cable

installation etc). Table 13.5 lists the components of the design of the marine part of the project that could influence the magnitude of impacts.

Table 13.5: Wind farm design features and their influence on the Rochdale envelope Parameters assessed for impacts on Marine Archaeology

Design feature	Design options
Wind Farm Site Layouts	Approximately the same total area of seabed will be directly affected whether the turbines are spread to fill the development boundary, or are in a more compressed layout. However, a more spread out distribution will require longer lengths of cable, hence this is the worst-case.
Wind Turbines	Greater number of turbines gives greater chance of affecting archaeology and will result in greater length of cable also creating a greater chance of affecting archaeology.
Foundations	Largest area of seabed affected will be the worst case for archaeology as this gives the greatest chance of affecting unknown archaeology. Introduction of scour protection could have greater effects on archaeology than options requiring no scour-protection
Offshore Substation	
Cables	Greater length of cable creates highest chance of affecting archaeology.
Navigation and Aviation Marking	
Construction and Installation	Dynamically Positioned or vessels with least interaction with seabed will reduce potential for disturbance to archaeology
Operation and Maintenance	
Decommissioning	Assumed as installation.

- 13.5.2 At this stage of the Project, design of the foundations, cable routes and construction methods are not finalized, and the assessment of impacts needs to consider the worst-case scenario (it should be noted that the MASA is larger than the proposed Rampion Offshore Project site, therefore impacts discussed below relate to a larger area than will actually be affected by the development). The 175 turbine option presents a greater chance of impacting upon unknown archaeology than the 100 turbine option, hence this is considered the worst case for marine archaeology. In addition to requiring more foundations, this option will also result in greater lengths of inter array cables.

Construction

- 13.5.3 Impacts to marine heritage assets (which includes both maritime and palaeo-environmental remains) can be direct, and occur during construction as a result of any activity that affects the seabed, including the installation of the export cable, turbine foundations and temporary activities from vessels such as jack-up barges used during construction. Impacts can also be indirect, resulting from processes such as scour or sediment deposition. Both of these processes can be caused by the construction process, and both can change the condition of seabed heritage assets.

- 13.5.4 The overall significance of such impacts could range from negligible to moderate. This range reflects that, for example, a turbine foundation could completely destroy a marine heritage asset of medium – low importance, while a cable alignment could have more localized impact affecting only a small proportion of a marine heritage asset of high – low importance. Predicted impacts do not take mitigation into account; this is described below.

Operation

- 13.5.5 Impacts to archaeology during the operation and maintenance of the proposed wind farm may include the degradation and corrosion of previously buried sites exposed due to changes in local scouring and sedimentation patterns (indirect impacts). The anchoring of maintenance vessels on the seabed may also directly damage archaeological sites. The overall significance of such impacts could range from negligible to moderate. This range reflects that, for example, anchoring a maintenance vessel could affect a large to small proportion of a marine heritage asset of high – low importance.

Decommissioning

- 13.5.6 As with the construction, decommissioning of the offshore wind farm at the end of its life has the potential to impact archaeological deposits, either directly or indirectly. For example, the anchoring or jacking up of vessels used in the decommissioning process may impact wreckage or archaeological layers undisturbed during construction. In addition, further changes in sedimentation or scouring following decommissioning may indirectly impact archaeological deposits. The scale of such impacts would range from negligible to moderate. This range reflects that, as described above, these activities could affect a large to small proportion of a marine heritage asset of high – low importance.

13.6 Mitigation Measures

- 13.6.1 The primary mitigation for marine heritage asset impacts, during construction, operation and decommissioning, is avoidance using 'Archaeological Exclusion Zones' (AEZ). Further archaeological input to future surveys, scoped within an 'Archaeological Written Scheme of Investigation', and the implementation of an archaeological reporting protocol are also proposed to mitigate effects on marine heritage assets.
- 13.6.2 All marine archaeological work will be subject to a formal programme of reporting, archiving and, if necessary, publication. This will include the deposition of digital reports with the English Heritage online access to the index of archaeological investigations (OASIS) system.
- 13.6.3 Archaeological mitigation in relation to the foreshore, intertidal zone and onshore elements of the export cable are considered in Section 25 (Archaeology and Cultural Heritage).

Archaeological Exclusion Zones (AEZs)

