

Volume 4, Chapter 17

Marine Archaeology Appendices



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4.17.1



Volume 4, Appendix 17.1

Marine Archaeology Technical Report



Executive summary

Purpose of this report

This report has been produced for the purpose of presenting the technical aspects of the marine archaeology assessment in relation to the Rampion 2 Offshore Wind Farm. The information in this report is summarised in and appended to **Chapter 17: Marine archaeology, Volume 2**.

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1. Introduction

This technical report identifies known and potential marine archaeological resources within the Rampion 2 Offshore Wind Farm and provides an assessment of the potential effects on the marine archaeology resources likely to be impacted by the development. This technical report accompanies **Volume 2, Chapter 17: Marine archaeology**.

1.1 Project background

- 1.1.1 Rampion Extension Development Limited (hereafter referred to as 'RED') is proposing to develop the Rampion 2 Offshore Wind Farm (Rampion 2). Rampion 2 will be located approximately 13km to 25km offshore, in the English Channel in the south of England, adjacent to the existing Rampion Offshore Wind Farm (for ease of reference hereafter referred to as Rampion 1). Rampion 2 will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network (**Figure 17.1.1**).
- 1.1.2 Maritime Archaeology (MA) were commissioned to undertake this marine archaeological technical report encompassing the offshore part of the PEIR Assessment Boundary of Rampion 2.

1.2 Aims and objectives

- 1.2.1 The aim of this technical report is to identify known or potential marine archaeological resources within the Proposed Development offshore part of the PEIR Assessment Boundary and wider marine archaeology study area and to provide an assessment of the potential effects on the marine archaeology receptors likely to be impacted by the development of Rampion 2.
- 1.2.2 The key objectives of the marine archaeology assessment are to:
- undertake ongoing consultation with Historic England and other key stakeholders, as required, in order to develop all aspects of the approach and identify receptors and mitigate impacts;
 - undertake a review of the known marine archaeology receptors within the proposed development area and marine archaeology study area;
 - summarise the environmental context and archaeological potential of the proposed development area;
 - assess geophysical and geotechnical data to identify previously unknown sites of archaeological potential;
 - provide an impact assessment and recommendation of environmental measures (mitigation) for all identified heritage receptors;
 - develop an agreed outline Written Scheme of Investigation (WSI) setting out the archaeological requirements pre- and post-consent; and

- provide a Protocol for Archaeological Discoveries (PAD) outlining the protocol and reporting chain to be followed during the pre-construction, construction, operation and maintenance, and decommissioning phases in case of any unexpected archaeological finds.

2. Methodology

2.1 Introduction

- 2.1.1 MA is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA); all work conducted by MA is in accordance with the guidance and principles set out in CIfA's Code of Conduct (2019a) and Code of Professional Conduct (2019b).
- 2.1.2 The following legislation, guidance and best practice has been consulted as part of this assessment:
- Standard and Guidance for Historic Environment Desk-Based Assessment, Chartered Institute for Archaeologists (CIfA 2014a);
 - Standard and Guidance for Commissioning Work on, or Providing Consultancy Advice on, Archaeology and the Historic Environment (CIfA 2014b);
 - Historic Environment Guidance for Offshore Renewable Energy Sector, Collaborative Offshore Wind Research into the Environment (COWRIE 2007);
 - Offshore Geotechnical Investigation and Historic Environment Analysis: Guidance for the Offshore Renewable Energy Sector (COWRIE 2011);
 - JNAPC Code of Practice for Seabed Development, Joint Nautical Archaeology Policy Committee (JNAPC 2006);
 - Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate 2010); and
 - Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate 2014);
 - South Inshore and South Offshore Marine Plan, Heritage Policy S-HER-1 (HM Government 2018);
 - Deposit Modelling and Archaeology: Guidance for Mapping Buried Deposits, (Historic England 2020);
 - Environmental Archaeology: A guide to the theory and practice of methods from sampling and recovery to post-excavation (Historic England 2011); and
 - Marine Geophysical Data Acquisition, Processing and Interpretation (Historic England 2013).

2.2 Marine archaeology study area

- 2.2.1 The marine archaeology assessment study area is defined as the PEIR Assessment Boundary area up to Mean High Water Spring (MHWS) tide level and surrounded by a 2km buffer. The extended area allows for the consideration of direct and indirect effects on marine archaeological receptors and is to accommodate the potential imprecision of historic marine positioning. This is in line with the existing Rampion 1 project marine archaeology study area and has

been agreed under the Evidence Plan process with Historic England (**Figure 17.1.1**).

- 2.2.2 The study area may be reviewed and potentially amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation ahead of the final Environmental Statement (ES) and Application for development consent.

2.3 Baseline assessment methodology

- 2.3.1 A baseline review of the archaeology receptors located within the marine archaeology study area is presented within **Section 3**. The data sources used to collate the information for this technical report are detailed in **Table 2-1**.

Table 2-1 Key sources used for the marine archaeology assessment

Source	Date	Summary	Coverage of study area
United Kingdom Hydrographic Office (UKHO) via Emapsite	22/04/2020	Database of known wrecks and obstructions held and maintained by the UKHO.	Full coverage of the study area.
Historic England National Record of the Historic Environment (NRHE) (Historic England)	28/09/2020	Site based information on intertidal sites and known wrecks and reported losses offshore including designated and non-designated archaeological sites.	Full coverage of the study area.
West Sussex County Council (WSCC) Historic Environment Record (HER)	23/04/2020	County maintained database of all known archaeological monuments and events, including designated and non-designated archaeological sites, designated and non-designated buildings and standing structures, conservation areas, sites with known palaeoenvironmental significance and historic landscape character studies.	Partial coverage of the study area (approximately 2/3rd falls within West Sussex County Council jurisdiction).

Source	Date	Summary	Coverage of study area
East Sussex County Council (ESCC) HER	06/05/2020	County maintained database of all known archaeological monuments and events, including designated and non-designated archaeological sites, designated and non-designated buildings and standing structures, conservation areas, sites with known palaeoenvironmental significance and historic landscape character studies.	Partial coverage of the study area (approximately 1/3rd falls within East Sussex County Council jurisdiction).
Submerged Palaeo-Arun River Project (Gupta <i>et al.</i> 2004; 2008)	n/a	A reconstruction of the prehistoric landscapes connected to the River Arun with an evaluation of the archaeological resource potential.	Partial coverage of the study area.
The South Coast Regional Environmental Characterisation (James <i>et al.</i> 2010)	n/a	A regional marine assessment, focusing on evaluating the geological, biological and archaeological resource.	Broadscale data with regional coverage.
Historic Seascape Characterisation (HSC): Hastings to Purbeck and Adjacent Waters (Maritime Archaeology and SeaZone Solutions 2011)	n/a	A regional marine assessment presenting the archaeological understanding of the historic cultural dimension of our coasts and seas, identifying and mapping areas whose present character has been shaped by similar dominant cultural processes.	Broadscale data with regional coverage.
South East Rapid Coastal Zone Assessment (Wessex Archaeology, 2011; 2013)	n/a	A regional assessment undertaken to enhance the knowledge of the coastal historic environment in order to inform Shoreline Management Plans.	Broadscale data with regional coverage.

Source	Date	Summary	Coverage of study area
Rampion Offshore Wind Farm Environmental Statement (RSK Environment Ltd 2012)	n/a	The Environmental Statement for Rampion 1 Offshore Wind Farm. Chapter 13 - Marine Archaeology provides a review of the archaeological potential of the area directly adjacent to Rampion 2.	Partial coverage of the study area.
British Marine Aggregate Producers Association (BMAPA) Finds Protocol (Wessex Archaeology)	n/a	Database of unexpected archaeological discoveries found and reported in material from offshore aggregate areas. Received as part of the NRHE dataset.	Full coverage of the study area.
Offshore Renewables Protocol for Archaeological Discoveries (Wessex Archaeology)	n/a	Database of unexpected archaeological discoveries found and reported during offshore development activities. Received as part of the NRHE dataset.	Full coverage of the study area.
Portable Antiquities Scheme	07/09/2020	Database containing records of terrestrial or intertidal archaeology found and reported by the public.	Partial coverage of the study area.
Marine Antiquities Scheme	n/a	Database containing records of marine archaeology found and reported by the public.	No data within study area.
Receiver of Wreck	30/09/2020	Database containing records of shipwrecks or archaeological sites of significance.	Full coverage of study area.

- 2.3.2 Where there are discrepancies in the spatial data between different sources, the coordinates provided by United Kingdom Hydrographic Office (UKHO) are used (as per Dellino-Musgrave & Heamagi, 2010). Datasets that were provided in the British National Grid co-ordinate system were transformed to World Geodetic System 1984 (WGS84) using the OSTN02 v7 transformation, the most appropriate transformation for working with marine data (Dellino-Musgrave & Heamagi, 2010). The vertical datum for depths listed in the gazetteer is the lowest astronomical tide (LAT).

- 2.3.3 Known and identified features within the marine environment typically fall into two categories: wrecks and obstructions. Definitions of these terms, as used by the UKHO, are provided below:
- **Wreck:** The remains of a stranded or sunken vessel which has been rendered useless; and
 - **Obstruction:** In marine navigation, anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel. The term is usually used to refer to an isolated danger to navigation. 'Fouls' (areas safe to navigate over but which should be avoided for anchoring, taking the ground, or ground fishing) listed by the UKHO are included within this category.
- 2.3.4 Wrecks and obstructions are further classified by the UKHO as:
- **LIVE:** Wreck considered to exist as a result of detection through survey;
 - **DEAD:** Not detected over repeated surveys, therefore not considered to exist in that location;
 - **LIFT:** Wreck has been salvaged;
 - **UNKNOWN:** The state of the wreck is unknown or unconfirmed; and
 - **ABEY:** Existence of wreck in doubt and therefore not shown on charts.
- 2.3.5 Protective legislation for heritage features includes the Protection of Wrecks Act 1973, which seeks to secure the protection of known wrecks and wreck sites in territorial waters from interference by unauthorised persons; and the Ancient Monuments and Archaeological Areas Act 1979 which seeks to protect monuments and sites of national importance and public interest due to historic, architectural, traditional, artistic or archaeological significance. The significance of a site is not defined by the protection it is currently under, as knowledge and data of wrecks and sites is constantly evolving, see **Volume 2, Chapter 17: Marine archaeology**.

2.4 Geophysical data collection methodology

- 2.4.1 Gardline Limited was contracted by RWE Renewables UK Ltd to acquire shallow geophysical and Ultra-High Resolution Seismic (UHRS) data across areas being considered for development at the Rampion 2 and associated export cable route corridor.
- 2.4.2 The offshore portion of the survey was undertaken predominantly by M.V. *Vigilant*, mobilising in Hull on 30 June 2020 and demobilising in Hull on 19 August 2020, after completion of the shallow geophysical data acquisition. The M.V. *Ocean Observer* carried out the UHRS portion of the survey including acquiring sub-bottom profiles (SBP) and magnetometer (MAG) data infilling the planned gaps in the geophysical survey including all crosslines. The M.V. *Titan Discovery* and Titan owned Unmanned Aerial Vehicle covered the inshore survey on the export cable corridor.

Side scan sonar data

- 2.4.3 An EdgeTech 4200 dual channel side scan sonar (SSS) system using an EdgeTech 4200FS towfish was used to scan the seabed on either side of the ship's track. The data was recorded with Octopus 760D. The beamwidth used was set to 1.26°/0.4° horizontal and 50° vertical. The frequency used was 120kHz/410kHz with a range of 100m per channel providing 100 percent - 300 percent coverage. The data was processed and analysed using Gardline's in-house GeoFusion software.
- 2.4.4 The raw data was received in Triton XTF format and post-processed in SonarWiz, imported with a 'threshold' value calculated for the specifics of the instrumentation and the environment, bottom tracked and normalised using the 'Empirical Gain Normalisation' (EGN) function.
- 2.4.5 The side scan sonar data was reviewed on a line-by-line basis by a qualified marine archaeologist. All anomalies were identified and assessed for archaeological potential as per **Table 2-2**, target reports were developed and exported as ESRI shapefiles into ArcMap 10 for synthesis with other data sets.
- 2.4.6 All SSS anomalies were assigned feature IDs ranging between MA2000 – MA2999.

Echo sounder (multi-beam system) data

- 2.4.7 A Simrad EM2040D hull mounted multi-beam echo sounder is permanently installed on M.V. *Vigilant* and was used to provide swath bathymetry data. The transducer frequency was 200-400 kHz with 800 beams and data was recorded using the SIS acquisition software. The survey vessel maintained an average speed of 4 knots and the angular coverage was 60-76°. The acquired data was processed using Caris HIPS and SIPS (version 10.4) software.
- 2.4.8 Multibeam swath bathymetry data was received as ungridded ASCII files, and .asc grids reduced to LAT. The data was visualised using the Fledermaus 7 suite; DMagic to produce a digital terrain model (DTM) gridded at 1m according to the highest resolution xyz data received and hillshaded. These were exported for interpretation into Fledermaus with a 32-step colour map overlaid to aid interpretation and later into ArcMap 10 for synthesis with other data.
- 2.4.9 Backscatter data has also been recorded, measuring the intensity of the echo sounder pings which are assigned a grey-scale value and gridded. This provides an acoustic intensity map that is similar in appearance to side scan sonar data, but without shadows to highlight relief. The data is useful for the interpretation of bathymetric anomalies and enables an understanding of material type for discrete features, and sediment classification of shallow deposits.
- 2.4.10 The MBES and BS data was reviewed by a qualified marine archaeologist for targets identified during the assessment of other datasets and information regarding the length, width and anomaly height above the seabed was cross-referenced with side scan and sub-bottom results where these features possessed a surface expression.
- 2.4.11 Target imagery was captured, and feature IDs were assigned ranging between MA4000 – MA4999.

Magnetic data

- 2.4.12 A Geometrics G882 marine caesium vapour magnetometer was soft towed 11m behind the side scan sonar and positioned using a USBL system. The regional field was set to 48550nT and the cycle time to 100ms. The data was processed using Gardline's GeoFusion software.
- 2.4.13 Magnetic data was assessed using GeoMetrics MagPick software package. Raw xyz profile text files were assessed on a line-by-line basis and only smoothed using low and/or high pass filters where necessary. Data was also gridded from the analytic signal to produce a spatial distribution map of anomalies. Interpreted magnetic targets were identified by combining a manual assessment of the magnetic profiles with a visual assessment of the gridded data.
- 2.4.14 Magnetic anomalies greater than 5nT have been accepted as a standard for the smallest change in magnetic field reliably detected (Dix *et al.* 2008). It has been argued that a minimum detectable deflection of 5nT may be on the conservative side and that, where the data is relatively noise free, 3 or even 2nT may be practical depending on noise levels, instrument type, data rate and purpose of investigation (Camidge *et al.* 2010). The current filtering of 4nT as selected by Gardline is appropriate given the survey parameters used.
- 2.4.15 MA has retained Gardline's adoption of > 4nT for this assessment. Objects giving a 5nT return from a six metre distance are likely to be ferrous objects of around 100kg (for example, a small anchor) (Camidge *et al.* 2009). Anomalies smaller than this are not likely to be discernible from signal noise unless passed over directly by the fish at extremely short range (c. 2m). Such signals are not expected to be of archaeological interest, constituting isolated debris or single instances of ferrous anthropogenic material.
- 2.4.16 These surveys, like most magnetometer surveys of large areas, are of variable sensitivity (Camidge *et al.* 2009:62). At 6m range, run lines directly over targets are able to detect a target with a mass of around 100kg, whereas the line spacing for this survey varies with the average line spacing at 75 or 150m. At 150m line spacing the slant range will be around 80m, which means that only objects of more than 100 tonnes will be discernible at 5nT deflection. Benefiting the data collection for this case is that the run lines were cross-lined which can possibly reduce the large differential sensitivity (Camidge *et al.* 2009:63).
- 2.4.17 All magnetic targets over 4nT were exported into ArcMap 10 for comparative analysis with other geophysical datasets and data identified during the baseline review.
- 2.4.18 Correlation between magnetic targets and other datasets were based on a 50m buffer due to the issues inherent in accurately positioning magnetic targets by their detectable magnetic field.
- 2.4.19 Target reports were developed for all magnetic anomalies correlating with high and medium potential side scan sonar anomalies. Feature IDs for all magnetic anomalies were assigned IDs ranging between MA5000 – MA7279.

Sub-bottom profiler data

- 2.4.20 A 16 element hull-mounted pinger monotracer seismic system was used to collect sub-bottom data. The digital recorder used was Octopus 760D. The energy power used was 4kW with a firing rate of 300ms and record length of 120ms. The band pass filter was set to 2.5-4.5kHz and swell filter on. The raw data was processed using Gardline's GeoFusion software.
- 2.4.21 Interpretation of sub-bottom profiler data was undertaken on a line-by-line basis by a qualified marine archaeologist.
- 2.4.22 The data was received in SEG-Y format and imported and visualised using SonarWiz. Lines were bottom tracked and gain corrected, and then reviewed in numerical order with features digitised continuously. Features were picked by digitising reflectors and horizons of potential archaeological interest. Discrete reflectors consist of point hyperbolae and blanking effects indicative of potential buried archaeological deposits, such as wreck and debris.
- 2.4.23 Feature IDs for all sub-bottom anomalies were assigned ID's ranging between MA3000 – MA3999.

2.5 Methodology geophysical data interpretation

- 2.5.1 The archaeological assessment of geophysical data has been undertaken by a qualified and experienced maritime archaeologist. Following delivery of the survey data as specified above the raw data has been processed and interpreted as per guidance in Marine Geophysics Data Acquisition, Processing and Interpretation (Historic England, 2013).
- 2.5.2 All anomalies of archaeological potential were assessed against the criteria in **Table 2-2** and the results of the assessment of all datasets were further reviewed against the baseline data collated for the marine archaeology study area, as detailed in **Section 3**.

Table 2-2 Definition of archaeological potential

Archaeological potential	Archaeological definition
High	Anomalies considered to map material of archaeological significance such as wreck or crash sites, buried and confirmed palaeolandscapes, as well as potential outcropping palaeolandscapes and their margins.
Medium	Anomalies that consist of defined structural outlines or coherent material distributions with strong backscatter, or clearly upstanding objects with shadow, or pronounced scour features; or a combination of these, interpreted as of possible archaeological significance but where further investigation would be required for more detailed interpretation.

Archaeological potential	Archaeological definition
Low	Anomalies considered to be of anthropogenic origin but likely related to modern activity with little or no archaeological significance such as modern debris, ropes, chains or fishing gear.

2.6 Environmental measures methodology

The environmental measures for Rampion 2 are formulated where archaeological receptors and anomalies are identified in the desk-based assessment and/or geophysical assessments. The environmental measures are based on guidance set out in Historic Environment Guidance for Offshore Renewable Energy Sector (COWRIE 2007) and Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate 2010).

Rampion 2 has approved several embedded environmental measures as part of the pre-application phase in order to reduce the potential for impacts on marine archaeology (see **Table 2-3**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

Table 2-3 Embedded environmental measures

ID	Environmental measure	How the environmental measures will be secured
C-57	A Marine Written Scheme of Archaeological Investigation (WSI) will be developed in accordance with the Outline Marine WSI. The Marine WSI will outline the Archaeological Exclusion Zones (AEZ), the implementation of a Protocol for Archaeological Discoveries in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (The Crown Estate, 2014) and future monitoring and assessment requirements.	Development Consent Order (DCO) requirements or deemed Marine Licence (dML) conditions.
C-58	Offshore geophysical surveys (including UXO surveys) undertaken during the life of the project will be subject to full archaeological review where relevant in consultation with Historic England.	DCO requirements or dML conditions.
C-59	Offshore geotechnical surveys prior to construction will be undertaken following early discussions with Historic England. The results of the geoarchaeological assessment will be presented a	DCO requirements or dML conditions.

ID	Environmental measure	How the environmental measures will be secured
	staged geoarchaeological report inclusive of publication.	
C-60	The offshore export cable, inter-array cables, inter-connector cables and other infrastructure within the array area will avoid all identified marine heritage receptors by utilising archaeological exclusion zones (buffers) as detailed in the Outline Marine WSI.	DCO requirements or dML conditions.

3. Baseline review

3.1 Environmental context

- 3.1.1 The area of seabed that the marine archaeology study area covers was previously large swathes of dryland that were exploited during the Pleistocene and early Holocene (Mesolithic). The dynamic processes of landscape evolution throughout the Pleistocene as a result of past fluctuations in sea-level and temperature resulted in repeat (re)colonisation and abandonment of these landscapes. These periods of (re)colonisation are typically associated with the retreat of icesheets following the last three lowland glaciations:
- Devensian: c. 115,000 to 11,000 Before Present (BP);
 - Wolstonian: c. 350,000 to 130,000 BP; and
 - Anglian: c. 480,000 to 430,000 BP [Marine Isotope Stage (MIS) 12].
- 3.1.2 However, despite these numerous glacial cycles during the Quaternary, there is currently no evidence to suggest that the glacial ice sheets reached as far south as the West Sussex Coastal Plains and English Channel (Farr *et al.* 2017). During these cold periods, the sea-level would have been significantly lower and large areas of the English Channel and southern North Sea would have been inhabitable dryland.
- 3.1.3 As the ice sheets did not extend into the south of Britain, there have been no adverse effects of ice scouring on earlier Palaeolithic deposits in this region, meaning that prehistoric material or deposits within the marine zone have the potential to range between the Lower Palaeolithic and Mesolithic. The rise in sea-level in the Holocene inundated these once-dry landscapes and rendered them un-inhabitable and thus any Neolithic (4000 to 2200 BC) material found in the marine zone is likely to be of a maritime nature.
- 3.1.4 Understanding of the Pleistocene landscapes of West Sussex has increased significantly over the last 20 years or so, with multiple projects sampling deposits and mapping the landscape, including: the Boxgrove Raised Beach Mapping Project (Pope 2004; Roberts and Pope 2009; Roberts and Pope 2018), the Palaeolithic Archaeology of the Sussex/Hampshire Coastal Corridor (PASHCC) project (Bates *et al.* 2007); the Submerged Palaeo-Arun River project (Gupta *et al.* 2004; 2008); and the Transition Zone Mapping for the Marine-Terrestrial Archaeological Continuity (Contiguous Palaeo-Landscape Reconstruction) project (Bates *et al.* 2009).
- 3.1.5 Through this work, it was recognised that the Early to Middle Pleistocene deposits of the West Sussex Coastal Plain and wider Solent Basin were shaped by successive interglacial sea-level highstands during the last 500,000 years (Bates *et al.* 2010). At least four of these marine terraces have been identified from the deposits as follows (oldest to youngest):
- Goodwin-Slindon (Marine Isotope Stage 13);
 - Aldingbourne (early MIS 7);

- Brighton-Norton (late MIS 7); and
- Pagham-Selsey (MIS 5e).

- 3.1.6 Tectonic uplift has elevated these terraces thus protecting them from erosion by later sea-level rises (Roberts & Parfitt 1999; Scourse & Preece 2009).
- 3.1.7 The marine deposits recorded within the Goodwin-Slindon raised beach at Boxgrove (c. 500,000 BP/MIS 13) are contemporaneous to a time when Britain was connected to mainland Europe by low chalk hills with extensive delta plains that bordered the southern shore of the North Sea embayment, giving way to the colonisation of Britain by hominins as there was no continuous seaway present (Bates *et al.* 2003; Preece & Parfitt 2012; Whittaker & Parfitt 2017). At this time of higher sea-level the Goodwin-Slindon Raised Beach formation was situated within a large marine embayment that opened southwards into the main English Channel, whilst the eastern end of the channel was closed (Bates *et al.* 2003). The point at which the embayment was created is not yet known, as there is no current evidence of deposits older than those at Boxgrove (Bates *et al.* 2010).
- 3.1.8 The coastline at the time of the Aldingbourne Raised Beach, seems to have had a broadly similar geomorphology than that of the Goodwin-Slindon Raised Beach, with a continuation of the marine embayment. However, the evidence appears to show that Aldingbourne was evolving and transitioning into an open coastline, as the mouth of the embayment widened (as recognised at the site of Pear Tree Knap) (Bates *et al.* 2010).
- 3.1.9 Towards the later part of the MIS 7, the Brighton-Norton Raised Beach was formed. All evidence indicates that the embayed coastline from the previous highstands was now a fully open coastline, with sediments demonstrably extending from Brighton in the east to at least Havant in the west (Bates *et al.* 2004).
- 3.1.10 The coastline continued to evolve more locally in the Ipswichian Interstadial and the Pagham-Selsey Raised Beach deposits were laid down, with dating of the gravels and sands across much of the Pagham/ Selsey/ Bognor area indicating MIS 5e. The evidence suggests that an offshore bar was created, known as the Selsey Ridge. The development of the ridge subsequently led to the formation of a protected coastal plain to the north, within which shallow harbours were formed (Bates *et al.* 2010).
- 3.1.11 The study area covers the site of the submerged Arun River extension and the Northern Palaeovalley, part of a larger confluence of submerged palaeo-river systems in the English Channel that would have comprised the combined drainage of the Rhine, Seine, Thames, Solent and other tributaries (Gupta *et al.* 2004; Farr *et al.* 2017).
- 3.1.12 This river system is situated in an erosive landscape and strong tidal streams have led to scouring of sediment in some parts (Gupta *et al.* 2008; Farr *et al.* 2017), however the study area does not appear to be significantly affected by these marine transgressive processes (Gupta *et al.* 2004). This region of submerged palaeo-river systems was previously investigated by the Submerged Palaeo-Arun Survey (Gupta *et al.* 2004; 2008) with geophysical mapping of the landscapes and a programme of environmental sampling in the Owers Banks.

3.2 Maritime activity

Introduction

- 3.2.1 The following sections will provide a broad contextual overview of the past human activity within the region. This will enable an assessment of the potential for archaeology within the marine archaeology study area and an assessment of significance of any sites that may be within it.
- 3.2.2 The marine archaeological resource can be characterised into the following four main categories of sites and features:
- Submerged prehistoric landscapes related to fluctuations in past sea-level. Such landscapes may contain significant evidence of prehistoric human occupation and/or environmental change.
 - Archaeological remains of vessels deposited after a wrecking event at sea or abandoned in an intertidal context.
 - Remains of aircraft crash sites, either coherent assemblages or scattered material, typically the result of Second World War military conflict, but also numerous passenger casualties. This category includes aircraft, airships and other dirigibles dating to the First World War; however, these rarely survive the archaeological record.
 - Structural remains other than watercraft, such as defensive structures, lighthouses or sites lost to the sea as a result of coastal erosion, may be found within the intertidal zone (between Mean Low Water Springs (MLWS) and MHWS).
- 3.2.3 There are a wide range of heritage sites without formal protection which have been identified and outlined below and in **Section 3.3**). Of the sites with formal heritage protection measures assessment work has determined that:
- there are no protected wrecks within the marine archaeology study area;
 - there are no conservation areas within the marine archaeology study area; and
 - there are no Marine Antiquities Scheme finds recorded within the marine archaeology study area.

Palaeolithic (c. 800,000 to 10,000BC)

- 3.2.4 The West Sussex coastal plains are home to a significant Lower Palaeolithic site known as Boxgrove (c. 500,000BP or MIS 13), situated some 10km inland of the present coastline of the English Channel. Although it was initially considered to be the earliest Palaeolithic site in Britain, as evidenced by faunal remains with butchery marks and Homo heidelbergensis human remains (a tibia shaft and two incisor teeth from two individuals), an earlier site has now been found dating to c. 1,000,000BP at Happisburgh on the Norfolk coast. However, the Boxgrove human remains are the earliest to be found at present in England, dating to between 525,000 and 478,000 years before present (BP) (Whittaker & Parfitt 2017). Boxgrove is situated in a former marine embayment and sits on a raised beach. At

this point the Straits of Dover were closed and as a result there was reduced salinity in the embayment.

- 3.2.5 The archaeological and palaeoenvironmental potential of the offshore Palaeolithic deposits from the English Channel and Solent region is demonstrated by the wealth of artefacts, faunal remains and peat evidence that have been identified to date. However, in situ offshore finds are rare, with most artefacts within the marine zone being found on the seabed in a secondary context. It is unlikely that archaeological material from interglacial periods of the Palaeolithic will be found in the offshore zone of the study area as sea-level was much higher and further inland than the present-day coastline, however, the deposits laid down in the marine zone during these interstadials are of great importance for understanding the localised geomorphological changes of the Sussex coast.
- 3.2.6 As discussed above, there were numerous glacial cycles during the last 500,000 years, resulting in periods of lower the sea-level. Large swathes of land that are now submerged, would have been inhabitable and exploitable by our human ancestors. Therefore, any archaeological finds from the Palaeolithic period in the offshore zone are more than likely from these periods of glaciation.
- 3.2.7 Further to this, an extensive survey of the Palaeo-Arun valley was carried out in 2004 by Gupta *et al.* (2004). Preliminary prospecting was carried out within the Palaeo-Arun river in the Owers Bank region, c. 18km south of Littlehampton, in the English Channel. This project collected 245km of seismic data over a 3.5km by 1km area of the seabed, as well as ground-truthing the survey with twenty vibrocores and 108 grab samples (Event number EWS1190 and Monument number MWS10387). The importance of the Palaeo-Arun valley is further discussed in **Section 4.3**.
- 3.2.8 The deposit sequences at Eartham pit, Boxgrove, are the most extensively studied and typically comprise the following units: 7. Soliflucted gravel; 6. Chalk gravel and calcareous silt beds ('brickearth'); 5. Organic bed; 4. Palaeosoil and spring/pond deposits; 3. Slindon Silts; 2. Slindon Sands; and 1. Beach gravel; upper chalk (Cretaceous). The deposit sequence indicates that the site was essentially a nearshore marine at the base of intertidal flats, followed by regression and a period of soil formation with freshwater pools. Interglacial deposits are then followed by a thick sequence of colluvium and mass-movement deposits that indicate change to colder and ultimately sub-arctic conditions (Whittaker & Parfitt 2017).

Mesolithic (c. 10,000 to 4,000 BC)

- 3.2.9 Most early prehistoric finds from the English Channel will be from the late Upper Palaeolithic and earlier Mesolithic, post-dating the Last Glacial Maximum (LGM) (Devensian) and representing the period of recolonisation of southern Britain by anatomically modern humans from c. 12,500 BP, which followed a period of approximately 10,000 years of glaciation (of which there is no current evidence of habitation) (Jacobi 2004).
- 3.2.10 The English Channel and Solent Basin has already produced important material from this period prior to the inundation, indicating the high potential for both in situ and secondary context archaeological material within the marine archaeology study area.

- 3.2.11 A submerged Mesolithic site (Monument no. 896563) was found approximately 700m offshore, c. 5.5km west of the Rampion 2 PEIR Assessment Boundary. The site consisted of 30 blades and flakes of Mesolithic date, now housed in Bognor Museum. Although this site is not within the marine archaeology study area, it highlights the potential to find submerged prehistoric archaeology along this coastline.
- 3.2.12 Further to the west of the study area, within the Solent region, lies the submerged site of Bouldnor Cliff off the Isle of Wight (c. 6,200 to 6,000 cal. BC). The site is made up of five known loci with archaeological evidence along a 1km stretch (orientated east to west) and has yielded significant archaeological material, both in situ and in secondary contexts. Archaeological material includes worked flint, worked wood, the oldest piece of prepared string in the country and the presence of Einkorn wheat DNA, 2,000 years earlier than previously believed to have been in the UK.
- 3.2.13 Waterborne travel during the Mesolithic was likely to be carried out in logboats or skin/hide boats (as summarised in McGrail 2001: 172-183). The vessels were able to operate in sheltered inshore waters, estuaries and rivers but the extent to which Mesolithic vessels were capable of making repeated open sea voyages is less clear. However, Garrow and Sturt (2011) have proposed a viable model of significant maritime contact between and along the western coasts and islands of the British Isles during the Mesolithic and Neolithic. Remains of early vessels are likely to occur in areas of formerly sheltered inshore waters (now further inundated and lying offshore), estuaries or rivers. Associated artefacts, such as paddles or fishing equipment also have the potential to survive in the archaeological record from this period (for example, McGrail 2001: 176).

Neolithic (c. 4,000 to 2,200 BC)

- 3.2.14 By the Neolithic sea-level had risen to levels similar to the present-day coastline, therefore the potential for submerged landscape deposits is significantly reduced in offshore environments, while remaining high in developing estuaries and harbours. However, current models of sea-level rise are fairly broad in their interpretations and are not always indicative of the localised nuances. For example, there is increasing evidence in the southern North Sea for the existence of Neolithic islands (Gaffney *et al.* 2017). As no localised models have been created for the south east coast, it remains true that there is some potential for in situ Neolithic remains, such as occupational material, structural remains and watercraft, to be found in the intertidal and marine zone. This can be seen in peat deposits lining estuaries and rivers dating to the Neolithic, particularly around the Solent coast. Furthermore, there is also potential for secondary context Neolithic material, originating from eroded deposits along the coast.
- 3.2.15 Neolithic watercraft, much like their Mesolithic counterparts, are likely to comprise of skin/hide boats or logboats (summary in McGrail 2001: 172-183). In general, the former craft are more likely to be capable of open water journeys, whereas the latter were likely restricted to sheltered waters.
- 3.2.16 The scope for surviving watercraft in the offshore zone, although unlikely, must be considered as recent evidence of a Neolithic logboat was uncovered 1km offshore under two metres of sand during trenching for a pipeline making landfall at

Gormanstown, Co. Meath (Brady 2002), highlighting the potential for these remains to survive offshore. Furthermore, the logboat showed evidence of possible modification with outriggers to aid long-distance sea travel, indicating that logboats could be adapted for use from sheltered waters to open waters (Brady 2002).

- 3.2.17 Onshore, Neolithic settlements at Whitehawk and Trundle, fortified by banks and ditches, overlook the coastal plains. The faunal evidence from these sites clearly indicates the exploitation of marine resources during occupation, in addition to the typical subsistence agriculture of the Neolithic - the cultivation of cereals and the rearing of stock (Gale & Fenwick 1998). Further, the site of Bishopstone on the East Sussex coast is evidence of open agricultural settlement, whilst the supposition of seasonal and/or specialist use of marine resources is evidenced at the nearby site of Chidham (Gale & Fenwick 1998), where the lithics assemblage seems to be specialised for the preparation of withies for fish traps. Thus, as with the Mesolithic, associated artefacts, such as fishing equipment, may also have the potential to survive in the archaeological record offshore, as in the examples found from Jaywick in Essex (Wilkinson & Murphy 1995).
- 3.2.18 One Neolithic find is recorded in the PAS within the Study Area: a large, knapped flint scraper in a horseshoe shape (SUSS-608793).

Bronze Age (c. 2,600 to 700 BC)

- 3.2.19 The potential for substantial submerged landscape deposits offshore is further reduced in the Bronze Age. However, with increasingly sedentary populations, both on the coast and inland, inevitably gave rise to increased communications along the coast and waterways of the region.
- 3.2.20 There is substantial potential for in situ archaeological remains in the intertidal zone, including: occupational material, ritual deposits, burials, and structures relating to coastal marine practices, such as jetties, causeways and fish traps. However, there is also potential for secondary context material from eroded deposits in the inshore and intertidal zone.
- 3.2.21 Along the south coast there are numerous examples of Bronze Age coastal activities, including the two Late Bronze Age structures found on the foreshore at Wootton-Quarr, Isle of Wight (James *et al.* 2010), and the Bronze Age remains and ancient river channel on the foreshore at Bognor Regis, to the west of the marine archaeology study area. The remains at Bognor Regis consisted of Bronze Age tree trunks, wooden stakes, 52 burnt flints and 193 struck flints (in situ), pottery fragments and a small fragment of human skull (Allen *et al.* 2004).
- 3.2.22 Watercraft during this period still include skin/hide boats and logboats, however, there is a development of the later plank-built hull forms which were relatively complex in their construction, using large hewn planks fastened together with yew withies, as exemplified by the Dover Boat (Clark 2004). Evidence of a Middle Bronze Age boat was found at Meadow Lake in Testwood, Hampshire, although only one piece, a cleat (used to fasten crossbeams to the hull), was recovered it drew similarities to the construction of the Dover Boat (Fitzpatrick *et al.* 1996; Van de Noort 2006). Further evidence of Bronze Age maritime activity is represented by the Bronze Age cargo wrecks off the Devon coast (Needham *et al.* 2013) and

the Ferriby boats, specifically Ferriby 5, discovered in the Humber estuary (McGrail 2001).

- 3.2.23 There are two Bronze Age finds recorded in the PAS database: metal working debris (SUSS-013803); and a Late Bronze Age cast copper-alloy chisel (SUSS-00F4D4).

Iron Age (c. 800 BC to AD 43)

- 3.2.24 By the Iron Age, sea-level change no longer has a significant impact on the geomorphology of the coastline. Rather, coastal erosion became the key agent for that change.
- 3.2.25 Maritime trade networks were further developed in the Iron Age with increasing evidence of not only coastal and inland trading, but also cross channel trade as indicated by the appearance Gallo-Belgic pottery and wheel-thrown ceramics in the archaeological record of Sussex and Hampshire (Champion 2011). Trade with northern Europe is also evidenced by the ceramics, with a wide range of regionally distinct forms as well as Roman amphora and Samian ware found in Late Iron Age contexts along the Sussex coast (Hamilton & Manley 2010). Despite the evidence of Bronze Age plank-built vessels, there is currently no archaeological evidence of Iron Age plank-built sea-going vessels. However, the above trading networks have some important implications for the types of watercraft in use at the time, and remains of such have potential to be present within the marine archaeology study area.
- 3.2.26 There is substantial evidence for the continued use of logboats within this period, with the best example being the c. 13m long, complex logboat excavated from Hasholme and dated to c. 300 BC (McGrail 2001). Whilst it remains possible that skin/hide boats were also still in use, the organic nature of these craft mean that there is currently no archaeological evidence of this (McGrail 2001).

Roman (c. AD 43 to 410)

- 3.2.27 During the Romano-British period, there is clear evidence for seaborne and coastal activity in the Solent region and parts of the Sussex coast (James *et al.* 2010). Several important sites were established in Sussex following the Roman invasion in AD 43, including the provincial settlements at Chichester (including Fishbourne Roman Palace), Southampton and the late Roman shore fort at Portchester.
- 3.2.28 The Roman territory was restricted in area in Sussex through the natural barrier of the Weald (Allen *et al.* 2013). Known sites, finds and burials from this period are commonly found both on the coastal plain and in the hills, indicating occupation along the coastal areas with immediate access to the sea.
- 3.2.29 A range of vessel types would have been in use during the Romano-British period to facilitate activity along the South Coast. Watercraft used for less archaeologically visible pursuits such as fishing would have also been present.
- 3.2.30 The remains of vessels from this period range from large ocean-going merchant vessels (St Peter Port 1), to estuarine and riverine craft (Blackfriars 1 and Barlands Farm) and vessels more suited for inland navigation (Zwammerdam).

These vessels were heavily framed, robustly built and it is clear could potentially have withstood the rigours of regular open water navigation. Alongside these vessels there would likely also have been continued use of log and skin boats.

- 3.2.31 There are nineteen finds dated as Roman recorded in the PAS database, including: 10 coins, from between 1-250AD (SUSS-2FE9D5, SUSS-149ED3, SUSS-1ABA34, SUSS-FDFDF4, SUSS-DDA343, SUSS-DD8844, SUSS-E2E936, SUSS-E2E091, SUSS-E2CFE7, SUSS-E2CAA7); and one spherical lead alloy weight, thought to be a fishing weight (SUSS-FE5867).

Medieval (c. 410 to 1540)

- 3.2.32 After the fall of the Roman Empire, there appeared to be a decline in maritime activity and trade in the Early Medieval period. However, there was an apparent resurgence in mercantile trade within continental Europe from the late 6th century, and the 8th and 9th centuries saw the greatest economic growth since the Roman period (James *et al.* 2010). Most of this trade relied on water transport and as a result there was an increased focus on building urban settlements along rivers and coastlines to facilitate this (Clarke 1985).
- 3.2.33 As with the Romano-British period, an extensive range of vessel types must have been in use to facilitate this surge in mercantile trade with continental Europe and Ireland in the Early Medieval period. Viking longships, such as the Skuldelev 2, are known to have been built in Dublin and most probably operated in the waters of the North Sea and English Channel (Crumlin-Pedersen 2010).
- 3.2.34 The later Medieval period vessels increased both in size and complexity. This is evidenced by the increasing number of ship types that are recorded in historical and archaeological sources. One of the best-preserved examples in Britain is the large clinker-built vessel found in Newport, Gwent, dating to the latter half of the 15th century and measuring some 35m in length. It is also possible that cogs, flat bottomed, sharp-ended, trading vessels that originated in southern Denmark and the Baltic during the 13th century (Ellmers 1994; Crumlin-Pedersen 2010), would have visited the Sussex region as these vessels were used extensively across northern Europe and were known to have been built and operated by English merchants and shipowners as well as the English Crown (Runyan 1994). No archaeological examples of cogs exist in British waters, but several, well-preserved examples come from the Netherlands (for example, Weski 1999) and the Baltic (for example, Adams & Rönnby 2002) indicating the potential of such vessels to survive from this period. Towards the end of the period, ship types such as carracks and hulks were also in use and are likely to have been at least comparable in size to the Newport Ship and possibly larger (see Crumlin-Pedersen 2010).
- 3.2.35 In addition to the large vessels discussed above, a range of much smaller craft would have been more common and would have been used to carry local trade along the coast. Wrecks such as the slate wreck at Pwll Fanog in the Menai Straits, a clinker-built vessel no more than 15m in length (Gale & Fenwick 1998), suggest the nature of such trade. Furthermore, myriad of small vessels would have been used for fishing, lightering, and inshore activities.

- 3.2.36 There are two Medieval sites located on the foreshore of the marine archaeology study area, the Middleton Deserted Medieval Village (MWS3380) and the site of Middleton Church (MWS8612).
- 3.2.37 From the Early Medieval to Medieval period there are 22 finds recorded in the PAS. The majority of these are various containers (13) ranging from pitchers and cast copper alloy cooking vessels to sherds (SUSS-B35767, SUSS-F70B43, SUSS-AEAF87, SUSS-B4B1E4, SUSS-AB6A67, SUSS-AACAF7, SUSS-AD8915, SUSS-FE7843, SUSS-D7B4E8, SUSS-D74ED5, SUSS-D5FAD1, SUSS-137F41, SUSS-5A97A2). Other finds include building and domestic pieces such as a fire cover (SUSS-152A21) and ridge tile (SUSS-AB8E64); personal items including a cast copper alloy pendent (SUSS-1B2298), beads (SUSS-F119B8), a buckle (SUSS-151786), a coin (SUSS-F0B522) and the guard of a knife (SUSS-FEA155); as well as a pin (SUSS-B49AD3), and mount (SUSS-575B91).

Post Medieval (c. 1540 to 1901)

- 3.2.38 In the Post Medieval period, there is a drastic increase in historical sources with documents relating to trade and warfare providing detailed records. As a result, known maritime losses also began to be recorded, although these were fairly sparse from the 14th to 17th centuries and progressively became more comprehensive in the 18th and 19th centuries (Gale & Fenwick, 1998).
- 3.2.39 The expansion of the royal fleet under Henry VIII between 1536 to 1547, which continued under Elizabeth I, was the single greatest naval expansion ever seen at that time. This new focus on naval prowess continued into the 19th century (Historic England, 2016).
- 3.2.40 The establishment of the East India Company in 1600, and general expansion of international maritime trade not only greatly increased the tonnage of the English merchant fleet, but the trade and maritime activity along the English coastline. With this increased shipping and naval activity and traffic came increased wrecking events within the marine archaeology study area.
- 3.2.41 The construction and composition of ships also underwent a transition, especially from the 19th century when the main propulsion moved from wood and sail to iron and steam. Examples of this evolution from sail to steam and the hybrid use of propulsion methods are further detailed below in the descriptions of the Quail (built 1870), Vesuvio (built 1879), Algiers (built 1882), Vernon II (built 1855) and Alert (built 1897).
- 3.2.42 From the Post Medieval period there are 23 finds in PAS record. There are 10 finds of vessels with many showing evidence of coloured glazes (SUSS-F257D8, SUSS-F22836, SUSS-F20981, SUSS-B6E9E6, SUSS-B6A097, SUSS-B3FFF6, SUSS-AB3F05, SUSS-AAF532, SUSS-AAB527, SUSS-133735). Personal items recorded include three fragments of shoes (SUSS-8B0334), two coins (SUSS-713B44, SUSS-3382E2), two decorated buckles (SUSS-152553, SUSS-151EE3), and a seal matrix (SUSS-E29A42). Equestrian finds include one cattle hide saddle (SUSS-8ACDF1), a copper alloy strap mount in the shape of an acorn (SUSS-5878C4) and rowel spur (SUSS-F1D416). The remaining items include wooden furniture pieces (SUSS-9100F6), an embossed applied seal from a wine bottle (SUSS-B45DD3), a strap fitting (SUSS-150E47) and a collection of tile fragments (SUSS-F14B76).

Modern (c. 1901 to present)

- 3.2.43 The rapid pace of technological development in the beginning of the twentieth century had a great impact on the broad pattern of maritime activity. Wartime innovations led to the increase in use of new types of vessels and technologies, and a transformation of a growing global shipping trade. Globalisation also expanded into the leisure industry, with a decrease in the use of ocean liners in favour of cruise ships and newly developed passenger aircraft in the mid-1900s, and planes becoming the primary method of intercontinental travel.
- 3.2.44 Deriving from the Modern period (1900-present) there are a total of 40 known wrecks of ships or boats within the marine archaeology study area (7 of which are listed by the UKHO as DEAD), with two more strongly suspected to be of this era but not confirmed, and a further 22 reported losses without associated remains. Vessels from this period range hugely in type, size, and use, though there is a bias towards vessels lost in the World Wars due to the sheer number of losses resulting from these conflicts.

Unknown

- 3.2.45 There are five records ascribed unknown status in PAS database, including an unidentified cast lead object (KENT-C2C6D1), debitage of a large flint flake from an uncertain prehistoric date (SUSS-8872F6), a lithic implement also from an uncertain prehistoric date (SUSS-87FCF3), three medium grained whetstones of probable Medieval to Post Medieval date (SUSS-F19393), and two small droplets of gold (SUSS-778185).

Aviation remains

- 3.2.46 Aviation remains include aircraft, airships, other dirigibles deriving from crash sites as either coherent assemblages or scattered material. Remains located in the offshore environment are often the result of Second World War or passenger air casualties, particularly during the peak of seaplaner activity during the inter-war period. ly during the peak of seaplane activity during the inter-war period.
- 3.2.47 Despite the low number of known aviation remains located on the seabed, the east Sussex coastline and the English Channel have been identified as a region with high levels of aviation activity with Second World War losses clustered along the southern and eastern margins of England. as further detailed in, Aircraft Crash Sites at Sea (Wessex Archaeology, 2008).
- 3.2.48 There are 21 reported losses of aircraft within the study area, all but one which has an unknown date, are associated with the Second World War. One record has associated known remains: WP275, a British Supermarine Attacker which crashed in 1956, see below. Parts of this aircraft were dredged up in 2005 but appeared to comprise of isolated remains rather than a coherent crash site, and no potential crash site was identified on the seabed in the vicinity. The location is outside Rampion 2 geophysical survey area and was included in the Rampion 1 baseline assessment but not further investigated.

UKHO 20174

- 3.2.49 This site is listed by the UKHO as LIVE. It is the remains of an aluminium aircraft, mostly broken up and almost buried. It has a single V-12 engine, and the instrument panel has German writing. It lies at 30m.
- 3.2.50 *Baseline Archaeological Significance:* As the identity and age of this site are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. If found to be a wartime loss, it would be protected by the Protection of Military Remains Act 1986. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	High
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Low
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	HIGH

- 3.2.51 Where remains associated with any aviation losses are found, they will be archaeologically significant and protected under the Protection of Military Remains Act 1986.

3.3 Known wrecks and their archaeological significance

Introduction

- 3.3.1 Known wrecks described in the following sections are illustrated in **Figure 17.1.2**. The significance assessment matrix used for each wreck is based on the criteria for the assessment of archaeological significance, as set out by the Department for Culture Media and Sport (DCMS 2013). There are 49 LIVE wrecks, 20 DEAD wrecks, 3 UNKNOWN or unconfirmed, and 3 LIFTED wrecks within the study area. Unless otherwise indicated the size of each wreck is presented as: length x width x depth.
- 3.3.2 There are also 85 recorded losses within the study area. Their location within the dataset is recorded as a general area. However, any seabed features possibly correlating with the recorded losses have been identified as anomalies during the

archaeological assessment of geophysical data and are further discussed in **Section 4** and **Annex D**.

Hedwig Lunstedt

- 3.3.3 Built in 1963 by Sietas K.G. Schiffswerft GmbH in Hamburg, the *Hedwig Lunstedt* (UKHO 19955) is a modern steel vessel measuring 60 x 13 x 4m with a gross tonnage of 424 and a 6-cylinder diesel engine. It was owned at the time of loss by Johannes & Wener and is listed as LIVE by the UKHO. On the 28th of January 1974, the *Hedwig Lunstedt* was sailing from Rotterdam to cork with a cargo of iron ore when the cargo shifted in rough seas, causing the vessel to flounder and sink. All eight of the crew were lost.
- 3.3.4 The wreck site was not covered by the geophysical survey but is reported to lie at a depth of 28 to 30m. UKHO data indicates the site measures 70m long and 29m wide, with a height of 8.3m, on an orientation of 018/198. It is surrounded by a long scour of 165m towards 084 degrees. The vessel is broken, with the bow section lying on its starboard side, but is otherwise mostly intact.
- 3.3.5 *Baseline Archaeological Significance:* This wreck has been well documented; the vessel construction is of no note, nor did it serve any particular purpose of import. This vessel type is well served by other sources, both documentary evidence and in other surviving examples.

Criteria (DCMS 2013)	Archaeological significance
Period	Low
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Good
Fragility/Vulnerability	Low
Diversity	Low
Potential	Low
Overall	LOW

Sapper

- 3.3.6 The wreck of HMS *Sapper* (UKHO 19982) is listed as LIVE by the UKHO. It was built in 1915 by Smith's Dock Co. Ltd in Middlesbrough and was owned and operated at the time of loss by the Royal Navy. A steam-powered steel trawler with a triple expansion engine and single boiler, the vessel measured 39.6 x 4.1 x 3.9m with a gross tonnage of 276. HMS *Sapper* was lost on the 29th of November 1917 with all hands; it was originally listed as missing, but a link was made to the minefield laid by submarine UC 71 after the fact.

- 3.3.7 The wreck site was not covered by the geophysical survey but is reported to lie at a general depth of 29m, while the site measures 41m long and 11.5m wide on an orientation of 055/235. It is broken into two sections which have both collapsed towards the north west. The bow section is the most intact, but the middle is entirely collapsed, likely from the initial sinking incident.
- 3.3.8 *Baseline Archaeological Significance:* This wreck has been well documented and as a small steel trawler, also represents a type of vessel common in the early twentieth century. Many ships of this type were built purposefully to be employed on war duties and subsequently lost during the First World War. Though common, as there is a substantial amount of material present, so this site can be classed as of medium significance.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Good
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Basil

- 3.3.9 The wreck of the *Basil* (UKHO 19943) is listed as LIVE by the UKHO. Built in 1895 by Workman, Clark & Co. Ltd. in Belfast, the vessel was originally named *Mourne*. The vessel was renamed the *Basil* in 1899 when it was purchased by the Booth Steamship Co. of Liverpool, under whose ownership it remained until its loss. Measuring 103 x 13.3 x 8m, with a gross tonnage of 3223, this steel steam cargo ship had a triple expansion engine and three boilers. During the war, the vessel was requisitioned for use as expeditionary force transport. On the 11th of November 1917, the *Basil* was sailing from Southampton to Boulogne, unescorted and without lights, when it collided with the French vessel the *Margaux*. The *Margaux* survived; the *Basil* sunk with the loss of all hands.
- 3.3.10 The wreck site was not covered by the geophysical survey but is reported to lie in 25m of water and the site measures 71m long by 23m wide on an orientation of 042/222 degrees. It is surrounded by a scour of 30m towards 045 degrees. Most of the cargo was salvaged, though some shells remain. One boiler and the engine are still visible, as well as a partial hull outline and some sections of frame.

- 3.3.11 There is one record associated with the *Basil* from within the marine study area that has been reported to the Receiver of Wreck: two shell cases and three timing heads (A/3903) (see Annex C for full detail).
- 3.3.12 *Baseline Archaeological Significance:* The situation of the *Basil*'s loss, running without lights or escort, was somewhat unusual, but the vessel itself shares a story with many other ships of the First World War: built pre-war, and then requisitioned for the war effort and lost while in service. The *Basil* was one of six lost by the Booth Steamship line between 1914 – 1918. Despite its partially broken and buried condition, there is still a substantial amount of material remaining of this vessel, so this site is deemed to be of medium significance.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Carbineer

- 3.3.13 The wreck of the *Carbineer* (UKHO 20190) is listed as LIVE by the UKHO. The steam-powered steel vessel was built in 1907 by Tyne Iron Shipbuilding Co. Ltd. in Willington. It measured 67 x 10 x 4.5m and had a gross tonnage of 1266, a triple expansion engine and a single boiler. It was owned at the time of loss by Fisher Renwick & Co. of Newcastle-Upon-Tyne. On the 22nd of April 1914, the *Carbineer* was bound for Manchester with general cargo when it collided with the HMS *Isis* in foggy conditions and sank.
- 3.3.14 The wreck site was not covered by the geophysical survey but is reported to lie at a general depth of 32m. The site measures 71m long, 14m wide, on an orientation of 075/255 degrees. Now severely degraded, it lies on its port side; the entire starboard hull plate has collapsed, but the boiler, propeller and rudder are still identifiable.
- 3.3.15 *Baseline Archaeological Significance:* The wreck's poor condition means there are better preserved and documented representatives of this vessel type elsewhere, but it still constitutes a good concentration of archaeological material, so the significance of this site are designated as medium.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Lightfoot

- 3.3.16 This wreck is listed as LIVE by the UKHO. A steel steam-powered cargo ship, the *Lightfoot* (UKHO 19948) was built in 1916 by John Crown & Sons Ltd. in Sunderland. The owner at the time of loss was Wandsworth & Putney Gas Light & Coke Company, under whom the vessel operated as a collier. The *Lightfoot* measured 81.7 x 11.6m with a gross tonnage of 1875, one triple expansion engine and two boilers. On the 16th of March 1918, while travelling from London to Barry, the *Lightfoot* joined several other vessels as a victim of German U-boat *UB-30*. Though reportedly sinking within 3 minutes of being torpedoed, no lives were lost.
- 3.3.17 The *Lightfoot* now lies at a depth of 25m on an orientation of 128/308. The site measures 91m long and 14m wide. The wreck is heavily degraded, but with two boilers, the engine, and some sections of frame and hull plate still visible. It corresponds with geophysical anomaly MA0032.
- 3.3.18 *Baseline Archaeological Significance:* The *Lightfoot* forms part of a group of vessels sunk in January 1918 in the area by the *UB-30* (the others being the *Gartland*, *Glenarm Head*, *Whorlton*, and the *Jaffa*). Despite the condition of the wreck, the conditions of its loss form part of a narrative representative of the First World War, where U-boats often patrolled 'hunting grounds' and several losses in an area can be attributed to one enemy vessel, so based on this group value, it becomes of medium archaeological significance.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium

Criteria (DCMS 2013)	Archaeological significance
Group Value	Medium
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Quail

- 3.3.19 The UKHO lists the wreck of the Irish vessel *Quail* (UKHO 20000) as LIVE. Built in Newcastle-Upon-Tyne by Palmer's Shipbuilding & Iron Co. Ltd in 1870, the owner at the time of loss was the Cork Steamship Co. Ltd of Cork. Powered by both sail and a 2-cylinder compound steam engine, this iron vessel measured 68.3 x 8.6 x 5.3m and had a gross tonnage of 924. On the 27th of August 1886, while travelling from Antwerp to Glasgow carrying a cargo including glassware and potted foods, the *Quail* collided in the fog with the French vessel *San Martin*.
- 3.3.20 The wreck was last extensively surveyed in 1986, at which point it was found to lying in 42m of water mostly intact. Numerous artefacts have been found from the vessel including deadeyes, a sounding lead and the bell, which allowed positive identification. It corresponds with geophysical anomaly MA0013; the anomaly measures 73m long by 11m wide.
- 3.3.21 Two records from within the marine study area associated with the *Quail* have been reported to the Receiver of Wreck (see Annex C for full detail). Each record (droit) can include multiple artifacts. These records consist of five bottles (A/3692) and 13 wine glasses (A/4102).
- 3.3.22 **Baseline Archaeological Significance:** In the second half of the 1800s, centres of shipbuilding industry had shifted north to where coal and iron was more accessible, and by the 1870s the compound steam engine was revolutionising long-haul ocean-going travel. Though not of a rare type, as a mostly intact iron-hulled vessel, built in the north of England and from the transitional period between sail and steam, the *Quail* represents a good example of its kind.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	High

Criteria (DCMS, 2013)	Archaeological significance
Fragility/Vulnerability	Medium
Diversity	Medium
Potential	Medium
Overall	MEDIUM

London Trader

- 3.3.23 The wreck of the *London Trader* (UKHO 19972) is listed as LIVE by the UKHO. Built in 1934 by Hawthorn Leslie & Co. Ltd in Newcastle, it was owned at the time of loss by the Free Trade Wharf Co. of London. The vessel was made of steel with a triple expansion engine and two boilers and had a gross tonnage of 646. It measured 59.9 x 8.8 x 3.4m. On the 26th of July 1940, the *London Trader* was travelling in convoy to Shoreham-by-Sea when it was attacked by a German schenllboot Flottille consisting of S-19, S-20, and S-27. The *London Trader* was sunk alongside the *Broadhurst* and the *Lulonga*.
- 3.3.24 The wreck now lies in 58m of water on a 018/198-degree angle. Intact, the site measures 69.4m long and 18.6m wide, with a 500m scour towards 0405 degrees. The site corresponds with geophysical anomaly MA0012.
- 3.3.25 There is one record associated with the *London Trader* from within the marine study area that has been reported to the Receiver of Wreck: one porthole and one mug (101/02) (see Annex C for full detail).
- 3.3.26 *Baseline Archaeological Significance:* The *London Trader* was built at a time when there was pressure to replace ships lost during the First World War; the design of vessels had not changed significantly from the preceding decades, and it is one of many lost in similar times and circumstances. It has some significance as part of a wider narrative of a particular enemy attack in which three ships were lost, and because it is quite intact, represents a good condition example of a common vessel type.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low

Criteria (DCMS, 2013)	Archaeological significance
Potential	Medium
Overall	MEDIUM

Broadhurst

- 3.3.27 The wreck of the *Broadhurst* has two reported locations, one listed as LIVE by the UKHO (UKHO 19959) and the second DEAD (UKHO 19951); this entry is for the LIVE wreck. Previously named the *Phylwood* the vessel was built in 1935 by Austin S. P. & Son Ltd. in Sunderland and was owned at the time of loss by Stephenson Clarke & Associated Companies Ltd. of London, who renamed it the *Broadhurst*. It was a steel cargo vessel with a triple expansion engine, single boiler, and gross tonnage of 1013. It measured 66.1 x 10.4 x 4m. On the 26th of July 1940, the *Broadhurst* was travelling in convoy but was attacked and sunk in the same incident as the *London Trader* with the loss of four crew.
- 3.3.28 The wreck now lies in 50.5m of water at 120/300 degrees: the site measures 37.8m long by 13.1m wide. As of 2014 the wreck is mostly buried. The wreck site corresponds with the geophysical anomaly MA0062.
- 3.3.29 *Baseline Archaeological Significance:* Like the *London Trader*, the *Broadhurst* has some group value as part of a particular incident, but because it is mostly buried and its condition unknown, as well as being a common and otherwise well-documented ship type, its individual significance is slightly lower. Despite this, should the vessel be preserved in good condition under the sand, it does have the potential to add to the archaeological record.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Unknown
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Vesuvio

- 3.3.30 The wreck of the *Vesuvio* (UKHO 19952) is listed as LIVE by the UKHO. This iron steam and sail vessel was built in 1879 by Laing James & Sons Ltd in Sunderland and was originally named the *Czar*. It was purchased in 1898 by the Mossiel Steamship Co. Ltd of Glasgow and renamed the *Vesuvio* but was then resold to the General Steam Navigation Company of London in 1901, who owned the vessel until its loss. The vessel measured 74.1 x 9.9 x 5.4m and had a compound expansion engine, two boilers, and a gross tonnage of 1391. While on route from Sicily to London the vessel hit a mine on the 6th of April 1916. Within 15 minutes the vessel had sunk with the loss of six crew.
- 3.3.31 The wreck site was not covered by the geophysical data but is recorded to measure 30m long and 20m wide and lie in 37m water at 090/270 degrees, with a 40m scour. It is broken in three places and lies on its port side. Its 13pdr gun is still visible at the stern as of 1983.
- 3.3.32 *Baseline Archaeological Significance:* The *Vesuvio* shares similarities with the earlier *Quail* in that they are both northern-built iron dual-propulsion sail and steam ships: the *Vesuvio* was longer-lived, but its wreck is now in worse condition. As such, though still of archaeological potential, there are better preserved examples of this well-documented ship type available.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Clan Macmillan

- 3.3.33 The wreck of the *Clan Macmillan* (UKHO 20168) is listed as LIVE by the UKHO. It was a steel steamship, built in 1901 by McMillan A. & Son Ltd of Dumbarton and owned at the time of loss by Clan Line Steamers Ltd. of London. The vessel measured 120.7 x 14.6 x 8.2m and had a triple expansion engine and a gross tonnage of 4525. On 23 March 1917, while travelling from Chittagong to Clyde via London, the *Clan Macmillan* was sunk by two torpedoes from German U-boat *UB-39*. All crew survived.

- 3.3.34 The wreck site was not covered by the geophysical data but is recorded to measure 132.4m long by 28.9m wide and lies at 104/284 degrees in 63m of water. It was positively identified from the name still visible on the stern. The vessel remains upright but is broken in half, with the bow in the east.
- 3.3.35 *Baseline Archaeological Significance:* The *Clan Macmillan* was the second-built of four ships constructed by McMillan A. & Son for the Clan Line that were subsequently lost, and one of many lost by the line during the First and Second World Wars. As such, the vessel type and story are well represented and documented across both wartime eras, though the wreck itself still represents substantial archaeological remains.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Minion

- 3.3.36 The wreck of the HMS *Minion* (UKHO 20014) is listed as LIVE by the UKHO. This Admiralty M class steam-powered destroyer was built in 1915 by Thornycroft & Co. Ltd in Hampshire and was owned by the Royal Navy at the time of loss. It measured 84 x 8 x 3m with a tonnage of 1025. The vessel was sold for breaking in Germany but was lost while under tow to the breakers yard some time in 1921; the exact date has not been recorded.
- 3.3.37 The wreck was positively identified in 1992 by the recovery of the ship builder's plate. The vessel now lies in 46m of water, and the wreck site measures 92m by 14.5m and lies at 090/270 degrees. As of the 1980s, the vessel is broken amidships, and the stern almost buried by a sand wave. It corresponds with the geophysical anomaly MA0010.
- 3.3.38 There is one record associated with the *HMS Minion* from within the marine study area that has been reported to the Receiver of Wreck: two pressure gauges, one brass wheel and one electric fuse box (385/07) (see Annex C for full detail).
- 3.3.39 *Baseline Archaeological Significance:* The *Minion* is one of 85 ships of its class that saw service during the First World War; most of those that survived their

service were sold for breaking in 1921. Two other vessels from the *Minion*'s order were lost, the *Marmion* and the *Mary Rose*, but the statuses of their wrecks are unknown. Other later vessels of the class were lost at the key sites of the Battle of Jutland and Scapa Flow. As there are few examples of this class of vessel still in existence, the wreck the *Minion* holds good archaeological potential.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Medium
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Gerlen

- 3.3.40 The wreck of the *Gerlen* (UKHO 20005) is listed as LIVE by the UKHO. It was built in the 1950s by Schulte & Bruns of Emden, Germany, and was originally named the *Antonius*. Its name was change by its last owner, G. Gerdes of Haren, Germany. It measured 45.6 x 7 x 2.4m and was powered by a diesel engine. It was lost in a collision with the Cypriot vessel *Gotland* on 19 June 1972 while sailing from Par to Utersen.
- 3.3.41 The wreck lies in 48m of water and covers an area 32m long by 12m wide. It is largely intact but partially buried. It corresponds with geophysical anomaly MA0004.
- 3.3.42 *Baseline Archaeological Significance:* As a modern vessel of no particular note, this vessel is not deemed to be archaeologically significant.

Criteria (DCMS 2013)	Archaeological significance
Period	Low
Rarity	Low
Documentation	Low
Group Value	Low
Survival/Condition	Medium

Criteria (DCMS 2013)	Archaeological significance
Fragility/Vulnerability	Low
Diversity	Low
Potential	Low
Overall	LOW

Porthkerry

- 3.3.43 There are two *Porthkerrys* listed by the UKHO; one LIVE (UKHO 20238), one DEAD (UKHO 19978). This entry is for the LIVE listing, for which Wrecksite.eu agrees with the position. This steamship was built in 1911 by John Crown & Sons Ltd. of Sunderland and was owned by Thomas & Stephens of Cardiff. It measured 85 x 12.2 x 5.5m and had a gross tonnage of 1920. On the 20th of May 1917 while travelling from Cardiff to Sheerness with a cargo of coal, the *Porthkerry* stopped to help the vessel *Tycho*, which has been torpedoed by German submarine *UB-40*. While coming alongside the stricken vessel, the *Porthkerry* was also torpedoed, and both vessels were sunk with the loss of 22 men between them.
- 3.3.44 The wreck of the *Porthkerry* is reported to lie near that of the *Tycho* in 45m of water. It was last located in 1988, when the ship's bell was recovered and offered positive identification of the vessel, but it was not spotted in a 2009 survey. The wreck site was not covered by the geophysical data.
- 3.3.45 *Baseline Archaeological Significance:* The *Porthkerry* is one of many ships that served in essential merchant roles during the First World War, and one of many that were torpedoed by German U-boats, so as an individual vessel does not have much to add to the archaeological record. However, the events surrounding its sinking and proximity to the wreck of the *Tycho*, should it ever be rediscovered, represent a good concentration of archaeological material. Due to the recovery of the ship's bell, identification of the wreck at this position, rather than the secondary UKHO listing of a DEAD wreck, is confident.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Low

Criteria (DCMS 2013)	Archaeological significance
Potential	Medium
Overall	MEDIUM

Tycho

- 3.3.46 The wreck of the *Tycho* (UKHO 19983) has been listed as DEAD by the UKHO. The position is given as close to the DEAD wreck of the *Porthkerry* (UKHO 19978), not the LIVE wreck (UKHO 20238). Although the site at this position was noted as a possible wreck in 1979, no material has been found in the original location in subsequent surveys. The *Tycho* was built in 1904 by Earle's Shipbuilding and Engineering Co. Ltd. of Hull, and was owned by the Ellerman Wilson Line Ltd., also of Hull. It measured 102.1 x 14.3 x 7m, was made of steel, and had a triple steam expansion engine and gross tonnage of 3126. It was torpedoed by German U-boat *UB-40* without warning on the 20th of May 1917. When passing vessel *Porthkerry* stopped to help, it was also torpedoed, and both ships were sunk.
- 3.3.47 *Baseline Archaeological Significance:* As a DEAD wreck, this vessel is currently of low archaeological significance. However, the position of this wreck may be incorrect. The positively identified wreck of the *Porthkerry* lies some 20km north west of the *Tycho's* listed position; given that they went down in the same incident, it is likely the true wreck of the *Tycho* may lay elsewhere. Should the vessel ever be rediscovered, the significance would be raised to medium, as, along with the potential site of the *Porthkerry* in close proximity, it would represent a high concentration of archaeological material. The wreck site was not covered by the geophysical data.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Low
Potential	Medium
Overall	LOW

Vernon II

- 3.3.48 The wreck of the *Vernon II* (UKHO 19927) is listed as LIVE by the UKHO. It was built in 1855 in the Portsmouth Royal Dockyards as a first-rate ship of the line and was owned by the Royal Navy. It measured 74.7 x 18.6m and had a displacing tonnage of 6300 tonnes. This three-decker 131gun screw ship had three masts and was also fitted with an auxiliary steam engine. It served as flagship of the Mediterranean Fleet from 1858 – 1864, and then became a training ship. The vessel was renamed from the *Marlborough* to the *Vernon II* in 1904 when it became an accommodation hulk for the shore establishment HMS *Vernon*. It was eventually sold to shipbreakers but capsized while under tow on the 29th of November 1924. Part of her hull was reported to have later washed up on Bognor sands.
- 3.3.49 The wreck site was not covered by the geophysical data but is recorded as lying in 4 m of water, and the site covers an area 49m long by 13.4m wide on an orientation of 084/264. The west half appears present and intact, but the eastern half has collapsed. A replica of the vessel's figurehead now sits in Gunwharf Quays, Portsmouth.
- 3.3.50 **Baseline Archaeological Significance:** The *Vernon II* was one of the last three-decked 1st rate ships to be built for the Royal Navy. The life and loss of the vessel have been well documented under its original name, the *Marlborough*. Though other vessels of the time had started to employ steam paddle propulsion, this class of vessel had not adopted the technology as it would mean a reduction in the number of guns it could carry in order to make room for the paddle box. Instead, they used a screw propeller. As one of a small number of ships of its kind, and of potentially reasonable preservation, the archaeological significance of this wreck site is high.

Criteria (DCMS 2013)	Archaeological significance
Period	High
Rarity	Medium
Documentation	High
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Medium
Diversity	Medium
Potential	High
Overall	HIGH

Stanwold

- 3.3.51 The *Stanwold* (UKHO 19998) is listed as LIVE by the UKHO. It was built in 1909 by Osbourne, Graham & Co. Ltd. of Sunderland. It was owned at the time of loss by the Stanhope Steamship Company. A steel steamship, the *Stanwold* measured 64.2 x 10.1 x 5.7m and was fitted with a triple expansion engine and two boilers and had a gross tonnage of 1019. The vessel also previously bore the names *Alfred Kreglinger*, *Pervyse*, and *Easingwold*. On the 22nd of February 1941, the *Stanwold* was carrying a cargo of coal from Southend to Cowes in convoy when it reported steering problems. The last reported sighting was on the 27th of February when the vessel appeared to be listing heavily. No further communication was received; several bodies washed ashore some days later.
- 3.3.52 The wreck site now lies in 34m of water and measures 80m long and 40m wide at 040/220 degrees. It lies upside down but is largely intact, and piles of coal have been found on the seabed nearby. The wreck site was not covered by the geophysical data.
- 3.3.53 *Baseline Archaeological Significance:* The *Stanwold* is a reasonably well-documented vessel, even if the specifics of its loss are unknown. Due to the refit it underwent in 1916, it is possible it may have some diversity in fittings that may be of archaeological interest, and as a largely intact wreck, it represents a good collection of archaeological material and example of vessels of its kind.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Medium
Potential	Medium
Overall	MEDIUM

Afon Dulais

- 3.3.54 The *Afon Dulais* (UKHO 19947) is listed by UKHO as a LIVE wreck. It was built in 1919 by the Dundee Shipbuilding Co. Ltd. of Dundee and owned by Coombs W. & Sons of Llanelli. It measured 63.4 x 10.1 x 4m with a gross tonnage of 988, a triple expansion engine and two boilers. On the 20th of June 1942, while travelling from Seaham to Poole with a cargo of coal, the *Afon Dulais* struck a mine and sank.

- 3.3.55 The wreck now lies in 26m of water on an orientation of 000/180 degrees. The site measures 73m long by 16.5m wide. It is quite broken up and partially buried. It correlates to the geophysical anomaly MA0030.
- 3.3.56 *Baseline Archaeological Significance:* As the wreck is quite broken up and buried, the archaeological significance is lower than other more intact and accessible site; steam cargo ships from this era are common and better represented by examples elsewhere.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Algiers

- 3.3.57 The wreck of the *Algiers* (UKHO 19935) is listed as LIVE by the UKHO. Built in 1882 by Wigham Richardson & Sons Ltd., of Newcastle-Upon-Tyne, this defensively armed merchant vessel was owned at the time of loss by Franco-British S. S. Co. of Cardiff. The vessel also previously bore the names *Castle Eden* and *Lys*. It had a gross tonnage of 2361 and measured 91.5 x 11.34 x 8.17m. It had a triple expansion steam engine and two boilers but was also schooner rigged. On the 26th of February 1917, while travelling from Calais to Barry Roads, the *Algiers* was torpedoed without warning by German submarine UC-65 and sank with the loss of eight lives.
- 3.3.58 The wreck now lies in 37m of water across a site 112m long and 15m wide on an orientation of 120/300 degrees. It has a large scour of approximately 500m at both the north and south ends. The vessel still sits upright, but the south east end, presumed to be the bow, is broken up. The wreck site was not covered by the geophysical data.
- 3.3.59 *Baseline Archaeological Potential:* The *Algiers* was built in what is sometimes called the era of the merchant schooner, when these vessels had established themselves as efficient and economical in all kinds of work. As such, numerous other examples of this type of vessel exists, and their types and activities well documented. The *Algiers* has some archaeological potential to add to this record based on its partial completeness.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

NY-Eeasteyr

- 3.3.60 This wreck is listed as LIVE by the UKHO. This wooden vessel (UKHO 20186) measured 24.1 x 6.4 x 2.4m, with a gross tonnage of 61, and was built in Germany in 1970. Not much is known about this vessel, other than it sank on the 12th August 1980 while travelling from Yarmouth to the Isle of Man. It now lies in 23m of water, and is mostly intact, with the stern shoved in. It correlates to the geophysical anomaly MA0017. The site measures 23m long by 6m wide.
- 3.3.61 *Baseline Archaeological Significance:* As a modern vessel without much documentation, this site does not hold much archaeological significance.

Criteria (DCMS 2013)	Archaeological significance
Period	Low
Rarity	Low
Documentation	Low
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Low
Overall	LOW

Keryado

- 3.3.62 The wreck of the *Keryado* is listed as LIVE by the UKHO. Identification of this wreck as the *Keryado* (UKHO 20173) is likely but not confirmed. This steel minesweeper was built in 1920 by Janssen & Schmilinsky A. G. in Hamburg but was last owned by the Royal Navy. It measured 39.6 x 7.6 x 3.14m, had a triple expansion engine and gross tonnage of 252, and was armed with one 12pdr gun. It was requisitioned in 1940 for use as a minesweeper but was mined itself on the 6th of March 1941.
- 3.3.63 The wreck site was not covered by the geophysical data but is recorded to be lying in 35.4m of water. It is in two parts but otherwise mostly intact. Part of a gunsight dated to 1918 was recovered from the wreck in 1991.
- 3.3.64 *Baseline Archaeological Significance:* Though of a common and well-documented vessel type, this wreck's comparative completeness means it may be one of the better examples of its kind, and therefore of archaeological significance.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Jaffa

- 3.3.65 The wreck of the *Jaffa* is listed as LIVE by the UKHO. This steel cargo vessel (UKHO 20010) was built in 1897 by Scott J. & Co. of Kinghorn and owned at the time of loss by the Ellerman Wilson Line Ltd. of Hull. It measured 79.3 x 10.7 x 4.9m, had a triple expansion engine and two boilers, and a gross tonnage of 1383. It was also defensively armed. On the 2nd of February 1918, whilst en route from Boulogne to Southampton, the *Jaffa* was torpedoed by German submarine *UB-30* and sank with the loss of ten lives.
- 3.3.66 The wreck now lies in 23m of water across a site measuring 80m long by 16m wide on an angle of 015/195 degrees. It lies almost upside down and is broken into two main sections, lying 30m apart, with the aft section the larger part at 40m long and debris spread between the two halves. It correlates to geophysical anomaly MA0025.

- 3.3.67 *Baseline Archaeological Significance:* The *Jaffa* was one of four vessels within the study area sunk by *UB-30* in the first quarter of 1918 (the others being the *Lightfoot*, *Glenarm Head*, and the *Gartland*). Though the wreck itself is quite broken up, and so is not as useful as a representative of its kind, its group value alongside the other victims of the *UB-30* as part of the wider narrative of the First World War is significant.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Zaanstroom

- 3.3.68 The wreck of the *Zaanstroom* is listed as LIVE by the UKHO. It was a Dutch vessel built by Huygens & Van Gelder in Amsterdam in 1895 and owned by Hollandsche Stoomboot Maatschappij (Holland Steamship Company), also of Amsterdam. It measured 65.1 x 9.8 x 5m, was made of steel with a wooden wheelhouse, and had a single boiler and gross tonnage of 899. On the 21st December 1911, the *Zaanstroom* (UKHO 20028) was travelling from Fowey to Amsterdam with a cargo of china clay when it was caught in a storm and developed a leak near the tail shaft before sinking with the loss of one life.
- 3.3.69 The wreck site was not covered by the geophysical data but is recorded as lying upright in 28m of water on a sandy seabed. The wreck site measures 30m long by 15m wide at 082/262 degrees. It is now severely degraded, with only the lower part of the hull present. The four cargo-handling cranes are still visible on either side of the holds, and some of the clay cargo remains in the hold. Regular surveys since 1975 have demonstrated this wreck has degraded substantially over the years.
- 3.3.70 *Baseline Archaeological Significance:* Though heavily degraded, the wreck of the *Zaanstroom* still represents a good concentration of archaeological material and a popular spot for sports divers. As a Dutch vessel, it may house different features to the British wrecks more commonly found in the area.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Medium
Diversity	Low
Potential	Medium
Overall	MEDIUM

Cairndhu

- 3.3.71 The wreck of the *Cairndhu* (UKHO 19987) is listed as LIVE by the UKHO. It was built in 1911 by Doxford W. & Sons of Sunderland, and was owned by Cairns, Young & Noble (Cairn Line) of Newcastle. A steel cargo vessel, it measured 112.8 x 15.5 x 7.5m and had a triple expansion engine and gross tonnage of 4019. On 15 April 1917, the *Cairndhu* was travelling from South Shields to Gibraltar with a cargo of coal when it was torpedoed by German submarine *UB-40*. The U-boat then surfaced and rammed one of the two lifeboats, killing 11 men.
- 3.3.72 The wreck now lies in 23m of water across a site measuring 120m long and 30m wide at 010/190 degrees. There is 15m of scour towards 005 degrees. In 1918, the masts were still visible above the water, so the wreck was dispersed. The site consists of a mass of debris in a general outline of hull; explosives were used to recover condenser copper and bronze bearings in the 1980s, which has further broken up the site. It corresponds with geophysical anomaly MA0022.
- 3.3.73 *Baseline Archaeological Significance:* The *Cairndhu* is not of an uncommon type of vessel, and while it served an important wartime role, as did many others, due to the condition of the wreck it is certainly better served by other examples elsewhere. Despite this, it still remains a significant concentration of archaeological material.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low

Criteria (DCMS 2013)	Archaeological significance
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Ariel

- 3.3.74 The *Ariel* (UKHO 20023) is listed as a LIVE wreck by the UKHO. Built in 1885 by Earle's Shipbuilding & Engineering Co. Ltd. of Hull, it was owned by Edward Leetham, also of Hull. Made of steel, it measured 91.44 x 12.86 x 6.07m and was driven by a triple expansion engine. It has a gross tonnage of 2220. On the 10th of June 1892, the *Ariel* was sailing from Varna to Hamburg with a cargo of wheat when it collided in foggy conditions with the *Lancashire* and sank.
- 3.3.75 The wreck now lies in 28m of water across as site 94.7m long by 18m wide on an orientation of 132/312 degrees. A 3m deep scour extends towards 140 degrees for 8m. Though it sits upright, it is heavily decayed, with only the base of the hull and some parts of the bow and stern visible alongside the single boiler and engine. The identity of this wreck was confirmed by the recovery of the ship's bell in 1981. It correlates with the geophysical anomaly MA0020.
- 3.3.76 *Baseline Archaeological Significance:* Steel-hulled, steam-powered vessels of the late 19th century, like the *Ariel*, provide a well-documented record of the development maritime steam engines. However, as this wreck is quite decayed, it is better represented in the archaeological record by other examples of its kind.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Shirala

- 3.3.77 The wreck of the *Shirala* (UKHO 20069) is listed as LIVE by the UKHO. The vessel was built in 1901 by Inglis A. & J. Ltd. of Glasgow and was owned by the British India Steam Navigation Co. Ltd. of London. Measuring 125 x 15 x 8.8m, the *Shirala* was built from steel and had a triple expansion engine, two boilers, and a gross tonnage of 5306. On the 2nd of July 1918, the vessel was travelling from London to Bombay with 213 passengers and 5000 tons of cargo when it was torpedoed by German submarine *UB-57* with the loss of 8 lives. Cargo included binoculars, telescopes, marmalade, wine, ivory, vehicle parts, and munitions, among other things.
- 3.3.78 The wreck now lies in 21m of water across a site measuring 138m long by 34m wide on an orientation of 165/345 degrees. Salvage operations in the 1970s appear to have moved the boilers (UKHO 20068) some 200m to the east and used explosives to open up the hull. The wreck is broken up, but the triple expansion engine and smaller auxiliary engine are still identifiable. There is debris strewn to both sides of the wreck. Numerous artefacts have been recovered from this wreck. The two boilers of UKHO 20069 correlate with the geophysical anomaly MA0037.
- 3.3.79 There is one record associated with the *Shirala* from within the marine study area that has been reported to the Receiver of Wreck: a trumpet (A/2343) (see Annex C for full detail).
- 3.3.80 *Baseline Archaeological Significance:* The wreck of the *Shirala* is of particular note due to its varied cargo: it has the potential to inform on many areas outside of the vessel itself including fashion, medicine, engineering, and day to day life. Finds are often in good condition, too: intact paper rupee notes have been recovered, and are now housed in Littlehampton Museum. Due to this, the archaeological significance of the wreck of the *Shirala* is deemed to be high.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	High
Potential	Medium
Overall	HIGH

Glenlee

- 3.3.81 The wreck of the *Glenlee* (UKHO 20055) is listed as LIVE by the UKHO. Built in 1918 by Charles Connell & Co. Ltd. of Scotstoun, it was owned by the Rio Cape Line of Glasgow. It measured 122.01 x 16.15 x 7.39m, was built of steel, and had a triple expansion engine and gross tonnage of 4915. It was also defensively armed. On the 9th of August 1918, the *Glenlee* was voyaging from Dunkirk to Portland with a cargo of government stores when it was torpedoed by German submarine *UB-57* and sank with the loss of one life.
- 3.3.82 The wreck now lies in 20m of water across a site measuring 122m long and 63m wide on an orientation of 095/275 degrees. It is well broken up, but the three main boilers are still arranged in a row with an auxiliary boiler to the west. It correlates to geophysical anomaly MA0036.
- 3.3.83 *Baseline Archaeological Significance:* Like many others in the area, the *Glenlee* is a wartime wreck involved in the vital transport of wartime goods, in this instance for the British Expeditionary Force. Its short life was well documented, but given the wreck is mostly flattened and broken, it does not hold as much significance as other examples of its kind.

Criteria (DCMS, 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

City of Waterford

- 3.3.84 The *City of Waterford* (UKHO 20056) is listed as a LIVE wreck by the UKHO. It was built in Dundee by the Caledon Shipbuilding & Engineering Co. Ltd with the name *Skerries II* in 1921. Upon its sale to Palgrave, Murphy & Co. of Ireland in 1946, the vessel was renamed the *City of Waterford*. A steel steamship, the vessel measured 82 x 11m, had a triple expansion engine and three boilers, and a gross tonnage of 1344. On the 14th of April 1949, the *City of Waterford* collided in thick fog with the much larger Greek vessel *Marpessa* and sank while en route from Antwerp to Cork.

- 3.3.85 The wreck now lies in 36m of water, mostly intact, at 102/282 degrees. Its two anchors are still in place, and a third anchor, this one of an admiralty pattern and likely from a different vessel, has broken open the starboard boiler. The site measures 88m long by 15m wide. It corresponds to geophysical anomaly MA0001.
- 3.3.86 There is one record associated with the *City of Waterford* from within the marine study area that has been reported to the Receiver of Wreck: a brass casting (possibly a flange) (A/1267) (see Annex C for full detail).
- 3.3.87 **Baseline Archaeological Significance:** The *City of Waterford* is a popular dive site, so the wreck is well documented. It has been noted to have some unusual features, including a lack of forecastle, and a pair of cranes where a central mast with derricks and winches would normally sit. Due to its reasonable condition, accessibility, and associated documentation of both the life of the vessel and wreck, this site is of higher archaeological significance despite being a fairly common type of vessel.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Medium
Potential	Medium
Overall	MEDIUM

Ramsgarth

- 3.3.88 The wreck of the *Ramsgarth* (UKHO 20049) is listed as LIVE by the UKHO. This steel cargo vessel was built in 1910 by Sir Raylton Dixon & Co. Ltd., of Middlesbrough. It was owned by the South Metropolitan Gas Company of London at the time of loss. It measured 74.7 x 11 x 5.8m, had a triple expansion engine and two boilers, and a gross tonnage of 1553. On the 28th of November 1916, the *Ramsgarth* was travelling from Cardiff and Brixham to Tunde in ballast when it was captured and scuttled by German submarine *UB-39*.
- 3.3.89 The wreck is reasonably intact, lying in 22m of water over a site 78m long by 26m wide on an orientation of 045/225 degrees. It is partially buried, lying on its starboard side, though some of the hull has collapsed. The two main boilers are still visible amidships alongside an auxiliary boiler and the triple expansion engine. It corresponds to geophysical anomaly MA0018.

- 3.3.90 *Baseline Archaeological Significance:* The *Ramsgarth* is another wartime merchant vessel loss, one of thousands during the First World War alone. As it is reasonably intact, it represents a better example of its kind than some others in the area such as the *Glenlee* and *Cairndhu*.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Northcoates

- 3.3.91 The wreck of the *Northcoates* (UKHO 20036) is listed as LIVE by the UKHO. It was built in 1918 by Cox & Co. Engineering Company of Falmouth, and previously bore the names *George Corton*, *Zencon*, and *Zircon*. Though originally built for and owned by the Royal Navy, it passed through several owners before it was requisitioned for use as a minesweeper in 1939 and once again came under Naval ownership. This steel steam-powered trawler measured 38 x 8 x 3.84m, had a single triple expansion engine, and a gross tonnage of 277. On the 2nd of December 1939, the vessel suffered engine failure and was brought under tow but sank in heavy weather.
- 3.3.92 The wreck site was not covered by the geophysical data but is recorded as lying in 26m of water on an orientation of 122/302 degrees. The site measures 42m long by 8.5m wide. There is shallow scour to the bow and stern. It is upright but with a slight list to the port side. A 12pdr gun still stands prominently towards the bow, pointing off the starboard side. The A-frame for the minesweeping electro-magnetic coil is also still visible, as well as the single boiler and rudder at the stern.
- 3.3.93 *Baseline Archaeological Significance:* The *Northcoates* is a good example of wartime minesweeper trawlers and archaeologically significant; most of its minesweeping equipment is still present, including diesel generators for creating the magnetic field and mounds of sweeping cables. It is unusual to have this level of preservation, especially for a vessel used in both the First World War and Second World War.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	High
Group Value	High
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	HIGH

Pine

- 3.3.94 The wreck of the *Pine* (UKHO 20091) is listed as LIVE by the UKHO. This steel trawler was built in 1940 by Hall, Russell & Co. Ltd., of Aberdeen, and was owned by the Royal Navy. It measured 46 x 8.3 x 3.2m, was powered by a reciprocating triple expansion engine, and had one boiler and a gross tonnage of 530. It was also armed with one 12pdr gun and two 5 inch 4-M L.G. guns. On the 31st of January 1944, the *Pine* was torpedoed and sunk by German E-Boat S-142 with the loss of ten crew.
- 3.3.95 The wreck now lies in 14m of water across a site measuring 38.2m long by 20.9m wide, at 090/270 degrees. It is very broken up and partially covered by sand, though part of one of the engines is still visible. The wreck site was not covered by the geophysical data.
- 3.3.96 *Baseline Archaeological Significance:* The *Pine* is a tree-class trawler, of which five others sank during the Second World War. The tree-class vessels were near identical to the Isles-class trawlers, of which the tree-class is considered a subset. Both classes are better represented by other wrecks, such as the *Chestnut* and the *Ash* (both in the Thames Estuary) and the *Colsay* (off Oostende).

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low

Criteria (DCMS 2013)	Archaeological significance
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

War Helmet

- 3.3.97 The *War Helmet* (UKHO 19984) is listed as LIVE by the UKHO. This War Lance class steel cargo ship was built by Asano Shipbuilding Company of Tsurumi, Japan, and owned at the time of loss by The Shipping Controller (Royal Mail) of London. It measured 135.6 x 17.7 x 12.2m, had two triple expansion engines, four boilers, and a gross tonnage of 8184. Whilst travelling from London to Barry in ballast on the 19th of April 1918, the *War Helmet* was sunk by a torpedo from German U-Boat *UC-75*. All hands were saved.
- 3.3.98 The wreck now lies in 27m of water across a site measuring 141.5m long by 45m wide on an orientation of 000/180 degrees. It is fairly broken up. The four boilers are still in place towards the bow, and the two engines still prominent amidships. It corresponds with geophysical anomaly MA0029.
- 3.3.99 *Baseline Archaeological Significance:* The *War Helmet* is of a mass-produced design of which other examples are better preserved and better documented. Despite this and the dispersed condition of the wreck, it still represents a substantial amount of archaeological material.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Medium
Documentation	Medium
Group Value	Medium
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Glenarm Head

- 3.3.100 There are two possible wreck sites for the *Glenarm Head*: UKHO 20012 and UKHO 20169. Both are listed as LIVE by the UKHO and are within the PEIR boundary.
- 3.3.101 The *Glenarm Head* was built in 1897 by Workman, Clark & Co. Ltd of Belfast and owned by the Ulster Steamship Company as part of their Head line, also of Belfast. It measured 109.7 x 14 x 6.1m, had a single triple expansion engine and a gross tonnage of 3908. On the 5th of January 1918, it was travelling between Southampton and Boulogne with a cargo of ammunition when it was sunk by German submarine *UB-30* (which also sunk the *Gartland*, the *Jaffa*, and the *Lightfoot* within the PEIR boundary).
- 3.3.102 UKHO 20012 now lies at 36m and is noted to be a large wreck. The geophysical anomaly corresponding with this site (MA0008) measures approximately 93m long and 19m wide, with some scour. The remains are coherent, with the bow lying to the south west. Ammunition rounds, both boxed and expended, were found on site.
- 3.3.103 UKHO 20169, the second candidate for the *Glenarm Head*, now lies in 44m of water. The geophysical anomaly corresponding with this site (MA0011) records a length of 60m and width of 17m but appears to be more broken up than UKHO 20012. It appears to be upright though partially buried and lies on 104/284 degrees.
- 3.3.104 *Baseline Archaeological Significance*: The *Glenarm Head* is one of many wartime merchant vessel losses in the area and of the era and does not in of itself warrant special interest. However, both potential sites of the *Glenarm Head* are substantial and broadly intact, and therefore represent significant archaeological remains which main add to the archaeological record on the basis of their good condition. It also holds some significance as part of the narrative of an individual U-Boat hunting spree. Due to their similarity, the table below applies to both sites.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Gartland

- 3.3.105 There are two locations listed for the *Gartland*, one DEAD (UKHO 19980) and one LIVE (UKHO 19971). This entry deals with the LIVE wreck. The *Gartland* was built in 1892 by Readhead John & Sons Ltd. of South Shields and owned at the time of loss by Whimster & Co., of Glasgow. This vessel also bore the name *Trewidden* under a previous owner. The vessel measured 91 x 12.2 x 6.1m, had a triple expansion engine and two boilers, and a gross tonnage of 2613. It was employed during the war as a collier. On the 3rd of January 1918, whilst en route from Newcastle to Gibraltar, the *Gartland* was torpedoed and sunk by German U-Boat *UB-30*. It is one of four sunk by this U-Boat within the PEIR boundary.
- 3.3.106 The wreck now lies in 30m of water across a site 95.4m long and 30m wide on an orientation of 130/310 degrees. It is severely degraded, with debris scattered to the starboard side, but two boilers are still apparent amidships. It correlates with geophysical anomaly MA0033.
- 3.3.107 **Baseline Archaeological Significance:** The vessel itself is of a common type employed in a common role, and the remains are not coherent enough to be likely to contribute significantly to the archaeological record, but like the *Glenarm Head*, the *Jaffa*, and the *Lightfoot*, the *Gartland* forms part of a wider narrative of the First World War and U-boat activity.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	Low
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

Pagenturm

- 3.3.108 The *Pagenturm* has two locations listed, one DEAD (UKHO 20050) and one LIVE (20001). This entry is for the LIVE wreck. The vessel was built in 1909 by Tecklenborg J. C. of Geestemünde, Germany, but was requisitioned at the time of loss by the Royal Navy. It measured 122.3 x 15.8 x 8.5m, had a quadruple expansion engine and three boilers, and a gross tonnage of 5000. Whilst travelling from Sheerness to Barry on the 16th of May 1917 with a cargo of military stores, the *Pagenturm* was torpedoed and sunk by German submarine *UB-40* with the loss of four hands.

- 3.3.109 The wreck now lies in 23m of water, with a deep scour on the eastern side, on an orientation of 015/195 degrees. Three guns are visible on the deck aft and on port and starboard quarters. It has been positively identified as the *Pagenturm* by the recovery of a maker's plate. It corresponds with geophysical anomaly MA009, which records a site of 90m long by 45m wide.
- 3.3.110 Four records from within the marine study area have been reported to the Receiver of Wreck associated with the *Pagenturm* (see Annex C for full detail). Each record (droit) can include multiple artifacts. These records are represented by one china plate (A/0008), one porthole (A/2925), one compass, one ships gimble clock (A/4305), one brass ship's builders plate inscribed 'SS 233, JoH. C. Techlenborg A-G, Schiffswerft und Maschinenfabrik, Brememhaven, Geestmunde 1909' and one brass twin lever telegraph with pedestal (243/07).
- 3.3.111 *Baseline Archaeological Significance:* The *Pagenturm* is one of five of its class known to have been lost, but the only one in UK waters. It is not known to carry any extraordinary features or to be of note in any other way but does represent a substantial archaeological feature.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Low
Survival/Condition	High
Fragility/Vulnerability	Low
Diversity	Low
Potential	Medium
Overall	MEDIUM

UKHO 19961

- 3.3.112 This wreck is listed as LIVE by the UKHO but does not have a confirmed identity. It lies in 57m of water, partially buried and broken in two, with the halves lying at roughly 90 degrees to each other and surround by a debris field. The bow and stern, although separated from each other are clearly defined and sit approximately 4m above the seabed, with an overall length of nearly 70m visible. It corresponds with geophysical anomaly MA007.
- 3.3.113 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 20170

- 3.3.114 UKHO 20170 is a LIVE wreck. It lies at 60m and the site measures 98.4m long by 21m wide, on an orientation of 013/193 degrees. It is upright and mostly intact but has some damage towards the bow.
- 3.3.115 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 20017

- 3.3.116 UKHO 20017 is a LIVE wreck. It corresponds to geophysical anomaly MA0003. It is suspected to be a trawler, which lies upright in a general depth of 45m on an orientation of 010/190 degrees. An electrical signal lamp recovered from the wreck indicated it is likely a victim of the Second World War.
- 3.3.117 *Baseline Archaeological Significance:* As the identity of this wreck is unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19975

UKHO 19975 is a LIVE wreck. It lies in 40m of water on its port side. It measures 60m long by 15m wide. There is a large coal mound amidships which appears to have spilled out of the hold. It has been dated to the Second World War from the degaussing wire coil which runs around the gunwale.