- 13.6.4 The gazetteer (Appendix 13.4) identifies the proposed scale of buffer for the known marine heritage assets within the development area. This is linked to the type of record, relative reliability of the wreck data, and the importance of the marine heritage asset. The exact number, location, and extent of the AEZs may, however, change as further survey detail becomes available (due to review of future geophysical and geotechnical survey) and in response to specific potential impacts from the proposed development. The approach taken in identifying buffers within the gazetteer is inclusive and precautionary and some may be withdrawn, as well as altered, as further information on both the nature of the marine heritage assets and the layout of the proposed development becomes available.
- 13.6.5 In some cases more than one data source, including the geophysical contacts, have broadly the same location. These have been grouped and allocated a grouped ID, as it is assumed that this is duplicated data relating to one marine heritage asset. However, it is possible that the grouped ID relates to more than one marine heritage asset in which case the exclusion zone is increased to take this into consideration as a precautionary and inclusive approach to mitigation.
- 13.6.6 In accordance with EN-3, flexibility is required to deal with any unforeseen marine heritage assets encountered during construction. A specified tolerance for micro-siting to allow for changes to be made to the precise location of infrastructure during construction will be requested when the final design of the wind farm is discussed and agreed with English Heritage, so that account can be taken of the discovery of any unforeseen marine heritage assets.
- 13.6.7 Archaeological AEZs will be mapped; these maps will be provided to the construction teams. Figure 13.1 provides the location of the known marine heritage assets as currently understood, along with a provisional identification of the buffer for the AEZ for each asset as described by Appendix 13.4, the gazetteer. This information is being used for layout design work.
- 13.6.8 AEZs will be monitored to ensure that they are avoided during all construction activities. AEZs could be added as a result of the further review of pre-construction surveys (referred to below) or when existing AEZs are altered. Temporary AEZs will be used in the event of finds being reported from the seabed during construction. These will be communicated to the construction team by the Nominated Person (see 13.6.16 below).

Written Scheme of Investigation

- 13.6.9 An Archaeological Written Scheme of Investigation (WSI) will be produced by a specialist marine archaeologist, which will confirm the requirement for involvement of specialist marine archaeologists in the planning and implementation of any future offshore geotechnical or geophysical surveys.

- 13.6.10 The WSI will be approved by the Marine Management Organisation following discussions with the English Heritage Marine Archaeology team (and, if relevant, Worthing District Council). The WSI will document a process under which any data relevant to the development of, or changes to, AEZs within the development area will be communicated to English Heritage, and how on-going consultation and communication with English Heritage will be maintained in general.
- 13.6.11 The objectives of future offshore geotechnical and geophysical studies will be agreed between the relevant specialist contractors and consultees, during the planning stages. Any relevant studies will include a quality assurance exercise undertaken by an appropriately qualified specialist to ensure that the data provided is fit for the purpose of archaeological interpretation.
- 13.6.12 The WSI will provide an assessment approach that relates to both maritime archaeology and the marine palaeoenvironmental and geoarchaeological resource.
- 13.6.13 The WSI will be prepared in line with the guidance provided by the following documents:
- Crown Estates and Wessex Archaeology (2010) Model Clauses for Archaeological Written Schemes of Investigation Offshore Renewable Projects (published by Crown Estates London); and
 - Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector EMU Ltd (2011) (published by COWRIE).
- 13.6.14 The WSI (in accordance with the above commitments) will specify that:
- Appropriate geophysical and geotechnical surveys undertaken prior to, or during the construction will include the consideration of any archaeological requirements, and any relevant results will be reviewed by an appropriately qualified archaeologist. Should it be appropriate, on-site advice will be sought from an archaeologist during the survey work; and
 - Any further diver/ROV surveys will include the consideration of any archaeological requirements, and any relevant results will be reviewed by an appropriately qualified archaeologist. Should it be appropriate, on-site advice will be sought from an archaeologist during the survey work. If relevant, consideration should be given to assigning an underwater archaeologist, who is qualified in health, safety and environmental (HSE) standards, as a participating diver.

- 13.6.15 This survey results will be compared against the baseline environment (including the South Coast Regional Environmental Characterisation project transects and geophysical surveys already undertaken). This could result in alteration to AEZs (adding, deleting, extending or contracting) in light of additional information about the resource affected. New marine heritage assets could also come to light, which would require additional AEZs.

Archaeological Reporting Protocol

- 13.6.16 A Protocol for Reporting Archaeological Discoveries will be produced as a stand-alone document, disseminated to the construction team and adopted during construction to ensure that any remains of archaeological interest identified during construction are properly notified and recorded. Finds will be reported to a Site Champion (or Champions) who will make a Nominated Contact aware that such finds have been made. In this case, the Nominated Contact will be the Project's Consents Manager. The Site Champion (or Champions) will be appointed within the construction team. Finds will be reported to the appropriate authorities and, if necessary, arrangements will be made for the protection or recording of seabed objects. The Protocol will be approved by the Marine Management Organisation following discussions with the English Heritage Marine Archaeology team (and, if relevant, Worthing District Council).
- 13.6.17 The protocol will be prepared in line with the guidance provided by the following document:
- The Crown Estate and Wessex Archaeology (2010) The Protocol for Archaeological Discoveries: offshore renewables projects (published by Crown Estates London).
- 13.6.18 Relevant legislation with regard to the treatment of wreck, flotsam, jetsam, military remains, treasure and human remains will be observed at all times.

General

- 13.6.19 All of the work undertaken to further evaluate or mitigate the effects of the offshore wind farm on marine heritage assets will be subject to suitable and proportionate analysis, reporting, publication and archiving arrangements, in accordance with the Management of Research Projects In the Historic Environment (MoRPHE), English Heritage 2006. This will include submission of reports to the English Heritage online access to the index of archaeological investigations (OASIS) system.