Baseline Archaeological Significance: As the identity of this wreck is unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown

Criteria (DCMS 2013)	Archaeological significance
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19970

- 3.3.118 This wreck is LIVE. It lies in 50m of water and measures 60m long by 12m wide. It corresponds with geophysical anomaly MA0014. It is partially buried with some damage midships.
- 3.3.119 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 20172

- 3.3.120 This is a LIVE wreck which lies in 50m of water. The site measures 25m long by 15m wide, and the vessel is largely intact but partially buried. It lies at 060/240 degrees orientation.
- 3.3.121 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 20020

- 3.3.122 This wreck is LIVE. It is the remains of a landing craft lying in 20m of water on an orientation of 018/198 degrees. Though upright, the wheelhouse and stern structures have collapsed, as well as part of the hull near the bow. The tank ramp is in the open position. The date of the wreck is unknown, and it correlates with geophysical anomaly MA20026.
- 3.3.123 *Baseline Archaeological Significance:* Landing craft wrecks are uncommon when compared to other vessel types such as fishing trawlers or cargo ships, but as the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have. If future investigations confirm it as a Second World War landing craft sunk during conflict, then its potential would be more significant and move from medium to high.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium

Criteria (DCMS 2013)	Archaeological significance
Overall	MEDIUM

UKHO 19996

- 3.3.124 The wreck of UKHO 19996 is LIVE and has been noted to be a freighter, identity unknown. The wreck is very broken up and dispersed across a site approximately 105m by 31m. It corresponds with geophysical anomaly MA0016.
- 3.3.125 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Low
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19993

- 3.3.126 This wreck is LIVE. It lies in 24m of water across a site 55m long by 8m wide, on an orientation of 120/300 degrees. It is broken into two parts approximately 15m apart. The south-eastern part has two boilers at its north-western end, while the other half is a mass of debris. It has been suggested this wreck may possibly be in four parts, with the other two boilers of the same dimensions as those found here forming UKHO obstruction 19992 some 130m away to the north east. However, this is not known for certain, and it seems like it may be too small a vessel to typically host four boilers. A case of howitzer shells dated 1914 was recovered from this wreck, thought to have been cargo.
- 3.3.127 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19991

- 3.3.128 This wreck is LIVE and corresponds with geophysical anomaly MA0015. It lies on its port side with the bow to the west-south-west in approximately 34m of water. It is broken amidships, with the mast lying horizontally across the wreck and engine still present. No cargo was found in the hold. A porthole was recovered from this wreck, but it did not offer any clues as to its identity.
- 3.3.129 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 19988

- 3.3.130 This wreck is LIVE and corresponds with geophysical anomaly MA0027. It is believed to comprise of British Mulberry Harbour bridge sections (Whales) and the dumb barges (Beetles) on which they were towed. It now lies in 27m of water in two halves, which lie at approximate right angles to each other.
- 3.3.131 *Baseline Archaeological Significance:* Mulberry Harbours were an important innovation and helped Allied forces to succeed during the Second World War: the pieces formed a portable harbour, allowing large quantities of vital equipment to be landed with speed during the Normandy invasions. They were used until major French ports could be captured and brought back into use. There are several other surviving examples which are both better preserved and more accessible, but this site is still of significant archaeological value, particularly when in context of the large Mulberry Harbour works.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	High
Documentation	Medium
Group Value	High
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	High
Overall	HIGH

UKHO 20067

- 3.3.132 This wreck is LIVE. It lies in 21m of water and comprises of a site 12m long by 9m wide on an orientation of 018/198 degrees. In 1985 it was found to be the remains of a wooden sailing barge with a cargo of cast iron pipes with a badly degraded hull, and associated wine and beer bottles dating to approximately 1845. As of 2018, it was poorly defined, with debris on all sides.
- 3.3.133 *Baseline Archaeological Significance:* If the approximate date of 1845 is correct, it does raise the significance of this site based on age, but the lack of identity and poor condition of this wreck mean that it may otherwise be able to make only limited contributions to the archaeological record. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium

Criteria (DCMS 2013)	Archaeological significance
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Low
Fragility/Vulnerability	High
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 20064

- 3.3.134 This wreck is LIVE. It lies in 10.3m of water across a site 71m long by 13m wide on an orientation of 133/313 degrees. It is heavily degraded and broken up, but a single boiler and steam engine are still identifiable. Their positioning indicates the bow is to the south east. Piles of iron ore were found to mark the positions of the cargo holds. A discovery of rigging deadeyes attached to the top plating on the port side in 2004 suggest it could have been a sailing vessel that was later converted to a steam ship. This in turn suggests it may date to somewhere between the 1880s and the Second World War.
- 3.3.135 *Baseline Archaeological Significance:* As the identity and a more exact age for this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Medium
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium

Criteria (DCMS 2013)	Archaeological significance
Overall	MEDIUM

UKHO 61579

- 3.3.136 This site is LIVE, and although listed as an obstruction, appears to be a well broken up wreck. The site measures 29.1m long by 7.3m wide and lies at a depth of 27m. The main body of the wreck lies towards the west of the site; towards the north east, there is a section of upturned hull.
- 3.3.137 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it. The wreck site was not covered by the geophysical data.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

Klondyke or Evadne

- 3.3.138 A geophysical anomaly (MA0024) has been identified at a site location which has been suggested to be either the *Klondyke*, sunk in 1916, or the *Evadne*, sunk in 1917. This position comes from the NHRE; UKHO currently lists other sites for the *Klondyke* (DEAD) and *Evadne* (63087 - LIVE) close by but outside of the PEIR boundary. It is currently unclear whether it could be either of these wrecks or another one entirely.
- 3.3.139 The *Klondyke* was built in 1898 by Cook, Welton & Gemmell Ltd, of Hull and owned at the time of loss by the Royal Navy. It measured 32 x 6.3m, had a triple expansion engine, single boiler, and gross tonnage of 155. It was employed as a minesweeper but collided with the SS *Hindu* and sank on the 3rd of June 1916.
- 3.3.140 The *Evadne* was also a minesweeper, built in 1907 by Mackie & Thompson & Co. of Glasgow and was also owned at the time of loss by the Royal Navy. It

measured 33.6 x 6.7 x 3.3m, had a triple expansion engine, single boiler, and gross tonnage of 189. On the 27th of February 1917 the *Evadne* was sunk by a mine laid by German submarine UC-65. The wreck site currently assumed to be the *Evadne* by the UKHO lies in 25m of water and is partially broken up, but no material offering firm identification has been found.

- 3.3.141 **Baseline Archaeological Significance:** The *Klondyke* and the *Evadne* are very similar vessels, and as such can be assessed the same way. Both were ex-fishing trawlers converted for minesweeping duties early in the First World War and have the potential to contain preserved examples of minesweeping equipment. From the geophysical data, the wreck site here appears to be broken in two but otherwise coherent, so it may provide useful additions to the archaeological record should its identity be confirmed. The significance matrix below assumes that this site is one of these two vessels.

Criteria (DCMS 2013)	Archaeological significance
Period	Medium
Rarity	Low
Documentation	Medium
Group Value	Medium
Survival/Condition	Medium
Fragility/Vulnerability	Low
Diversity	Medium
Potential	Medium
Overall	MEDIUM

- 3.3.142 The vessels below have been listed as DEAD as they have not been detected over repeated surveys, therefore not considered to exist in that location, and LIFTED, to show they have been previously salvaged.

Alert

- 3.3.143 The wreck of the *Alert* (UKHO 19945) is listed as DEAD by the UKHO. Built in 1897, it was a schooner-rigged steamer which was scuttled by a German U-boat in 1916. The wreck site was not covered by the geophysical data.

Jenny

- 3.3.144 The wreck of the *Jenny* (UKHO 19985) is listed as DEAD by the UKHO. This 16.2m long fishing trawler sank on the 14th of September 1979 after an on-board fire. Its position was reported at the time of sinking but has not been recorded since. The wreck site was not covered by the geophysical data.

Marie Marguerite

- 3.3.145 The UKHO lists this wreck (19973) as DEAD. It was a Norwegian schooner built in 1919 which previously bore the names *Martha Therese* and *Terneholmen*. It sunk in a collision. The wreck site was not covered by the geophysical data.

Eden

- 3.3.146 The UKHO lists this wreck (20227) as DEAD. The *Eden* was built in 1879 and torpedoed by a German submarine in 1917. Location is as reported at time of loss, but it has not been traced in subsequent surveys. The wreck site was not covered by the geophysical data.

St Anne

- 3.3.147 The UKHO lists this wreck (20044) as DEAD. Location is as reported at time of loss, it was not found when searched for. The wreck site was not covered by the geophysical data.

UKHO 20025

- 3.3.148 UKHO 20025 is listed as DEAD. It is the reported position of an unnamed loss in 1949. The wreck site was not covered by the geophysical data.

UKHO 20058

- 3.3.149 This wreck is listed as DEAD by the UKHO. Originally reported to be a 12.1m wooden hull of a vessel which sank on the 12th of August 1955 close to Worthing Pier, it has not been located on subsequent surveys. The wreck site was not covered by the geophysical data.

UKHO 20261

- 3.3.150 This wreck is listed as DEAD. It was originally reported in 1990 to be an outline of a wreck about 75m long and 23m wide, lying on a north-south alignment and partially buried. It has not been found in later surveys. The wreck site was not covered by the geophysical data.

UKHO 20013

- 3.3.151 This wreck is listed as DEAD. In 1979 it was reported to be a fairly broken up and well buried, lying on its port side, though with forecastle still mostly intact. It had chain steering and appeared to be broken in two. It has not been found in later surveys. The wreck site was not covered by the geophysical data.

UKHO 20026

- 3.3.152 This wreck is listed as DEAD. Originally reported to be a small wooden wreck, partially buried, across a site measuring 10m wide and 10m long at a depth of 23m. It was identified in a 2018 survey as a rock outcrop. The wreck site was not covered by the geophysical data.

UKHO 19990

- 3.3.153 This wreck is listed as DEAD. It was believed to be an early Admiralty destroyer. Last located in 1977, it was at the time mostly broken up. The wreck site was not covered by the geophysical data.

UKHO 58308

- 3.3.154 This wreck is listed as DEAD. Beyond initial reporting, there is no further information available. The wreck site was not covered by the geophysical data.

UKHO 19979

- 3.3.155 This wreck is listed as DEAD. Originally reported in 1918 as two masts of a vessel sunk in 1917, nothing has been found at the site since. The wreck site was not covered by the geophysical data.

UKHO 20046

- 3.3.156 This wreck is listed as DEAD. Originally reported as two masts visible in 1917, it was last confirmed by survey in 1971 but has not been found since. The wreck site was not covered by the geophysical data. UKHO 59393.
- 3.3.157 This wreck is listed as DEAD. Originally reported as a possible wreck, it was later amended to be a steep-sided shingle mound in 1978, but then was not located in later surveys. The wreck site was not covered by the geophysical data.

UKHO 20003

- 3.3.158 This wreck is listed as DEAD. Originally reported as a wreck in 1973, it was later suggested to be a dredging scour filled in by tidal action. The wreck site was not covered by the geophysical data.

UKHO 58365

- 3.3.159 This wreck is listed as DEAD. Originally reported as possible wreck, it was later found to be bottom contact. The wreck site was not covered by the geophysical data.

UKHO 20063

- 3.3.160 This wreck is listed as DEAD. Originally located by divers, but nothing found in a second intensive survey of the area. The wreck site was not covered by the geophysical data.

UKHO 19994

- 3.3.161 This wreck is listed as DEAD. Originally reported as a wreck, this was later revised to a rocky pinnacle in 1971. However, a 2018 survey presumes it to be a man-made object but with little defined form. It appears to have cables or lines attached. The wreck site was not covered by the geophysical data.

UKHO 58366

- 3.3.162 This wreck is listed as DEAD. Originally reported as possible wreck, it was later found to be a bottom contact. The wreck site was not covered by the geophysical data.

UKHO 82762

- 3.3.163 UKHO 82762 is listed as of UNKNOWN status by the UKHO but has been identified as geophysical anomaly MA0019. It is the wreck of a small vessel, possibly a fishing boat. It is 11m long by 4m wide, lying at 120/300 degrees. There is an A-frame near the stern and wheelhouse towards the bow. It had been previously listed as an obstruction.
- 3.3.164 *Baseline Archaeological Significance:* As the identity and age of this wreck are unknown, it is unclear what archaeological significance it may have, but it does have the potential to be significant were further investigations able to provide more information on it.

Criteria (DCMS 2013)	Archaeological significance
Period	Unknown
Rarity	Unknown
Documentation	Unknown
Group Value	Unknown
Survival/Condition	Unknown
Fragility/Vulnerability	Unknown
Diversity	Unknown
Potential	Medium
Overall	MEDIUM

UKHO 85937

- 3.3.165 The UKHO lists the status of this site as UNKNOWN. It lies in just 0.63m of water, measures 12.3m long by 4.3m and is accompanied by a 5m scour towards 059 degrees. It is not clear what this feature is, but it has a strong magnetic return. The wreck site was not covered by the geophysical data.

LIFTED wrecks

- 3.3.166 There are three wrecks listed as LIFTED by the UKHO within the PEIR boundary: two LCM (Landing Craft Mechanised - a tank that was used as a landing craft) UKHO 58349 and 20149, and one unknown hulk (58348). These wreck sites were not covered by the geophysical data.

Reported Losses

- 3.3.167 There are 85 additional reported losses within the boundary for which there are no corresponding UKHO records or seabed remains, and for which only a general position is given. These are listed in **Annex B**.

Fishermen's fasteners

- 3.3.168 There are 32 records classed as fishermen's fasteners recorded by the NRHE. Records classed as fishermen's fasteners or which otherwise remain unidentified and are not associated with vessel or structural remains (including records classified as DEAD by the UKHO). They are unidentified obstructions reported by fishermen, possibly indicative of a wreck or submerged feature. No other baseline information is available for any of these obstructions, while they may well represent archaeological remains, this is not possible to ascertain from the existing sources.

3.4 Receiver of Wreck records

- 3.4.1 Sixty-five records from within the marine archaeology study area have been reported to the Receiver of Wreck, see **Annex C** for full detail. Each record (droit) can include multiple artefacts. None of the wrecks associated with these records are protected under the Protection of Wrecks Act, 1973.
- 3.4.2 Those associated with wrecks that are not associated with known wreck sites (covered in **Section 3.3**) include: *HMS Inverclyde* (1942) has one brass shelf with holes in it, one small brass valve, one wheel and handle from a telegraph and one brass box lid (A/2711); *Candia* with one bottle with cork in the bottom and one brass object resembling a propeller blade (A/4098); the *Ariston* with one 9" porthole (A/0996); the *HMS Brazen* with a cannon (A/2341); one three way brass valve (A/1613) associated with the 3 Mile Wreck; the *Celtic* has one porthole (A/0506); the *Indiana* with one compass bowl and one tureen lid (249/07) are associated; the *Seaford Ferry* with one china plate and one brass plate inscribed 'engine room' (457/00); the *SS Bessell* with two earthenware gin bottles, two 2oz medicine bottles, one complete toothpaste pot and two bases of toothpaste pots (310/17); and the *Thompson* with two portholes, two empty shell cases, one bell and one lead sounding weight (A/0157).
- 3.4.3 There has also been one U-boat toilet from an unknown U-boat (A/0398).
- 3.4.4 There are 41 finds which include timbers, bottles and brass fittings also found in the area, but which are not associated with a known wreck see **Annex C** for further detail).

3.5 Historic seascapes characterisation

- 3.5.1 Changes to the character of the sea surface and the perception of the historic seascape as a direct result of the construction, operation, maintenance and decommissioning of Rampion 2 will result from the addition of new infrastructure such as foundations and turbines as well as ongoing activity from installation and maintenance vessels.

- 3.5.2 The existing seascape of Rampion 2 marine archaeology study area is known for its marine and intertidal historic character utilised mainly for navigation, industry, fishing, ports and docks, coastal infrastructure, military, settlements and recreation.
- 3.5.3 It should be noted that changes to the visible elements of the shore and the sea surface have been assessed further in **Chapter 16: Seascape, landscape and visual, Volume 2** and therefore this section only considers the historic aspects of Seascape Characterisation.
- 3.5.4 The Historic Seascape Characterisation (HSC) assessment draws on Historic Seascape Characterisation: England's Historic Seascape: HSC Method Consolidation (Tapper & Johns, 2008) and England's Historic Seascape: Demonstrating the Method (Merritt & Dellino-Musgrave, 2009).
- 3.5.5 The marine environment presents some characteristic differences in comparison with the land for historic character assessment. HSC considers the multi-dimensional aspects of the marine environment which is broken down by levels as detailed in Tapper 2008 and Tapper & Hooley 2012).
- sub-sea floor HSC: identifying the historic character beneath the sea floor;
 - sea floor HSC: identifying the historic character within or directly on the sea floor;
 - water column HSC: identifying the historic character across the vertical height of the water column;
 - sea surface HSC: identifying the historic character of the surface of the water;
 - coastal land HSC: identifying those areas of coastal land above Mean Low Water (MLW) which have a distinctly maritime historic character; and
 - previous HSC (where information is available).
- 3.5.6 The sub-sea floor, sea floor and water column have been assessed for archaeological potential and significance in detail in this report, using a wide suite of geophysical datasets and historical resources.
- 3.5.7 This Historic Seascape Characterisation is using the marine archaeology study area plus an additional 45km buffer to define the maximum extent of significant visual effect. (**Figure 17.1.3**) The extent has been applied as recommended in the Visual Representation of Wind Farms: Guidance (Scottish Natural Heritage 2017) for turbines with a total height above 150m.
- 3.5.8 The intertidal and marine zones are ever-changing due to physical processes such as currents, tidal range and sediment mobility. Considering this dynamism and the multi-dimensions defined by HSC, people create complex spatial relationships within and across all marine levels, reflected within sites of cultural activity and their material imprints.
- 3.5.9 Further anthropogenic studies have the potential to contribute to our understanding of how people have used and perceived the landscape/seascape in a variety of dynamic ways in the past.

- 3.5.10 Historic Seascape Characterisation in nearby areas has been undertaken by Maritime Archaeology on behalf of English Heritage (Maritime Archaeology, 2011). The HSC: Hastings to Purbeck and Adjacent Waters includes Rampion 2 and extends to the UK Controlled Waters following the Median Line with French waters.
- 3.5.11 The HSC considers the added effect of Rampion 2 within the multiple dimensions of the marine environment (sub-sea floor, sea floor, water column, sea surface, coastal land and previous historic character) in combination with the existing activity within the Broad Historic Character Types as further detailed below.
- 3.5.12 The study identifies the area as holding the Broad Historic Character Types as summarised below:

Navigation

- 3.5.13 English waters have been used for navigation since prehistoric times and such activity contributes considerably to the character of the seascape. Even though craft themselves leave no permanent mark on the sea surface, they have a diversity of associated features on and offshore and are responsible for the wrecks and related materials and debris surviving on the seabed as further discussed in **Section 3**.
- 3.5.14 Examples of changes to the historic seascape throughout time can be the result of mobile sandbanks, prompting the need for abandoning navigational channels or active management to maintain navigation. Further change to navigational routes can be the need for port developments suitable for commercial shipping which need to maintain navigational accessibility.
- 3.5.15 People perceiving the sea from land are unlikely to be aware of the scale of navigation and shipping activities that occur offshore but are often aware of the source of goods, income and employment it provides.
- 3.5.16 Navigational hazards are an integral part of the cultural seascape character of many areas, expressed directly through their records on charts and highly visible maritime safety installations. They are also present culturally in the vast store of myths, legends, traditions and stories of the sea and its dangers that pertain to most coastal communities. The use of landmarks and navigation aids facilitated the development of surveying techniques and the drafting of maritime charts and coast profiles.

Industry

- 3.5.17 There are many visible and unquantifiable reminders of England's rich and varied mining past along our coastline, both directly and in the infrastructure. The remains of these industrial processes on the present seascape can generate complex and mixed feelings in different regions and places.
- 3.5.18 The energy industry concerned with the extraction, processing and/or storage of hydrocarbons (oil, oil derivatives, and gas, but not coal) as well as installations relating to all forms of renewable energy generation, by wind, wave or tide, and power stations of all fuels, together with their associated transmission facilities and directly associated transport facilities. General policy trends show an expansion of

renewable energy with an encouragement of wind power, especially in offshore locations where more consistent strong wind speeds are available.

- 3.5.19 The condition of coastal processing industrial remains varies considerably from almost total destruction to excellent preservation. Where modern processing plants become redundant, they are generally quickly cleared and re-presented as areas ripe for new development. Historic coastal remains from these industries are prime targets for public-awareness initiatives in the context of the coastal access requirements from the Marine and Coastal Access Act 2009.
- 3.5.20 The shipbuilding industry in England is widely expressed through its components such as docks; basins; wrecks; wharfs, quays, jetties and slipways; warehouses, offices, depots and travelling cranes; dockworkers' cottages; and specifically, associated transport systems (such as railways, roads, tramways). Today, the shipping industry can be seen as an expanding global business and linked to recreational and leisure activities such as cruises and sailing.

Fishing

- 3.5.21 The thriving fishing industry of the Southern England region has been documented from the seventh century onwards. Early methods of fishing include net-fishing and shellfish collection. The livelihoods of fishing communities are intimately tied to the productivity of the seas, and there are deep cultural attachments associated with fishing.
- 3.5.22 While some small towns and villages in the region are very proud of their long links with the fishing industry and so attract tourists and day trippers. Offshore fishing is remote from the coast and only visible on clear days, so it does not connect so directly with the local tourist economy.
- 3.5.23 Aquaculture, fish and shellfish farming is still deeply engrained in the perception and economy of some communities in the region. As such, it is valued for the distinctiveness it affords such areas and as an important element in their local economy.

Ports and docks

- 3.5.24 The Southern England region contains numerous examples of small hards, quays and landing places and major ports including docks, ferry terminals and car terminals. Although many of the port locations may be inaccessible to the public, the harbours contain an amenity value which is linked to recreational and leisure activities such as sailing and wildlife watching.
- 3.5.25 The ports, docks and harbours in the Southern England region show impact at a national and international levels through their commercial trade links and transatlantic cruise businesses.

Coastal infrastructure

- 3.5.26 Sea and flood defences in the region are characteristic for protecting agricultural land and coastal settlements where the coastline has been receding for hundreds of years, and settlements surrounding those rivers which are prone to flooding.

- 3.5.27 Sea and flood defences are generally seen as essential for the preservation of settlements along the Southern England coast for protecting property by preventing erosion and providing flood protection which conserves the economic value and provides local residents with reassurance.

Communications

- 3.5.28 Motorways, main roads, railways and airports are covered by this broad character type. There is one canal in the study area, the Chichester Ship Canal. It opened in 1823 and was totally abandoned in 1928. Canals are a lasting imprint on the present-day landscape of a 19th century period of prosperity and success. At the same time, they are an integral part of the present social and cultural landscape, with a range of current uses, including leisure.

Telecommunications

- 3.5.29 There are two active principal submarine cables routes through the region, CrossChannel Fibre from Brighton, United Kingdom to Veules-les-Roses, France and Circle South from Cayeux-sur-Mer, France to Pevensey Bay, United Kingdom.
- 3.5.30 Due to the character of submarine telecommunications cables, their presence in the marine environment is likely to be known only to those who were involved in laying them, and to people involved in communications infrastructure. Although highly dependent on them, the wider public are likely to know little about their location. However, their importance on public and private life cannot be underestimated due to the impact they have made for millions of internet and phone users.

Military

- 3.5.31 Military coastal defences and military bases in the Southern England region can be found all along the coast, although there is a tendency to find them concentrated around the main ports.
- 3.5.32 In addition to the long-appreciated heritage value of most medieval and earlier fortifications, post-medieval military defences are increasingly being perceived as part of the overall historic legacy of the landscape too.
- 3.5.33 In England, there are military vessels (including aircraft) which are protected as war graves under the Protection of Military Remains Act 1986. The primary reason for designation as a 'war grave' is to preserve the site as the last resting place of UK servicemen (or other nationals).

Settlements

- 3.5.34 The coastal area of the Southern England region is densely populated. It includes a variety of coastal settlement types including major cities, tourist resorts and smaller fishing towns and villages.
- 3.5.35 Coastal settlements are where most people in the coastal region live and base their visits. As such, they are where most people develop their coastal perceptions. Some see the larger port cities as places of economic growth that support many local jobs and provide local income, contrasting with 'more tranquil'

smaller fishing villages and the coastal resorts as areas of entertainment and holiday destinations.

Recreation

- 3.5.36 Tourism is an important source of income and employment in the region, visitors are often involved in recreational activities such as walking, sunbathing, and golfing. Popular water sport activities involve sea bathing, sailing, surfing, diving, leisure fishing, angling, water, and jet-skiing. Wildlife watching is also a popular pastime in the region which has several Nature Reserves.
- 3.5.37 The value of coastal recreation and water related activities has a number of positive outcomes, including health benefits, social inclusion and quality of life, environmental protection and economic benefits.

Cultural topography

- 3.5.38 The potential for survival of palaeolandscape components and submerged archaeology in the marine topography and deposits in the study area is further discussed in **Section 3.1** the cultural topography landward is discussed in detail in **Volume 2, Chapter 26: Historic environment**.
- 3.5.39 Much of the intertidal zone in the area, is valued for its numerous and varied recreational opportunities. Where unmanaged, this zone is often subject to relatively low levels of visitors who enjoy its quiet and solitude as a source of relaxation and inspiration. Much of the Southern England region's foreshore is accessible to the public.

Woodland

- 3.5.40 Coastal woodlands were often important in providing timber and other materials for boat building and other coastally focused activities. Patterns of woodland also form distinctive elements of the coastal landscape visible from the sea, aiding position-finding from ships.
- 3.5.41 Those patterns are culturally defined and combine with variation in topography and other cultural features and aspects to give a sense of place and position to mariners and coastal users alike.

Summary

- 3.5.42 Activities on the sea surface and the water column are dominated by modern and current navigational routes in combination with historic shipping routes. The sea surface also comprises offshore infrastructure such as renewables, gas, oil, navigational markers and ocean survey equipment. It is therefore unlikely that Rampion 2 will further alter the perception of the Historic Seascape within the sea surface and water column.
- 3.5.43 Activities on the sea floor and within the sub-sea floor include fishing, the energy industry (oil, gas, renewables) construction including foundations, cables, pipelines and anchor activities and telecommunication cables. The historic characterisation of the sea floor and sub-sea floor also considers the cultural topography which includes prehistoric deposits and artefacts as well as shipwrecks and aviation

remains from multiple periods. The impact on identified archaeological receptors is discussed in **Volume 2, Chapter 17: Marine archaeology**.

- 3.5.44 It is therefore unlikely that Rampion 2 will further alter the perception of the Historic Seascape within the sea floor and sub-sea floor.
- 3.5.45 The value and perception of the above Broad Historic Character Types include the increased attention of the wider general public of modern aquaculture and the benefits and disadvantages of renewable energy, sub-sea communication cables and marine global trading. People's perception of the sea and its value also include the biodiversity, the archaeological potential and fishing and transport heritage.
- 3.5.46 It has been established that HSC is value-neutral and was developed to be a positive force in informing change as well as recognising that landscape and seascape are both a product of that inevitable change. Developments should therefore respect and retain cultural distinctiveness and legibility wherever possible (Tapper & Johns 2008).
- 3.5.47 Considering the perception of the above outlined Broad Historic Character Types (as well as people's perception of the sea and its value), no significant change in the multiple dimensions of the marine environment as a result of Rampion 2 in isolation or cumulatively with neighbouring developments is identified.
- 3.5.48 Therefore, it is considered that the impact on the historic seascape by the introduction of wind farm infrastructure does not warrant further methodological development or mitigation.

4. Geophysical assessments

- 4.1.1 The archaeological assessment of geophysical data is presented below and summarised in **Table 4-1**. The archaeological potential of the anomalies was determined following the criteria as stated in **Table 2-2**.

Table 4-1 Summary of archaeological anomalies

Archaeological potential	No. anomalies
High	31
Medium	24
Low	228
Magnetic anomalies of low potential	2,280

4.2 Anomalies of archaeological potential

High potential anomalies

- 4.2.1 Thirty-one anomalies have been assessed as high archaeological potential as summarised below and detailed in **Annex A**.
- **MA0001** The coherent remains of a wreck, measuring 88m in length and 15m width, with a shadow that suggests it sits 8m above the seabed (SSS MA2003, MBES MA4010). The wreck site has a magnetic return of 4993nT (MAG MA7198) This correlates with the cargo steam ship, *City of Waterford*, sunk on the 14th of April 1949 (UKHO ID 20056).
 - **MA0002** The curved outline is showing a partially buried hull of a vessel measuring approximately 54m in length and 12m width (SSS MA4011, MBES MA4011) with a magnetic return of 1364nT (MAG MA6790) potentially associated with the remains of a trawler (UKHO ID 20017).
 - **MA0004** The semi-coherent bow of a vessel, partially buried, measuring 31m in length and 6.5m in width (SSS MA2014, MBES MA4012) with a magnetic return of 1760nT (MAG MA6868). This is the potential wreck of the motor vessel *Gerlen*, sunk on the 19th of July 1972 (UKHO ID 20005).
 - **MA0005** The semi-coherent, partially buried outline of a hull measuring approximately 22m in length and 9m in width with a magnetic return of 17nT (SSS MA2017, MBES MA4013, MAG5093).
 - **MA0007** (SSS MA2028) The coherent outline of the bow of a vessel and associated debris to the SW, covering an area of approximately 60 x 40m with a magnetic return of 3344nT (MAG MA7123). The identity of the remains of this vessel are unknown (UKHO ID 19961).

- **MA0008** (SSS MA2029) The coherent remains of a vessel and its super-structure, measuring approximately 93m in length and 19m width and with a magnetic return of 1007nT (MAG MA 6738). The shadow suggests a height of 8m above the seabed, with some scour. This is potentially the wreck of the Northern Irish steam cargo vessel *Glenarm Head*, sunk on the 4th of January 1918 (UKHO ID 19926/20012).
- **MA0009** (SSS MA2031) The coherent remains of a wreck and associated debris over an area of 90m x 45m with a magnetic return of 4766nT (MAG MA6784). This correlates with the wreck of the English cargo steam vessel *Pagenturm*, sunk on the 16th of May 1917 (UKHO ID 20001).
- **MA0010** (SSS MA2033) The cylindrical, partially buried remains of a wreck, measuring approximately 77m in length and 7m width with a magnetic return of 1237nT (MAG MA6705). This record correlates with the British destroyer HMS *Minion*, sunk on the 1st of January 1921 (UKHO ID 20014).
- **MA0011** (SSS MA2036) The semi-coherent outline of a vessel measuring 60m in length and 17m width with an extended shadow suggesting it sits approximately 7m above the seabed with a magnetic return of 691nT (MAG MA6830). This is the other possible site for the remains of the Northern Irish cargo vessel *Glenarm Head* (UKHO ID 20169).
- **MA0012** (SSS MA2041) The semi-coherent remains of a partially buried cylindrical anomaly, potentially a wreck, measuring approximately 61m in length and 14m width, associated with two hard reflectors ca 100m to the NNE and a magnetic return of 2435nT (MAG MA7043). This is potentially the site of the wreck of the cargo steam ship *London Trader*, sunk on the 26th of July 1940 (UKHO ID 19972).
- **MA0013** (SSS MA2042) The coherent remains of a vessel measuring approximately 73m in length and 11m in width, with an extended shadow which suggests the wreck sits approximately 7m above the seabed and much of the super-structure remains. There is a magnetic return of 1375nT (MAG MA7268). This correlates with the record of the cargo steam ship *Quail*, sunk on the 27th of August 1886 (UKHO ID 20000).
- **MA0014** (SSS MA2044) The semi-coherent remains of a cylindrical anomaly, measuring approximately 60m in length and 7m width, partially buried with an extended shadow which suggest a height of 8m above the seabed with a magnetic return of 637nT (MAG MA6876) (UKHO ID 19970).
- **MA0015** (SSS MA2045) The semi-coherent outline of a vessel, measuring approximately 76m in length and 7m width, with associated scour and a magnetic return of 909nT (MAG MA6724). This correlates with the remains of a cargo vessel (UKHO ID 19991).
- **MA0016** (SSS MA2047) A spread of debris over an area of 105m x 30m with an extended shadow which suggests a height of 7.3m above the seabed with a magnetic return of 7720nT (MAG MA6693). This correlates with the remains of a freighter (UKHO ID 19996).
- **MA0017** (SSS MA2053) A long ovate feature, measuring approximately 23m in length and 6m width, partially buried, with an elongated shadow that suggest a

height of 2m above the seabed. This correlates with the fishing vessel *Ny-Eeasteyr*, sunk on the 8th of December 1980 (UKHO ID 20186).

- **MA0018** (SSS MA2055) The semi-coherent partially buried remains of a vessel with associated debris measuring approximately 77m in length and 16m width with a magnetic return of 1198nT (MAG MA5011). This correlates with the wreck of the English cargo steam ship *Ramsgarth*, sunk on the 28th of November 1916 (UKHO ID 20049).
- **MA0020** (SSS MA2060) The coherent remains of a partially buried vessel measuring approximately 70m in length and 14m width, with extended shadows suggesting the presence of super-structure with a magnetic return of 2311nT (MAG MA6277). This correlates with the steam cargo ship *Ariel*, sunk on the 10th of June 1892 (UKHO ID 20023).
- **MA0021** (SSS MA2062) A buried linear anomaly measuring approximately 28m in length with a shadow suggesting a height of 2m above the seabed.
- **MA0022** (SSS MA2065) The semi-coherent buried remains of a vessel measuring approximately 102m in length and 32m width, with extended shadows from the centre of the vessel suggesting the remains of super-structure, potentially the boilers, and other associated debris with a magnetic return of 7729nT (MAG MA5029). This correlates with the wreck of the English cargo steam ship *Cairndhu*, sunk on the 15th of April 1917 (UKHO ID 19987).
- **MA0024** (SSS MA2067) The broken remains of a vessel over an area approximately 60 x 8m, with extended shadow suggesting a height of approximately 4m above the seabed with a magnetic return of 1022nT (MAG MA5028). Probable association with MA023 (MA2066). These remains are possibly associated with the wreck of the drifter or trawler *Klondyke*, sunk on the 4th of June 1916 or *Evadne*, sunk on the 27th of February 1917 (UKHO ID 19997).
- **MA0025** (SSS MA2068) The semi-coherent remains of a partially buried vessel measuring approximately 74m in length and 20m width, with an extended shadow suggesting debris and super-structure with a height of 5m above the seabed with a magnetic return of 6783nT (MAG MA6275). This correlates with the English steam cargo ship *Jaffa*, sunk on the 2nd of February 1918 (UKHO ID 20010).
- **MA0026** (SSS MA2073) The semi-coherent remains of a partially buried vessel measuring approximately 55m in length and 10m width, with an extended shadow suggesting debris and super-structure with a height of 3m above the seabed with a magnetic return of 5079nT (MAG MA6203). This correlates with the remains of a tank landing craft (UKHO ID 20020).
- **MA0027** (SSS MA2080) Three sets of parallel linear hard reflectors with associated shadows suggesting a height of approximately 2.5m above the seabed, and a partially buried ladder-like anomaly, contained within an area of approximately 55 x 50m with a magnetic return of 728nT (MAG MA6265). This correlates with a wreck believed to comprise British Mulberry Harbour bridge sections, together with the dumb barges on which they were towed (UKHO ID 19988).

- **MA0029** (SSS MA2088) The scattered debris of a wreck over an area of approximately 90 x 20m with a magnetic return of 439nT (MAG MA6243). This correlates with the English armed cargo steam ship *War Helmet*, sunk on the 19th of April 1918 (UKHO ID 19984).
- **MA0030** (SSS MA2093) A cluster of features concentrated within an area measuring 60 x 15m with a magnetic return of 2072nT (MAG MA6489). This correlates with the wreck of the Welsh steam cargo ship *Afon Dulais*, sunk on the 20th of June 1918 (UKHO ID 19947).
- **MA0032** (SSS MA2095) The scattered debris of a wreck over an area of approximately 91 x 14m. This is the potential wreck of the British cargo steam ship *Lightfoot*, sunk on the 16th of March 1918 (UKHO ID 19948). It is located outside of the PIER area, but within the ASA.
- **MA0033** (SSS MA2097) The semi-coherent partially buried remains of a wreck measuring approximately 83m in length and 15m width, with extended shadow suggesting the remains of super-structure including two boilers with a magnetic return of 6401nT (MAG MA6325). This correlates with the Scottish steam cargo vessel *Gartland*, sunk on the 3rd of January 1918 (UKHO ID 19971).
- **MA0034** (SSS MA2112) Ovate anomaly with extended shadow, measuring approximately 14.5m in length and 7m width, sitting 3m above the seabed with a magnetic return of 538nT (MAG MA5889). This is potentially the wreck of a vessel carrying a cargo of metal bars (UKHO ID 20075).
- **MA0036** (SSS MA2121) Coherent remains of a steel plated cargo ship approximately 120m in length and 30m width. Super-structure including three boilers remains with a magnetic return of 3951nT (MAG MA5994). This is the potential wreck of the English cargo vessel *Glenlee*, torpedoed and sunk in 1918 (UKHO ID 20055).
- **MA0037** (SSS MA2129) Pair of 'L' shaped anomalies with extended shadows suggesting a height of approximately 4m above the seabed with a magnetic return of 823nT (MAG MA5931). This is potentially boilers (UKHO ID 20068) from the wreck of the Scottish steam cargo vessel *Shirala*, sunk on the 2nd of July 1918 (UKHO ID 20069).
- **MA0062** (SSS MA2034) Buried hard reflector measuring approximately 47m in length with a magnetic return of 1751nT (MAG MA5097). This is potentially the wreck of the British steam cargo vessel *Broadhurst*, sunk on the 26th of July 1940 (UKHO ID 19959).

Medium potential anomalies

4.2.2 Twenty-four anomalies of medium archaeological potential as summarised below and as detailed in **Annex A**.

- **MA0006** (SSS MA2020) An ovate hard reflector measuring approximately 15m in length and 4m in width, with no associated debris. The feature appears to have raised edges with a depression in the middle which corresponds to the surrounding seabed.

- **MA0019** (SSS MA2057) An ovate feature with an extended shadow suggesting a height of approximately 3m above the seabed and some scour. Corresponds to site of UKHO ID 82762.
- **MA0028** (SSS MA2087) A cluster of features concentrated within an area measuring 70 x 15m with a magnetic return of 414nT (MAG MA6477).
- **MA0031** (SSS MA2094) A linear anomaly measuring approximately 24m in length with an extended triangular shadow suggesting a height of 1m above the seabed.
- **MA0035** (SSS MA2117) Two parallel buried reflectors approximately 15m in length and 1m apart.
- **MA0038** (SSS MA2149) A prominent mound which may represent anthropogenic material. The mound measures 10.6 x 3.7m, with a maximum height of 0.9m.
- **MA0040** (SSS MA2165) A cluster of features concentrated within an area measuring 48 x 16m, with shadow suggesting a height of 1.6m above the seabed.
- **MA0041** (SSS MA2167) A cluster of features concentrated within an area measuring 38 x 29m.
- **MA0042** (SSS MA2172) A cluster of features concentrated within an area measuring 57 x 24m.
- **MA0045** Two magnetic anomalies MAG MA5501 (104nT) and MAG MA5503 (105nT).
- **MA0046** Isolated magnetic anomaly ca 30m SSW of seabed reflector (110nT) (MAG MA7206).
- **MA0047** Isolated magnetic anomaly (110nT) (MAG MA6298).
- **MA0048** Isolated magnetic anomaly (112nT) (MAG MA6485).
- **MA0049** Pair of linear hard reflectors; potential anthropogenic debris or boulders, associated with magnetic anomaly (115nT) (SSS MA2085, MAG ID MA6224).
- **MA0050** Isolated magnetic anomaly (116nT) (MAG MA6529).
- **MA0051** Isolated magnetic anomaly (125nT) (MAG MA5844).
- **MA0052** Isolated magnetic anomaly (125nT) (MAG MA5600).
- **MA0053** Isolated magnetic anomaly (145nT) (MAG MA5202).
- **MA0054** Isolated magnetic anomaly (156nT) (MAG MA5537).
- **MA0055** Isolated magnetic anomaly (165nT) (MAG MA5380).
- **MA0056** Isolated magnetic anomaly associated with seabed reflector (4nT) (MAG MA5032).
- **MA0058** Three magnetic anomalies MA5504 (245nT) MA5505 (47nT) MA5506 (38nT) (MAG MA5504).

- **MA0059** Isolated magnetic anomaly (147nT) (MAG MA6556).
- **MA0060** Isolated magnetic anomaly (300nT) (MAG MA5823).
- **MA0061** Isolated magnetic anomaly (716nT) (MAG MA5529).

Low potential anomalies

- 4.2.3 The low potential anomalies have been characterised as a mixture of small features, often boulder like, or isolated linear features and modern debris such as rope, chain, fishing gear or lost equipment.
- 4.2.4 Magnetic anomalies with no corresponding data in any of the assessed geophysical datasets or research resources have also been assigned low archaeological potential.

4.3 Palaeogeographic assessment of geophysical data

- 4.3.1 This section presents a preliminary deposit model which is to be refined following the assessment of forthcoming geotechnical data, it also interprets and presents the results from the archaeological assessment of the sub-bottom data and places it in the context of current understanding of the complex prehistoric landscapes and the correlation between the marine and terrestrial sediment phases.
- 4.3.2 Knowledge and understanding of submerged prehistory is developing rapidly as a positive outcome of collaboration and data sharing between offshore developers, curators and researchers.
- 4.3.3 The nature, extent, and distribution of preserved palaeolandscapes is being mapped and understood as survey methods are developing. The contextual relationship between channels, micro and macro fauna, submerged forests, and identified and possible sites both in the marine zone and terrestrial area are becoming clearer as the volume of data is increasing.

Current understanding

- 4.3.4 As discussed in detail in **Section 3.1: Environmental context**, the area of seabed that the marine archaeology study area covers was previously large swathes of dryland that were exploited during the Pleistocene and early Holocene. Early to Middle Pleistocene deposits of the West Sussex Coastal Plain and wider Solent Basin were shaped by successive interglacial sea-level highstands during the last 500,000 years (Bates *et al.* 2010).
- 4.3.5 Studies in the area undertaken by Imperial College (Gupta *et al.* 2004) present details of submerged topography and outline features of the Palaeo- Arun Valley landform from the land out into the marine zone, including terraces and details of the submerged floodplain. The project aimed to use the understanding of terrestrial prehistoric deposits to show the offshore potential.
- 4.3.6 The Transition Zone Mapping Project (TZMP) also focused on linking the offshore sedimentation with the terrestrial record by using geophysical data and boreholes. The results showed that the area along the Sussex coast between the mouth of the River Arun at Littlehampton and Chichester Harbour is a Tertiary solid geology overlain by Pleistocene Head and raised beach deposits. Pleistocene fluvial

channels and infilled Holocene marine inlets are also present. The study is a benchmark model for how the offshore records should be integrated with the terrestrial component.

- 4.3.7 It has also been highlighted that, although fluvial sediments exist in the submerged zone, they do not necessarily represent contexts associated with the terrestrial deposits of archaeological potential.
- 4.3.8 Offshore deposits should therefore not be understood as an extension of the terrestrial landscape but as a representation of a lower elevation landscape which has been subject to frequent transgressions and regression dominated by a large river system (Pope & Bates, 2016).
- 4.3.9 The purpose of increasing our understanding of the changes to climate, landscape and environment and its link to human behaviours, culture and therefore archaeological potential is based on the assumption that peoples have always and will always respond to short- and long-term changes in their immediate environs and adapt as necessary.
- 4.3.10 People tend to live where resources necessary for survival are available and, as further described in **Section 3.1** the Palaeolithic climate in the area was dominated by numerous glacial cycles during the last 500,000 years, resulting in periods of lower the sea-level where a land connection to mainland Europe was possible.
- 4.3.11 Previous assessments in the area have identified major palaeovalleys associated with the Northern Palaeovalley, which is the Northern branch of the English Channel River (Dyer, 1975; Hamblin *et al.* 1992; Bellamy, 1995; Velegrakis *et al.*, 1999). The valley systems demonstrate complex channel infills and terrace deposits associated with cold climate fluvial activity during glacial lowstands.
- 4.3.12 At the end of the Pleistocene, the marine sediments infilled the river channels with estuarine deposits leading to extensive terraces and localised head deposits. The transgression period allowed sediments to be reworked into lag sediments which covered the majority of the seabed and subsequent marine deposits.
- 4.3.13 Throughout the Holocene, marine sediments began to build up in some areas of the seabed. They are now covering the Pleistocene sediments and bedrock outcrops, often very thinly inshore and thicker and more extensively further offshore (Gupta *et al.* 2004).
- 4.3.14 Four main streams drain southwards into the English Channel along the coast of Sussex. These rivers are the Arun, Adur, Ouse and Cuckmere. Only the River Arun is located within the marine archaeology study area, the offshore extension of the river was first studied by Bellamy (1995) and later by Gupta *et al.* (2004) who concluded the palaeo-Arun cuts through the Upper Chalk bedrock and extends to about 8 km offshore. Analysis of seismic data also shows a valley, oriented NNW-SSE and in places the Upper Chalk bedrock has been eroded away by the palaeo-Arun which runs perpendicular to the current coastline.
- 4.3.15 While the Upper Chalk bedrock deposit is not of geoarchaeological interest, mapping the chalk shelf is as it is the primary source of flint for production of stone tools by prehistoric people, and is why chalk landscapes often contain high concentrations of archaeological findspots (Gupta *et al.* 2004).

- 4.3.16 Further, a significant fluvial system east of the marine archaeology study area, the Adur Valley has been draining into the English Channel River system for at least 250,000 years. The River Adur makes its course through the chalk downlands, where a wide, flat-bottomed profile with clearly demarked valley edges indicates an alluvial depositional regime as well as a significant estuarine depositional regime during the development of this valley (Bates 2010; Burrin 1983; Burrin and Jones 1991; Jennings 1985;) The Adur and Tarring/Brooklands fluvial channels offshore have been shown to preserve Holocene alluvium, basal Pleistocene alluvium and possibly inter-digitated layers of head/dry Valley deposits (E.ON, 2012).
- 4.3.17 We know that the Solent and what is currently the south coast of England has yielded early Palaeolithic archaeology in high concentrations, for example at Boxgrove, West Sussex (Roberts *et al.*, 1994; Roberts and Parfitt, 1998) where the earliest hominid fossils from the British Isles were recovered from a Pleistocene raised beach and various finds of interest reported by the aggregate dredging industry (Bates *et al.*, 2004). Three of the finds are located within the Rampion 2 marine archaeology study area; one animal bone (NMRHE Object ID 196439), and two bone fragments (NMRHE Object ID 197962 and NMRHE Object ID 196869), dredged up at the Owers (Dredging Licence Area 123/1A).
- 4.3.18 The archaeological assessment of sub-bottom data ahead of Rampion 1 Offshore Wind Farm Environmental Assessment concluded that the majority of the area showed no apparent channel features and the sediment thickness varied between 4m to 30m. However, in the north west of the Rampion 1 area a shallow buried channel feature was identified with the bedrock noted at a maximum of 5m below sea level. The ES Section 6 – Physical Environment noted that the geological structures include rock outcrops, rock ridges and a network of steep-sided buried north to south trending palaeochannels. Vibrocores collected in areas of acoustic blanking proved that the paleochannel infill is made up of peat and soft clays.

Archaeological assessment of sub-bottom data

- 4.3.19 The archaeological assessment of the sub-bottom data collected in the offshore part of the PEIR Assessment Boundary has aimed to:
- locate and map channel and valley features present within the marine archaeology study area;
 - identify and describe stratigraphic units within the channels and valleys;
 - link the features identified from the sub-bottom data to known offshore and terrestrial landscape features; and
 - develop an outline deposit model based on the information gathered.

Results

- 4.3.20 The assessment of sub-bottom data has resulted in the identification of the features described in detail below and as illustrated on **Figure 17.1.7**.

MA3000

- 4.3.21 The sub-bottom assessment has shown that the mapping of the palaeo-Arun from the terrestrial zone follows the route as shown by Gupta *et al.* (2004) and continues to flow further south and turning east before the incision in the bedrock (Unit 1, **Table 4-2**) becomes less prominent. The valley is generally 3km wide but can be narrower in places, and the depth of the valley reaches 15m, the data indicates a flat valley floor. The thickness of the infill deposit varies between 5m and 15m. The western edge appears steep sided while the eastern edge is generally showing a gentle slope.
- 4.3.22 The infill (Unit 4, **Table 4-2**) is represented by dark reflectors which are indicating complex cut and fill deposits representing different stages of deposit movements across the lowland, filling the valley with sediments. It is likely that the Arun Valley has been a dominant feature through the Quaternary and that the basal erosion surface (as indicated by the base of the palaeochannel) is at least a 500,000-year-old surface (Gupta *et al.* 2004).
- 4.3.23 During stages of sea level movement areas of the Arun Valley would have been partly submerged and the lower levels dominated by tidal and marine conditions. It has been estimated that for the valley to have been completely exposed the sea level must have been below -45m (Gupta *et al.* 2004).
- 4.3.24 Erosion and stages of sediment infill are noted in section where a terrace formation is visible along the eastern edge with hard basal, probably gravel or sand deposits throughout the valley infill. Refill of the valley is noted, caused by fluvial movements, probably tidal and later marine conditions which filled the valley with silt, sand and possibly clay.
- 4.3.25 The as the Arun valley turns eastward it becomes hard to observe and the chalk bedrock (Unit 1, **Table 4-2**) becomes dominant overlain with a thinner layer of mobile sands (Unit 5, **Table 4-2**). It should however be noted that the sub-bottom survey data in this area was collected using lines going north-south, rather than the east-west lines, which does not show the edges of the north-south flowing valley as clearly. The data does not cover the extent of Rampion 1 Offshore Wind farm Area but there is an indication that the valley turns south again as the eastern edge is visible in the east—west lines in the middle of the Rampion 2 survey area. The southern part of the Arun Valley is located close to the Northern Palaeovalley of the English Channel (MA0001) and the palaeo-Arun is a tributary of this larger fluvial system.

MA3001

- 4.3.26 The Northern Palaeovalley was a large system that flowed from the east and joined the Median Palaeovalley offshore from Cherbourg, France before continuing westward along the Hurd Deep (Antoine *et al.* 2003).
- 4.3.27 A feature identified as the Northern Palaeovalley was identified in the Rampion 1 data and the channel edges were identified and mapped. The feature is also identified in the 2020 sub-bottom data (MA3001) and clearly corresponds with the location previously identified; however, it is more likely that MA3001 represents a channel or valley tributary associated with the Northern Palaeovalley rather than the main valley itself.