13.7 Significance of Residual Effects

- 13.7.1 Following the implementation, review and monitoring of the AEZs, all known marine heritage assets will be avoided by the development and there will be no residual effects on marine heritage assets during the construction, operation or decommissioning of the offshore wind farm. A summary of residual impacts is presented in Table 13.6
- 13.7.2 Measures will be taken, as outlined above, to ensure as far as reasonably possible that there will be no residual effects on any unanticipated marine heritage assets that are disturbed during the construction, operation or decommissioning of the wind farm. This assumes that any unanticipated assets are identified and dealt with in full accordance with the Archaeological Protocol and Protocol for Archaeological Discoveries, including appropriate reporting, archiving and publication. There remains however, a slight possibility that previously unknown marine heritage assets will only be identified following impact during construction. In this case, the marine heritage asset will suffer a residual effect. However, the WSI will provide methods (e.g. diver survey) to mitigate these effects and following implementation of mitigation, residual effects will be moderate to neutral, depending on the relative sensitivity of the asset and magnitude of effect.

13.8 Cumulative Impacts

- 13.8.1 The Rampion project is not expected to produce direct impacts to known marine heritage assets in the MASA assuming that all sites can be avoided in the detailed planning phase. Indirect impacts, such as the creation of scour, which could expose marine heritage assets may have an effect, though this is anticipated to be negligible. The pre-application site (499) for aggregate extraction (see Figure 19.1) is directly adjacent to the Project site, and should aggregate be extracted from 499 in the future, there is a chance of scour from that site which may also reveal marine heritage assets (though it is assumed that all known archaeological features in that area will be avoided). Therefore there is potential for scour from both the Project and aggregate site 499 to produce an additive impact on unknown marine heritage assets in the area (limited to the vicinity around site 499), though this is expected to be negligible given the mitigation measures (Archaeological Written Scheme of Investigation and Protocol for Archaeological Discoveries) which will be imposed during the construction, operation and decommissioning of both projects.
- 13.8.2 Indirect cumulative effects of the offshore wind farm on terrestrial heritage assets are considered in Section 25 - Archaeology and Cultural Heritage of this ES.

13.9 References

English Heritage (1998) Identifying and Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers.

English Heritage (2002) Environmental Archaeology.

English Heritage (2002) Military Aircraft Crash Sites: Archaeological guidance on their significance and future management.

English Heritage (2005) Wind Energy and the Historic Environment.

English Heritage (2006) Management of Research Projects In the Historic Environment (MoRPHE).

English Heritage (2007) Climate Change and the Historic Environment.

EMU Ltd (2011) Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector. Report commissioned by COWRIE.

Joint Nautical Archaeology Policy Committee (JNAPC) (2006) The Code of Practice for Seabed Developers.

Oxford Archaeology commissioned by COWRIE (2008) Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy.

Wessex Archaeology (2007) Historic Environment Guidance for the Offshore Renewable Energy Sector. Report commissioned by the Collaborative Offshore Wind Research into the Environment (COWRIE).

Wessex Archaeology and Crown Estates (2010) Model Clauses for Archaeological Written Schemes of Investigation Offshore Renewable Projects.

Wessex Archaeology and Crown Estates (2010) The Protocol for Archaeological Discoveries: offshore renewables projects.

Table 13.6: Summary of Residual Effects and Mitigation Measures

Aspect	Effect	Proposed Mitigation Measures	Sensitivity	Magnitude	Residual Effect
Construction Phase					
Marine Heritage Assets	Construction activities could impact known and potential marine heritage assets including wrecks and palaeo-environmental remains	The adoption of AEZs to avoid all known marine heritage assets and an archaeological protocol to ensure the proper treatment of any items found	Medium/ Low/ Negligible/ Uncertain	Medium/ Low/ Negligible/ Uncertain	None
Operational Phase					
Marine Heritage Assets	Operational activities could impact known and potential marine heritage assets including wrecks and palaeo-environmental remains	The adoption of AEZs to avoid all known marine heritage assets and an archaeological protocol to ensure the proper treatment of any items found	Medium/ Low/ Negligible/ Uncertain	Medium/ Low/ Negligible/ Uncertain	None
Marine Heritage Assets	Operational activities could impact previously unknown marine heritage assets including wrecks and palaeo-environmental remains	Provision of mitigation (such as diver survey) during construction to ensure that any impacted remains are recorded	Medium/ Low/ Negligible/ Uncertain	Medium/ Low/ Negligible/ Uncertain	Moderate - Neutral
Decommissioning Phase					
Marine Heritage Assets	Decommissioning activities could impact known and potential marine heritage assets including wrecks and palaeo-environmental remains	The adoption of AEZs to avoid all known marine heritage assets and an archaeological protocol to ensure the proper treatment of any items found	Medium/ Low/ Negligible/ Uncertain	Medium/ Low/ Negligible/ Uncertain	None