- 4.3.28 MA3001 is approximately 3km wide and clearly infilled, while parts of the Northern Palaeovalley is only partly or not at all infilled and tends to be up to 15km wide. MA30001 also seems to run south-north rather than east-west.
- 4.3.29 There is some overlap between the Rampion 1 survey area and the Rampion 2 survey area at this location and while no archaeological or geoarchaeological assessment was undertaken in relation to this valley it is clear from the survey reports that the infill is made up of mainly clays and silts; a spongy peat was located in VC03 (E.ON, 2012) at 0.21 – 0.45m Below Sea Bed (BSB).
- 4.3.30 The presence of peat in this part of the valley indicates a high rate of organic sedimentation with reduced erosion from marine influences or a quick burial of organic material from fluvial estuarine sediment input. It was also in this area that blanking was discovered during the Rampion 1 survey indicating the presence of peat and gas. Some blanking is also noted in the 2020 survey data, likely to be a result of a concentration of peat.
- 4.3.31 As understood from the sub-bottom data, MA3001 is an approximately 3km wide channel with varying layers of infill and indications of islands. The banks are not clearly evident on all lines but where visible they are steep, the infill can be up to 20m deep but is generally less than 5m, the channel base is mostly flat but rounded at the deepest parts of the valley indicating several cutting events.
- 4.3.32 The channel is also clearly visible on the north-south sub-bottom survey lines in the eastern area adjacent to Rampion 1 but does not appear as clearly on the east-west going lines. The valley is possibly connected to the palaeo-Arun valley as the infill reflectors and valley banks are similar in deposition and form. The physical connection between MA3000 and MA3001 may no longer be clearly evident as tidal and marine mobile sediments have eroded the chalk bedrock and valley edges or the connection is further inshore, north of the marine archaeology study area and outside the survey areas for both Rampion 1 and 2. Both MA3000 and MA3001 are also likely to join the Northern Palaeovalley further south.

MA3002

- 4.3.33 Another narrower channel ca 7km long is running south-west to north-east to the east of MA3001, the extent of the channel is not clearly defined. The bottom of the channel is wide, flat and uneven in places with some deeper cuts through the chalk. The infill in the channel is varied between light and dark reflectors representing soft material like silt mixed with a layers and pockets of sand or gravel. The depth of the channel is generally at around 10m deep but older cuts, especially close to the western bank go down to 20m with a rounded base. The eastern bank has a gentle slope and is at times hard to distinguish while the western edge generally shows steep banks. The composition of the infill and channel edges are similar to MA3000 and MA3001 and is likely to be associated with them. It also it is likely that this channel continues further north beyond the survey area. In the south the channel is both narrower and shallower before it turns eastwards and becomes slightly wider again.

MA3003

- 4.3.34 This braided channel is ca 1km wide with a clear main channel part and tributary streams getting more frequent as it stretches from the south to the north. The

channel banks are clearly defined with steep sides both in the east and west. The channel base is generally flat with a rounded base in deeper cuts up to 15m, more commonly found closer to the eastern channel bank. The infill is mostly shown as light reflectors representing soft material like silt mixed with a layers and pockets of sand or gravel. As with MA3000- MA3002 the channels and tributary it is likely that this is also a substantial tributary of the Northern Palaeovalley fluvial system.

MA3004 and MA3005

- 4.3.35 MA3004 and MA3005 are two narrow channels, 1km and 3km wide respectively, lying north east of MA3000. The direction of both of the channels is north-west south-east to southeast and indicates that they would probably join up with the main channel identified in the Rampion 1 data (E.ON, 2012).
- 4.3.36 MA3004 is ca 4.5km long, between 300m and 2km wide at its widest point in the east where it joins the Rampion 1 development area outside of the 2020 survey area. The channel base is mostly flat with gently sloping banks where the western bank is slightly more graduated than the eastern bank which is steeper. The infill reflectors indicate soft sediments in layers with a hard lag base.
- 4.3.37 1.3km of MA3005 of the feature falls within the geophysical survey area, the feature could be a smaller tributary of one of the other features and it is possibly associated with MA3004. The channel is ca 8m deep and 200-250m wide with a rounded base and mostly evenly sloped banks. The infill reflectors indicate soft sediments with a hard possible lag deposit at the bottom of the channel. The most eastern extent as picked up by the north-south going survey lines, has some higher ground or river islands which show prominently within the channel infill.

MA3006

- 4.3.38 MA3006 covers an area 2km by 800m and is a channel or lake feature with steep banks and an infill with hard reflectors possibly indicating gravel terraces, and some blanking in areas within the feature suggesting peat. The infill is generally ca 5m under the seabed but goes down to 20m depth in some areas. The extent of the channel is not known but it is possible that it continues into the Rampion 1 area and is associated with the channel previously identified (E.ON, 2012).

MA3007

- 4.3.39 This narrow, braided channel with a few tributaries is 5 km long, the widest part is 500m and the narrowest in its northern most extension is only approximately 100m wide. The feature is likely to be a smaller tributary of the Northern Palaeovalley fluvial system. The channel is in places underlying prominent sand banks and is cut into the underlying bedrock. In other places along the channel the sand bank is located west of the channel. The channel shows a flat base generally 6m deep. The eastern most tributary and the two northern most forks are 100m wide, 5m deep round-based channels with soft sediment infill and possibly with gravelly lag deposit at the base.

MA3008

- 4.3.40 A small feature on the western most edge of the survey extent. The feature is shallow at 6m deep with soft infill with a rounded base and steep banks.

MA3009

- 4.3.41 A 500m wide, 10m deep channel with a very flat base and very straight vertical banks on both sides. The reflections from the bedrock are not prominent in this area and the feature might be cutting through the Tertiary sediments (Unit 3 and 4, **Table 4-2**). The infill is a mixture of light and dark reflectors indicating silty sands and gravels. In the southern part of the channel, it is wider with a round base and flatter banks.

MA3010

- 4.3.42 Small area (2km by 2km) of shallow (9m) channel features with very soft infill, rounded base, and consistently steep banks. The channel is not visible on all lines and does not indicate a strong cut through the chalk bedrock but rather a cut through the Tertiary sediments (Unit 3 and 4, **Table 4-2**).

MA3011

- 4.3.43 An approximately 140m wide and nearly 5km long tributary associated with the surrounding channels. The tributary has a rounded base and gently sloping banks, is ca 4m deep, cut into the chalk bedrock and is infilled with soft material.

MA3012-MA3025

- 4.3.44 Simple cut and fill features not clearly associated with channels or valleys less than 10m deep and generally 100m wide. Likely to be associated with the Northern Palaeovalley.

MA3026

- 4.3.45 Small part of a simple cut and fill channel ca 250m wide and about 10m deep, the extent of the channel is not clear from the data coverage but might connect to terrestrial deposits. The infill reflectors indicate soft material, the north eastern bank is steeper than the south western bank which has a gentler slope. The position of the feature aligns with the palaeo-Arun feature as identified by Gupta *et al.* (2004) where the offshore section meets the terrestrial area. The feature is also identified further offshore (MA3000).

MA3027

- 4.3.46 A part of a braided channel extending outside the survey area. The feature is ca 700m wide at the southern extent with a clear main channel part and tributary streams in the northern area closer inshore. The channel banks are clearly defined with steep sides both in the east and west. The channel base is generally rounded and up to 10m deep. In the widest part in the south, the bank cutting through the bedrock shows flattened sides for up to 300m on either side of the channel indicating several stages of development. The feature is running parallel with the palaeo-Arun valley MA3000 and might represent the western extension as mapped by Gupta *et al.* (2004).

MA3028

- 4.3.47 Braided channel valley oriented north-west to south-east. The mapped extent is 5.3km, but it is likely that the feature extends beyond the data collection area. The

channel is 1.8km at its widest point with narrower tributaries in the north and west. The channel base at the widest part is flat, around 10m deep with steep sides on both the east and south west. The infill is mixed soft and hard materials with some indication of a harder lag layer and possible blanking indicating peat. The tributaries have rounded bases and support softer infill material. The feature might be an extension of MA3003 located directly south of MA3028. The north eastern bank of the channel is running parallel with the Goodwin Slindon raised beaches possibly connecting the offshore sediments with deposits identified in the terrestrial areas and dated to the Comerian age. The deposits are normally located at 30m OD and are associated with the Boxgrove site where the raised beach deposit is overlying a chalk bedrock (Timpany, 2009).

Outline deposit model

- 4.3.48 As outlined in **Table 4-2** the seabed in the marine archaeology study area is predominantly gravels and sands (Unit 5) which are overlying consolidated and clays (Unit 3 and 2). The fine-grained sediments tend to be mobile which allows coarse-grained surface deposits to form. The underlying geology in the area is characterised by Upper Cretaceous Chalk (Unit 1) which is in places cut by channel and valley features filled with Unit 4.
- 4.3.49 The outline deposit model will be further refined following a staged geoarchaeological assessment as outlined in the Outline Marine WSI (C-57) **Table 2-3**.

Table 4-2 Outline deposit model

Unit	Sediment	Description	Epoch	Geoarchaeological potential
5	Mobile seabed sediments	Sand and gravel	Holocene	No
4	Channel/Valley infill	Soft possibly peaty clay and sand	Late Pleistocene to Early Holocene	Yes
3	London Clay	Firm to hard silty clay	Tertiary	Low
2	Lambeth group	Silt, clay and sand	Tertiary	Low
1	Cretaceous Upper Chalk Group.	Chalk and gravel	Cretaceous	No

5. Mitigation

5.1 Introduction

- 5.1.1 As detailed below the embedded environmental measures are proposed to reduce the potential for impacts on marine archaeology. The agreed embedded environmental measures are further detailed in **Table 2-3**. It is assumed that the embedded environmental measures will evolve during the development process and in response to consultation feedback.
- 5.1.2 The mitigation strategies outlined below are supported by the embedded environmental measures and have been designed to reduce or eliminate direct impact on known, unknown and potential heritage receptors. This approach is further detailed in **Volume 2, Chapter 17: Marine archaeology** and is expected to be reflected in the DCO requirements or dML conditions.

5.2 Mitigation for known wrecks and obstructions

- 5.2.1 Seventy-five wrecks identified in the data provided by UKHO and NRHE are located within the marine archaeology study area. Of the 75 wrecks, 49 are classed as LIVE. In addition, there are 31 foul and seabed obstructions and 85 recorded losses.
- 5.2.2 As per embedded environmental measure C-60 **Table 2-3** precautionary AEZs of 50m radius is recommended for all 191 known maritime heritage receptors, as illustrated in **Figure 17.1.6**. Full details of locations are provided **Annex A**.

5.3 Mitigation for geophysical anomalies of archaeological potential

- 5.3.1 The combined geophysical data assessments undertaken to identify material of archaeological potential identified anomalies of low, medium and high archaeological potential within the marine archaeology study area as detailed in **Table 4-1**.
- 5.3.2 Anomalies of low archaeological potential and magnetic anomalies > 100nT without correlating seabed feature have, due to the uncertainty of their archaeological potential, not been assigned archaeological exclusion zones (AEZ).
- 5.3.3 As per environmental measure C-57 **Table 2-3** if any works during the construction, operational and decommissioning phases of the project are taking place within the RED area, the project specific protocol for archaeological discoveries (**Volume 4, Appendix 17.2: Outline Marine Written Scheme of Investigation, Annex A**) should be observed and any objects of archaeological potential should be reported.
- 5.3.4 As per embedded environmental measure C-60 **Table 2-3**, anomalies assigned medium and high archaeological potential are probably of anthropogenic origin and of archaeological significance and have therefore been assigned archaeological exclusion zones based on the archaeological potential, the archaeological significance and size as understood from the geophysical data

assessment. The AEZ have been placed as a radius from the centre point of the feature.

- 5.3.5 Thirty-one high potential and 24 medium potential anomalies have been assigned AEZs per **Figure 17.1.4** and **Annex A**.

5.4 Mitigation for deposits of geoarchaeological potential

- 5.4.1 The baseline review in **Section 3**, supported by the geophysical survey data, (**Section 4**) has provided information about potential Holocene sediments and palaeolandscapes within the marine archaeology study area.
- 5.4.2 It is recognised that all phases of the development may cause direct impact to deposits which have the potential to be of geoarchaeological interest, however the impact to the mentioned sediments will be restricted to the required burial and penetration depths, as outlined in **Volume 2, Chapter 17**.
- 5.4.3 As per environmental measure C-59 **Table 2-3** any potential impact will be offset by the collection and analysis of geotechnical data. The geoarchaeological assessment will be undertaken using a staged geoarchaeological approach to assessment and analysis of the collected geotechnical data as further outlined in **Volume 4, Appendix 17.2: Outline Marine Written Scheme of Investigation, Annex A**.

5.5 Mitigation for unexpected archaeological discoveries

- 5.5.1 Environmental measures C-58 and C-59 (**Table 2-3**) ensures that archaeological input is sought ahead of and during all relevant geophysical and geotechnical surveys throughout construction, operation or decommissioning undertaken at Rampion 2.
- 5.5.2 Further, as per embedded environmental measure C-57 **Table 2-3**, it is proposed that if any finds believed to be of archaeological potential are recovered by any operating vessels during construction, operation or decommissioning they should be reported using the methodology outlined in the project-specific Protocol for Archaeological Discoveries (PAD) (**Volume 4, Appendix 17.2: Outline Marine Written Scheme of Investigation, Annex A**).
- 5.5.3 The PAD document aims to mitigate the effect on the historic environment by enabling people working offshore to report their finds in an effective and convenient manner.
- 5.5.4 Any finds discovered should be safeguarded for instance, kept in water in a clean, covered container. It is not recommended to remove concretions, clean the finds, or in any other way interfere with them.
- 5.5.5 Crew on board the vessels and onshore staff should familiarise themselves with the PAD and the reporting procedures it describes, which is further detailed in the **Volume 4, Appendix 17.2: Outline Marine Written Scheme of Investigation, Annex A**.

6. Glossary of terms and abbreviations

Table 6-1 Glossary of terms and abbreviations

Term (acronym)	Definition
Archaeological Exclusion Zones (AEZs)	Buffers around known marine heritage receptors that should be avoided during construction works.
Before Present (BP)	Time scale referring to the years before 1950.
Bronze Age	This period follows on from the Neolithic and is characterized by the increasing use of Bronze work. It is subdivided in the Early, Middle and Late Bronze Age. Archaeological period lasting from 2,600-700 BC.
Deemed Marine Licence (dML)	If a Development Consent Order (DCO) is granted, this may include provision deeming a marine licence to have been issued under Part 4 of the Marine and Coastal Access Act 2009.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Decommissioning	The period during which a development and its associated processes are removed from active operation.
Early Medieval	This dates from the breakdown of Roman rule in Britain to the Norman invasion in 1066 and is to be used for monuments of post Roman, Saxon and Viking date. Archaeological period lasting from AD410 to 1066.
Early Prehistoric	For monuments which are characteristic of the Palaeolithic to Mesolithic but cannot be specifically assigned. Archaeological period lasting from 50,000 to 4,000 BC.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Regulations, 2017	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. The EIA regulations

Term (acronym)	Definition
	require that the effects of a project, where these are likely to have a significant effect on the environment, are taken into account in the decision-making process for the project.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Geophysical	Relating to the physical properties of the Earth.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
Historic England	The public body that champions and protects England's historic places.
Historic England National Record of the Historic Environment (NRHE)	National database of known wrecks and reported losses held by Historic England.
Historic Seascape Characterisation (HSC)	Maps and describes historic cultural influences which shape seascape perceptions across marine areas and coastal land.
Impact	The changes resulting from an action.
Intertidal	The area of the shoreline which is covered at high tide and uncovered at low tide.
Iron Age	This period follows on from the Bronze Age and is characterized by the use of iron for making tools and monuments such as hillforts and oppida. The Iron Age is taken to end with the Roman invasion. Archaeological period lasting from 800 BC to AD 43.
Last Glacial Maximum	Most recent time during the last glacial period that the ice sheets were at their greatest extents, approximately 26,500-19,000 years ago.
Marine archaeology study area	Defined as the PEIR Boundary area up to MHWS and surrounded by a 2 km buffer.
Marine Heritage Receptors	Physical resources such as shipwrecks, remains of aircraft, archaeological sites, archaeological finds and material including pre-historic deposits as well as archival documents and oral accounts recognised as of historical/archaeological or cultural significance.

Term (acronym)	Definition
Marine Management Organisation (MMO)	MMO is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs. MMO license, regulate and plan marine activities in the seas around England so that they're carried out in a sustainable way.
Medieval	The Medieval period or Middle Ages begins with the Norman invasion and ends with the dissolution of the monasteries. Archaeological period lasting from AD 1066-1540.
Mesolithic	The Middle Stone Age, falling between the Palaeolithic and the Neolithic; marks the beginning of a move from a hunter gatherer society towards food producing society. Archaeological period lasting from 10,000-4,000 BC.
MBES	Multi-beam Echo Sounder
Nanotesla (nT)	Measurement describing the magnetic field (flux) of ferrous materials as measures by a magnetometer. (one nanotesla equals 10 ⁻⁹ tesla)
Neolithic	This period follows on from the Palaeolithic and the Mesolithic and is itself succeeded by the Bronze Age. This period is characterized by the practice of a farming economy and extensive monumental constructions. Archaeological period lasting from 4,000-2,200 BC.
Offshore	The sea further than two miles from the coast.
Offshore Wind Farm	An offshore wind farm is a group of wind turbines in the same location (offshore) in the sea which are used to produce electricity.
Palaeolithic	The period is defined by the practice of hunting and gathering and the use of chipped flint tools. This period is usually divided up into the Lower, Middle and Upper Palaeolithic. Archaeological period lasting from 50,000-10,000 BC.
Preliminary Environmental Information Report (PEIR)	Presents the results of the Environmental Impact Assessment to date and the results of the potential impacts of Rampion 2 Offshore Wind Farm on marine archaeology heritage receptors.

Term (acronym)	Definition
PEIR Assessment Boundary	The area comprised of the export cable corridor and wind farm array within which the construction, operation and maintenance of Rampion 2 will occur.
Post-medieval	Begins with the dissolution of the monasteries (AD 1536-1541) and ends with the death of Queen Victoria (AD 1901). A more specific period is used where known. Archaeological period lasting from AD 1540-1901.
Proposed Development	The development that is subject to the Application for development consent.
Protocol for Archaeological Discoveries (PAD)	A document detailing how finds made during the lifetime of the Proposed Development should be reported.
Receiver of Wreck	Official of the British Government whose main task is to administer the law in relation to Wreck and Salvage.
RED	Rampion Extension Development Limited
Roman period	Traditionally begins with the Roman invasion in AD 43 and ends with the emperor Honorius directing Britain to look to its own defences in AD 410. Archaeological period lasting from AD 43-410.
SBP	Sub-Bottom Profiler
Scour	A localised sediment erosion feature caused by local enhancement of flow speed and turbulence due to interaction with an obstacle.
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
SSS	Side Scan Sonar
Study area	Area where potential impacts from the Proposed Development could occur, as defined for each aspect.
UHRs	Ultra-High Resolution Seismic

Term (acronym)	Definition
United Kingdom Hydrographic Office (UKHO)	Database of known wrecks and obstructions held and maintained by the UKHO.
West Sussex Historic Environment Record	This record collection provides details of all known archaeological assets, sites and former archaeological events within West Sussex.
Written Scheme of Investigation (WSI)	A document forming the agreement between the client, the appointed archaeologists, contractors and the relevant stakeholders. The document sets out methods to mitigate the effects on all the known and potential marine heritage receptors within the development area.

7. Figures

Figure 17.1.1 Marine archaeology study area

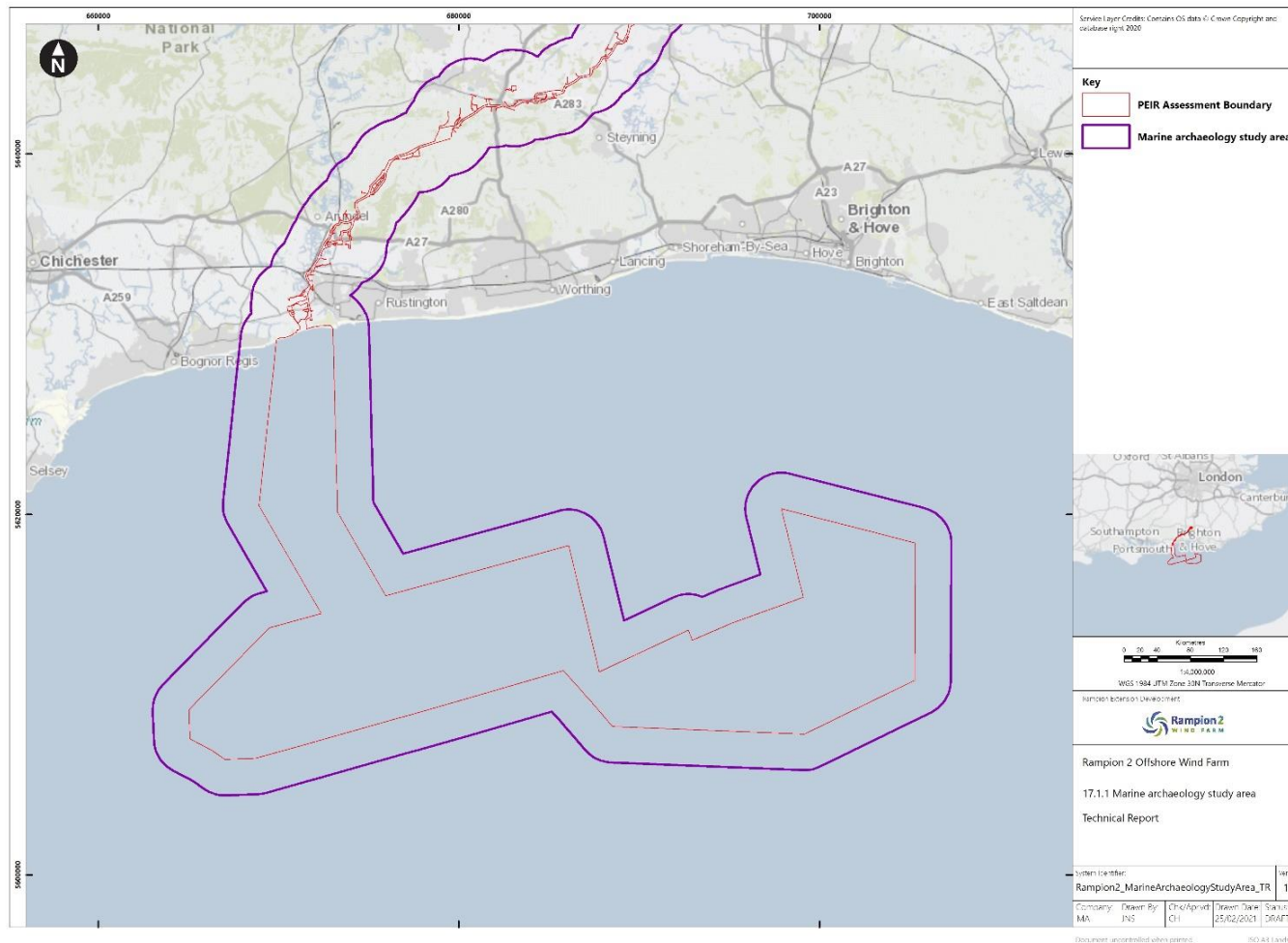


Figure 17.1.2 Known wrecks and obstructions within the marine archaeology study area

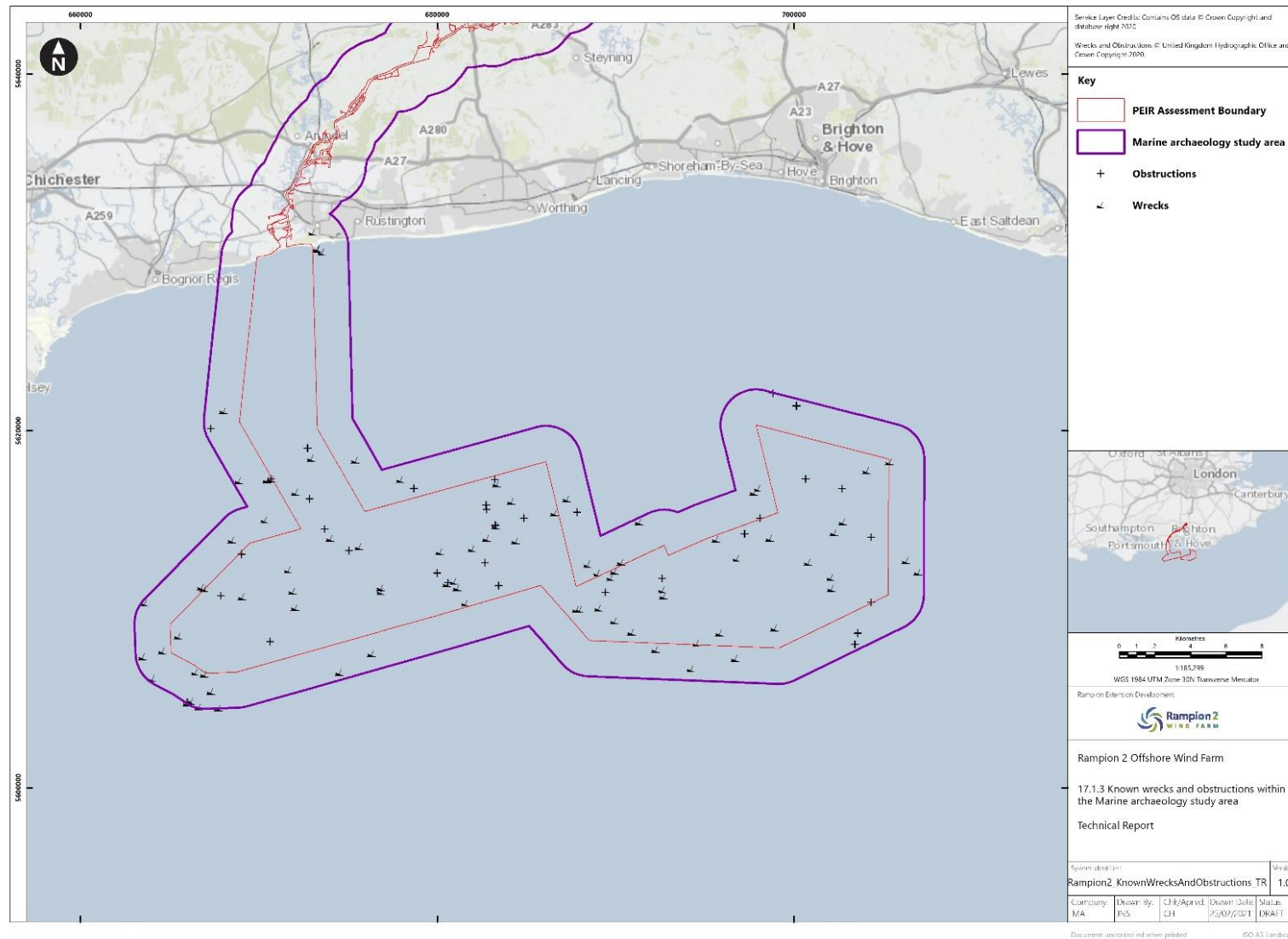


Figure 17.1.3 Historic seascapes broad historic character types

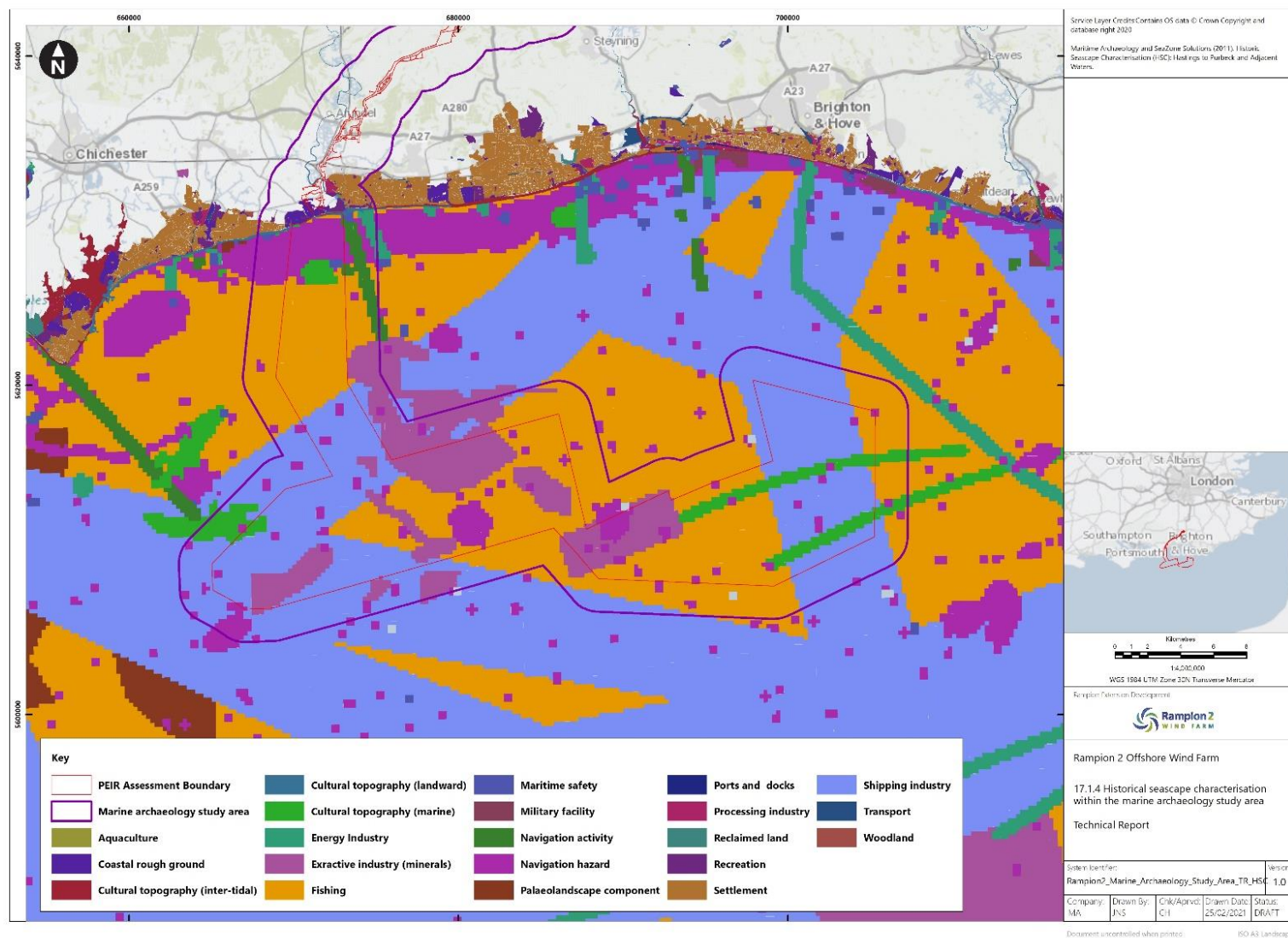


Figure 17.1.4 Archaeological anomalies of high and medium potential

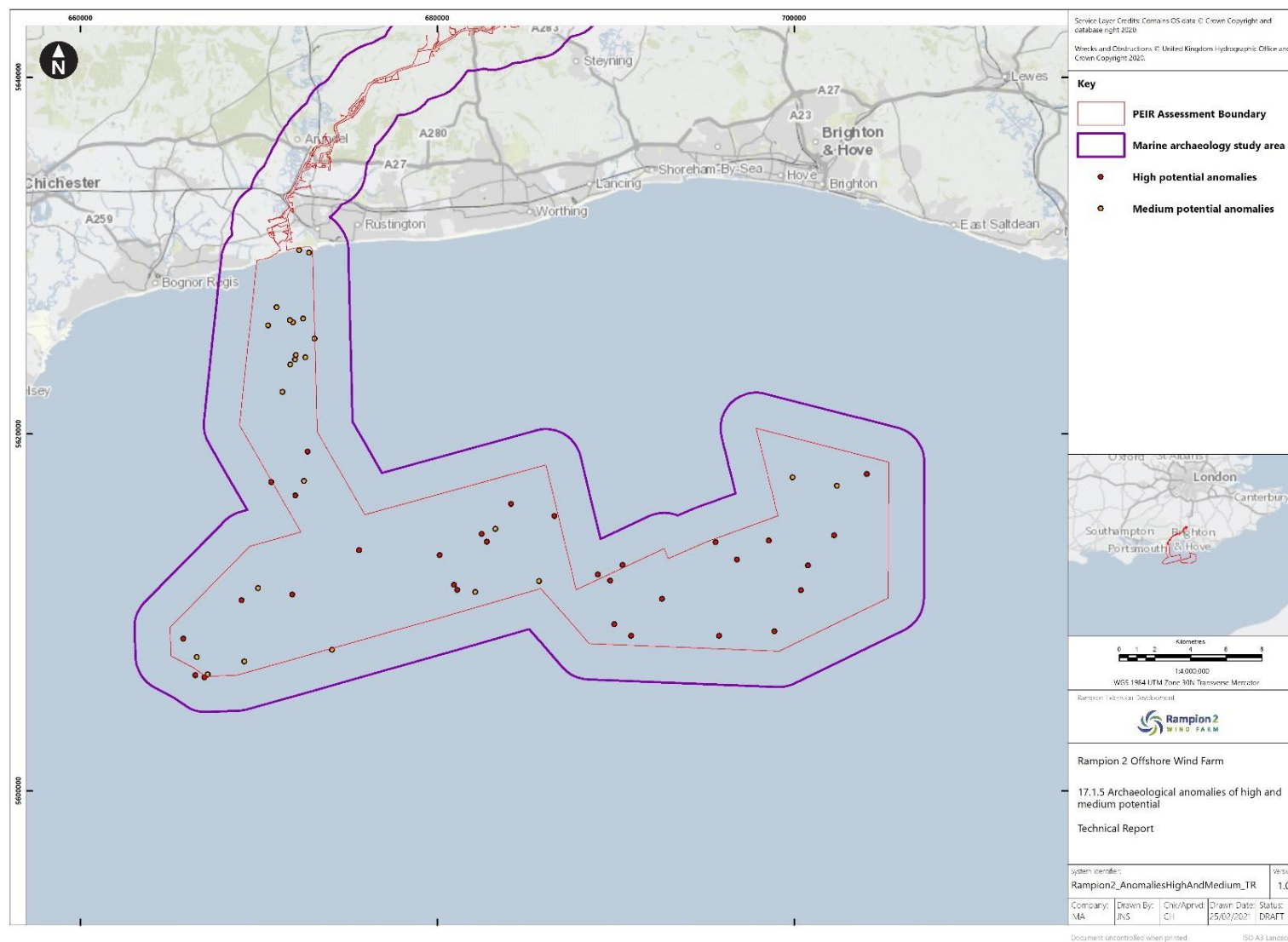


Figure 17.1.5 Archaeological anomalies of low potential

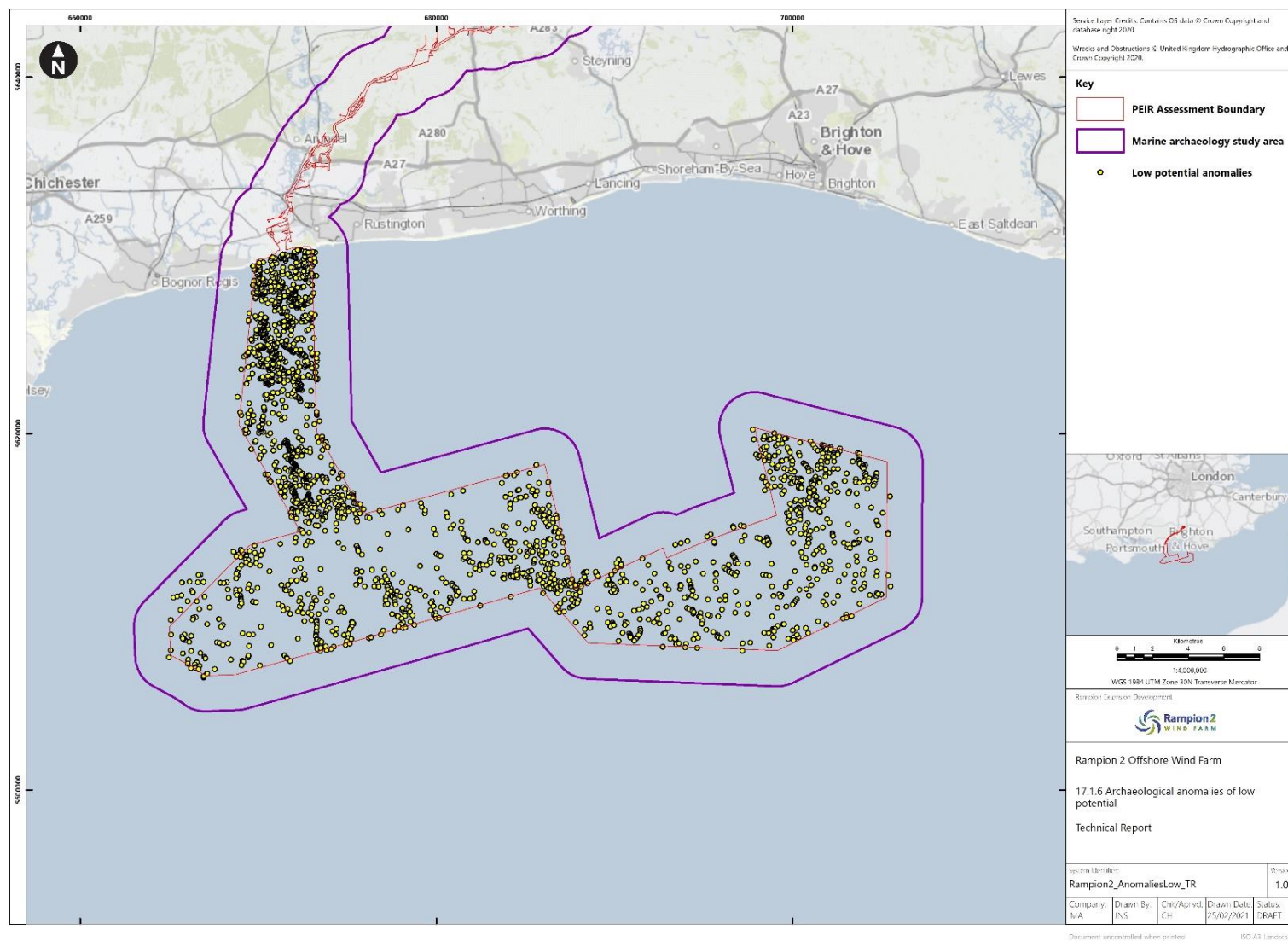


Figure 17.1.6 Archaeological exclusion zones recommended for high and medium potential anomalies

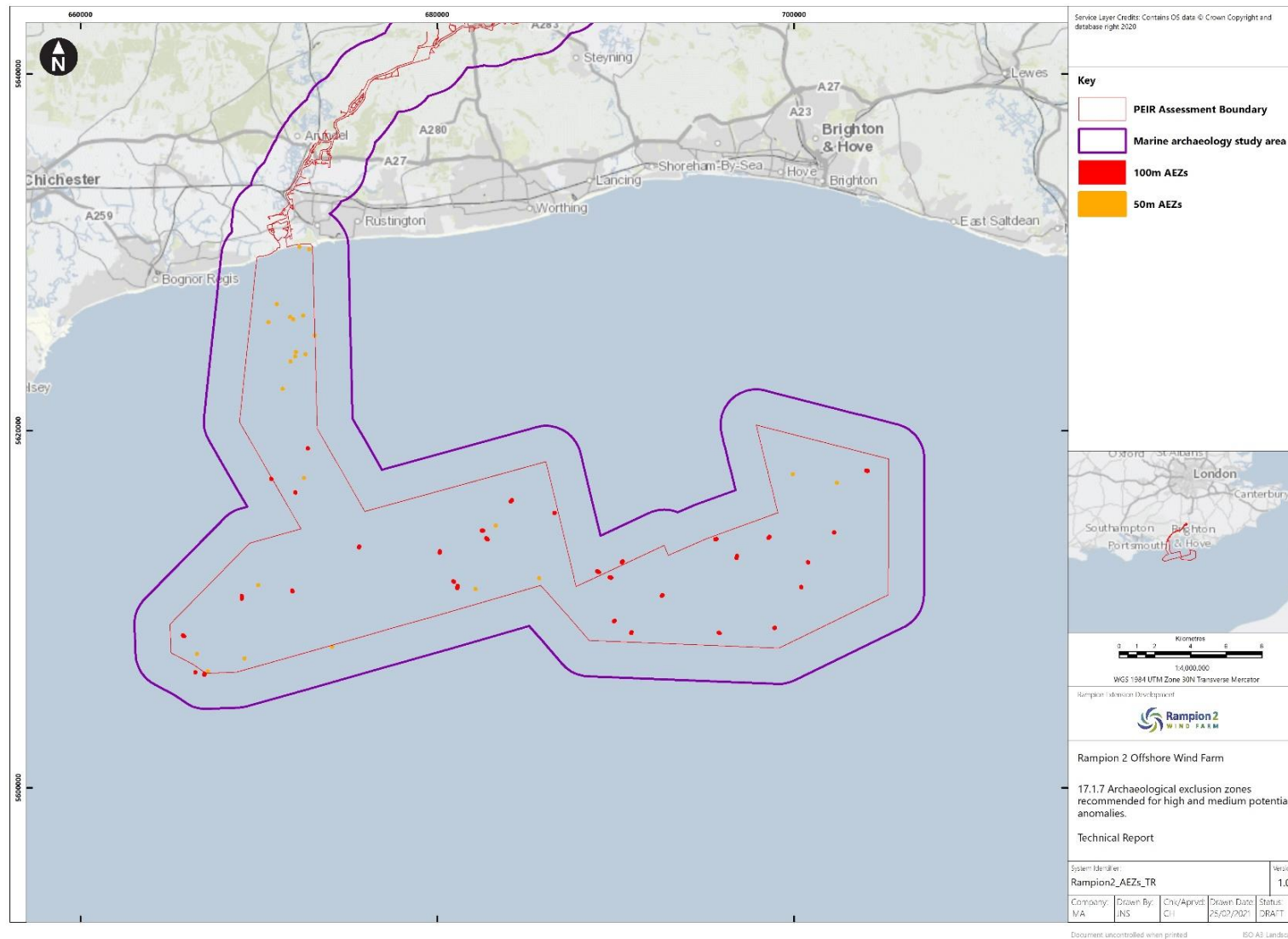
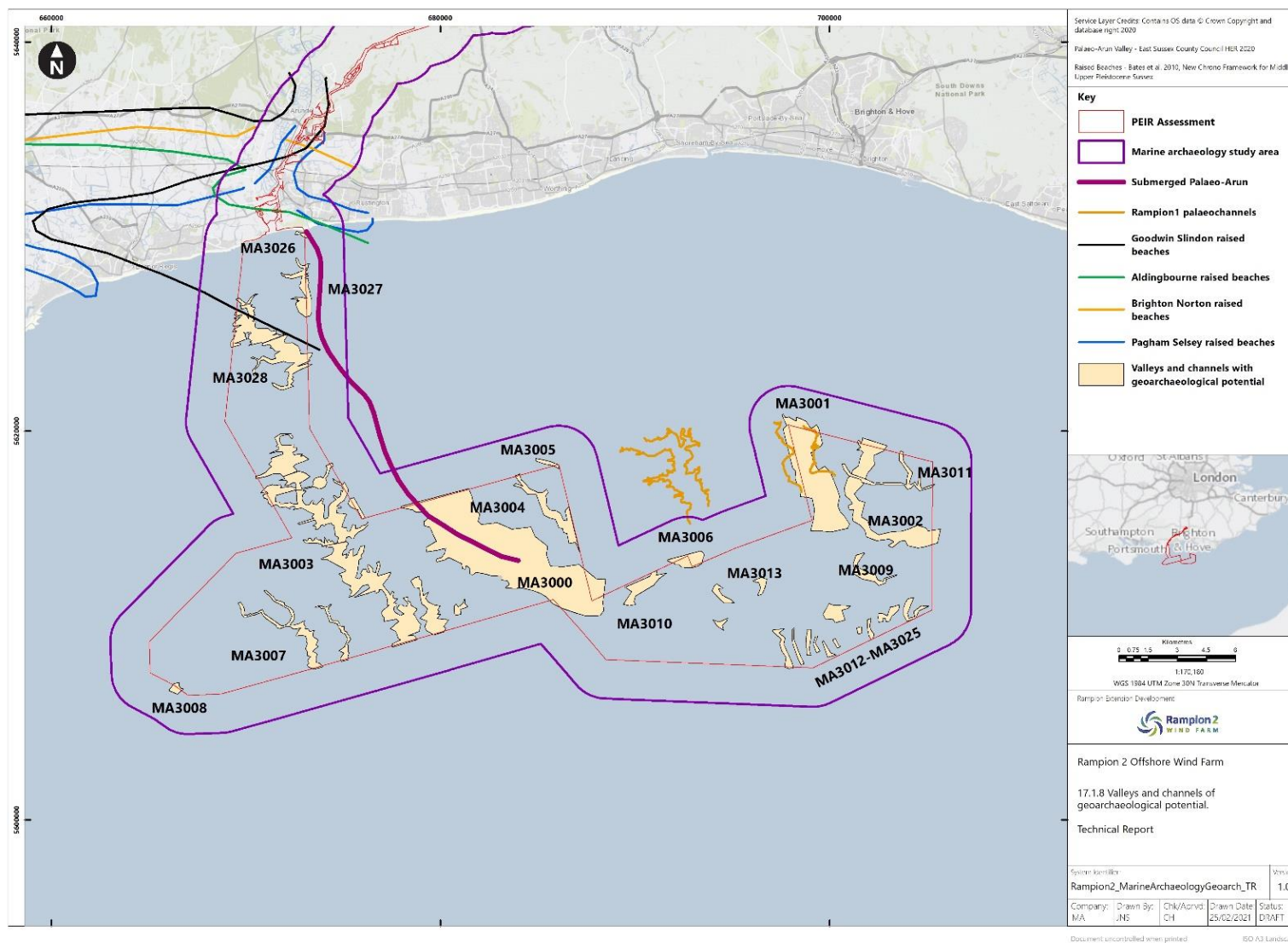


Figure 17.1.7 Valleys and channels with geoarchaeological potential



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Annex A

Known wrecks and obstructions

Description	GID	Wreck name	Information	Status	X	Y
Obstruction, Foul ground	1001698640				-0.32208333330	50.61948333330
Obstruction, Foul ground	1001698772				-0.60905000000	50.64493333330
Obstruction, Foul ground	1001698786				-0.34208333330	50.66031666670
Obstruction, Foul ground	1001698789				-0.52373333330	50.64505000000
Obstruction, Foul ground	1001698860		Fisherman's Fastener		-0.10988333330	50.64226666670
Obstruction, Foul ground	1001698912				-0.62650000000	50.62448333330
Obstruction, Foul ground	1001699286				-0.16516666670	50.70976666670
Obstruction, Foul ground	1001708579		Fisherman's Fastener	dead	-0.19738333330	50.65393333330
Obstruction, Foul ground	1001708008		Fisherman's Fastener	dead	-0.12348333330	50.59421666670
Obstruction, Foul ground	1001708038		Fisherman's Fastener	dead	-0.12598333330	50.58866666670
Obstruction, Foul ground	1001708277		Fisherman's Fastener	dead	-0.15988333330	50.67281666670
Obstruction, Foul ground	1001708315		Fisherman's Fastener	dead	-0.20986666670	50.64643333330
Obstruction, Foul ground	1001708408		Fisherman's Fastener	dead	-0.13155000000	50.66726666670

Description	GID	Wreck name	Information	Status	X	Y
Obstruction, Foul ground	1001708414		Stones/Masonry/Rubble	dead	-0.41401666670	50.66560000000
Obstruction, Foul ground	1001708430		Fisherman's Fastener	dead	-0.11183333330	50.60948333330
Obstruction, Undefined	302182880				-0.40640000000	50.67830000000
Obstruction, Undefined	302182881				-0.58373330000	50.68245000000
Wreck, Non-dangerous wreck	1001698638	QUAIL	steam ship; Sunk: 1886/08/27; Length: 68.3m; Beam: 8.5m; Draught: 5.2m; Tonnage: 924; Cargo: natural fibres and materials in general		-0.30875000000	50.63448333330
Wreck, Non-dangerous wreck	1001698661	LONDON TRADER (POSSIBLY)	steam ship; Sunk: 1940/07/26; Length: 59.9m; Beam: 8.8m; Draught: 3.4m; Tonnage: 646; Cargo: 750 tons of coal		-0.30258333330	50.59903333330
Wreck, Non-dangerous wreck	1001698662				-0.18925000000	50.59848333330
Wreck, Non-dangerous wreck	1001698668	BROADHURST (PROBABLY)	steam ship; Sunk: 1940/07/26; Length: 66.1m; Beam: 10.4m; Draught: 4m;		-0.23310000000	50.59698333330

Description	GID	Wreck name	Information	Status	X	Y
			Tonnage: 1013; Cargo: coal			
Wreck, Non-dangerous wreck	1001698676	VESUVIO (POSSIBLY)	steam ship; Sunk: 1916/04/06; Length: 74.1m; Beam: 10.1m; Draught: 5.5m; Tonnage: 1391; Cargo: general, including ammunition		-0.50881666670	50.59273333330
Wreck, Non-dangerous wreck	1001698689				-0.28408333330	50.58995000000
Wreck, Non-dangerous wreck	1001698719	GLENARM HEAD (POSSIBLY)	steam ship; Sunk: 1918/01/04; Length: 109.7m; Beam: 14m; Draught: 6.1m; Tonnage: 3908; Cargo: fodder, guns and charcoal		-0.22141666670	50.58393333330
Wreck, Non-dangerous wreck	1001698723	CLAN MACMILLAN	steam ship; Sunk: 1917/03/23; Length: 120.7m; Beam: 14.6m; Draught: 8.2m; Tonnage: 4525; Cargo: BALLAST & 50TONS COIR MATTING		-0.25663333330	50.57950000000

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Non-dangerous wreck	1001698773		trawler		-0.139333333330	50.64531666670
Wreck, Non-dangerous wreck	1001698782		steam ship; Cargo: coal		-0.27625000000	50.61671666670
Wreck, Non-dangerous wreck	1001698811	HMS MINION	destroyer; Sunk: 1921/01/01; Length: 84.1m; Beam: 8.2m; Draught: 3m; Tonnage: 1042		-0.232933333330	50.64421666670
Wreck, Non-dangerous wreck	1001698817	GERLEN (POSSIBLY)	motor vessel; Sunk: 1972/07/19; Length: 38.7m; Beam: 7m; Draught: 2.4m; Tonnage: 299		-0.16071666670	50.63088333330
Wreck, Non-dangerous wreck	1001698827	GLENARM HEAD (POSSIBLY)	steam ship; Sunk: 1918/01/04; Length: 109.7m; Beam: 14m; Draught: 6.1m; Tonnage: 3908; Cargo: ammunition		-0.190433333330	50.64365000000
Wreck, Non-dangerous wreck	1001698830	PORTHKERRY	steam ship; Sunk: 1917/05/20; Length: 85.3m; Beam: 12.2m; Draught: 5.5m;		-0.31430000000	50.63005000000

Description	GID	Wreck name	Information	Status	X	Y
			Tonnage: 1920; Cargo: coal			
Wreck, Non-dangerous wreck	1001698895				-0.31581666670	50.60500000000
Wreck, Non-dangerous wreck	1001698914				-0.07405000000	50.62366666670
Wreck, Non-dangerous wreck	1001699936	HMS VERNON II (POSSIBLY)	steam ship; Sunk: 1924/11/29; Length: 74.7m; Beam: 18.6m; Tonnage: 6300		-0.63123333330	50.56800000000
Wreck, Non-dangerous wreck	1001707989			dead	-0.13210000000	50.65060000000
Wreck, Non-dangerous wreck	1001708065	ALERT	steam ship; Sunk: 1916/11/28; Length: 38.1m; Beam: 7m; Draught: 3m; Tonnage: 289	dead	-0.53483333330	50.58393333330
Wreck, Non-dangerous wreck	1001708267		Wooden Vessel; Sunk: 1955/12/08	dead	-0.40513333330	50.67615000000
Wreck, Non-dangerous wreck	1001708285			dead	-0.39160000000	50.64701666670
Wreck, Non-dangerous wreck	1001708378		Cargo: 507,1	dead	-0.42651666670	50.64393333330

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Non-dangerous wreck	1001708395	MARIE MARGUERITE (POSSIBLY)	sailing vessel; Sunk: 1924/11/07; Length: 47.7m; Beam: 9.4m; Draught: 4.3m; Tonnage: 491; Cargo: coke	dead	-0.34320000000	50.61143333330
Wreck, Dangerous wreck	1001698634		landing craft		-0.51586666670	50.64685000000
Wreck, Dangerous wreck	1001698637	STANWOLD	steam ship; Sunk: 1941/02/27; Length: 64m; Beam: 10.1m; Draught: 4.3m; Tonnage: 1020; Cargo: coal		-0.33541666670	50.63393333330
Wreck, Dangerous wreck	1001698663	CARBINEER	steam ship; Sunk: 1914/04/22; Length: 67.1m; Beam: 10.1m; Draught: 4.6m; Tonnage: 1266; Cargo: general and mixed goods		-0.67445000000	50.59758333330
Wreck, Dangerous wreck	1001698672	HEDWIG LUNSTEDT	carrier; Sunk: 1974/01/28; Length: 60.4m; Beam: 10.7m; Draught: 4m; Tonnage: 424; Cargo:		-0.69021666670	50.59500000000

Description	GID	Wreck name	Information	Status	X	Y
			ferrous elements and ore			
Wreck, Dangerous wreck	1001698697	LIGHTFOOT (POSSIBLY)	steam ship; Sunk: 1918/03/16; Length: 81.7m; Beam: 20m; Draught: 2m; Tonnage: 1875; Cargo: ballast		-0.64881666670	50.58633333330
Wreck, Dangerous wreck	1001698704	AFON DULAIS	steam ship; Sunk: 1942/06/20; Length: 63.4m; Beam: 10.1m; Draught: 4m; Tonnage: 988; Cargo: coal		-0.64173333330	50.58525000000
Wreck, Dangerous wreck	1001698716	BASIL-2	steam ship; Sunk: 1917/11/11; Length: 103m; Beam: 13.4m; Draught: 7.9m; Tonnage: 3223; Cargo: ammunition		-0.68313333330	50.58378333330
Wreck, Dangerous wreck	1001698727	ALGIERS	steam ship; Sunk: 1917/02/26; Length: 91.4m; Beam: 11.3m; Draught: 8.2m; Tonnage: 2361; Cargo: munitions		-0.63681666670	50.57643333330

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Dangerous wreck	1001698765	NY-EEASTEYR	fishing vessel; Sunk: 1980/12/08; Length: 24.1m; Beam: 6.4m; Draught: 2.4m; Tonnage: 61		-0.36011666670	50.66051666670
Wreck, Dangerous wreck	1001698774	PAGENTURM	steam ship; Sunk: 1917/05/16; Length: 122.2m; Beam: 15.8m; Draught: 8.5m; Tonnage: 5000; Cargo: military stores		-0.21710000000	50.63421666670
Wreck, Dangerous wreck	1001698831	HMS KERYADO (PROBABLY)	trawler; Sunk: 1941/03/06; Length: 39.6m; Beam: 7.6m; Tonnage: 252		-0.08321666670	50.62976666670
Wreck, Dangerous wreck	1001698842	JAFFA	steam ship; Sunk: 1918/02/02; Length: 79.2m; Beam: 10.7m; Draught: 4.9m; Tonnage: 1383; Cargo: ballast		-0.45200000000	50.64286666670
Wreck, Dangerous wreck	1001698846		freighter		-0.32791666670	50.62921666670
Wreck, Dangerous wreck	1001698848				-0.44178333330	50.62770000000

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Dangerous wreck	1001698867		steam ship; Tonnage: 2000; Cargo: ballast		-0.31763333330	50.62698333330
Wreck, Dangerous wreck	1001698869		barge		-0.56973333330	50.62550000000
Wreck, Dangerous wreck	1001698878	ZAANSTROOM	steam ship; Sunk: 1911/12/21; Length: 65.1m; Beam: 9.8m; Draught: 5.1m; Tonnage: 990; Cargo: china clay		-0.61645000000	50.65228333330
Wreck, Dangerous wreck	1001698881				-0.53853333330	50.65156666670
Wreck, Dangerous wreck	1001698891	CAIRNDHU	steam ship; Sunk: 1917/04/15; Length: 112.8m; Beam: 15.5m; Draught: 7.6m; Tonnage: 4019; Cargo: coal		-0.43921666670	50.62463333330
Wreck, Dangerous wreck	1001698893	GARTLAND	steam ship; Sunk: 1918/01/03; Length: 91m; Beam: 12.2m; Draught: 6.1m; Tonnage: 2613; Cargo: 3440 tons coal		-0.66150000000	50.60490000000

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Dangerous wreck	1001698904	ARIEL	steam ship; Sunk: 1892/06/10; Length: 91.4m; Beam: 12.8m; Draught: 6.1m; Tonnage: 2200; Cargo: grain		-0.41475000000	50.64883333330
Wreck, Dangerous wreck	1001698913	WAR HELMET	steam ship; Sunk: 1918/04/19; Length: 135.6m; Beam: 17.7m; Draught: 12.2m; Tonnage: 8184; Cargo: ballast		-0.60983333330	50.62348333330
Wreck, Dangerous wreck	1001698915	HMS SAPPER	trawler; Sunk: 1917/12/29; Length: 39.6m; Beam: 4.1m; Draught: 3.9m; Tonnage: 276		-0.68721666670	50.62200000000
Wreck, Dangerous wreck	1001698982		Boiler/Engine/Genera tor		-0.58373333330	50.68241666670
Wreck, Dangerous wreck	1001698983		sailing vessel; Cargo: general		-0.60970000000	50.68210000000
Wreck, Dangerous wreck	1001698984	SHIRALA	steam ship; Sunk: 1918/07/02; Length: 125m; Beam: 15.5m; Draught: 8.8m;		-0.58716666670	50.68208333330

Description	GID	Wreck name	Information	Status	X	Y
			Tonnage: 5306; Cargo: ammunition, general, wine, ivory and spares			
Wreck, Dangerous wreck	1001698999		steam ship; Cargo: 505,6		-0.48141666670	50.67993333330
Wreck, Dangerous wreck	1001699013	GLENLEE	steam ship; Sunk: 1918/08/09; Length: 121.9m; Beam: 16.2m; Draught: 8.2m; Tonnage: 4915; Cargo: 2100 tons of steel		-0.56483333330	50.67531666670
Wreck, Dangerous wreck	1001699016	CITY OF WATERFORD	steam ship; Sunk: 1949/04/14; Length: 82.3m; Beam: 11m; Draught: 4.9m; Tonnage: 1334; Cargo: 1000 tons of general		-0.11155000000	50.67588333330
Wreck, Dangerous wreck	1001699038	RAMSGARTH	steam ship; Sunk: 1916/11/28; Length: 74.7m; Beam: 11m; Draught: 5.8m; Tonnage: 1553; Cargo: ballast		-0.39415000000	50.66705000000

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Dangerous wreck	1001699065	HMS NORTHCOATE S	trawler; Sunk: 1944/12/02; Length: 38m; Beam: 7.6m; Tonnage: 277		-0.589933333330	50.66196666670
Wreck, Dangerous wreck	1001699103	HMS PINE	trawler; Sunk: 1944/01/31; Length: 45.7m; Beam: 7.6m; Draught: 3.7m; Tonnage: 545		-0.619733333330	50.71761666670
Wreck, Dangerous wreck	1001708291	JENNY	fishing vessel; Sunk: 1979/09/14; Length: 16.2m	dead	-0.499850000000	50.623933333330
Wreck, Dangerous wreck	1001708292	TYCHO	steam ship; Sunk: 1917/05/20; Length: 102.1m; Beam: 14.3m; Draught: 7m; Tonnage: 3216; Cargo: general and mixed goods	dead	-0.14321666670	50.62281666670
Wreck, Dangerous wreck	1001708356	PORTHKERRY	steam ship; Sunk: 1917/05/20; Length: 85.3m; Beam: 12.2m; Draught: 5.5m; Tonnage: 1920	dead	-0.14321666670	50.61726666670

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Wreck showing any portion of hull or superstructure	1001702055	LCM	Length: 15.2m; Beam: 4.3m; Draught: 1.2m; Tonnage: 30	lifted	-0.54095000000	50.79751666670
Wreck, Wreck showing any portion of hull or superstructure	1001702056		landing craft; Length: 15.2m; Beam: 4.3m; Draught: 1.2m; Tonnage: 30	lifted	-0.54151666670	50.79725000000
Obstruction, Foul ground	302183368				-0.41356670000	50.66340000000
Wreck, Dangerous wreck	302183484				-0.64170000000	50.62920000000
Wreck, Dangerous wreck	302183485				-0.65318330000	50.57185000000
Wreck, Dangerous wreck	302183486				-0.64706670000	50.56888330000
Wreck, Dangerous wreck	302183487				-0.40705000000	50.65508330000
Obstruction, Undefined	302110600				-0.40713333330	50.65513333330
Obstruction, Undefined	1001699851				-0.65583333330	50.57133333330
Wreck, Non-dangerous wreck	302183409				-0.34551670000	50.61146670000
Obstruction, Undefined	1001698889		NON-SUB CONTACT		-0.27653333330	50.62560000000
Obstruction, Undefined	1001699037				-0.55366666670	50.67180000000

Description	GID	Wreck name	Information	Status	X	Y
Obstruction, Undefined	1001699288				-0.63023333330	50.70873333330
Obstruction, Undefined	1001708518			dead	-0.58871666670	50.60060000000
Obstruction, Undefined	1001708532			dead	-0.38430000000	50.65836666670
Obstruction, Undefined	1001708548			dead	-0.45456666670	50.63226666670
Obstruction, Undefined	1001708822			dead	-0.18333333330	50.71666666670
Obstruction, Snag or stump	1001698839		Stones/Masonry/Rubble		-0.54250000000	50.65633333330
Obstruction, Snag or stump	1001698890		Stones/Masonry/Rubble		-0.40611666670	50.62483333330
Obstruction, Snag or stump	1001698926		Stones/Masonry/Rubble		-0.41655000000	50.63660000000
Obstruction, Snag or stump	1001699212		Metal; Cargo: metal		-0.55398333330	50.69731666670
Wreck, Dangerous wreck	1001707997			dead	-0.44735000000	50.62671666670
Wreck, Non-dangerous wreck	1001708002			dead	-0.49985000000	50.62586666670
Wreck, Non-dangerous wreck	1001708022	BROADHURST (PROBABLY)	501; Sunk: 1940/07/26; Tonnage: 1013; Cargo: 5	dead	-0.25153333330	50.59226666670

Description	GID	Wreck name	Information	Status	X	Y
Wreck, Dangerous wreck	1001708355		Sunk: 1917/01/01	dead	-0.433333333330	50.61666666670
Wreck, Dangerous wreck	1001708370	EDEN	501; Sunk: 1917/04/30; Length: 75m; Beam: 10.4m; Draught: 5.2m; Tonnage: 1304; Cargo: coal	dead	-0.55150000000	50.69225000000
Wreck, Dangerous wreck	1001708376			dead	-0.34986666670	50.66726666670
Wreck, Dangerous wreck	1001708404			dead	-0.51651666670	50.69045000000
Wreck, Dangerous wreck	1001708467			dead	-0.57261666670	50.63628333330
Wreck, Non-dangerous wreck	1001708328			dead	-0.27708333330	50.61976666670
Wreck, Dangerous wreck	1001708573			dead	-0.09321666670	50.67976666670
Wreck, Dangerous wreck	1001708596			dead	-0.63988333330	50.62835000000
Wreck, Non-dangerous wreck	1001708345	PAGENTURM	501; Sunk: 1917/05/16; Length: 122.2m; Beam: 15.8m; Draught: 8.5m; Tonnage: 5000	dead	-0.19821666670	50.66893333330
Wreck, Non-dangerous wreck	1001708354	GARTLAND	501; Sunk: 1918/01/03; Length: 91m; Beam: 12.2m;	dead	-0.56816666670	50.61726666670

Description	GID	Wreck name	Information	Status	X	Y
			Draught: 6.1m; Tonnage: 2613; Cargo: 3440 tons coal			
Wreck, Non-dangerous wreck	1001708393			dead	-0.32791666670	50.61171666670
Wreck, Non-dangerous wreck	1001708407	ST ANNE	501; Sunk: 1924/04/07; Tonnage: 2247	dead	-0.20155000000	50.66726666670
Wreck, Wreck showing any portion of hull or superstructure	1001702015			lifted	-0.54456666670	50.80585000000
Wreck, Undefined	1001698856		aircraft		-0.29348333330	50.65448333330
Obstruction, Ground tackle	1001699015		Boiler/Engine/Generator		-0.47061666670	50.67528333330
Obstruction, Ground tackle	1001707995		Boiler/Engine/Generator	dead	-0.44623333330	50.62726666670
Wreck, Distributed remains of wreck	302183498				-0.65601670000	50.57083330000
Wreck, Distributed remains of wreck	302110021				-0.53761666670	50.79575000000

Annex B

Recorded losses

Object id	Hob ooid	Name	Description	Type
97404	895799	HMS Pincher	1838 wreck of British schooner which capsized and foundered off the Owers, to be recovered, beached and sold some months later. It is unclear whether she was sold as a constructive total loss to be broken up, or, as with the fate of some naval wrecks, sold.	Named Location
97422	895829	Rasholm	RASHOLM, NORWEGIAN VESSEL, 1934	Named Location
97504	895966	Esmeralda	ENGLISH SCHOONER, 1867	Named Location
99959	903077	Dragon	ENGLISH CRAFT, 1880	Named Location
99979	903099	Pilot Boat No 3	DUTCH SCHOONER, 1883	Named Location
100114	903406	Scotia	ENGLISH YAWL, 1895	Named Location
100135	903433	Frances	ENGLISH SCHOONER, 1898	Named Location
100147	903449	Ann Humphreys	ENGLISH SCHOONER, 1900	Named Location
100208	903565	Envoy	ENGLISH BARGE, 1912	Named Location
100239	903608	Advance	BRITISH SMACK, 1917	Named Location
100262	903639	Bantry	IRISH CARGO VESSEL, 1934	Named Location

Object id	Hob ooid	Name	Description	Type
102435	911749	Huntsholm	Possible remains of the 1917 wreck of a Scottish cargo vessel, located approximately 8.6 nautical miles south-east of Selsey Bill. See 1390471 for the account of the wreck event.	Named Location
139685	1165531	Rose Mystérieuse	FRENCH KETCH, 1890	Named Location
139707	1165885	Grimaldi	ENGLISH SCHOONER, 1901	Named Location
139712	1165917	Rose	ENGLISH KETCH, 1907	Named Location
139713	1165995	Silverlands	ENGLISH SCHOONER, 1908	Named Location
139715	1166000	Venture	ENGLISH CUTTER, 1911	Named Location
140207	1175213	Campeador	SPANISH CARGO VESSEL, 1882	Named Location
140233	1175452	Earl Of Moira	BRITISH CRAFT, 1829	Named Location
140256	1175547	Thomas And Mary	BRITISH CRAFT, 1831	Named Location
140338	1176132	Margaritha Agnes	1853 wreck of Dutch galliot which was abandoned to founder following a collision with another Dutch vessel, while en route from Nantes for Rotterdam. Constructed of wood, she was a sailing vessel.	Named Location
140351	1176148	Ardina	1856 wreck of Dutch cargo vessel which foundered off the Owers, following a collision en route from Lisbon for Rotterdam with fruit. Constructed of wood, she was a cargo vessel.	Named Location
140407	1176754	Supply	1813 wreck of English brig which foundered off Littlehampton following a collision. Constructed of wood, she was a sailing vessel.	Named Location

Object id	Hob ooid	Name	Description	Type
140501	1177912	Elizabeth Jenkins	CANADIAN BARQUE, 1866	Named Location
143977	1237642	Lovely Druiner	ENGLISH KETCH, 1887	Named Location
144114	1238821	Alison	1916 wreck of English cargo vessel which foundered 8 miles SE of the Owers light vessel after being scuttled by a boarding party from a German submarine. Bound from Le Havre to Littlehampton with government stores, she was a steel-built, steam-powered vessel	Named Location
151026	1319703	Gordyx	GALLIOT, 1763	Named Location
154821	1341010	BEAUFIGHTER MK VIF MM869	British Fighter, 1943	Named Location
157982	1354187	WELLINGTON MK IV Z1278	British Heavy Bomber, 1942	Named Location
158093	1354833	HALIFAX MK III LW132	British Heavy Bomber, 1944	Named Location
168930	1390471	Huntsholm	1917 wreck of a Scottish cargo vessel which foundered 4 miles south east of the Owers lightship after being torpedoed. This steel steam vessel, built in 1914, was en route from Dieppe to Southampton in ballast.	Named Location
171800	1400236	JU87B	1940 wreck of a German Junkers Ju87 which was shot down off Littlehampton. It was part of Squadron III/StG77.	Named Location
172800	1403523	DORNIER DO217E-4 (5383)	1942 wreck of a Dornier Do217 which was shot down and crashed off Littlehampton. It was part of Squadron 1/KG2.	Named Location

Object id	Hob ooid	Name	Description	Type
173617	1407197	Vedra	1832 wreck of English brig which stranded on the Owers during a gale; a wooden sailing vessel.	Named Location
181844	1444173	Algiers	1917 wreck of English cargo vessel which foundered 3 miles south of the Owers Light Vessel after being torpedoed by a U-boat en route from Calais to Barry Roads in ballast. Constructed of iron, she was a steam-driven vessel.	Named Location
187078	1459890	Thelma	1917 wreck of Norwegian cargo vessel which foundered 4 miles south of the Owers Light Vessel after striking a mine, en route from the River Tyne for Rouen with coal. Constructed of iron in 1884, she was a steam-driven vessel.	Named Location
190202	1468286	Atlas	1917 wreck of Norwegian cargo vessel, operating under the British flag, which foundered 5 miles SE of the Owers Light Vessel after being torpedoed en route from Warkworth or Amble to Rouen with coal. Constructed of steel in 1904, she was a steam-driven v	Named Location
99735	902640		CRAFT, 1789	Named Location
99814	902729	Louisa	1818 wreck of British cargo vessel which stranded near Littlehampton en route from Arundel to Swansea with barley. Constructed of wood, she was a sailing vessel.	Named Location
99834	902752	Victoria	1840 wreck of British brig which stranded near Littlehampton, during a storm, in which the LIVELY [see TQ 00 SW 75] was also lost. Constructed of wood, she was a sailing vessel.	Named Location

Object id	Hob ooid	Name	Description	Type
99835	902753	Lively	1840 wreck of English sloop which stranded at Littlehampton during a storm, in which the VICTORIA [see TQ 00 SW 74] was also lost. Constructed of wood, she was a sailing vessel.	Named Location
99843	902847	Economy	1842 wreck of English brig which stranded 'between Rustington Mill and the Hot Baths' to the east of Littlehampton, while waiting for the tide to take her into Littlehampton harbour, on her arrival from Sunderland with coal. Constructed of wood in 1816,	Named Location
99961	903079	Jane	1880 wreck of English cutter which stranded at Littlehampton on her passage from Le Havre for Emsworth with oysters. Constructed of wood in 1810, she was a sailing vessel.	Named Location
100042	903185	James And John	1891 wreck of English schooner which stranded 1.5 miles west of Littlehampton, while on a fishing and return trip out of Newhaven. Constructed of wood in 1879, she was a sailing vessel.	Named Location
100101	903393	Glitner	1894 wreck of Norwegian brig which stranded in Littlehampton Harbour on her arrival from Pembrey with culm. Constructed of wood in 1867, she was a sailing vessel.	Named Location
100153	903457	Amy	1901 wreck of English brigantine which stranded a mile east of Littlehampton Harbour en route from Sunderland for Exeter with coal. Constructed of wood in 1868, she was a sailing vessel.	Named Location
140130	1174751	Friends Adventure	1807 wreck of British cargo vessel which stranded near Littlehampton en route from London to Bristol. Constructed of wood, she was a sailing vessel.	Named Location

Object id	Hob ooid	Name	Description	Type
140331	1176091	Fates	1823 wreck of cargo vessel, thought to have been British, which stranded next to Littlehampton Pier, where she had been blown by the weather conditions. Her cargo of coal was retrieved. Constructed of wood, she was a sailing vessel.	Named Location
140346	1176143	Dispatch	1823 wreck of British cargo vessel which stranded west of Littlehampton during "a most tremendous gale", en route from Wisbech to Southampton. Constructed of wood, she was a sailing vessel.	Named Location
143217	1228345	Two Brothers	1741 wreck of British craft which was lost near Arundel en route from London to Milford Haven. Constructed of wood, she was a sailing vessel.	Named Location
150913	1319189	HURRICANE MK I P3140	British Fighter, 1940	Named Location
151989	1325139	SPITFIRE MK I L1019	British Fighter, 1940	Named Location
154912	1341339	Speedwell	BRITISH BARGE, 1809	Named Location
154977	1341694	Duchess Of York	1810 wreck of British craft which was "totally lost" near Littlehampton, en route from London to Redbridge, Hampshire. Constructed of wood, she was a sailing vessel.	Named Location
157972	1354136	BEAUFIGHTER MK IF X7672	British Nightfighter, 1942	Named Location
158148	1355076	MOSQUITO MK XVII HK312	British Nightfighter, 1944	Named Location

Object id	Hob ooid	Name	Description	Type
158627	1357308	SPITFIRE MK VB W3374	British Fighter, 1941	Named Location
166550	1383553	Undine	1870 wreck of schooner which stranded 2 miles east of Littlehampton en route from Hartlepool for Poole with coal. Constructed of wood, she was a sailing vessel.	Named Location
170181	1393912	Prudent	1800 wreck of English cargo vessel which was wrecked near Littlehampton. Constructed of wood, she was a sailing vessel.	Named Location
171009	1397439	Papillon	1806 wreck of French lugger privateer which stranded and bilged near Littlehampton. Constructed of wood, she was a sailing vessel.	Named Location
171879	1400489	MESSERSCHMITT ME110D/0 (3390) S9+AB	1940 wreck of a German Messerschmitt Me110 which was shot down and crashed 2 miles off Littlehampton. It was part of Stab ErproGr210.	Named Location
172962	1404638	FOCKE WULF FW190A-3 (7003) 1+	1942 wreck of a German Focke Wulf which was shot down and crashed 2 miles south east of Littlehampton. It was part of Squadron 10/JG26.	Named Location
172975	1404677	Brothers	1820 wreck of English cargo vessel which was beached at Littlehampton on her arrival from Shields with coal. Constructed of wood, she was a sailing vessel.	Named Location
183668	1449456	Le Seintspirit	1329 wreck of cargo vessel, possibly Spanish, which stranded "near Arundel", perhaps at Littlehampton on the coast and at the mouth of the River Arun. She had just left Southampton for "foreign parts". Constructed of wood, she was a sailing vessel.	Named Location

Object id	Hob ooid	Name	Description	Type
206419	1522846	Little Gem	1979 wreck of an English fishing vessel which foundered after a collision with a cargo coaster approximately 3 miles South of Littlehampton. She was an engine driven vessel.	Named Location
220485	1582512	St Jacob	1655 wreck of Dutch cargo vessel which was beached at Littlehampton after springing a leak en route from Portugal for the Netherlands. The wreck was plundered by local people who stole the cargo, cut down her masts, and 'hewed the ship all in pieces.' Co	Named Location
99693	902594	St George	BRITISH CRAFT, 1758	Named Location
99841	902845	Mary Ann	1842 wreck of an English snow, which foundered in heavy weather off Brighton. She was a wooden-hulled sailing vessel, en route from Newcastle to Plymouth with a cargo of coal.	Named Location
99985	903108	Village Blacksmith	BRITISH FISHING VESSSEL, 1884	Named Location
99993	903117	Phoebe	BRITISH YACHT, 1886	Named Location
99995	903121	Wisdom	1886 wreck of an English cutter which foundered 8 miles south of Brighton following a collision with the STAR OF GERMANY.	Named Location
100009	903137	Adolphe Louise Protege De Marie	1888 wreck of a French cutter which foundered off Brighton following a collision with the cargo vessel MARION ROSS. She was a wooden sailing vessel, on a fishing and return voyage out of Fecamp.	Named Location
100124	903417	John Evans	1896 wreck of a Welsh schooner, which foundered approximately 8 miles SSE of Brighton, following a collision with the steamer BORDEAUX. She was a wooden sailing vessel, en route from Fredrikstad to Port Talbot with a cargo of granite.	Named Location

Object id	Hob ooid	Name	Description	Type
118425	974939	Brighton Light Vessel	ENGLISH LIGHT VESSEL, 1917-1918	Approx.
124227	1033733	Aldborough	1696 wreck of English ketch which caught fire and exploded off Brighton, the remains presumably being left to founder. Constructed of wood, she was a sailing vessel.	Named Location
139691	1165633	Prosperity	ENGLISH CARGO VESSEL, 1826	Named Location
139806	1166942	Jupiter	ENGLISH CARGO VESSEL, 1917	Named Location
140147	1174895	Sainte Anne	FRENCH CARGO VESSEL, 1924	Named Location
140175	1174965	Tally-Ho	BRITISH LUGGER, 1881	Named Location
140342	1176136	HMS Jasper	BRITISH PACKET, 1854	Named Location
141721	1200756		1775 wreck of British sloop which foundered off Brighton en route from Newcastle-upon-Tyne to Shoreham-by-Sea with coal; a wooden sailing vessel.	Named Location
143963	1237382	Mary Ann	BRITISH LUGGER, 1885	Named Location
144020	1237956	Nellie	BRITISH LUGGER, 1892	Named Location
144099	1238667	Pecheries Ostendaises V	BELGIAN TRAWLER, 1910	Named Location
144235	1240377	Stavros	GREEK CARGO VESSEL, 1920	Named Location

Object id	Hob ooid	Name	Description	Type
151590	1322751	BEAUFIGHTER MK IF R2068	British Fighter, 1940	Named Location
151591	1322757	BEAUFIGHTER MK IF R2135	British Fighter, 1941	Named Location
155223	1342738	HAVOC MK I BD124	British Fighter, 1941	Named Location
155682	1344456	Catch Me If You Can	SCHOONER, 1815	Named Location
155952	1345392	Severn	ENGLISH CRAFT, 1817	Named Location
156362	1347183	Maida	ENGLISH CRAFT, 1820	Named Location
157795	1352956	WALRUS MK I W2736	British Flying Boat, 1942	Named Location
158412	1356474	TYPHOON MK IB JP532	British Fighter, 1943	Named Location
168692	1390080	Hurrys	1788 wreck of English craft which foundered 7 leagues west of Beachy Head following a collision on her passage to La Rochelle; a wooden sailing vessel.	Named Location
169085	1390991	Lulonga	1940 wreck of an English cargo vessel which foundered nearly 10 miles south south west of Shoreham-by-Sea after being torpedoed. This steel steam vessel, built in 1907, was en route from Goole to Shoreham-by-Sea.	Named Location

Object id	Hob ooid	Name	Description	Type
172212	1401726		1814 wreck of cutter, probably English, which foundered off Brighton during a storm, with her cargo of porter; a wooden sailing vessel.	Named Location
172278	1401896	JUNKERS JU88A-5 (01419) 7A+LM	1941 wreck of a German Junkers Ju88 which was probably shot down and crashed off Worthing. It was part of Squadron 4(F)/121.	Named Location
172290	1401913	HEINKEL HE111P-4 (2976) G1+KH	1941 wreck of a German Heinkel He111 which was shot down and crashed off Worthing. It was part of Squadron 1/KG55.	Named Location
172557	1402787	HEINKEL HE111H-3 (6915) 6N+HL	1941 wreck of a German Heinkel He111 which was shot down and crashed off Hove. It was part of Squadron 3/KGr100.	Named Location
191647	1473508	WP275	The findspot of aircraft remains identified as belonging to aircraft WP275, a British Supermarine Attacker, which crashed into the sea on 6th July 1956 after taking off from Royal Naval Air Station Ford, in Sussex.	Named Location
228310	1611620	Sylph	1842 wreck of a Jersey schooner which foundered approximately 12 miles off Brighton, following a collision with the TINO. She was a wooden sailing vessel, en route from Shields to Jersey with a cargo of coal.	Named Location
123986	911202		Possible remains of a wreck.	Point
123993	911210	Concha	Remains of the 1897 wreck of a Belgian cargo vessel located approximately 7.5 miles SSE of Littlehampton. The CONCHA was a steel-hulled steamer which foundered following a collision with the Liverpool registered SAINT FILLANS, while en route from Carlofor.	Point
124140	911510		POSSIBLE REMAINS OF BURIED WRECK	Point

Object id	Hob ooid	Name	Description	Type
124257	911777	Ikeda	1918 wreck of English cargo vessel which foundered 7 miles west of Brighton Lightvessel after being torpedoed en route from London to Galveston in ballast. Built of steel, she was a screw-driven steamer.	Point
140695	974940		Unknown vessel	Point

Annex C

Receiver of Wreck records

Droit Number	Name of Wreck	Description
A/0008	Pagenturm (HMS)	1 x china plate
A/0398	U-boat (Unknown)	1 x U boat toilet
A/2711	Inverclyde (HMS) (1942)	1 x brass shelf with holes in it, 1 x small brass valve, 1 x part of telegraph (wheel & handle), 1 x brass box lid
A/1368	Unknown	1 x Walker's Log head, 1 x plate, 1 x oil lamp, 1 x electric metre wooden case, 1 x egg cup
A/1998	Unknown	1 x terracotta bowl 10" diameter, 1 x fire hose muzzle, 1 x pottery fragment - neck of jug with handle, probably 15th-16th century according to local museum, 1 x anchor 43"
A/3692	Quail	5 x bottles
A/1267	City of Waterford	1 x brass casting - possibly a flange - photograph provided.
A/3801	Unknown	1 x gun part, 2 x shell cases
A/0996	Ariston	1 x 9" porthole.
A/2925	Pagenturm (HMS)	1 x porthole
A/3677	Unknown	3 x fittings, 1 x connector, 12 x shell cases, 1 x copper pin, 7 x valves

Droit Number	Name of Wreck	Description
A/4126	Unknown	1x naval shell
A/4098	Candia	1x bottle with cork in bottom, 1x brass object resembling propeller blade
A/4102	Quail	13x wine glasses
A/4104	Unknown	1x gauge, 1x porthole, 2x clay pipes, 3x clay jars, 4x bottles, 1x double handed telegraph, 1x brass plate inscribed with quartermaster, attached to a small piece of timber.
A/4086	Unknown	2 x portholes, 1 x skylight, 1 x pair hatch winders, 3 x shell cases, 2 x shell heads
A/1479	Unknown	2 x gate valves
A/4305	Pagentum (HMS)	1x compass, 1x ships gimbles clock.
A/4311	Unknown	1x brass ships bell, half ships bell, 1x ships bell, 1x rectangular porthole, 1x white earthenware mug, 1x pistol, 1x copper ingot, 1x white earthenware bottle, 2x brown earthenware bottle, clear glass bottle, 1x fish from ships log, 1x compass.
A/4504	Brighton cannon site - protected.	1 x cannon, iron. 1 x breech block wrought iron built up cannon, c.1520. 1 x barrel of wrought iron built-up gun.
A/4604	Brighton cannon site - protected wreck	2 x hollow lead shot, bronze c15th century Hackbutt swivel gun without tiller arm. Iron swivel supports, swivel gun spike for breech loading gun, lead plumb weight, collection of part melted shot from crucible.
385/07	Minion (HMS)	2 x pressure gauges; 1 x brass wheel; 1 x electric fuse box

Droit Number	Name of Wreck	Description
243/07	Pagenturm	1 x Ship's builders plate inscribed 'SS 233, JoH. C. Techlenborg A-G, Schiffswerft und Maschinenfabrik, Bremenhaven, Geestmunde 1909', brass, excellent condition. 1 x Twin lever telegraph with pedestal, brass, intact, areas of heavy corrosion, 4ft high, 14" diameter face, not yet cleaned & therefore uncertain about markings.
326/16	Unknown	1 x Flat based Hamilton or 'torpedo' bottle, stands 220mm high, with a 12mm wide neck and 54mm wide base and 79mm wide at the waist, it has an 'A' embossed on its base, there is possibly other text/numerals worn away present.
327/16	Unknown	1 x Flat based Hamilton or 'torpedo' bottle, stands 210mm high with a 25mm wide neck and 45mm wide base, it has 'SCHWEPPE'S', 'BY APPOINTMENT' and a UK royal coat of arms embossed on one side and 'BL' on the base.
316/16	Unknown	1 x Cylindrical screw top beverage bottle, 500mm tall, 71mm wide at its base, 73mm wide at the shoulder with a 31mm wide neck, it is embossed with 'T. LINSLEY & Co Registered Trade Mark HULL' with a mounted rider and catafalque/plinth logo also present,
321/16	Unknown	1 x Small cologne bottle, part prismatic, 5 flat faces, 1 curved. Embossed with 'Rue de la Cloche, No.4711 a Cologne' on one of the flat faceted faces.
322/16	Unknown	1 x Cylindrical beverage bottle with an intact screw stopper, is embossed with 'D. STERRY & SONS LIMEHOUSE', there is also 'DS' embossed on the base, the stopper is stamped 'HEY & HUMPHRIES, LEEDS 1911', the bottle is 204mm high with a 61mm base and 62mm wide at the shoulder, the neck is 30mm wide, with a straight lip and internal screw, the stopper is made of cork and Bakelite.
323/16	Unknown	1 x Blob top squat cylindrical beverage bottle with 'Pint' and 'Imperial' embossed on shoulder, its base is date stamped 1892, it is 190mm tall and still has part of a cork present, it has a neck that is not 'square' to the rest of the bottle, it is 65mm wide at the base, 67mm wide at the shoulder and the throat of the bottle is 15mm wide with an internal screw thread.

Droit Number	Name of Wreck	Description
324/16	Unknown	1 x Cylindrical beverage bottle, 230mm tall, 59mm wide at the base and 61mm wide at the shoulder with a 13mm neck, it is embossed with 'W. CORRY & Co. Ltd Registered Trade Mark, BELFAST', the logo appears to be an eagle holding olive branches.
310/17	Bessell (SS)	2 x Earthenware gin bottles. 2 x 2oz medicine bottles. 1 x Complete toothpaste pot. 2 x Bases of toothpaste pot.
101/02	London Trader (1940)	1 x Porthole, 1 x Mug.
010/15	Unknown	1 x Olive lamp, brass or bronze object, possibly an old oil lamp, slightly bent with uneven patina, size approx. 12 x 10 x 5cm. Image provided shows small poss. Cu alloy lidded jug-shaped lamp with naïve bird shaped handle on lid and on handle for pouring.
A/2341	Brazen (HMS) poss.	1 x cannon.
A/4195	Unknown	1x compass case, 1x 4" brass shell case (empty).
A/0160	Unknown	1 x water jug, 1 x fire hose, 1 x filler cup, 3 x wheel boses, 1 x tray, 1 x flare gun, bottles, stair tread, 1 x cannon ball, 1 x large empty shell case, 1 x handle, 1 x bulkhead light.
A/1242	Unknown	1 x brass clamp, 1 x sounding weight.
A/4027	Unknown	1 x porthole, 6 x lead grapeshot balls
A/1491	Unknown	16 x 8 Reals, 1 x stone anchor (is more likely some kind of weight).
A/4195	Unknown	1x compass case, 1x 4" brass shell case (empty).
b063/93/94	Unknown	1 x bronze age axe head app. 8" long. Approx. 1/3lb in weight. Good Condition.

Droit Number	Name of Wreck	Description
128/04	Unknown	1 x stone ring [Row comment - this appears to be a net weight or sinker from photo] - approx. 10 cm diameter, with 3.5 cm hole.
002/20	Unknown	3 x Timbers washed up on tide line after storm Atiyah. 1 x curved, oak, no fasteners, 8' 9" x 5' x 3'. 1 x straight, elm, with scarf joint and perpendicular fasteners including ferrous, 7' x 8' x 4', fasteners 1.5-2" diameter. 1 x Rib section, oak, with 6 pegs, 2' 3" x 4.75" x 3.5", fasteners 1.25" diameter x 5, one perpendicular 1 1/8 " - rib probably one of a pair.
A/2343	Shirala	1 x trumpet.
128/03	Unknown	1 x Dressel 20 Baetican Roman amphora neck & handles dating mid 1st - mid 3rd century.
141/07	Unknown	1 x Brass binnacle.
249/07	Indiana	1 x Compass bowl; 1 x Tureen lid.
059/18	Unknown	1 x Merlin 45gear unit, serial number GU 69677, with a truncated, heavily damaged and corroded, three-bladed propeller.
457/00	Seaford Ferry	1 x Plate, china. 1 x Brass plate saying "engine room".
A/0157	Thompson	2 x portholes, 2 x shell cases (empty), 1 x bell, 1 x lead sounding weight, remains of a lamp - since thrown away.
A/0160	Unknown	1 x water jug, 1 x fire hose, 1 x filler cup, 3 x wheel boses, 1 x tray, 1 x flare gun, bottles, stair tread, 1 x cannon ball, 1 x large empty shell case, 1 x handle, 1 x bulkhead light.
A/1613	3 mile wreck	1x 3-way brass valve.
A/0506	Celtic	1 x Porthole.

Droit Number	Name of Wreck	Description
A/3481	Unknown	1x brass gauge body, 1x brass cover, 1x brass flanges, 1x brass electric box, 1x brass lamp, 1x brass port + starboard indicator, 2x portholes (no glass).
A/3901	Unknown	1x brass valve, 1x brass tee piece, brass disc, brass leuber, 2x shell cases, 1x ceramic mug, 2x champagne bottles, 4x shell cases, 4x timing heads, 1x porthole window.
A/3903	Basil	2x shell cases, 3x timing heads.
046/08	Unknown	1 x Iron anchor, mid 19th century, Spanish, c. 8lb in weight, image provided.
221/17	Unknown	1 x Shell case 660mm x 152mm, empty with no base.
222/17	Unknown	1 x Remnants of a companionway ladder and stair. 1140mm, 150mm wide with 560mm wide step. Step and groove radiused rather than square cut.
223/17	Unknown	2 x Timber pieces (790 x 75 x 90mm and 160 x 100 x 60mm).
224/17	Unknown	1 x Ship's timber 830mm long, 110 x 120mm in profile with 25mm diameter treenail. Slotted on both side for metalwork with visible corrosion products present.
225/17	Unknown	1 x Brass porthole ring. 250mm in diameter with 28mm wide ring.
091/07	Unknown	Newly cut timber washed ashore after gales between Christmas and New Year (2006-2007). Dimensions: 100x20mm or 130x20mm. Some were larger - 0.4 to 4.0m in length.
048/14	Unknown ("23")	1 x Small sailing dinghy, no mast or keel board, approx. 5' long.
214/99	Unknown	39 planks of wood.

Annex D

Geophysical anomalies of archaeological potential

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0001	Hard reflector approx. 88m length with extended shadow and pronounced super-structure; wreck. (4993 nT)	City of Waterford	Remains of the 1949 Scottish cargo steamer which foundered almost 8 miles South of the Brighton Marine breakwater after a collision with the Greek cargo ship MARPESSA. She was <i>en route</i> from Antwerp to Cork with 1,000 tons of unspecified cargo. Steam ship; Sunk: 1949/04/14; Length: 82.3m; Beam: 11m; Draught: 4.9m; Tonnage: 1334; Cargo: 1000 tons of general	1522662	20056	1001699016	MA2003	MA4010	MA7198	high	Medium	100	704078.8	5617753.57
MA0002	Curved hard reflector; associated with MA2008. (1364 nT)	Unknown	Trawler	911480	20017	1001698773	MA2007	MA4011	MA6790	high	Medium	100	702248.76	5614306.53
MA0004	Ovate reflector partially buried with extended shadow; wreck. (1760 nT)	Gerlen (possibly)	motor vessel; Sunk: 1972/07/19; Length: 38.7m; Beam: 7m; Draught: 2.4m; Tonnage: 299		20005	1001698817	MA2014	MA4012	MA6868	high	Low	100	700785.01	5612618.39

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0005	Ovate partially buried reflector; wreck. (17 nT)						MA2017	MA4013	MA5093	high	Not assessed	100	700404.67	5611235.09
MA0006	Isolated hard reflector; potential anthropogenic vessel.	Unknown					MA2020	MA4030	n/a	medium	Not assessed		699930.97	5617565.24
MA0007	Pair of ovate hard reflectors with extended shadow; wreck with bow and stern separated but adjacent to each other. (3344 nT)	Unknown	Remains of vessel	911464	19961	1001698662	MA2028	MA4014	MA7123	high	Medium	50	698905.84	5608928.85
MA0008	Strong hard reflector of hull with extended shadow of super-structure; wreck. (1007 nT)	Glenarm Head (possibly)	Possible remains of 1918 wreck of Northern Irish cargo vessel located approximately 10.25 miles SSW of Brighton. If the GLENARM HEAD, she was a steamer, built of steel, which foundered after being torpedoed en route from Southampton for Boulogne. Steam ship; Sunk: 1918/01/04; Length: 109.7m; Beam: 14m; Draught: 6.1m; Tonnage: 3908;	911884	19926/20012	1001698827	MA2029	MA4015	MA6738	high	Medium	100	698595.34	5614019.2

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			Cargo: ammunition											
MA0009	Hard reflector of hull with associated debris and extended shadow; wreck. (4766 nT)	Pagenturm	Remains of 1917 wreck of English cargo vessel located approximately 18.5 miles SW of Beachy Head or 11.5 miles SSE of Shoreham-by-Sea and identified by her makers' plates. The PAGENTURM foundered after being torpedoed en route from Sheerness for Barry. Steam ship; Sunk: 1917/05/16; Length: 122.2m; Beam: 15.8m; Draught: 8.5m; Tonnage: 5000; Cargo: military stores	911879	20001	1001698774	MA2031	MA4016	MA6784	high	Medium	100	696800.97	5612956.19
MA0010	Cylindrical, partially buried reflector; wreck. (1237 nT)	HMS Minion	Remains of 1921 wreck of British destroyer located approximately 14 miles south of Shoreham-by-Sea, and positively identified by her name plate. She foundered in this position while under tow to Germany to be broken up, after	911756	20014	1001698811	MA2033	MA4017	MA6705	high	Medium	100	695616.41	5613921.99

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			being sold out of service. Destroyer; Sunk: 1921/01/01; Length: 84.1m; Beam: 8.2m; Draught: 3m; Tonnage: 1042											
MA0011	Hard reflector of outline of hull and extended shadow from super-structure; wreck. (691 nT)	Glenarm Head	Possible remains of 1918 wreck of Northern Irish cargo vessel located approximately 13 miles due south of Shoreham-by-Sea. If the GLENARM HEAD, she was a steamer, built of steel, which foundered after being torpedoed en route from Southampton for Boulogne. Steam ship; Cargo: fodder, guns and coal	911171	20169	1001698782	MA2036	MA4018	MA6830	high	Medium	100	692599.74	5610760.59
MA0012	Cylindrical hard reflector partially buried with extended shadow; wreck. Associated with two hard reflectors ca 100m to the NNE. (2435 nT)	London Trader (possibly)	steam ship; Sunk: 1940/07/26; Length: 59.9m; Beam: 8.8m; Draught: 3.4m; Tonnage: 646; Cargo: 750 tons coal		19972	1001698661	MA2041	MA4031	MA7043	high	Medium	100	690883.5	5608680.83
MA0013	Cylindrical hard reflector	Quail	Remains of the 1886 wreck of an	911753	20000	1001698638	MA2042	MA4019	MA7268	high	Medium	100	690392.13	5612657.95

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	approx. 70m long with pronounced shadow of super structure; steel hulled vessel. (1375 nT)		Irish cargo vessel, located approximately 10.7 nautical miles SE of Worthing. The QUAIL foundered following a collision with the French steam ship SAN MARTIN. She was en route from Antwerp to Glasgow, with a general cargo. Steam ship; Sunk: 1886/08/27; Length: 68.3m; Beam: 8.5m; Draught: 5.2m; Tonnage: 924; Cargo: natural fibres and materials in general											
MA0014	Cylindrical hard reflector partially buried with extended shadow; wreck. (637 nT)	Unknown			19970	1001698895	MA2044	MA4020	MA6876	high	Medium	100	689934.07	5609332.38
MA0015	Strong hard reflector with extended shadow and scour; wreck. (909 nT)	Unknown	Remains of a cargo vessel. Steam ship; Tonnage: 2000; Cargo: 537	911177	19991	1001698867	MA2045	MA4021	MA6724	high	Medium	100	689699.3	5611773.82
MA0016	Scattered reflectors over approx. 100m	Unknown	Remains of a vessel located approximately	911181	19996	1001698846	MA2047	MA4022	MA6693	high	Medium	100	689008.59	5612115.08

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	with extended masking shadow; wreck. (7720 nT)		10.9 nautical miles south of Worthing. The wreck appears to have broken in to two pieces. Freighter.											
MA0017	Isolated reflector with elongated shadow; potential wreck.	Ny- Eeasteyr	A Manx fishing vessel which leaked and foundered approximately 8.9 miles SSE of Worthing pier while en route from Great Yarmouth to Ramsey on the Isle of Man. Built of wood in Germany in 1970, she was an engine-driven vessel. Fishing vessel; Sunk: 1980/12/08; Length: 24.1m; Beam: 6.4m; Draught: 2.4m; Tonnage: 61	1522854	20186	1001698765	MA2053	MA4025	n/a	High	Low	100	686572.7	5615393.35
MA0018	Partially buried hull of vessel with extended shadows; wreck. (1198 nT)	Ramsgarth	Remains of 1916 wreck of English cargo vessel which foundered 11 miles SE of the Owers light vessel after being fired on, whereupon the ship was abandoned. She was lost in company with the	911768	20049	1001699038	MA2055	MA4001	MA5011	high	Medium	100	684145.34	5616076.3

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			ALERT [wreck event SZ 97 NW 45; possible remains TV 07 NW 4]. Steam ship; Sunk: 1916/11/28; Length: 74.7m; Beam: 11m; Draught: 5.8m; Tonnage: 1553; Cargo: ballast											
MA0019	Ovate reflector with large shadow; potential anthropogenic debris or boulder.	Obstruction			82762	302183487/302110600	MA2057	MA4026	n/a	medium	Medium	50	683274.37	5614682.34
MA0020	Partially buried vessel with shadow extending from bow structure; wreck. (2311 nT)	Ariel	Remains of the 1892 wreck of an English cargo vessel, which foundered following a collision approximately 9.8 nautical miles SSW of Worthing. She was an iron-hulled steamer, en route from Varna to Hamburg with a cargo of wheat. Steam ship; Sunk: 1892/06/10; Length: 91.4m; Beam: 12.8m; Draught: 6.1m; Tonnage: 2200; Cargo: grain	911759	20023	1001698904	MA2060	MA4002	MA6277	high	Medium	100	682780.79	5613947.9

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0021	Buried linear reflector with shadow; potential anthropogenic debris or sand bar.						MA2062	MA4027	n/a	high	Not assessed	100	682506.47	5614392.72
MA0022	Extended shadow from centre of vessel with hull plating and scattered debris in surrounding area; wreck. (7729 nT)	Cairndhu	Remains of English cargo vessel, 1917. Steam ship; Sunk: 1917/04/15; Length: 112.8m; Beam: 15.5m; Draught: 7.6m; Tonnage: 4019; Cargo: coal	911750	19987	1001698891	MA2065	MA4003	MA5029	high	Medium	100	681133.27	5611250.11
MA0024	Pair of reflectors with extended shadow showing separated bow and stern of vessel; wreck. (1022 nT)	Unknown	Possible remains of a drifter or trawler. The wreck has been suggested to be either the remains of the KLONDYKE, sunk 4 June 1916 after a collision near the Owers Light Vessel (see 1614394) or the remains of the EVADNE, sunk on 27 February 1917 by a mine.	911179	19997	1001698848	MA2067	MA4004	MA5028	high	Medium	100	680941.05	5611542.64
MA0025	Outline of hull of vessel with extended shadow; wreck. (6783 nT)	Jaffa	Remains of the 1918 wreck of an English cargo vessel torpedoed by the German submarine UB 30 approximately 10 nautical miles SW	911755	20010	1001698842	MA2068	MA4005	MA6275	high	Medium	100	680146.83	5613200.63

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			of Worthing. She was a steel-hulled steamer, en route from Boulogne to Southampton in ballast. Steam ship; Sunk: 1918/02/02; Length: 79.2m; Beam: 10.7m; Draught: 4.9m; Tonnage: 1383; Cargo: ballast											
MA0026	Reflector of outline of hull with shadow of super-structure; wreck. (5079 nT)	Unknown	Remains of a tank landing craft located approximately 9.3 nautical miles south of Littlehampton.	911194	20020	1001698634	MA2073	MA4006	MA6203	high	Medium	100	675621.61	5613488.32
MA0027	Three sets of parallel linear hard reflectors with a ladderlike reflector; wreck. (728 nT)	Unknown	Wreck remains believed to comprise British Mulberry Harbour bridge sections, together with the dumb barges without propulsion on which they were towed, located approximately 11.5 miles SE of Selsey Bill or 11.7 miles SSE of Bognor Regis. If these remains	911175	19988	1001698869	MA2080	MA4007	MA6265	high	Medium	100	671878.72	5610995.1
MA0028	Hard reflector approx. 70m length; potential	Unknown					MA2087		MA6477	medium	Not assessed	50	669197	5607236.66

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	wreck. (414 nT)													
MA0029	Scattered array of plating from hull of vessel; wreck. (439 nT)	War Helmet	Remains of the 1918 wreck of an English armed cargo vessel torpedoed by the German submarine UC 75 approximately 8.9 nautical miles south-east of Selsey Bill. She was a steel-hulled steamer, en route from London to Barry in ballast. Steam ship; Sunk: 1918/04/19; Length: 135.6m; Beam: 17.7m; Draught: 12.2m; Tonnage: 8184; Cargo: 537 team ship; Sunk: 1918/04/19; Length: 135.6m; Beam: 17.7m; Draught: 12.2m; Tonnage: 8184; Cargo: ballast	911748	19984	1001698913	MA2088	MA4008	MA6243	high	Medium	100	669043.73	5610679.45
MA0030	Line/cluster of hard reflectors; potential wreck or boulders. (2072 nT)	Afon Dulais	Remains of the 1942 wreck of a Welsh cargo vessel which foundered 9.8 nautical miles south-east of Selsey Bill after detonating a German mine. She was a steel-	911738	19947	1001698704	MA2093	MA4029	MA6489	High	Medium	100	666958.43	5606341.04

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			hulled steamer en route from Seaham to Poole with a cargo of coal. Steam ship; Sunk: 1942/06/20; Length: 63.4m; Beam: 10.1m; Draught: 4m; Tonnage: 988; Cargo: coal											
MA0031	Isolated linear hard reflector with angular shadow; potential anthropogenic debris or sand bar.	Unknown					MA2094		n/a	medium	Not assessed	50	666527.31	5607493.48
MA0032	Scattered debris with extended shadows forming an ovate outline; wreck.	Lightfoot (possibly)	Possible remains of the 1918 wreck of a British cargo vessel torpedoed by the German submarine UB 30, approximately 1 mile south of the Varne. She was a steel-hulled steamer on Admiralty Service, en route from London to Barry in ballast. Steam ship; Sunk: 1918/03/16; Length: 81.7m; Beam: 20m; Draught: 2m; Tonnage: 1875; Cargo: 537	911169	19948	1001698697	MA2095			high	Medium	100	666444.01	5606462.68

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			steam ship; Sunk: 1918/03/16; Length: 81.7m; Beam: 20m; Draught: 2m; Tonnage: 1875; Cargo: ballast											
MA0033	Scattered super-structure and hull plating of vessel with shadows extending from potential boilers; wreck. (6401 nT)	Gartland	Remains of the 1918 wreck of a Scottish cargo vessel, torpedoed by the German submarine UB 30 approximately 1 mile south-east of Owers. She was a steel-hulled steamer, en route from Newcastle upon Tyne to Gibraltar with a cargo of coal. Steam ship; Sunk: 1918/01/03; Length: 91m; Beam: 12.2m; Draught: 6.1m; Tonnage: 2613; Cargo: 5	911743	19971	1001698893	MA2097	MA4009	MA6325	high	Medium	100	665780.91	5608512.76
MA0034	Curvilinear hard reflector, extended shadow; raised feature likely anthropogenic small vessel. (538 nT)	Unknown	Cargo of metal bars, thought to be steel or cast iron, located on the seabed approximately 6 miles SSW of Littlehampton. This cargo appears to retain its deck arrangement, suggesting that it	911219	20075	1001699212	MA2112	MA4023	MA5889	high	Not assessed	100	672744.19	5619007.28

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			was not jettisoned.											
MA0035	Parallel linear buried reflectors; possible buried anthropogenic debris.	Unknown					MA2117			medium	Not assessed	50	672532.51	5617353.15
MA0036	Wreck approx. length 120m; probable steel hulled cargo shipwreck with three boilers. (3951 nT)	Glenlee (possibly)	Remains of 1918 wreck of English cargo vessel located approximately 7.5 miles SW of Littlehampton, or 5 miles NE of the Owers Light Vessel. The identity of this wreck has been confirmed as that of the GLENLEE, which foundered after being torpedoed en route	911770	20055	1001699013	MA2121	MA4000	MA5994	high	Medium	100	672049.37	5616547.07
MA0037	Pair of L shaped hard reflectors with extended shadows; potential anthropogenic debris or boulders. (823 nT)	Shirala (possibly)	Remains of 1918 wreck of Scottish cargo vessel which foundered approximately 6.5 nautical miles south of Middleton-on-Sea; a position which is approximately 6.7 nautical miles SE of Bognor Regis or 7.3 nautical miles SW of Littlehampton. Steam ship;	911214	20069	1001698982/302182881/1001698984	MA2129	MA4024	MA5931	high	High	100	670695.16	5617299.78

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
			Sunk: 1918/07/02; Length: 125m; Beam: 15.5m; Draught: 8.8m; Tonnage: 5306; Cargo: general, including wine, ivory and spares											
MA0038	A large isolated curvilinear hard reflector with crater-like depression; possible debris of anthropogenic origin.	Unknown					MA2149	MA4032		medium	Not assessed	50	672614.3	5624283.05
MA0040	An isolated area of dark reflectors; possible debris field of anthropogenic origin.	Unknown					MA2165	MA4033	n/a	medium	Not assessed	50	672075.25	5624418.89
MA0041	An isolated area of hard reflectors; possible debris field of anthropogenic origin.	Unknown					MA2167	MA4034	n/a	medium	Not assessed	50	672039.42	5624167.09
MA0042	Scatters of dark reflectors; possible debris field.	Unknown					MA2172	MA4035	n/a	medium	Not assessed	50	671767.42	5623881.7
MA0045	Two magnetic anomalies MA5501 (104nT)								MA5501	medium	Not assessed	50	671924.31	5626243.5

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	MA5503 (105nT)													
MA0046	Isolated magnetic anomaly (110nT) ca 30m SSW of seabed reflector							MA4036	MA7206	medium	Not assessed	50	702399.94	5617085.5
MA0047	Isolated magnetic anomaly (110nT)								MA6298	medium	Not assessed	50		
MA0048	Isolated magnetic anomaly (112nT)								MA6485	medium	Not assessed	50	667140.81	5606522
MA0049	Pair of linear hard reflectors; potential anthropogenic debris or boulders, associated with magnetic anomaly (115nT)						MA2085	MA4037	MA6224	medium	Not assessed	50	669964.38	5611345.3
MA0050	Isolated magnetic anomaly (116nT)							MA4038	MA6529	medium	Not assessed	50	674110.69	5607897.5
MA0051	Isolated magnetic anomaly (125nT)								MA5844	medium	Not assessed	50	672304.63	5630280.5
MA0052	Isolated magnetic anomaly (125nT)								MA5600	medium	Not assessed	50	671003.75	5627095

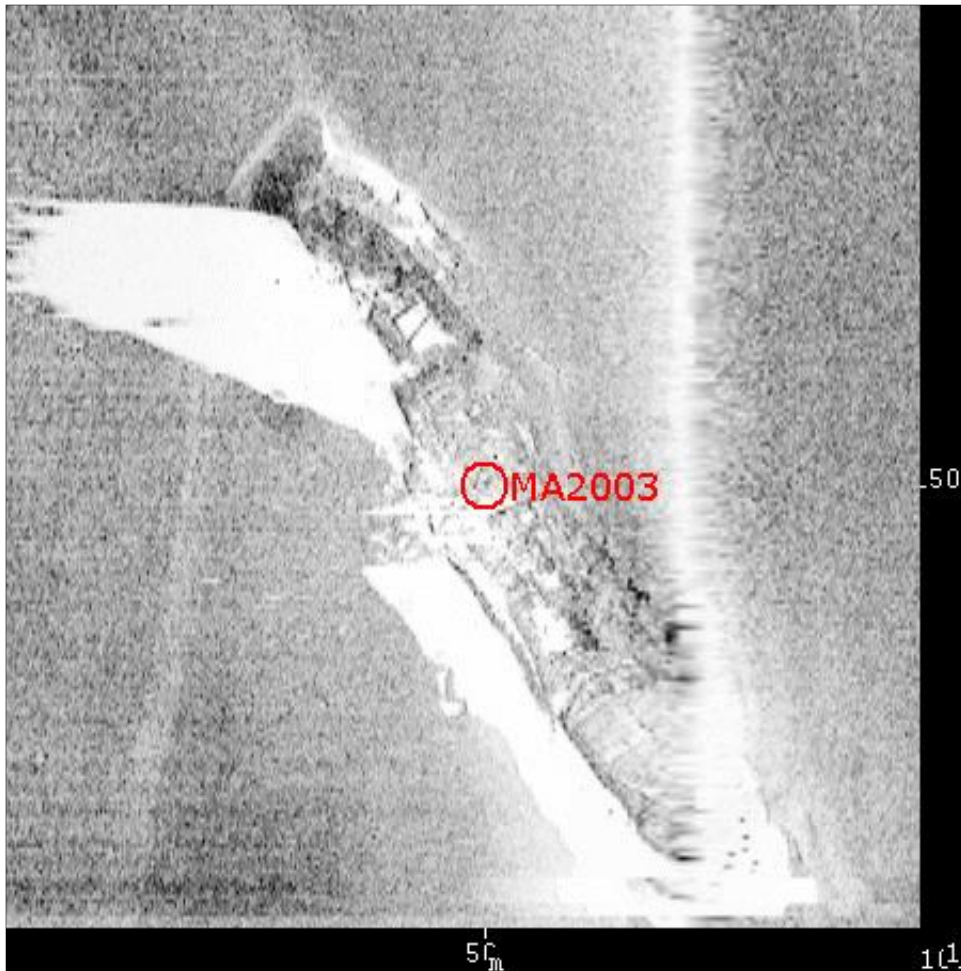
MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
MA0053	Isolated magnetic anomaly (145nT)								MA5202	medium	Not assessed	50	671336.25	5622349
MA0054	Isolated magnetic anomaly (156nT)								MA5537	medium	Not assessed	50	670536.31	5626078.5
MA0055	Isolated magnetic anomaly (165nT)								MA5380	medium	Not assessed	50	670101.31	5626471
MA0056	Isolated magnetic anomaly associated with seabed reflector							MA4039	MA5032	medium	Not assessed	50	682143.69	5611126
MA0057	Isolated magnetic anomaly associated with seabed reflector							MA4040	MA5927	medium	Not assessed	50		
MA0058	Three magnetic anomalies MA5504 (245nT) MA5505 (47nT) MA5506 (38nT)								MA5504	medium	Not assessed	50	672489.06	5626455.5
MA0059	Isolated magnetic anomaly (147nT)								MA6556	medium	Not assessed	50	685715.69	5611733.5
MA0060	Isolated magnetic								MA5823	medium	Not assessed	50	672817.81	5630164.5

MA ID	Description	Name	Information	NRHE ID (HOB)	UKHO Wreck Number	UKHO ID (GID)	SSS ID	MBES ID	MAG ID	Archaeological potential	Archaeological significance	AEZ (m)	X	Y
	anomaly (300nT)													
MA0061	Isolated magnetic anomaly (716nT)								MA5529	medium	Not assessed	50	671751.19	5626378
MA0062	Buried hard reflector; possible anthropogenic debris (1751nT)	Broadhurst (possibly)	Steam ship; Sunk: 1940/07/26; Length: 66.1m; Beam: 10.4m; Draught: 4m; Tonnage: 1013; Cargo: coal		19959	1001698668	MA2034	MA4041	MA5097	high	Medium	100	695802.41	5608678.3

Annex E

High potential anomalies

Graphic E-1 MA0001



Contact Info: MA2003

Sonar Time at Target: 07/17/2020
20:56:16
Click Position (Lat/Lon Coordinates)
50.6757907123 -0.1114770119 (WGS84)
Click Position (Projected Coordinates)
(X) 704078.80 (Y) 5617753.57
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HFA_M-34H.xtf
Ping Number: 187949
Range to Target: 21.71 Meters

User Entered Info

Target Height: = 8 Meters
Target Length: 88 Meters
Target Shadow: 35 Meters
Target Width: 15 Meters
Mag Anomaly: 4993 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Hard reflector approx. 88m
length with extended shadow and
pronounced super-structure; wreck.

Fish Height: 13.95 Meters
Heading: 75.590 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-34H

Graphic E-2 MA0002



Contact Info: MA2007

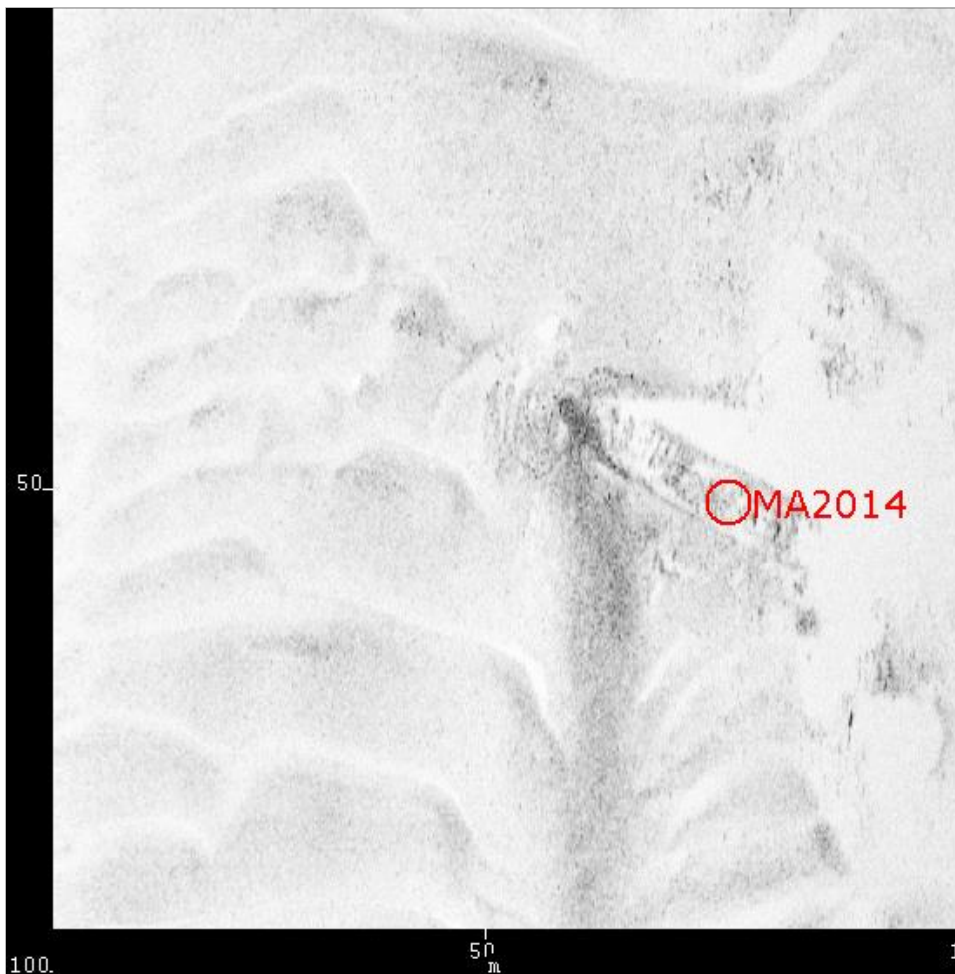
Sonar Time at Target: 07/21/2020
11:06:22
Click Position (Lat/Lon Coordinates)
50.6454688001 -0.1392277753 (WGS84)
Click Position (Projected Coordinates)
(X) 702248.76 (Y) 5614306.53
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-62AH.xtf

User Entered Info

Target Height: = 0 Meters
Target Length: 12 Meters
Target Shadow: 0 Meters
Target Width: 5 Meters
Mag Anomaly: 1364 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Curved hard reflector;
associated with MA2008.

Ping Number: 569246
Range to Target: 87.86 Meters
Fish Height: 9.31 Meters
Heading: 250.537 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-62AH

Graphic E-3 MA0004



Contact Info: MA2014

Sonar Time at Target: 07/22/2020
19:45:36
Click Position (Lat/Lon Coordinates)
50.6308121519 -0.1608194585 (WGS84)
Click Position (Projected Coordinates)
(X) 700785.01 (Y) 5612618.39
Map Proj: UTM84-30N

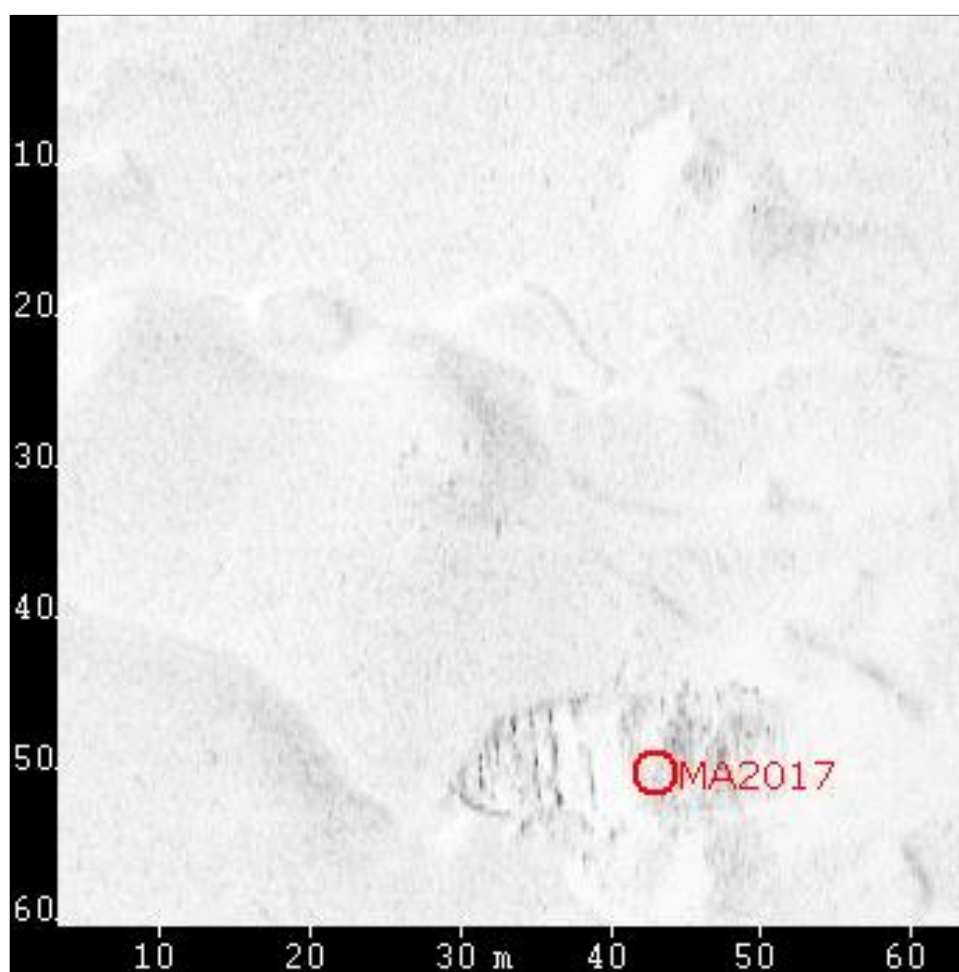
User Entered Info

Target Height: = 2 Meters
Target Length: 31 Meters
Target Shadow: 15 Meters
Target Width: 7 Meters
Mag Anomaly: 1760 nT
Avoidance Area: 100m
Classification 1: wreck
Classification 2: high

Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-75.001H.xtf
Ping Number: 1393745
Range to Target: 75.29 Meters
Fish Height: 13.15 Meters
Heading: 70.405 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-75.001H

Description: Ovate reflector, partially
buried with extended shadow; wreck.

Graphic E-4 MA0005



Contact Info: MA2017

Sonar Time at Target: 07/23/2020
12:27:30
Click Position (Lat/Lon Coordinates)
50.6185180903 -0.1669379726 (WGS84)
Click Position (Projected Coordinates)
(X) 700404.67 (Y) 5611235.09

User Entered Info

Target Height: = 0 Meters
Target Length: 23 Meters
Target Shadow: 0 Meters
Target Width: 9 Meters
Mag Anomaly: 17 nT
Avoidance Area: 100 m

Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HFA_M-88H.xtf
Ping Number: 1819067
Range to Target: 63.46 Meters
Fish Height: 12.10 Meters
Heading: 76.032 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-88H

Classification 1: wreck
Classification 2: high
Description: Ovate partially buried
reflector; wreck.

Graphic E-5 MA0007



Contact Info: MA2028

Sonar Time at Target: 07/24/2020
21:36:00
Click Position (Lat/Lon Coordinates)
50.5983158131 -0.1893346228 (WGS84)

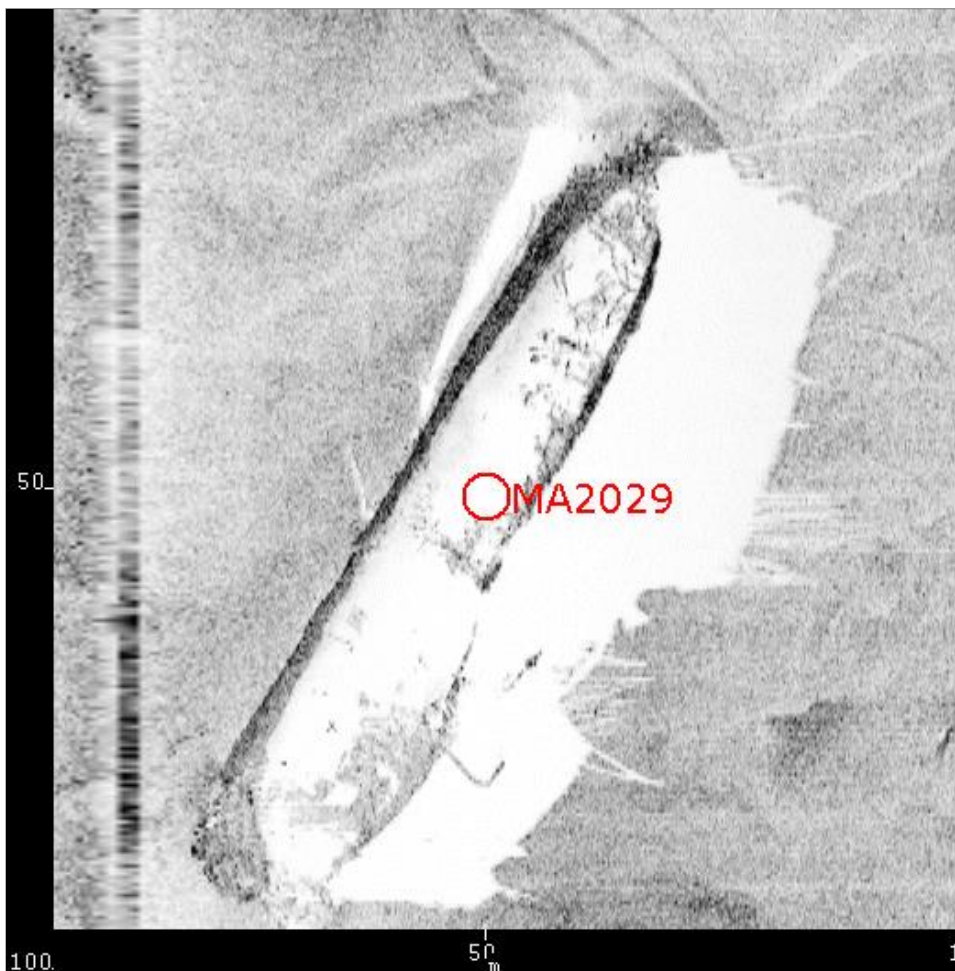
User Entered Info

Target Height: = 4 Meters
Target Length: 61 Meters
Target Shadow: 38 Meters
Target Width: 36 Meters

Click Position (Projected Coordinates)
(X) 698905.84 (Y) 5608928.85
Map Proj: UTM84-30N
Acoustic Source File:
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A\\HF\\A_M-106H.xtf
Ping Number: 2663364
Range to Target: 84.05 Meters
Fish Height: 12.90 Meters
Heading: 256.489 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-106H

Mag Anomaly: 3344 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Pair of ovate hard reflectors
with extended shadow; wreck with bow
and stern separated but adjacent to each
other.

Graphic E-6 MA0008



Contact Info: MA2029

Sonar Time at Target: 07/19/2020
07:03:03

User Entered Info

Target Height: = 6 Meters
Target Length: 93 Meters

Click Position (Lat/Lon Coordinates)
50.6441444705 -0.1909919834 (WGS84)
Click Position (Projected Coordinates)
(X) 698595.34 (Y) 5614019.20
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HFA_M-55H.xtf
Ping Number: 1057085
Range to Target: 38.33 Meters
Fish Height: 15.24 Meters
Heading: 73.971 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-55H

Target Shadow: 25 Meters
Target Width: 19 Meters
Mag Anomaly: 1007 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Strong hard reflector of hull
with extended shadow of super-structure;
wreck.

Graphic E-7 MA0009



Contact Info: MA2031

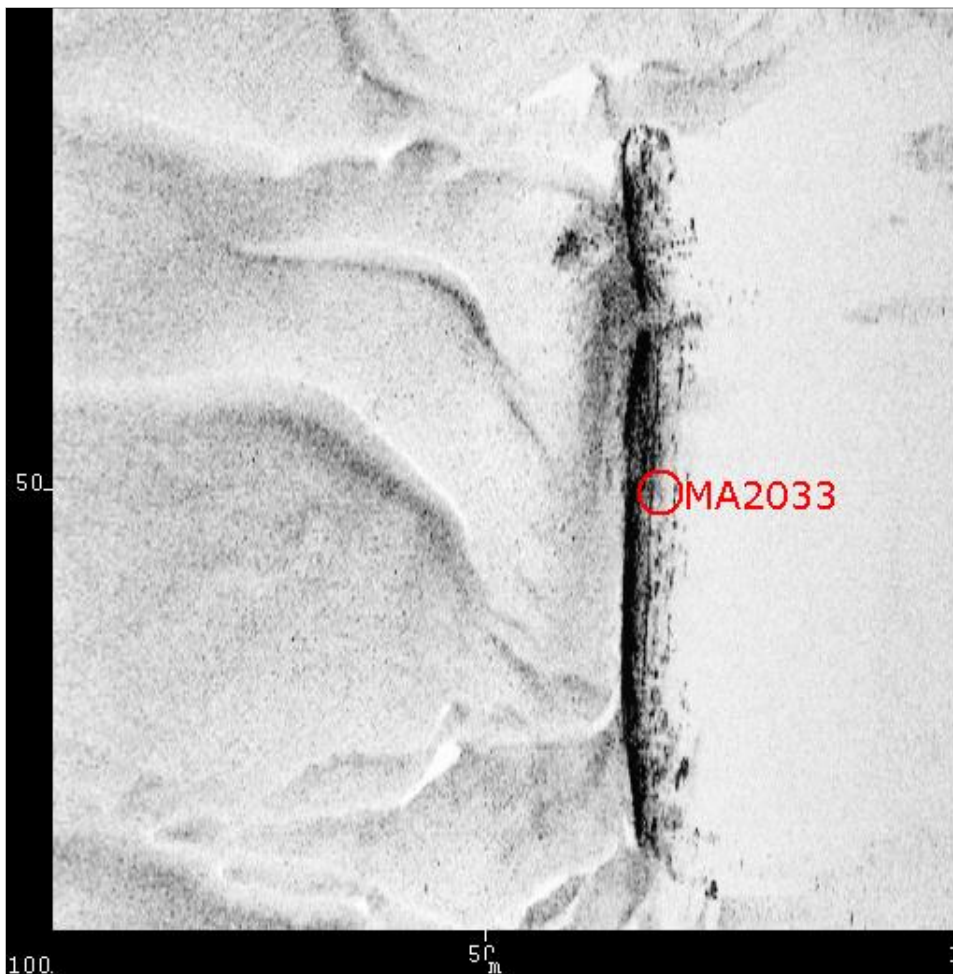
User Entered Info

Target Height: = 10 Meters

Sonar Time at Target: 07/21/2020
05:21:58
Click Position (Lat/Lon Coordinates)
50.6352048283 -0.2169045532 (WGS84)
Click Position (Projected Coordinates)
(X) 696800.97 (Y) 5612956.19
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-61AH.xtf
Ping Number: 423021
Range to Target: 55.00 Meters
Fish Height: 24.01 Meters
Heading: 74.627 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-61AH

Target Length: 88 Meters
Target Shadow: 41 Meters
Target Width: 44 Meters
Mag Anomaly: 4766 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Hard reflector of hull with
associated debris and extended shadow;
wreck.

Graphic E-8 MA0010



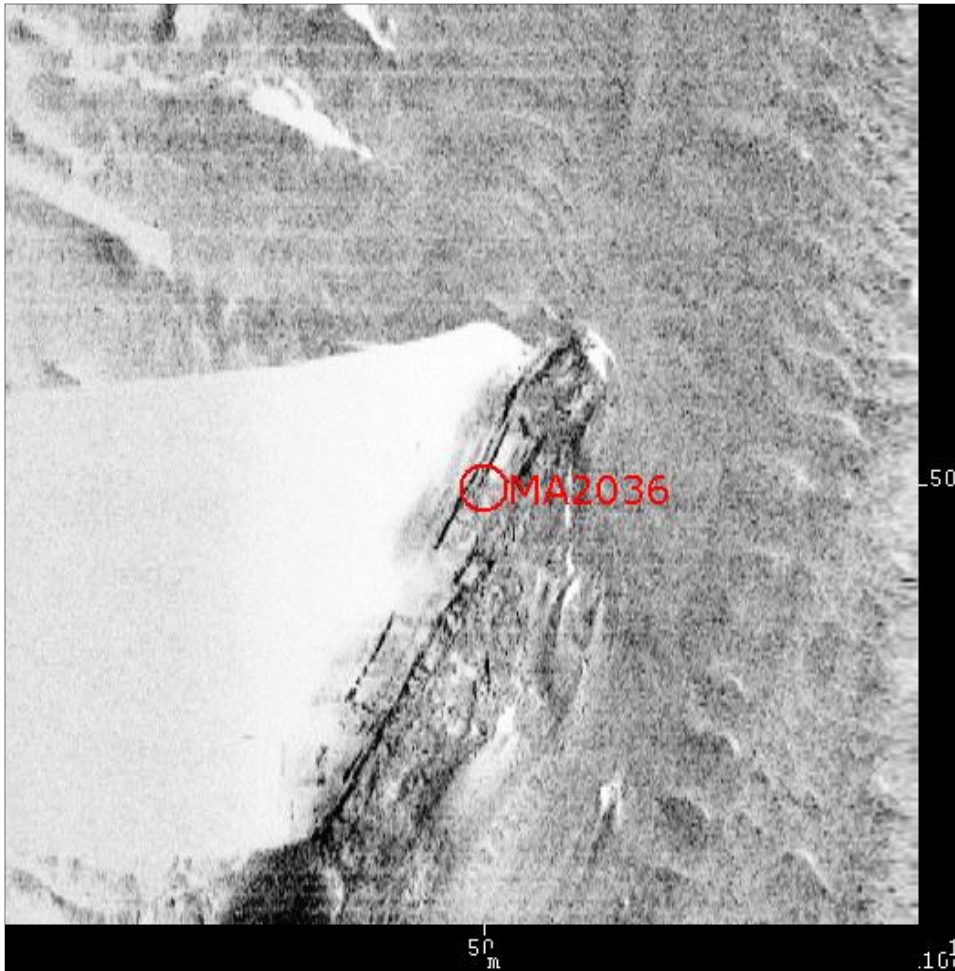
Contact Info: MA2033

Sonar Time at Target: 07/17/2020
15:34:49
Click Position (Lat/Lon Coordinates)
50.6442788178 -0.2331255897 (WGS84)
Click Position (Projected Coordinates)
(X) 695616.41 (Y) 5613921.99
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-47H.xtf
Ping Number: 51449
Range to Target: 68.15 Meters
Fish Height: 12.00 Meters
Heading: 71.738 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-47H

User Entered Info

Target Height: = 3 Meters
Target Length: 76 Meters
Target Shadow: 20 Meters
Target Width: 7 Meters
Mag Anomaly: 1237 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Cylindrical, partially buried
reflector; wreck

Graphic E-9 MA0011

**Contact Info: MA2036**

Sonar Time at Target: 07/22/2020
01:54:41
Click Position (Lat/Lon Coordinates)
50.6168851168 -0.2773848154 (WGS84)
Click Position (Projected Coordinates)
(X) 692599.74 (Y) 5610760.59
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HFA_M-71H.xtf
Ping Number: 946416
Range to Target: 45.88 Meters
Fish Height: 12.30 Meters
Heading: 73.967 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-71H

User Entered Info

Target Height: = 7 Meters
Target Length: 59 Meters
Target Shadow: 55 Meters
Target Width: 17 Meters
Mag Anomaly: 691nT
Avoidance Area: 100m
Classification 1: wreck
Classification 2: high
Description: Hard reflector of outline of
hull and extended shadow from super-
structure; wreck.

Graphic E-10 MA0012

**Contact Info: MA2041**

Sonar Time at Target: 07/23/2020
07:21:42
Click Position (Lat/Lon Coordinates)
50.5987665448 -0.3026861701 (WGS84)
Click Position (Projected Coordinates)
(X) 690883.50 (Y) 5608680.83
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-87H.xtf
Ping Number: 1689225
Range to Target: 64.74 Meters
Fish Height: 11.06 Meters
Heading: 74.133 degrees
Event Number: 0

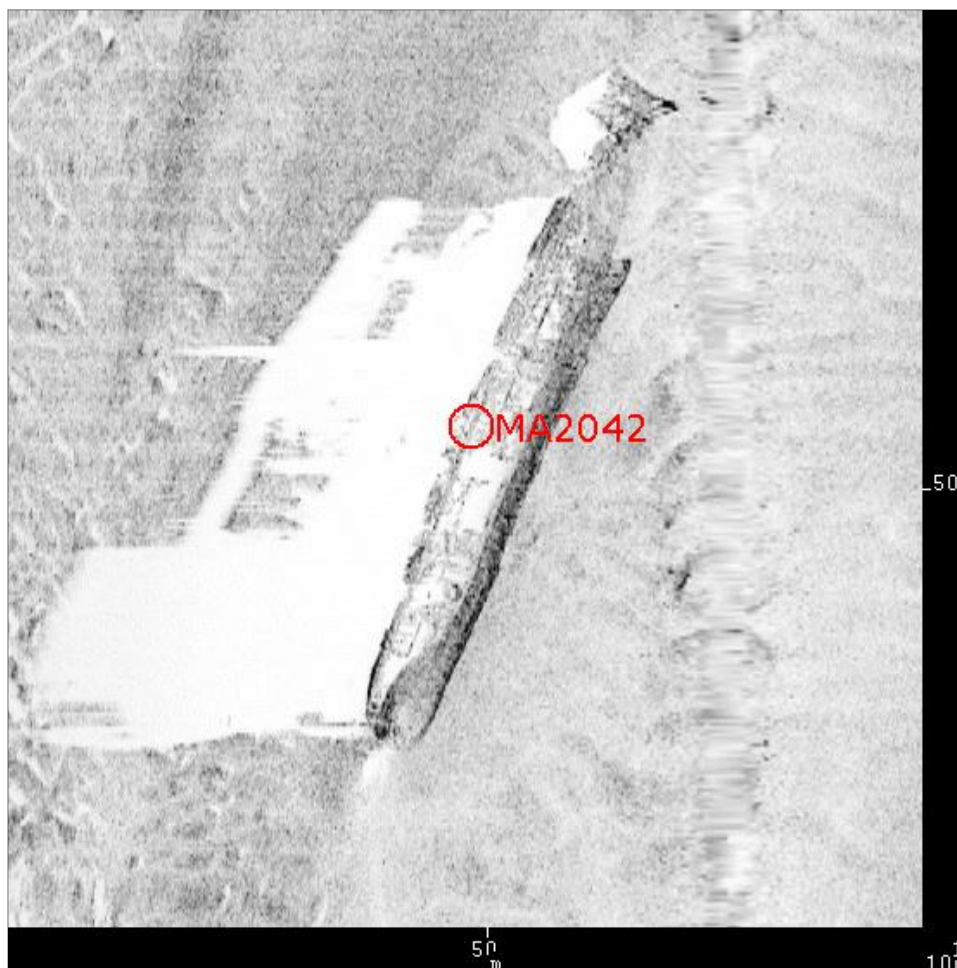
User Entered Info

Target Height: = 5 Meters
Target Length: 61 Meters
Target Shadow: 49 Meters
Target Width: 14 Meters
Mag Anomaly: 2435 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Cylindrical hard reflector,
partially buried with extended shadow;
wreck.

Water Depth: 0.00
Line Name: A_M-87H

Graphic E-11

MA0013

**Contact Info: MA2042**

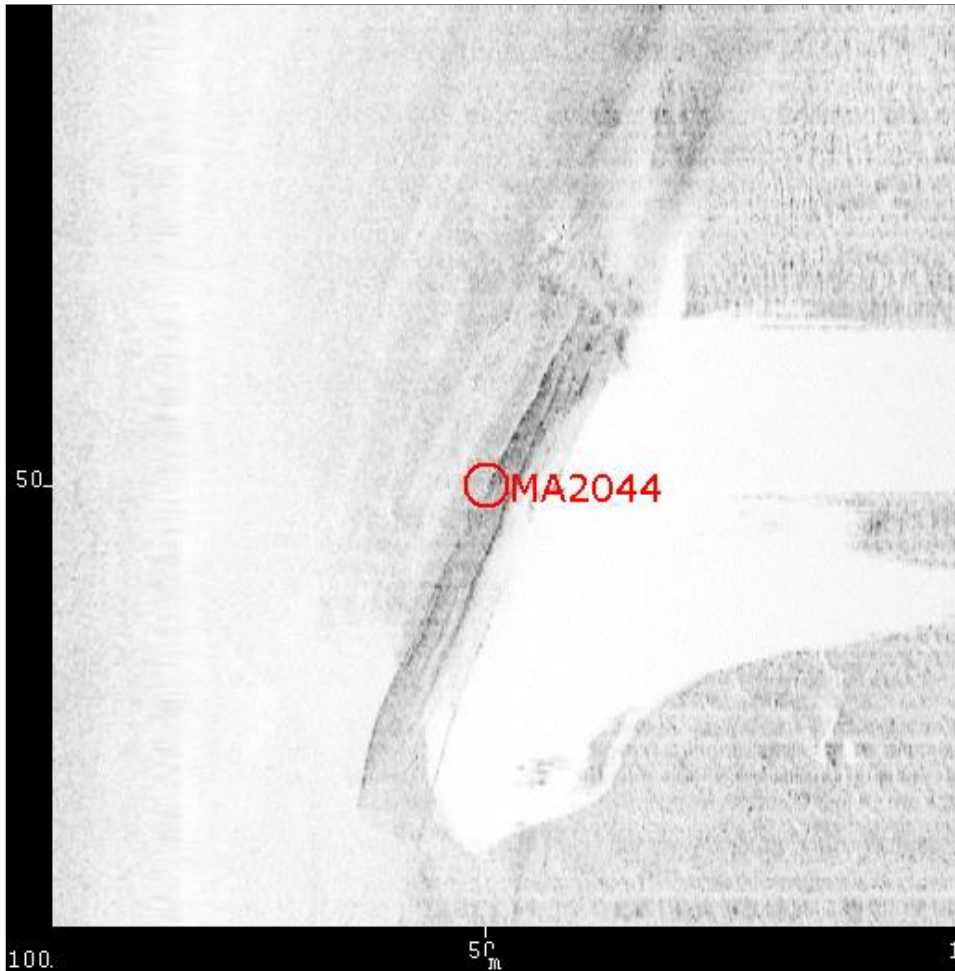
Sonar Time at Target: 07/19/2020
14:54:09
Click Position (Lat/Lon Coordinates)
50.6346541049 -0.3075809827 (WGS84)
Click Position (Projected Coordinates)
(X) 690392.13 (Y) 5612657.95
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HFA_M-45H.xtf
Ping Number: 1254063
Range to Target: 26.72 Meters
Fish Height: 13.10 Meters
Heading: 73.215 degrees

User Entered Info

Target Height: = 7 Meters
Target Length: 73 Meters
Target Shadow: 35 Meters
Target Width: 11 Meters
Mag Anomaly: 1375 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Cylindrical hard reflector
approx. 70m long with pronounced
shadow of super structure; steel hulled
vessel.

Event Number: 0
Water Depth: 0.00
Line Name: A_M-45H

Graphic E-12 MA0014



Contact Info: MA2044

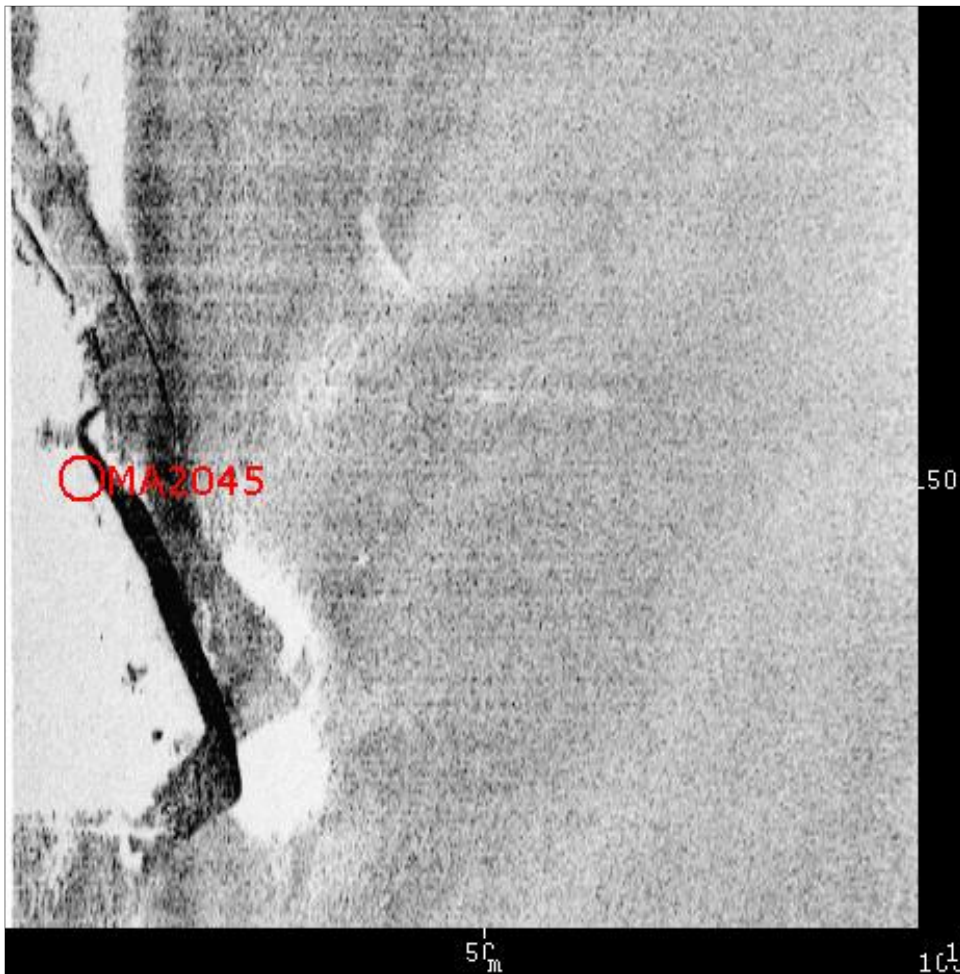
Sonar Time at Target: 07/22/2020
09:25:12
Click Position (Lat/Lon Coordinates)
50.6049292950 -0.3157533579 (WGS84)
Click Position (Projected Coordinates)
(X) 689934.07 (Y) 5609332.38
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-77.001H.xtf
Ping Number: 1137700
Range to Target: 32.00 Meters

User Entered Info

Target Height: = 8 Meters
Target Length: 59 Meters
Target Shadow: 39 Meters
Target Width: 7 Meters
Mag Anomaly: 637 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Cylindrical hard reflector,
partially buried with extended shadow;
wreck.

Fish Height: 15.09 Meters
Heading: 253.413 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-77.001H

Graphic E-13 MA0015



Contact Info: MA2045

Sonar Time at Target: 07/19/2020
09:38:35
Click Position (Lat/Lon Coordinates)
50.6269376803 -0.3178193938 (WGS84)
Click Position (Projected Coordinates)
(X) 689699.30 (Y) 5611773.82
Map Proj: UTM84-30N
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HFA_M-51.001H.xtf

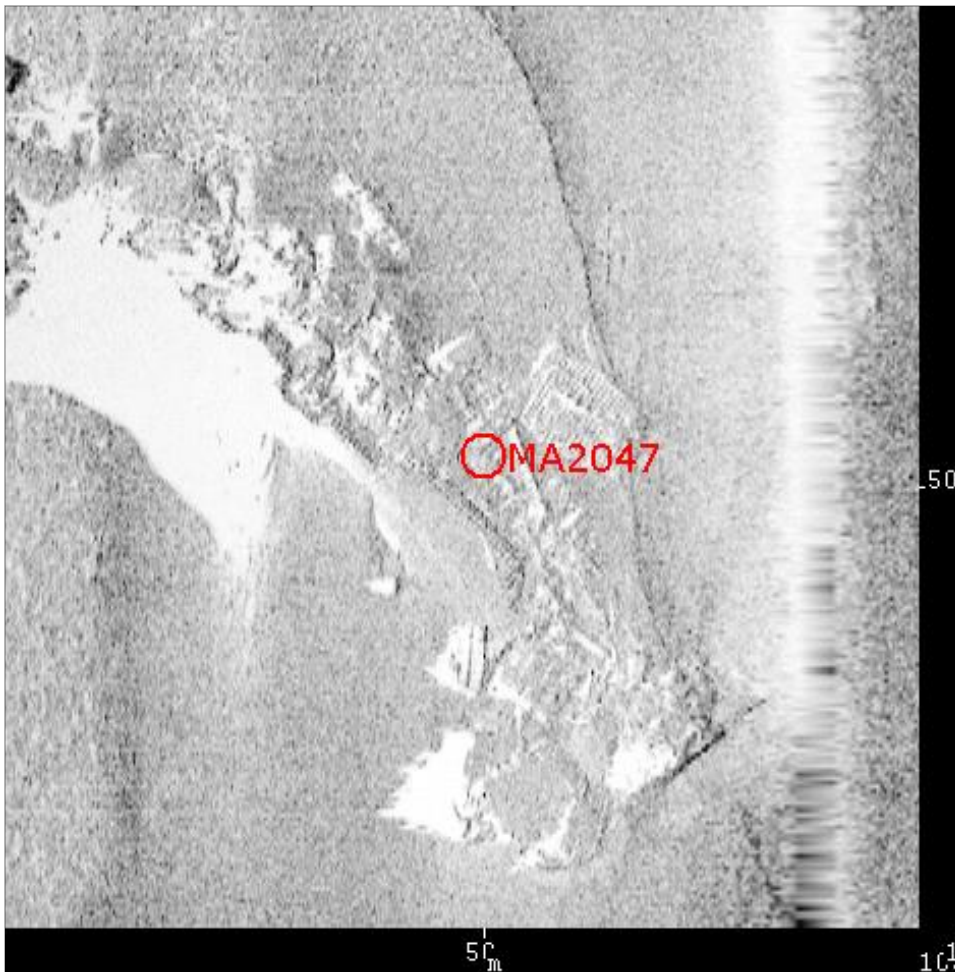
User Entered Info

Target Height: = 2 Meters
Target Length: 76 Meters
Target Shadow: 21 Meters
Target Width: 7 Meters
Mag Anomaly: 909 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Strong hard reflector with
extended shadow and scour; wreck.

Ping Number: 1123141
Range to Target: 92.07 Meters
Fish Height: 10.81 Meters
Heading: 255.037 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-51.001H

Graphic E-14

MA0016

**Contact Info: MA2047**

Sonar Time at Target: 07/19/2020
22:40:26
Click Position (Lat/Lon Coordinates)
50.6302276201 -0.3274002380 (WGS84)
Click Position (Projected Coordinates)
(X) 689008.59 (Y) 5612115.08
Map Proj: UTM84-30N

User Entered Info

Target Height: = 7 Meters
Target Length: 105 Meters
Target Shadow: 31 Meters
Target Width: 29 Meters
Mag Anomaly: 7720 nT
Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high

Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-46.001H.xtf
Ping Number: 1452038
Range to Target: 34.49 Meters
Fish Height: 16.24 Meters
Heading: 254.354 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-46.001H

Description: Scattered reflectors over
approx. 100m with extended masking
shadow; wreck.

Graphic E-15

MA0017

**Contact Info: MA2053**

Sonar Time at Target: 07/07/2020
13:29:30
Click Position (Lat/Lon Coordinates)
50.6604625290 -0.3601539758 (WGS84)
Click Position (Projected Coordinates)
(X) 686572.70 (Y) 5615393.35

User Entered Info

Target Height: = 2 Meters
Target Length: 23 Meters
Target Shadow: 9 Meters
Target Width: 6 Meters
Mag Anomaly: n/a
Avoidance Area: 100 m

Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-91H_SSS HF.xtf
Ping Number: 237344
Range to Target: 40.56 Meters
Fish Height: 11.69 Meters
Heading: 156.593 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-91H_SSS HF

Classification 1: sand waves
Classification 2: high
Description: Isolated reflector with
elongated shadow; potential wreck or
sand bar.

Graphic E-16

MA0018



Contact Info: MA2055

Sonar Time at Target: 07/17/2020
02:17:50
Click Position (Lat/Lon Coordinates)
50.6673704310 -0.3941212495 (WGS84)
Click Position (Projected Coordinates)
(X) 684145.34 (Y) 5616076.30

User Entered Info

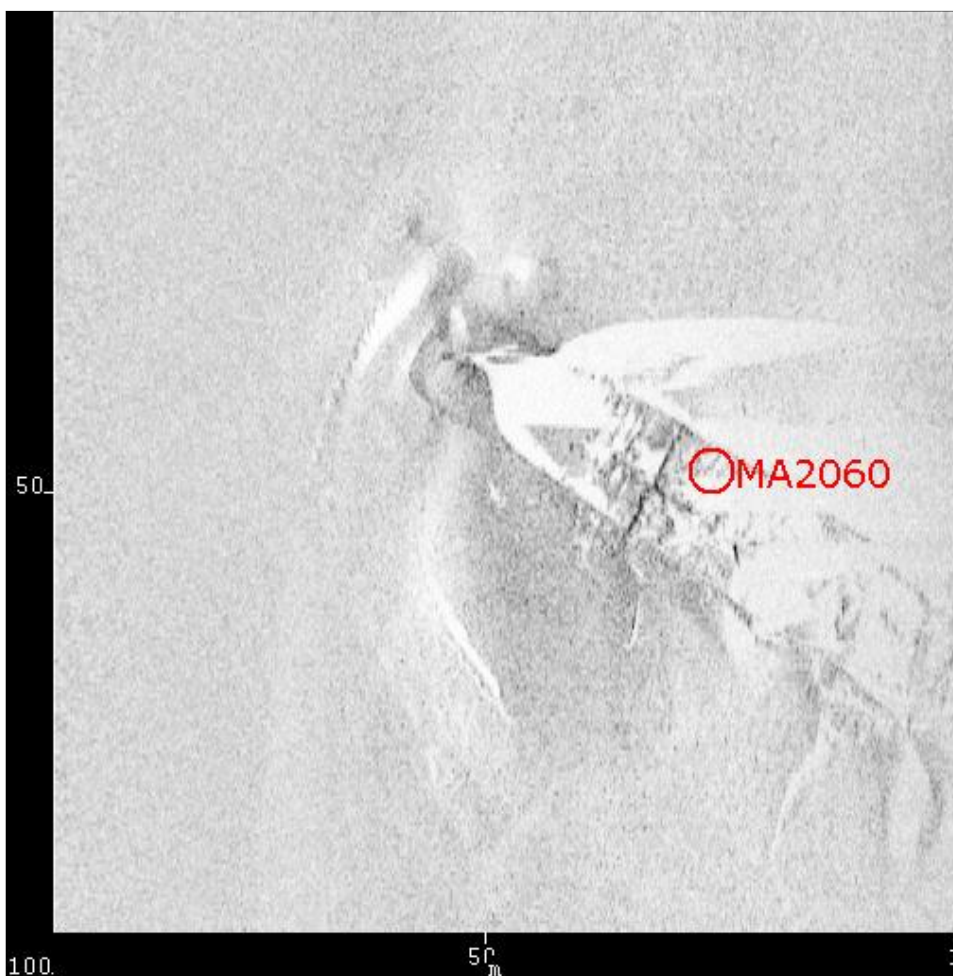
Target Height: = 3 Meters
Target Length: 77 Meters
Target Shadow: 15 Meters
Target Width: 16 Meters
Mag Anomaly: 1198 nT
Avoidance Area: 100m

Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-20.001H_SSS HF.xtf
Ping Number: 786616
Range to Target: 49.65 Meters
Fish Height: 14.15 Meters
Heading: 79.993 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-20.001H_SSS HF

Classification 1: wreck
Classification 2: high
Description: Partially buried hull of vessel
with extended shadows; wreck.

Graphic E-17

MA0020

**Contact Info: MA2060**

Sonar Time at Target: 07/10/2020
21:04:18
Click Position (Lat/Lon Coordinates)
50.6486791674 -0.4144609717 (WGS84)
Click Position (Projected Coordinates)

User Entered Info

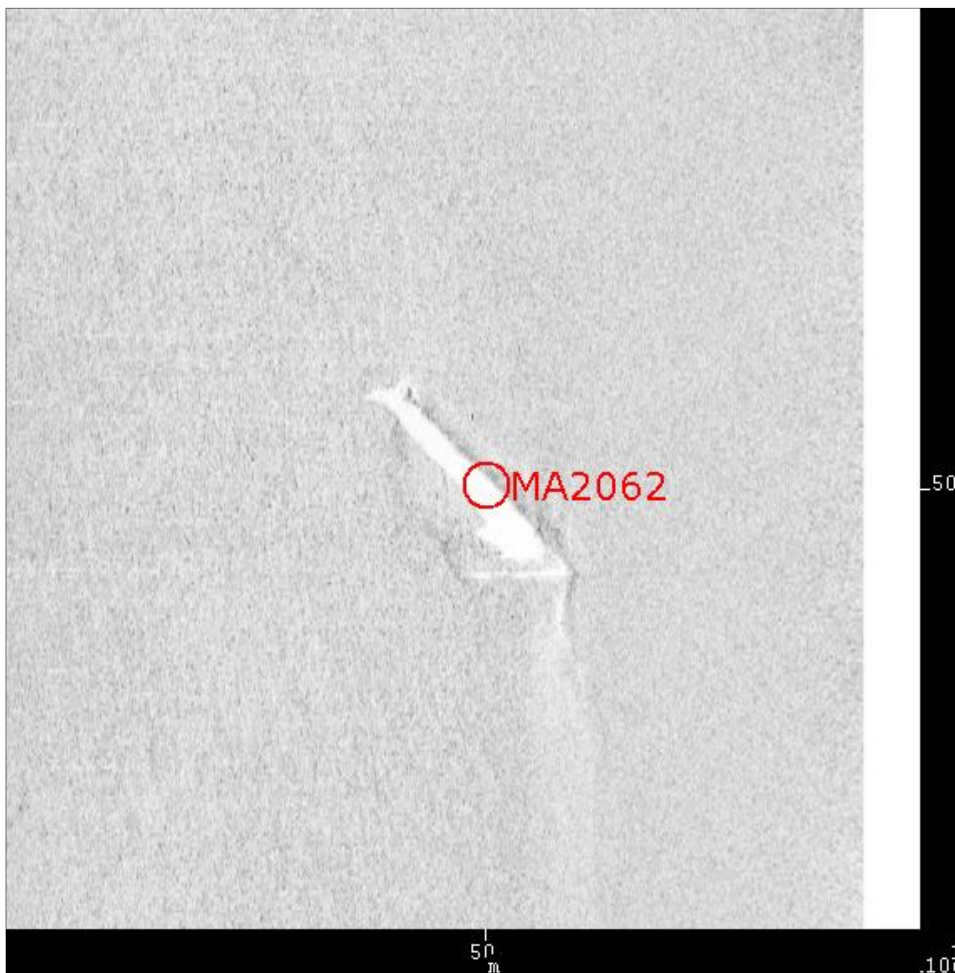
Target Height: = 3 Meters
Target Length: 69 Meters
Target Shadow: 32 Meters
Target Width: 13 Meters
Mag Anomaly: 2311 nT

(X) 682780.79 (Y) 5613947.90
Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-36.001H_SSS HF.xtf
Ping Number: 578655
Range to Target: 73.40 Meters
Fish Height: 10.76 Meters
Heading: 82.951 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-36.001H_SSS HF

Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Partially buried vessel with
shadow extending from bow structure;
wreck.

Graphic E-18

MA0021

**Contact Info: MA2062**

Sonar Time at Target: 07/11/2020
01:56:46
Click Position (Lat/Lon Coordinates)
50.6527613816 -0.4181178842 (WGS84)
Click Position (Projected Coordinates)

User Entered Info

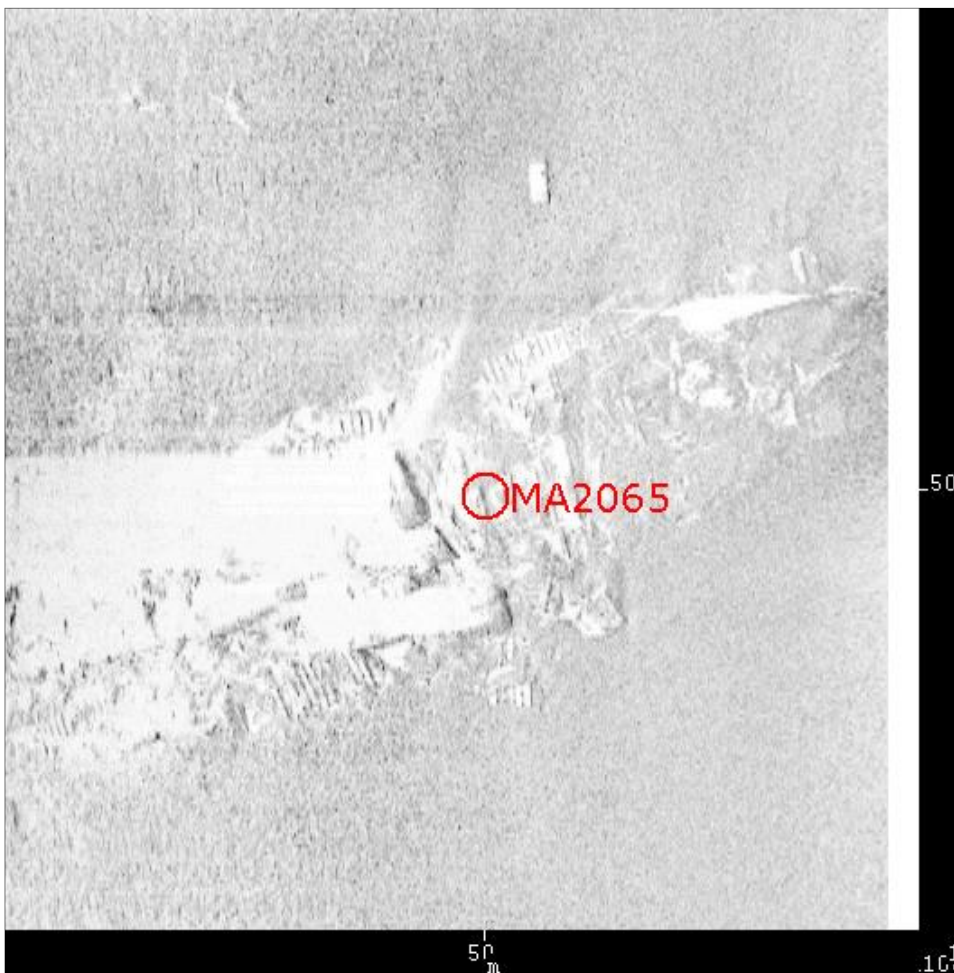
Target Height: = 2 Meters
Target Length: 27 Meters
Target Shadow: 12 Meters
Target Width: 0 Meters
Mag Anomaly: n/a

(X) 682506.47 (Y) 5614392.72
Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-32.001H_SSS HF.xtf
Ping Number: 702844
Range to Target: 44.28 Meters
Fish Height: 10.66 Meters
Heading: 81.077 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-32.001H_SSS HF

Avoidance Area: 100 m
Classification 1: debris
Classification 2: high
Description: Buried linear reflector with
shadow; potential anthropogenic debris or
sand bar.

Graphic E-19

MA0022

**Contact Info: MA2065**

Sonar Time at Target: 07/06/2020
17:13:12
Click Position (Lat/Lon Coordinates)
50.6249565603 -0.4390593526 (WGS84)
Click Position (Projected Coordinates)

User Entered Info

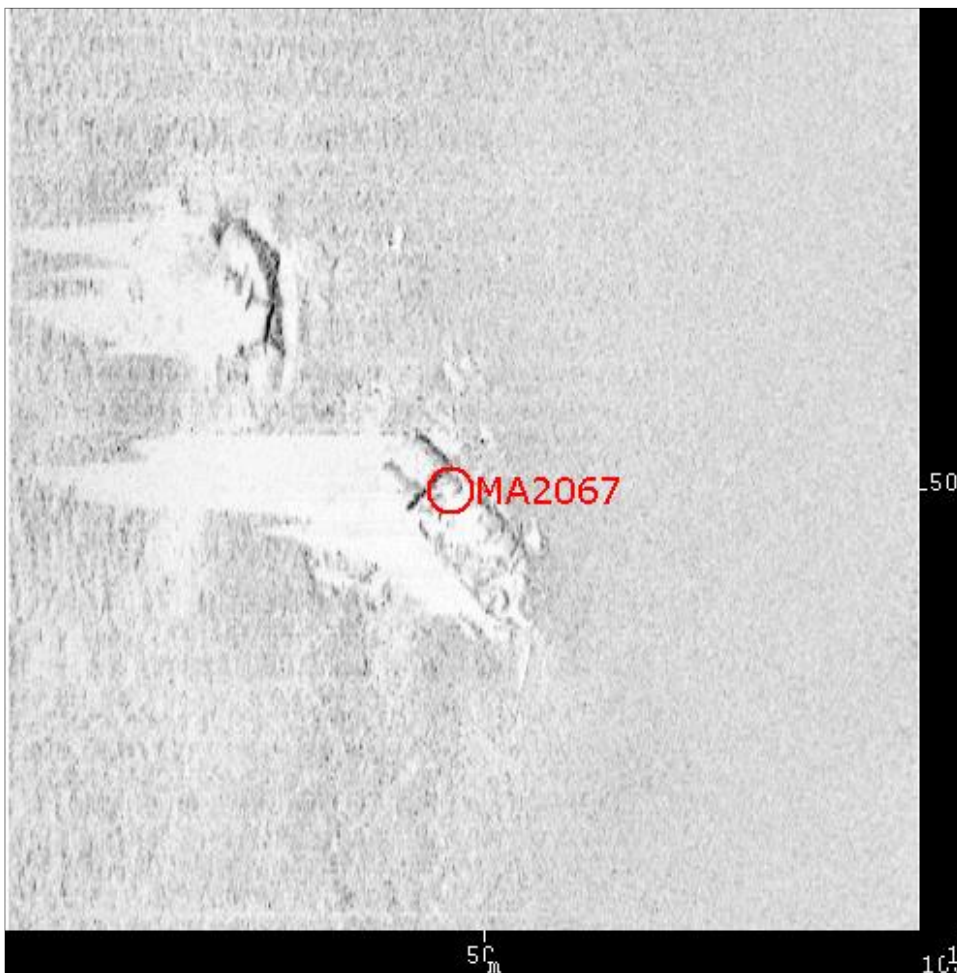
Target Height: = 6 Meters
Target Length: 102 Meters
Target Shadow: 41 Meters
Target Width: 32 Meters
Mag Anomaly: 7729 nT

(X) 681133.27 (Y) 5611250.11
Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-59H_SSS HF.xtf
Ping Number: 150359
Range to Target: 46.92 Meters
Fish Height: 12.05 Meters
Heading: 249.299 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-59H_SSS HF

Avoidance Area: 100m
Classification 1: wreck
Classification 2: high
Description: Extended shadow from
centre of vessel with hull plating and
scattered debris in surrounding area;
wreck.

Graphic E-20

MA0024

**Contact Info: MA2067**

Sonar Time at Target: 07/08/2020
18:12:27
Click Position (Lat/Lon Coordinates)
50.6276443151 -0.4416313718 (WGS84)
Click Position (Projected Coordinates)

User Entered Info

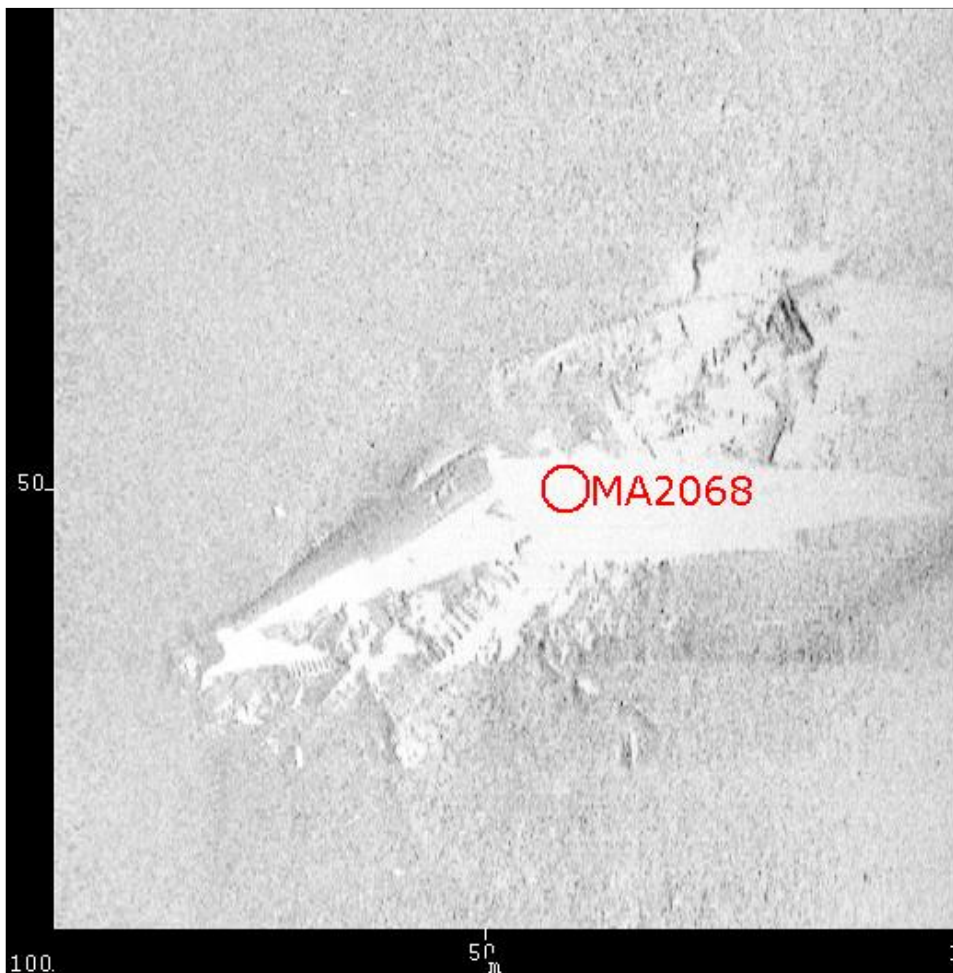
Target Height: = 4 Meters
Target Length: 58 Meters
Target Shadow: 36 Meters
Target Width: 8 Meters
Mag Anomaly: 1022 nT

(X) 680941.05 (Y) 5611542.64
Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-56.001H_SSS HF.xtf
Ping Number: 91130
Range to Target: 53.56 Meters
Fish Height: 8.92 Meters
Heading: 70.922 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-56.001H_SSS HF

Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Pair of reflectors with
extended shadow showing separated
bow and stern of vessel; wreck.

Graphic E-21

MA0025

**Contact Info: MA2068**

Sonar Time at Target: 07/10/2020
20:48:13
Click Position (Lat/Lon Coordinates)
50.6427859186 -0.4520435303 (WGS84)
Click Position (Projected Coordinates)

User Entered Info

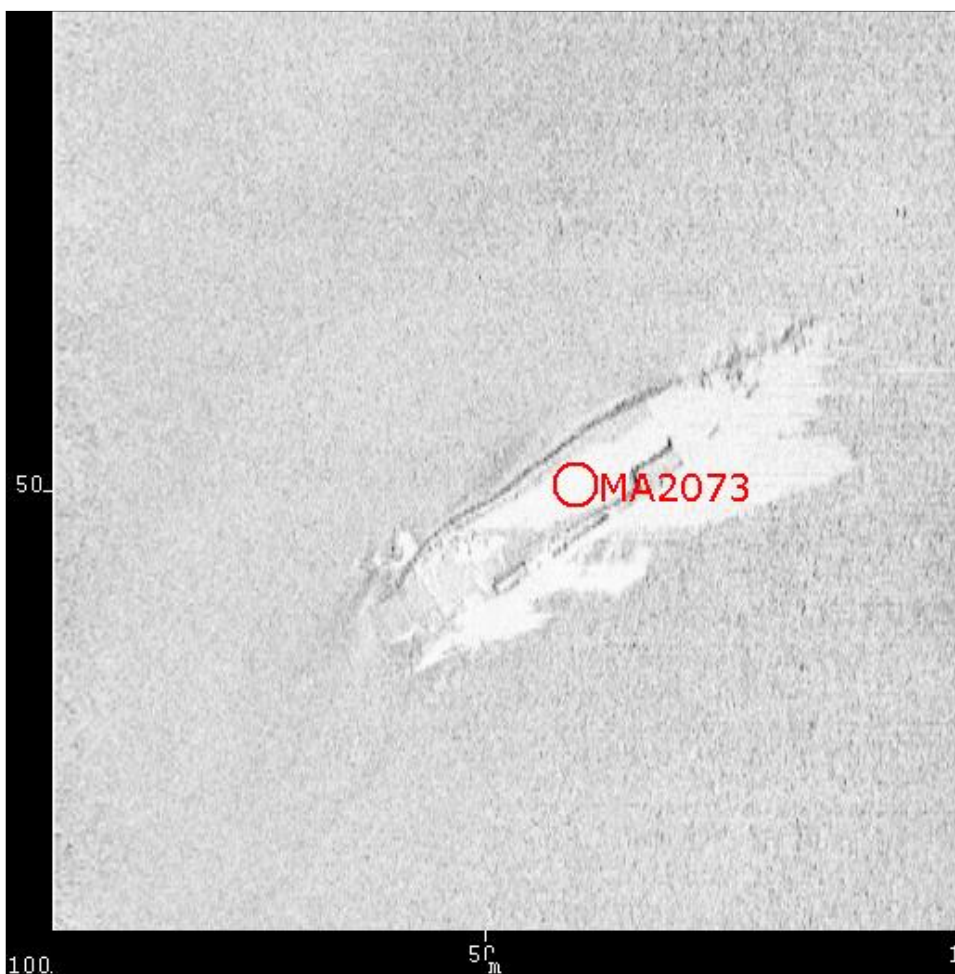
Target Height: = 5 Meters
Target Length: 74 Meters
Target Shadow: 45 Meters
Target Width: 20 Meters
Mag Anomaly: 6783 nT

(X) 680146.83 (Y) 5613200.63
Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-36.001H_SSS HF.xtf
Ping Number: 571825
Range to Target: 58.25 Meters
Fish Height: 11.01 Meters
Heading: 80.701 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-36.001H_SSS HF

Avoidance Area: 100 m
Classification 1: wreck
Classification 2: high
Description: Outline of hull of vessel with
extended shadow; wreck.

Graphic E-22

MA0026

**Contact Info: MA2073**

Sonar Time at Target: 07/17/2020
01:23:24
Click Position (Lat/Lon Coordinates)
50.6467520213 -0.5158459699 (WGS84)
Click Position (Projected Coordinates)
(X) 675621.61 (Y) 5613488.32

User Entered Info

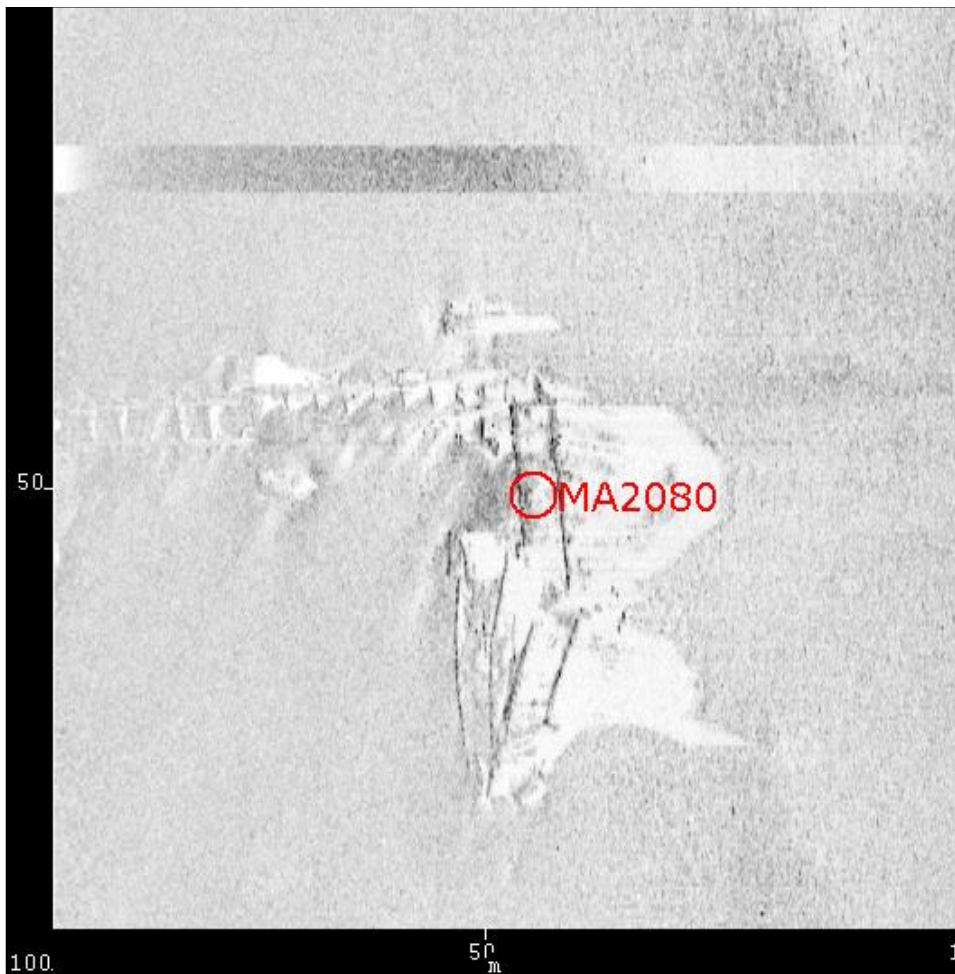
Target Height: = 3 Meters
Target Length: 55 Meters
Target Shadow: 17 Meters
Target Width: 9 Meters
Mag Anomaly: 5079 nT
Avoidance Area: 100 m

Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-20H_SSS HF.xtf
Ping Number: 763503
Range to Target: 59.23 Meters
Fish Height: 14.05 Meters
Heading: 72.428 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-20H_SSS HF

Classification 1: wreck
Classification 2: high
Description: Reflector of outline of hull
with shadow of super-structure; wreck.

Graphic E-23

MA0027

**Contact Info: MA2080**

Sonar Time at Target: 07/28/2020
17:47:55
Click Position (Lat/Lon Coordinates)
50.6254667065 -0.5698934974 (WGS84)
Click Position (Projected Coordinates)
(X) 671878.72 (Y) 5610995.10

User Entered Info

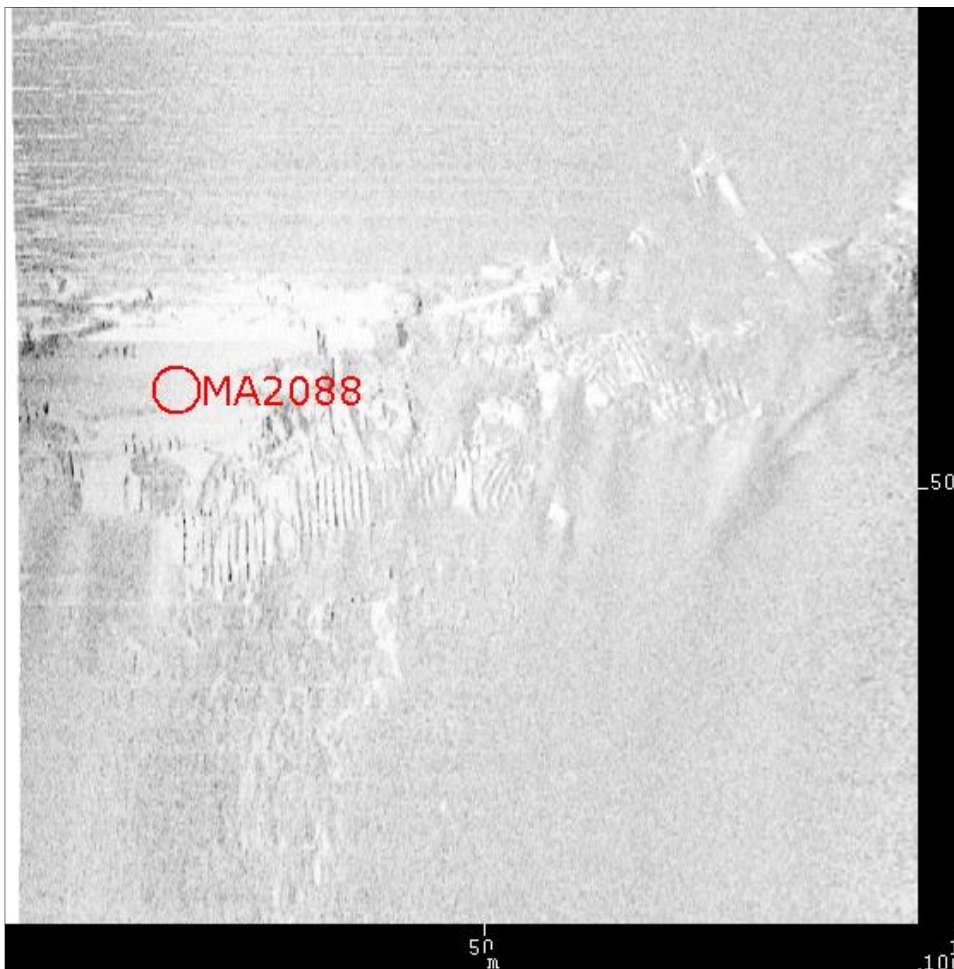
Target Height: = 2 Meters
Target Length: 54 Meters
Target Shadow: 18 Meters
Target Width: 50 Meters
Mag Anomaly: 728 nT
Avoidance Area: 100m

Map Proj: UTM84-30N
Acoustic Source File: F:\01_SSS\Area
B\HF\B_I-107H_SSS HF.xtf
Ping Number: 131434
Range to Target: 54.93 Meters
Fish Height: 9.71 Meters
Heading: 74.491 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_I-107H_SSS HF

Classification 1: wreck
Classification 2: high
Description: Three sets of parallel linear
hard reflectors with a ladderlike reflector;
wreck.

Graphic E-24

MA0029

**Contact Info: MA2088**

Sonar Time at Target: 07/11/2020
05:18:08
Click Position (Lat/Lon Coordinates)
50.6234592738 -0.6100824634 (WGS84)
Click Position (Projected Coordinates)
(X) 669043.73 (Y) 5610679.45
Map Proj: UTM84-30N

User Entered Info

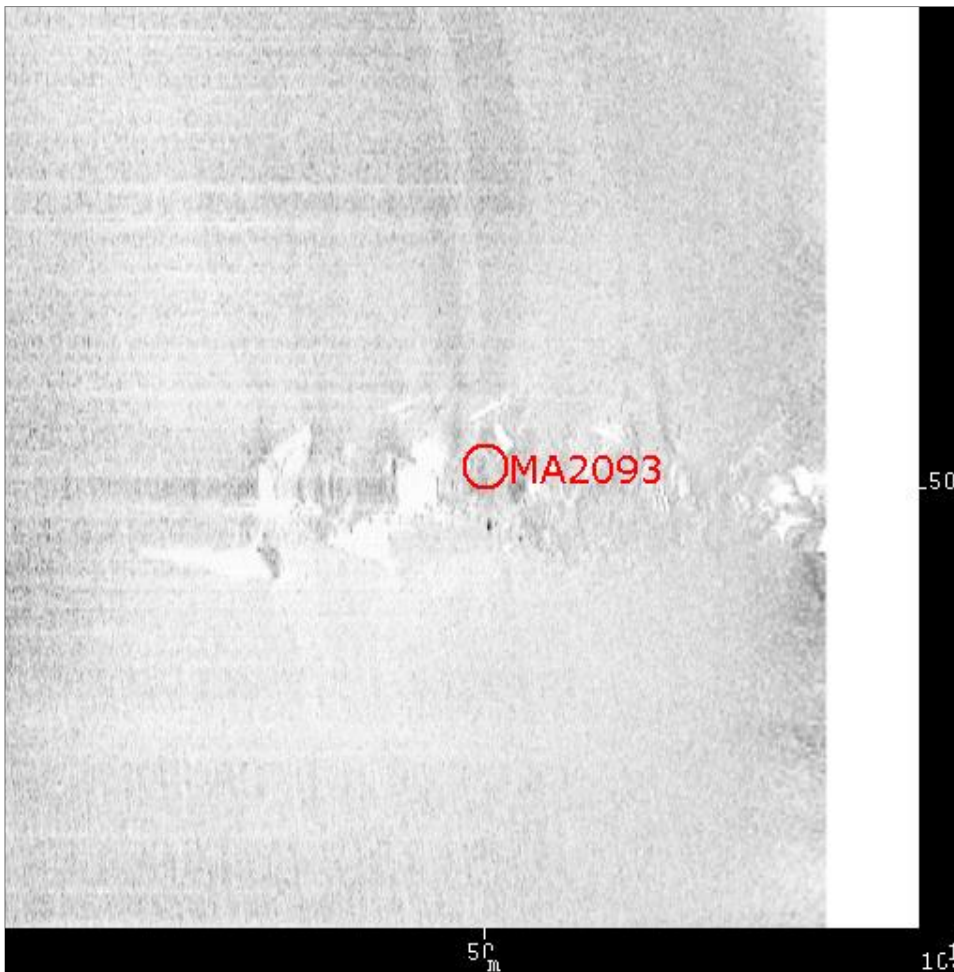
Target Height: = 5 Meters
Target Length: 90 Meters
Target Shadow: 36 Meters
Target Width: 21 Meters
Mag Anomaly: 439 nT
Avoidance Area: 100 m
Classification 1: wreck

Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-31H_SSS HF.xtf
Ping Number: 788351
Range to Target: 82.10 Meters
Fish Height: 16.44 Meters
Heading: 74.949 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-31H_SSS HF

Classification 2: high
Description: Scattered array of plating
from hull of vessel; wreck.

Graphic E-25

MA0030



Contact Info: MA2093

Sonar Time at Target: 07/03/2020
06:22:06
Click Position (Lat/Lon Coordinates)
50.5850773517 -0.6414877641 (WGS84)
Click Position (Projected Coordinates)
(X) 666958.43 (Y) 5606341.04
Map Proj: UTM84-30N

User Entered Info

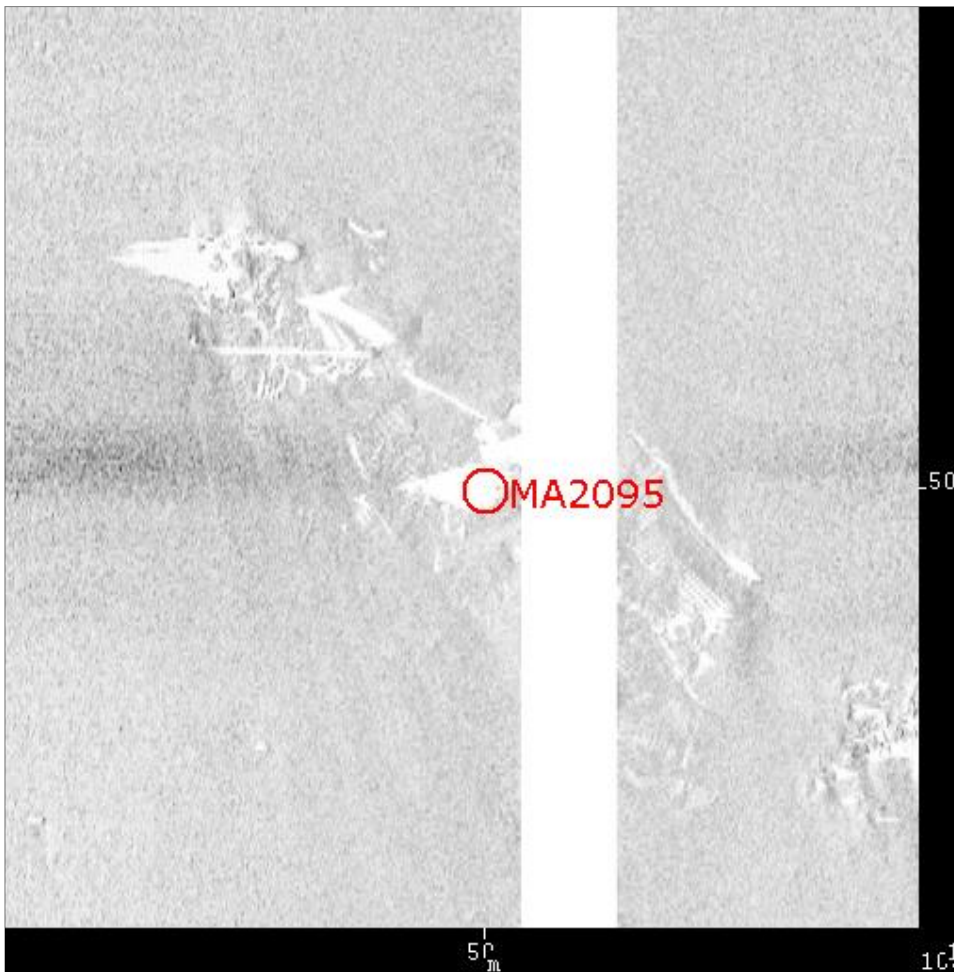
Target Height: = 3 Meters
Target Length: 60 Meters
Target Shadow: 13 Meters
Target Width: 15 Meters
Mag Anomaly: 2072 nT
Avoidance Area: 100 m
Classification 1: debris

Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-67.001H_SSS HF.xtf
Ping Number: 102119
Range to Target: 40.46 Meters
Fish Height: 12.45 Meters
Heading: 255.688 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-67.001H_SSS HF

Classification 2: high
Description: Line/cluster of hard
reflectors; potential wreck or boulders.

Graphic E-26

MA0032

**Contact Info: MA2095**

Sonar Time at Target: 07/06/2020
19:06:14
Click Position (Lat/Lon Coordinates)
50.5863171271 -0.6486935885 (WGS84)
Click Position (Projected Coordinates)
(X) 666444.01 (Y) 5606462.68
Map Proj: UTM84-30N

User Entered Info

Target Height: = 4 Meters
Target Length: 91 Meters
Target Shadow: 13 Meters
Target Width: 14 Meters
Mag Anomaly: n/a
Avoidance Area: 100 m
Classification 1: wreck

Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-64H_SSS HF.xtf
Ping Number: 198356
Range to Target: 8.70 Meters
Fish Height: 7.84 Meters
Heading: 69.296 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-64H_SSS HF

Classification 2: high
Description: Scattered debris with
extended shadows forming an ovate
outline; wreck.

Graphic E-27

MA0033



Contact Info: MA2097

Sonar Time at Target: 07/10/2020
13:30:04
Click Position (Lat/Lon Coordinates)
50.6049269784 -0.6571380410 (WGS84)
Click Position (Projected Coordinates)
(X) 665780.91 (Y) 5608512.76
Map Proj: UTM84-30N

User Entered Info

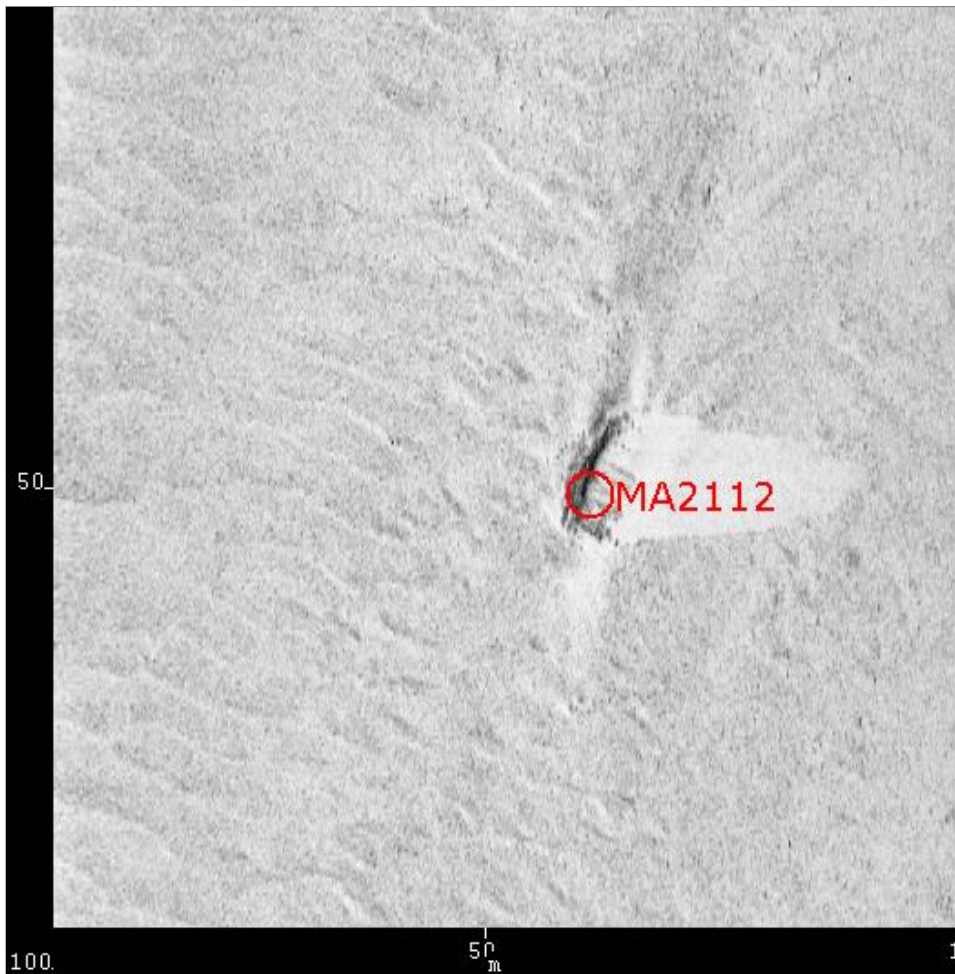
Target Height: = 1 Meters
Target Length: 82 Meters
Target Shadow: 11 Meters
Target Width: 15 Meters
Mag Anomaly: 6401 nT
Avoidance Area: 100 m
Classification 1: wreck

Acoustic Source File: F:\01_SSS\Area
B\HF\B_M-43.001H_SSS HF.xtf
Ping Number: 385773
Range to Target: 66.66 Meters
Fish Height: 8.67 Meters
Heading: 243.844 degrees
Event Number: 0
Water Depth: 0.00
Line Name: B_M-43.001H_SSS HF

Classification 2: high
Description: Scattered super-structure
and hull plating of vessel with shadows
extending from potential boilers; wreck.

Graphic E-28

MA0034

**Contact Info: MA2112**

Sonar Time at Target: 07/14/2020
00:00:40
Click Position (Lat/Lon Coordinates)
50.6971989994 -0.5539298783 (WGS84)
Click Position (Projected Coordinates)
(X) 672744.19 (Y) 5619007.28
Map Proj: UTM84-30N

User Entered Info

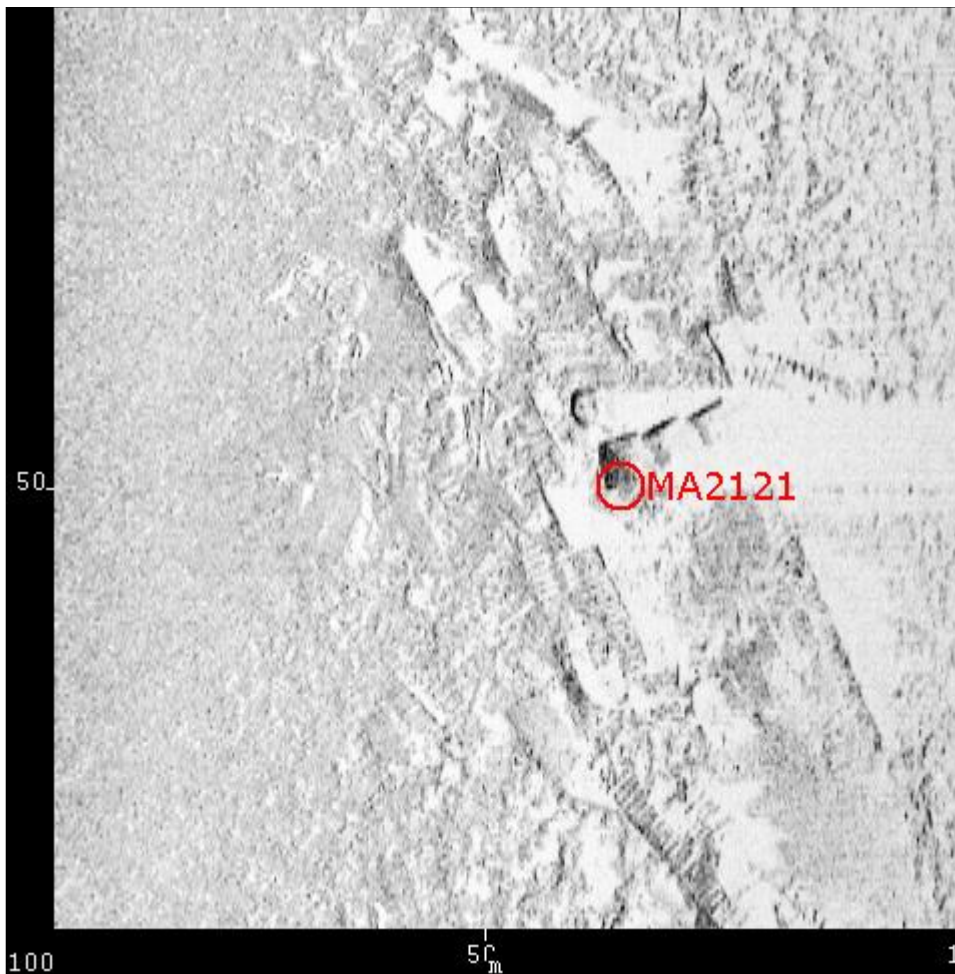
Target Height: = 3 Meters
Target Length: 14 Meters
Target Shadow: 22 Meters
Target Width: 7 Meters
Mag Anomaly: 538 nT
Avoidance Area: 100 m
Classification 1: anthropogenic

Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
C\\HF\\C_M-21H.xtf
Ping Number: 1025447
Range to Target: 60.79 Meters
Fish Height: 10.06 Meters
Heading: 254.030 degrees
Event Number: 0
Water Depth: 0.00
Line Name: C_M-21H

Classification 2: high
Description: Curvilinear hard reflector,
extended shadow; raised feature likely
anthropogenic small vessel.

Graphic E-29

MA0036

**Contact Info: MA2121**

Sonar Time at Target: 07/13/2020
09:22:31
Click Position (Lat/Lon Coordinates)
50.6753003490 -0.5649042498 (WGS84)
Click Position (Projected Coordinates)
(X) 672049.37 (Y) 5616547.07
Map Proj: UTM84-30N

User Entered Info

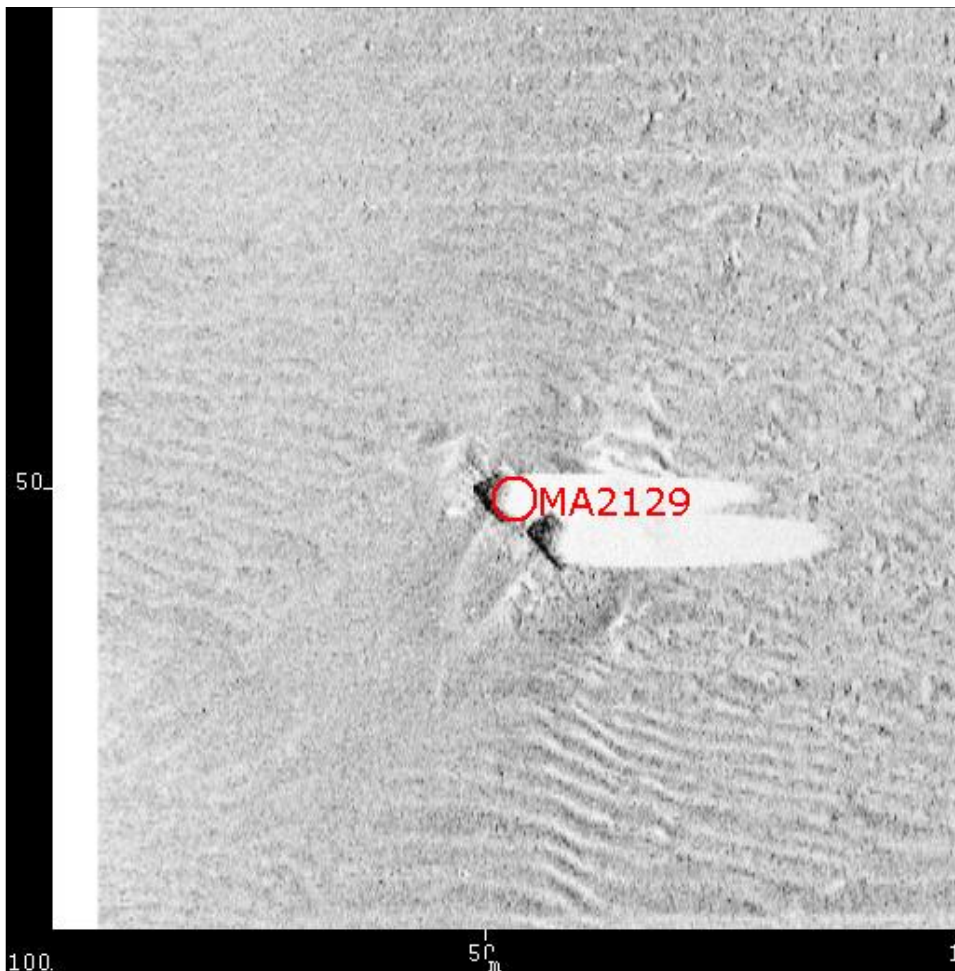
Target Height: = 1 Meters
Target Length: 107 Meters
Target Shadow: 5 Meters
Target Width: 29 Meters
Mag Anomaly: 3951 nT
Avoidance Area: 100 m

Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
C\\HF\\C_M-55H.xtf
Ping Number: 652553
Range to Target: 64.12 Meters
Fish Height: 10.56 Meters
Heading: 74.084 degrees
Event Number: 0
Water Depth: 0.00
Line Name: C_M-55H

Classification 1: wreck
Classification 2: high
Description: Wreck approx. length 120m;
probable steel hulled cargo shipwreck
with three boilers.

Graphic E-30

MA0037

**Contact Info: MA2129**

Sonar Time at Target: 07/13/2020
13:50:51
Click Position (Lat/Lon Coordinates)
50.6824621267 -0.5837052617 (WGS84)
Click Position (Projected Coordinates)
(X) 670695.16 (Y) 5617299.78
Map Proj: UTM84-30N

User Entered Info

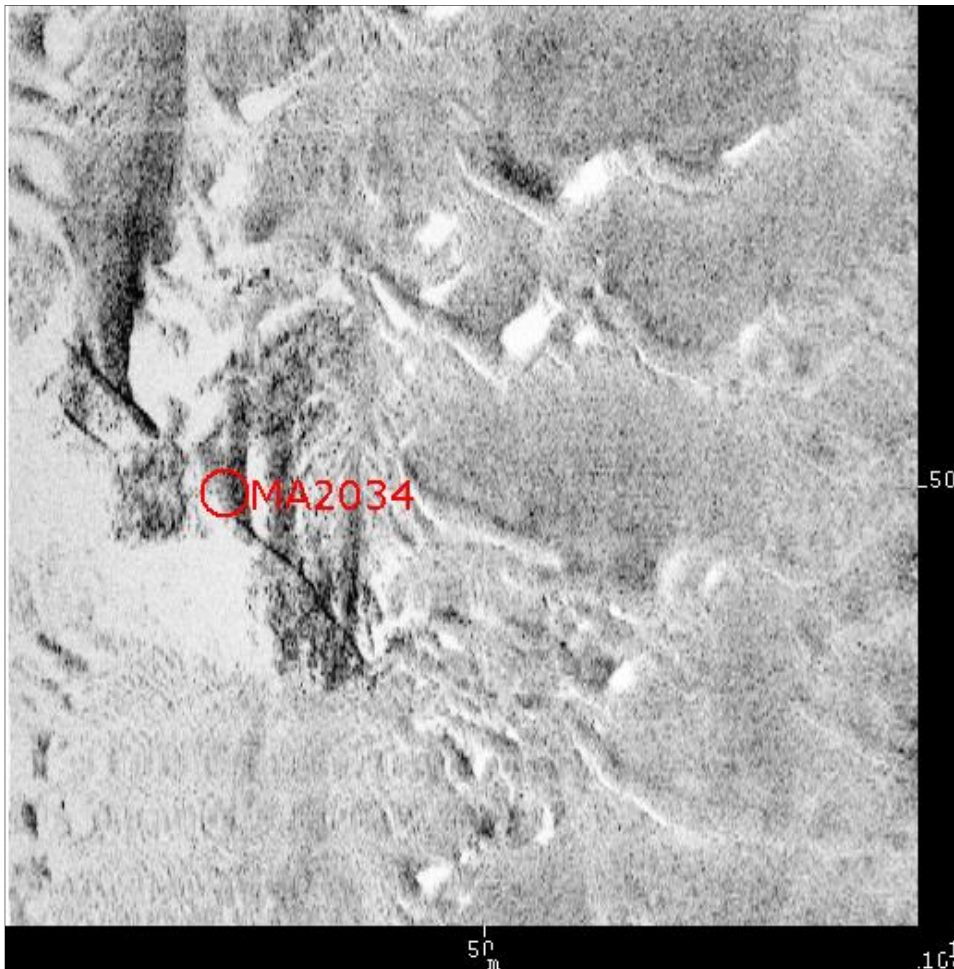
Target Height: = 4 Meters
Target Length: 5 Meters
Target Shadow: 27 Meters
Target Width: 3 Meters
Mag Anomaly: 823 nT
Avoidance Area: 100 m

Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
C\\HF\\C_M-37H.xtf
Ping Number: 766494
Range to Target: 47.28 Meters
Fish Height: 11.51 Meters
Heading: 73.013 degrees
Event Number: 0
Water Depth: 0.00
Line Name: C_M-37H

Classification 1: debris
Classification 2: high
Description: Pair of L shaped hard
reflectors with extended shadows;
potential anthropogenic debris or
boulders.

Graphic E-31

MA0062

**Contact Info: MA2034**

Sonar Time at Target: 07/24/2020
18:52:37
Click Position (Lat/Lon Coordinates)
50.5971145103 -0.2332651665 (WGS84)
Click Position (Projected Coordinates)
(X) 695802.41 (Y) 5608678.30
Map Proj: UTM84-30N

User Entered Info

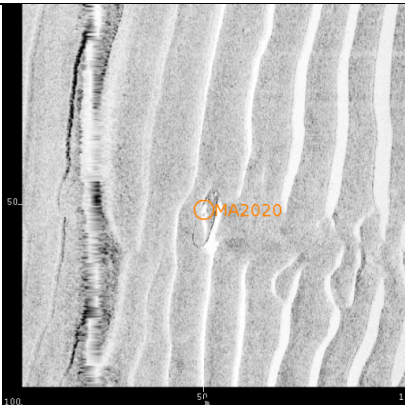
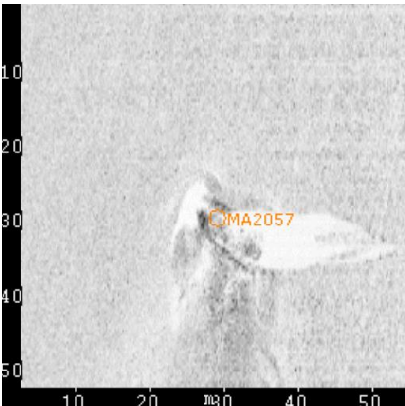
Target Height: = 1 Meters
Target Length: 47 Meters
Target Shadow: 16 Meters
Target Width: 1 Meters
Mag Anomaly: 1751 nT
Avoidance Area: 100 m

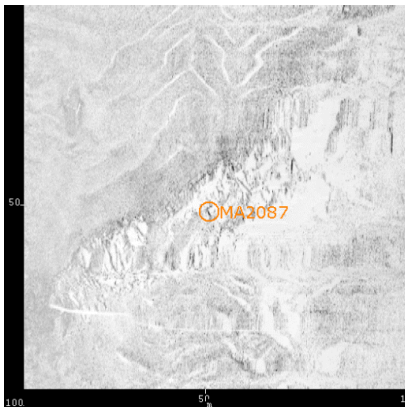
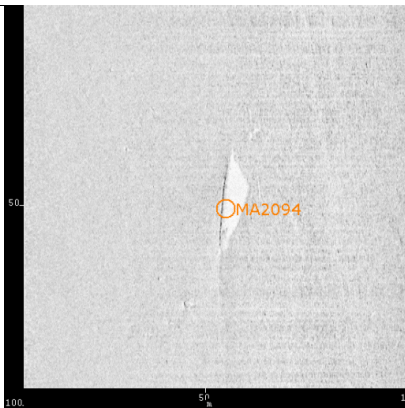
Acoustic Source File:
\\Dreadnought\\rampionii\\01_SSS\\Area
A\\HF\\A_M-100H.xtf
Ping Number: 2593990
Range to Target: 77.13 Meters
Fish Height: 8.57 Meters
Heading: 253.419 degrees
Event Number: 0
Water Depth: 0.00
Line Name: A_M-100H

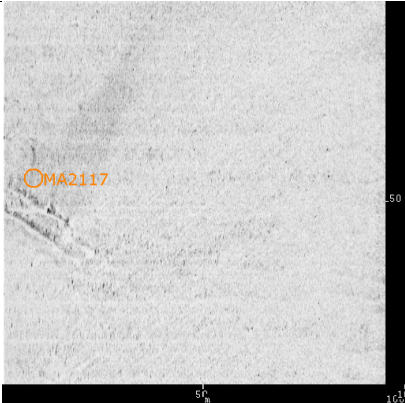
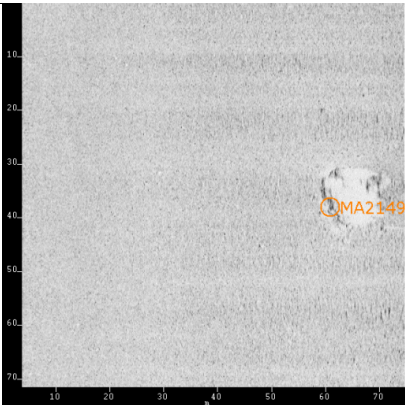
Classification 1: Wreck
Classification 2: High
Description: Buried hard isolator; possible
buried anthropogenic debris or
convergence of sand waves.

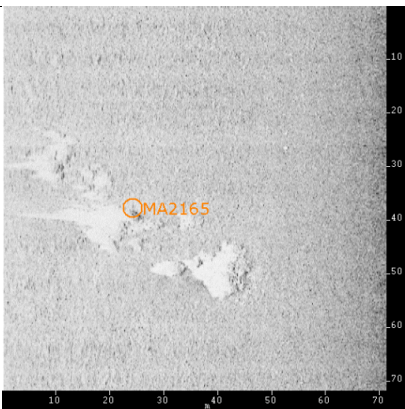
Annex F

Medium potential anomalies

Contact Image	Contact Info	User Entered Info
	MA0006 Contact info: MA2020 Sonar Time at Target: 07/21/2020 06:25:06 Click Position (Lat/Lon Coordinates) 50.6755385637 -0.1702098377 (WGS84) Click Position (Projected Coordinates) (X) 699930.97 (Y) 5617565.24 Map Proj: UTM84-30N Acoustic Source File: \\Dreadnought\\rampionii\\01_SSS\\Area A\\HFA_M-136H.xtf Ping Number: 449820 Range to Target: 27.50 Meters Fish Height: 11.26 Meters Heading: 342.752 degrees Event Number: 0 Water Depth: 0.00 Line Name: A_M-136H	Dimensions Target Height: = 0 Meters Target Length: 15 Meters Target Shadow: 1 Meters Target Width: 4 Meters Mag Anomaly: n/a Avoidance Area: 50 m Classification 1: debris Classification 2: medium Description: Isolated hard reflector; potential anthropogenic vessel.
	MA0019 Contact info: MA2057 Sonar Time at Target: 07/11/2020 07:16:20 Click Position (Lat/Lon Coordinates) 50.6551221813 -0.4071231255 (WGS84) Click Position (Projected Coordinates) (X) 683274.37 (Y) 5614682.34 Map Proj: UTM84-30N Acoustic Source File: F:\01_SSS\Area B\HF\B_M-31AH_SSS HF.xtf Ping Number: 836651 Range to Target: 47.21 Meters Fish Height: 10.36 Meters	Dimensions Target Height: = 3 Meters Target Length: 12 Meters Target Shadow: 18 Meters Target Width: 4 Meters Mag Anomaly: n/a Avoidance Area: 50 m Classification 1: debris Classification 2: medium

Contact Image	Contact Info	User Entered Info
	Heading: 74.187 degrees Event Number: 0 Water Depth: 0.00 Line Name: B_M-31AH_SSS HF	Description: Ovate reflector with large shadow; potential anthropogenic debris or boulder.
	MA0028 Contact info: MA2087 Sonar Time at Target: 07/06/2020 13:39:12 Click Position (Lat/Lon Coordinates) 50.5924803946 -0.6094863779 (WGS84) Click Position (Projected Coordinates) (X) 669197.00 (Y) 5607236.66 Map Proj: UTM84-30N Acoustic Source File: F:\01_SSS\Area B\HF\B_M-65A.001H_SSS HF.xtf Ping Number: 59491 Range to Target: 50.82 Meters Fish Height: 9.61 Meters Heading: 247.417 degrees Event Number: 0 Water Depth: 0.00 Line Name: B_M-65A.001H_SSS HF	Dimensions Target Height: = 3 Meters Target Length: 70 Meters Target Shadow: 18 Meters Target Width: 15 Meters Mag Anomaly: 414 nT Avoidance Area: 50 m Classification 1: wreck Classification 2: medium Description: Hard reflector approx. 70m length; potential wreck.
	MA0031 Contact info: MA2094 Sonar Time at Target: 07/09/2020 02:21:34 Click Position (Lat/Lon Coordinates) 50.5955557540 -0.6470561034 (WGS84) Click Position (Projected Coordinates) (X) 666527.31 (Y) 5607493.48 Map Proj: UTM84-30N Acoustic Source File: F:\01_SSS\Area B\HF\B_M-54H_SSS HF.xtf	Dimensions Target Height: = 1 Meters Target Length: 23 Meters Target Shadow: 6 Meters Target Width: 0 Meters Mag Anomaly: n/a Avoidance Area: 50 m Classification 1: debris

Contact Image	Contact Info	User Entered Info
	Ping Number: 298819 Range to Target: 54.93 Meters Fish Height: 10.46 Meters Heading: 62.200 degrees Event Number: 0 Water Depth: 0.00 Line Name: B_M-54H_SSS HF	Classification 2: medium Description: Isolated linear hard reflector with angular shadow; potential anthropogenic debris or sand bar.
	MA0035 Contact info: MA2117 Sonar Time at Target: 07/13/2020 14:39:00 Click Position (Lat/Lon Coordinates) 50.6823997971 -0.5576966414 (WGS84) Click Position (Projected Coordinates) (X) 672532.51 (Y) 5617353.15 Map Proj: UTM84-30N Acoustic Source File: \\Dreadnought\trampionii\01_SSS\A rea C\HF\C_M-44H.xtf Ping Number: 786956 Range to Target: 92.24 Meters Fish Height: 9.49 Meters Heading: 254.283 degrees Event Number: 0 Water Depth: 0.00 Line Name: C_M-44H	Dimensions Target Height: = 0 Meters Target Length: 15 Meters Target Shadow: 2 Meters Target Width: 1 Meters Mag Anomaly: n/a Avoidance Area: 50 m Classification 1: wreck Classification 2: medium Description: Parallel linear buried reflectors; possible buried anthropogenic debris.
	MA0038 Contact info: MA2149 Sonar Time at Target: 07/12/2020 08:44:27 Click Position (Lat/Lon Coordinates) 50.7446389641 -0.5532989088 (WGS84) Click Position (Projected Coordinates) (X) 672614.30 (Y) 5624283.05 Map Proj: UTM84-30N	Dimensions Target Height: = 0.9 Meters Target Length: 10.6 Meters Target Shadow: 9.5 Meters Target Width: 3.7 Meters Mag Anomaly: n/a Avoidance Area: 50 m

Contact Image	Contact Info	User Entered Info
	Acoustic Source File: \\Dreadnought\rampionii\01_SSS\Area C Nearshore\HF\20200712_M70H.xtf Ping Number: 49906 Range to Target: 60.82 Meters Fish Height: 6.57 Meters Heading: 248.952 degrees Event Number: 4848 Water Depth: 0.00 Line Name: 20200712_M70H	Classification 1: debris Classification 2: Medium Description: A large isolated curvilinear hard reflector with crater-like depression; possible debris of anthropogenic origin.
	MA0040 Contact info: MA2165 Sonar Time at Target: 07/12/2020 09:40:21 Click Position (Lat/Lon Coordinates) 50.7460194513 -0.5608688103 (WGS84) Click Position (Projected Coordinates) (X) 672075.25 (Y) 5624418.89 Map Proj: UTM84-30N Acoustic Source File: \\Dreadnought\rampionii\01_SSS\Area C Nearshore\HF\20200712_M75.001H.xtf Ping Number: 80288 Range to Target: 50.59 Meters Fish Height: 5.81 Meters Heading: 76.170 degrees Event Number: 5156 Water Depth: 0.00 Line Name: 20200712_M75.001H	Dimensions Target Height: = 1.6 Meters Target Length: 47.8 Meters Target Shadow: 19.9 Meters Target Width: 15.7 Meters Mag Anomaly: n/a Avoidance Area: 50 m Classification 1: debris Classification 2: Medium Description: An isolated area of dark reflectors; possible debris field of anthropogenic origin.

Contact Image	Contact Info	User Entered Info
	MA0041 Contact info: MA2167 Sonar Time at Target: 07/12/2020 10:03:29 Click Position (Lat/Lon Coordinates) 50.7437677277 -0.5614937715 (WGS84) Click Position (Projected Coordinates) (X) 672039.42 (Y) 5624167.09 Map Proj: UTM84-30N Acoustic Source File: \\Dreadnought\\rampionii\\01_SS S\\Area C Nearshore\\HF\\20200712_M72 H.xtf Ping Number: 92854 Range to Target: 27.89 Meters Fish Height: 7.85 Meters Heading: 247.519 degrees Event Number: 5276 Water Depth: 0.00 Line Name: 20200712_M72H	Dimensions Target Height: = 0.0 Meters Target Length: 0.0 Meters Target Shadow: 0.0 Meters Target Width: 0.0 Meters Mag Anomaly: n/a Avoidance Area: 50m Classification 1: debris Classification 2: Medium Description: An isolated area of hard reflectors; possible debris field of anthropogenic origin.
	MA0042 Contact info: MA2172 Sonar Time at Target: 07/12/2020 08:51:17 Click Position (Lat/Lon Coordinates) 50.7412840455 -0.5654784361 (WGS84) Click Position (Projected Coordinates) (X) 671767.42 (Y) 5623881.70 Map Proj: UTM84-30N Acoustic Source File: \\Dreadnought\\rampionii\\01_SS S\\Area C Nearshore\\HF\\20200712_M70 H.xtf Ping Number: 53621 Range to Target: 27.12 Meters Fish Height: 6.11 Meters	Dimensions Target Height: = 0.0 Meters Target Length: 0.0 Meters Target Shadow: 0.0 Meters Target Width: 0.0 Meters Mag Anomaly: Avoidance Area: Classification 1: debris Classification 2: Medium Area: Block:

Contact Image	Contact Info	User Entered Info
	Heading: 250.670 degrees Event Number: 4889 Water Depth: 0.00 Line Name: 20200712_M70H	Description: Scatters of dark reflectors; possible debris field.
	MA0049 Contact info: MA2085 Sonar Time at Target: 07/17/2020 04:11:47 Click Position (Lat/Lon Coordinates) 50.6291744296 -0.5967734778 (WGS84) Click Position (Projected Coordinates) (X) 669964.38 (Y) 5611345.30 Map Proj: UTM84-30N Acoustic Source File: F:\01_SSS\Area B\HF\B_M-25.001H_SSS HF.xtf Ping Number: 835005 Range to Target: 68.91 Meters Fish Height: 10.96 Meters Heading: 254.069 degrees Event Number: 0 Water Depth: 0.00 Line Name: B_M-25.001H_SSS HF	Dimensions Target Height: = 2 Meters Target Length: 5 Meters Target Shadow: 20 Meters Target Width: 1 Meters Mag Anomaly: 115 nT Avoidance Area: 50 m Classification 1: debris Classification 2: medium Description: Pair of linear hard reflectors; potential anthropogenic debris or boulders.

Volume 4, Appendix 17.2

Draft Marine Outline Written Scheme of Investigations



Executive summary

Purpose of this report

This Draft Marine Outline Written Scheme of Investigations (WSI) has been produced to summarise the proposed mitigation in relation to the Rampion 2 Offshore Wind Farm. The strategies outlined in this document accompany **Volume 2, Chapter 17: Marine archaeology**.

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1. Introduction

This Outline Marine Written Scheme of Investigations (WSI) sets out the basis for the archaeological mitigation strategies in relation to the Rampion 2 Offshore Wind Farm (Rampion 2) and accompanies **Volume 2, Chapter 17: Marine archaeology**.

1.1 Introduction

- 1.1.1 Rampion Extension Development Limited (hereafter referred to as 'RED') is proposing to develop Rampion 2 which will be located approximately 13km to 25km offshore, in the English Channel in the south of England, adjacent to the existing Rampion Offshore Wind Farm (for ease of reference hereafter referred to as Rampion 1).
- 1.1.2 This Outline Marine WSI summarises the known and potential marine archaeological resources within the Marine Archaeology Study Area, as defined in **Section 1.2** and illustrated in **Figure 17.2.1**.
- 1.1.3 This document has been structured to consider required mitigation and offsetting works through archaeological actions in relation to the following offshore phases and does not consider any area of the development landward of Mean High Water Springs (MHWS).
- pre-construction:
 - ▶ survey and site investigations; and
 - ▶ seabed preparation.
 - construction:
 - ▶ Wind Turbine Generator (WTG) foundation installation;
 - ▶ array, interconnector and export cables;
 - ▶ offshore substations;
 - ▶ associated vessel works – jack-up vessels, anchorage, etc.;
 - ▶ operation (including maintenance);
 - ▶ presence of foundations;
 - ▶ exposure of cables;
 - ▶ use of cable protection measures; and
 - ▶ associated vessel works – jack-up vessels, anchorage, etc.
 - decommissioning:
 - ▶ removal of foundations;
 - ▶ removal of cables; and
 - ▶ associated vessel works – jack-up vessels, anchorage, etc.

- 1.1.4 This document further presents expected impacts, recommended archaeological mitigation methodologies and actions for a range of work phases within the marine environment.
- 1.1.5 Each phase of work may require a more detailed Method Statement which will be prepared by appropriately qualified professionals and submitted to Archaeological Curators. The final WSI will form the basis of agreement between RED, its contractors, and relevant regulators.
- 1.1.6 This Outline Marine WSI has been compiled by Maritime Archaeology to accompany **Volume 2, Chapter 17: Marine archaeology** and should be read in conjunction with **Appendix 17.1: Marine Archaeology Technical Report**.

1.2 Marine archaeology study area

- 1.2.1 The marine archaeology study area assessment is defined as the offshore part of the Preliminary Environmental Information Report (PEIR) Assessment Boundary area up to MHWS and surrounded by a 2km buffer to accommodate the potential imprecision of historic marine positioning and in line with the existing Rampion 1 project marine archaeology study area (**Figure 17.2.1**).
- 1.2.2 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

2. Implementation of the outline marine WSI

2.1 Introduction

- 2.1.1 The primary responsibility for the delivery of the measures presented in this Outline Marine WSI lies with RED. Through project documentation and procedures, the implementation of this Outline Marine WSI will involve archaeological contractors and curators.

2.2 Rampion Extension Development Limited: Implementation

- 2.2.1 RED will be responsible for implementing the Outline Marine WSI. RED will ensure that all relevant project personnel understand the archaeological requirements, particularly those where reporting may be required by contractors through the Protocol for Archaeological Discoveries (PAD) (The Crown Estate, 2014). Personnel responsible for communication of actions to RED will be clearly appointed which may include specific representatives on-board work vessels.
- 2.2.2 RED will be responsible for maintaining a record of contacts related to the delivery of mitigation. This will include archaeological consultants, contractors, and curators, in addition to Nominated Contacts within survey, sampling and construction contractors.
- 2.2.3 Any future archaeological works undertaken will require detailed Method Statements outlining methods and further mitigation.

2.3 Retained Archaeologist: Implementation

- 2.3.1 Communication with the Archaeological Curators is the responsibility of RED. RED will engage a Retained Archaeologist to implement this Outline Marine WSI.
- 2.3.2 RED will advise the Retained Archaeologist of all requirements or responsibilities related to communication with curators and contractors, or in relation to scheme-wide documentation such as Environmental Management Plans.
- 2.3.3 The Retained Archaeologist will report to RED and will provide advice to RED to inform communication with curators and contractors in relation to the implementation of the Outline Marine WSI.

2.4 Archaeological Curators: Implementation

- 2.4.1 The main Archaeological Curators involved in the agreement of this Outline Marine WSI and subsequent mitigation works are:
- Pip Naylor, Historic England Marine Planning Unit; and
 - Chris Pater, Historic England Marine Planning Unit.

- 2.4.2 Archaeological Curators will be provided with copies of all relevant project documentation. Historic England Marine Planning Unit will take the lead for the offshore historic environment and the Work Packages outlined within this Outline Marine WSI.

2.5 Development Contractors: Implementation

- 2.5.1 Contractors working within the marine zone, where archaeological exclusion zones (AEZs) are in place and where the PAD is being used, must ensure all relevant personnel are aware of the associated requirements. This will include understanding the Outline Marine WSI and all procedures and lines of communication for reporting unexpected archaeological discoveries.

3. Proposed Development details

- 3.1.1 Rampion 2 will be located approximately 13km to 25km offshore, in the English Channel in the south of England, adjacent to the existing Rampion 1 project.
- 3.1.2 Rampion 2 will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network.
- 3.1.3 The offshore elements of Rampion 2 refer to works below MHWS and will comprise the following key components:
- up to 116 WTGs;
 - wind turbine foundations (monopiles or jackets);
 - up to three substations and associated foundations;
 - inter-array cables; and
 - export cables to connect the wind farm area to the landfall.
- 3.1.4 Each foundation type and cable may require some form of seabed preparation which may include seabed levelling, ground reinforcement and removing surface, subsurface debris and trenching. Scour protection material may be required around the base of some or all wind turbine foundations to protect them from current and wave action ensuring structural integrity.
- 3.1.5 For full details on the project description refer to **Volume 2, Chapter 4: The Proposed Development** and for further details on the potential impact on marine heritage receptors refer to **Volume 2, Chapter 17: Marine archaeology**.

4. Site-specific surveys

- 4.1.1 The geophysics pre-application survey data acquired in 2020 included Multibeam Echosounder (MBES), Side Scan Sonar (SSS), Magnetometer (MAG), Sub-Bottom Profiler (SBP) and Ultra-High Resolution Seismic (UHRs) surveys, within the offshore part of the PIER Assessment Boundary.
- 4.1.2 All the marine data collected was assessed for archaeological potential and all anomalies were recorded. The results are summarised in **Section 5** and noted in **Appendix 17.1**.

5. Summary of archaeology and cultural heritage baseline

- 5.1.1 A detailed description of the marine archaeology and cultural heritage within the Rampion 2 limits and more widely within the marine archaeology study area is provided in **Volume 2, Chapter 17** and **Volume 4, Appendix 17.1**. A summary of the known and potential archaeology within the marine archaeology study area is presented below, with a focus on heritage assets which may be impacted by Rampion 2.

5.2 Palaeolandscapes

- 5.2.1 The archaeological and palaeoenvironmental potential of the offshore Palaeolithic deposits from the English Channel and Solent region is demonstrated by the wealth of artefacts, faunal remains and peat evidence that have been identified to date. *In situ* offshore finds are rare to come by, with most artefacts within the marine zone being found on the seabed in a secondary context, however, deposits laid down in the marine zone during associated interstadials are of great importance for understanding the localised geomorphological changes of the Sussex coast.
- 5.2.2 The West Sussex Coastal Plains are home to a significant Lower Palaeolithic site known as Boxgrove (c. 500,000 Before Present (BP) or Marine Isotope Stage (MIS) 13), situated some 10km inland of the present coastline of the English Channel. Earlier prehistoric finds from the English Channel are from the late Upper Palaeolithic and earlier Mesolithic, post-dating the Last Glacial Maximum (LGM) and representing a period of recolonisation of southern Britain by anatomically modern humans.
- 5.2.3 The English Channel and Solent Basin has already produced important material from this period prior to the inundation, indicating the high potential for both *in situ* and secondary context archaeological material within the marine archaeology study area. By the Neolithic sea level had risen to levels similar to the present-day coastline.
- 5.2.4 As no localised models have been created for the south east coast, it remains true that there is some potential for *in situ* Neolithic remains, such as occupational material, structural remains and watercraft, to be found in the intertidal and marine zone. Furthermore, there is also potential for secondary context Neolithic material, originating from eroded deposits along the coast. Bronze Age material of geoarchaeological potential such as peat can also be found in areas close to the shore.

5.3 Offshore-maritime

- 5.3.1 A broad contextual overview of human activity in the region and of the archaeological site types that may be expected to occur within the marine archaeology study area is included in **Appendix 17.1, Section 3.5**.

5.3.2 The offshore marine archaeological resource is presented by three main classes of material and features:

- submerged prehistoric landscapes caused by changes to sea level and eventual stabilisation of sea level at or near to the present position of the coast. Such landscapes may contain highly significant evidence of prehistoric human occupation and/or environmental change;
- archaeological remains of watercraft deposited when vessels sank while at sea or became abandoned in an inter-tidal context which subsequently became inundated; and
- remains of aircraft crash sites, either coherent assemblages or scattered material, usually the result of Second World War military conflict, but also numerous passenger casualties, particularly during the peak of seaplane activity during the inter-war period. Also includes aircraft, airships and other dirigibles dating to the First World War, although these rarely survive in the archaeological record.

5.4 Geophysical assessments

5.4.1 The assessment of geophysical data as detailed in the **Appendix 17.1, Section 4** identified 283 anomalies (**Table 5-1**) (low, medium and high) of anthropogenic potential within the marine archaeology study area. 228 of these are of low archaeological potential. There are a further 2,228 magnetic anomalies of low potential. 24 medium and 31 high potential anomalies have been assigned AEZs; the radius of the AEZs is 50m for the medium potential anomalies and 100m for the high (**Figure 17.2**).

Table 5-1 Anomalies of archaeological potential

Archaeological potential	No. anomalies
High	31
Medium	24
Low	228
Magnetic anomalies of low potential	2,280

5.5 Sedimentary horizons

5.5.1 This section summarises the interpretation of the archaeological assessment of the sub-bottom data and places the current understanding of the complex prehistoric landscapes and the correlation between marine and terrestrial sediment phases in context. For further detail refer to **Appendix 17.1, Section 4.2**.

- 5.5.2 The area of seabed that the marine archaeology study area now covers was previously large swathes of dry land that were exploited by people during the Pleistocene and early Holocene.
- 5.5.3 Previous studies in the area have revealed details of the submerged topography including terraces, details of the submerged floodplain, and features of the Palaeo-Arun Valley landform which runs from the terrestrial zone into the marine zone (Gupta et al, 2008).
- 5.5.4 The Solent and the south coast of England, areas also utilised by people during the Pleistocene and Holocene, have yielded early Palaeolithic archaeology in high concentrations, for example at Boxgrove, West Sussex (Roberts et al., 1994; Roberts and Parfitt, 1999).
- 5.5.5 An archaeological assessment of sub-bottom data (chirp) was undertaken which has resulted in a number of features being identified as of geoarchaeological interest. Together, the features reveal a complex system of interlinked inundated valleys and channels. (**Figure 17.2.**).
- 5.5.6 The channel and valley features have been mapped as detailed in **Appendix 17.1, Section 4.2**. They represent an extensive deltaic river system containing a combination of shallow braided channel systems with many tributaries, numerous wider, deeper channels, and simple cut and fill features. The channel features are mostly cut into the chalk bedrock and filled with a combination of hard reflectors representing sand or gravel and softer reflectors representing silt and possible clay.
- 5.5.7 The outline deposit model presented in **Table 5-2** shows that the seabed in the marine archaeology study area is predominantly gravels and sands (Unit 5) which are overlying consolidated and clays (Unit 3 and 2).
- 5.5.8 The fine-grained sediments tend to be mobile and sand waves are widespread across much of the survey area stretching north-west to south-east. The underlying geology in the area is characterised by Upper Cretaceous Chalk (Unit 1) which is, in places, cut by channel and valley features filled with Unit 4.
- 5.5.9 The outline deposit model will be further refined following a staged geoarchaeological assessment post-application as outlined in **Section 9**.

Table 5-2 Preliminary deposit model

Unit	Sediment	Description	Epoch	Geoarchaeological potential
5	Mobile seabed sediments	Sand and gravel	Holocene	No
4	Channel/Valley infill	Soft possibly peaty clay and sand	Late Pleistocene to Early Holocene	Yes
3	London Clay	Firm to hard silty clay	Tertiary	Low

Unit	Sediment	Description	Epoch	Geoarchaeological potential
2	Lambeth Group	Silt, clay and sand	Tertiary	Low
1	Cretaceous Upper Chalk Group.	Chalk and gravel	Cretaceous	No

5.6 Historic Seascape Characterisation

- 5.6.1 The Historic Seascape Characterisation (HSC) assessment draws on Historic Seascape Characterisation: England's Historic Seascape: HSC Method Consolidation (Tapper & Johns, 2008) and England's Historic Seascape: Demonstrating the Method (Merritt & Dellino-Musgrave, 2009). This section is a summary of the characterisation in [Appendix 17.1, Section 3.5](#).
- 5.6.2 Changes to the character of the sea surface and the perception of the historic seascape as a direct result of the construction, operation, maintenance and decommissioning of Rampion 2 will result from the addition of new infrastructure such as foundations and turbines as well as ongoing activity from installation and maintenance vessels.
- 5.6.3 The HSC considers the added effect of Rampion 2 within the multiple dimensions of the marine environment (sub-sea floor, sea floor, water column, sea surface, coastal land and previous historic character) in combination with the existing activity within the Broad Historic Character Types (see below) and is detailed in [Appendix 17.1, Section 3.5](#). and summarised below.
- 5.6.4 It has been established that HSC is value-neutral and was developed to be a positive force in informing change as well as recognising that landscape and seascape are both a product of that inevitable change. Developments should therefore respect and retain cultural distinctiveness and legibility wherever possible (Tapper & Johns 2008).
- 5.6.5 Activities on the sea surface and the water column are dominated by modern and current navigational routes in combination with historic shipping routes. The sea surface also comprises offshore infrastructure such as renewables, gas, oil, navigational markers and ocean survey equipment. It is therefore unlikely that Rampion 2 will further alter the perception of the Historic Seascape within the sea surface and water column.
- 5.6.6 Activities on the seafloor and within the sub-sea floor include fishing, the energy industry (oil, gas, renewables) construction including foundations, cables, pipelines and anchor activities and telecommunication cables. The historic characterisation of the seafloor and sub-sea floor also considers the cultural topography which includes prehistoric deposits and artefacts as well as shipwrecks and aviation remains from multiple periods.
- 5.6.7 It is unlikely that Rampion 2 will further alter the perception of the Historic Seascape within the sea floor and sub-sea floor.

- 5.6.8 Considering the perception of the outlined Broad Historic Character Types (as well as people's perception of the sea and its value), no significant change in the multiple dimensions of the marine environment as a result of Rampion 2 in isolation or cumulatively with neighbouring developments is identified.
- 5.6.9 Broad Historic Character Types are:
- navigation;
 - industry;
 - fishing;
 - coastal infrastructure;
 - communication;
 - telecommunications;
 - military;
 - settlements;
 - recreations;
 - cultural topography;
 - woodland; and
 - increased attention of the wider general public.
- 5.6.10 As detailed in **Appendix 17.1, Section 3.5**, the assessment has concluded that the impact on the historic seascape by the introduction of wind farm infrastructure does not warrant further methodological development or mitigation.

6. Potential effects

- 6.1.1 Potential impacts on marine heritage receptors are outlined in **Table 6-1** and **Table 6-2** and was carried out in accordance with the methodology set out in **Volume 2, Chapter 5: Approach to the EIA** and is detailed in the **Volume 2, Chapter 17: Marine archaeology**.
- 6.1.2 Heritage considerations of relevance to all phases of Rampion 2 lifecycle are:
- under the Protection of Wrecks Act 1973, if a wreck of historical, archaeological or artistic importance were to be discovered then it would be possible for it to be designated at very short notice. This has the potential to disrupt construction activities and associated timetables;
 - under the Protection of Military Remains Act 1986, if a crashed military aircraft was discovered in the course of construction then it is automatically protected. It is then an offence to undertake unauthorised disturbance of the site unless under licence;
 - under the Burial Act 1857, if human remains are discovered in the course of site investigations or construction they cannot be exhumed without authority from the Secretary of State (SoS); and
 - under the Ancient Monuments and Archaeological Areas Act 1979, sites that warrant protection due to them being of national importance as 'ancient monuments' must have a consent from the SoS before any works can be undertaken.
- 6.1.3 Potential effects on marine heritage receptors that have been scoped in for assessment are summarised in **Table** and further detailed in **Volume 2, Chapter 17**.

Table 6-1 Potential effects on marine heritage receptors

Receptor	Activity or impact	Potential effect
Construction		
Marine heritage receptors	Scour effects caused by the presence of WTG substation foundations and the exposure of inter-array and export cables or the use of cable protection measures.	Effects may include exposing marine heritage receptors to natural, chemical, or biological processes and causing or accelerating loss of the same.
Decommissioning		
Marine heritage receptors	Effects may include the destabilisation of archaeological sites and	Draw-down of sediment into voids left by removed WTG

Receptor	Activity or impact	Potential effect
	contexts, and exposing such material to natural, chemical, and biological processes, causing or accelerating loss of the same.	foundations leading to loss of sediment.

- 6.1.4 Potential effects on marine heritage receptors that have been scoped out for assessment are summarised in **Table 6-2** and further detailed in **Volume 2, Chapter 17**.

Table 6-2 Scoping out activity and impact on marine heritage receptors

Activity or impact	Rationale for scoping out
Removal of sediment containing undisturbed archaeological contexts during seabed preparation for WTG and offshore substation foundations leading to total or partial loss of the receptor (Construction).	<p>The embedded environmental measures as detailed Section 7.4 will ensure that impact on marine heritage receptors will either be completely avoided through established AEZs or offset by the agreement to further assess data for archaeological potential.</p> <p>Historic England is content that if the embedded environmental measures are adequately secured and presented in sufficient detail then they may be relied upon as means to demonstrate an absence of significant effect (Scoping response letter 02 July 2020).</p> <p>MMO concluded that the proposed scoping-out is acceptable (Scoping Opinion ID 3.16.1).</p> <p>It is expected that the embedded environmental measures will form Development Consent Order (DCO) requirements or deemed Marine Licence (dML) conditions.</p>
Penetration of piling foundations resulting in total or partial loss of the receptor (Construction).	
Compression of stratigraphic contexts containing archaeological material from combined weight of foundation, transition piece, tower and WTG (Construction).	
Disturbance of sediment containing potential marine heritage receptors (material and contexts) during the laying of inter-array cables (Construction).	
Disturbance of sediment containing potential marine heritage receptors (material and contexts) during export cable laying operations (Construction).	
Penetration and compression effects of jack-up barges and anchoring of construction vessels during WTG, sub-station or cable installation	

Activity or impact	Rationale for scoping out
leading to total or partial loss of marine heritage receptors (material or contexts) (Construction).	
Penetration and compression effects on the seabed caused by corrective and preventative operation and maintenance activities (via jack-up vessels) (Operation).	
Draw-down of sediment into voids left by removed WTG foundations leading to loss of sediment (Decommissioning).	
Penetration and compression effects of jack-up barges and anchoring of decommissioning vessels leading to total or partial loss of marine heritage receptors (material or contexts) (Decommissioning)	

7. Environmental measures

- 7.1.1 The embedded environmental measures for Rampion 2 are formulated where marine heritage receptors and anomalies are identified in the desk-based assessment and/or geophysical assessments. The embedded environmental measures are based on guidance set out in Historic Environment Guidance for Offshore Renewable Energy Sector (COWRIE, 2007) and Model Clauses for Archaeological Written Schemes of Investigations, Offshore Renewables Projects (The Crown Estate, 2010).
- 7.1.2 Rampion 2 has approved several embedded environmental measures as part of the pre-application phase in order to reduce the potential for impacts on marine heritage receptors (see **Table** and **Graphic 7-1**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.
- 7.1.3 A post-construction monitoring plan (C-57) will be developed and submitted to Archaeological Curators which will present the approach to the monitoring required for the established AEZs (C-60).
- 7.1.4 The plan will further outline how geophysical survey data, drop-down video (DDV) (and Remotely Operated Vehicle (ROV) imagery if available) will be reviewed and compared with results from pre-construction data acquired for each of the features requiring monitoring (C-58 and C-59).

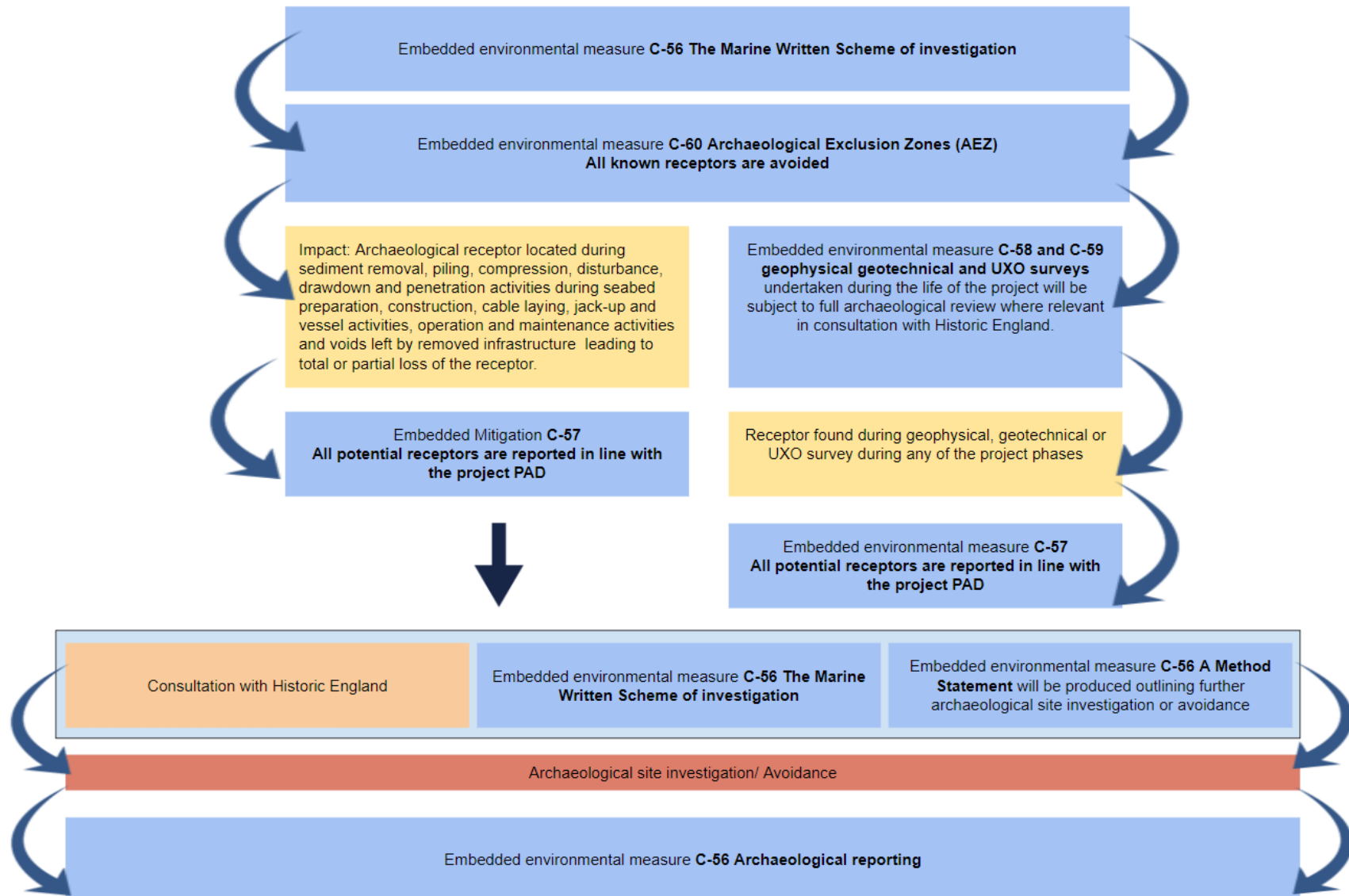
Table 7-1 Embedded environmental measures

ID	Environmental measure	When environmental measure was introduced	How the environmental measures will be secured
C-57	A Marine Written Scheme of Archaeological Investigations (WSI) will be developed in accordance with the Outline Marine WSI. The Marine WSI will outline the archaeological exclusion zones (AEZ), the implementation of a Protocol for Archaeological Discoveries in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (The Crown Estate, 2014) and future monitoring and assessment requirements.	Scoping	DCO requirements or dML conditions.

ID	Environmental measure	When environmental measure was introduced	How the environmental measures will be secured
C-58	Offshore geophysical surveys (including UXO surveys) undertaken during the life of the project will be subject to full archaeological review where relevant in consultation with Historic England.	Scoping	DCO requirements or dML conditions.
C-59	Offshore geotechnical surveys prior to construction will be undertaken following early discussions with Historic England. The results of the geoarchaeological assessment will be presented as a staged geoarchaeological report inclusive of publication.	Scoping	DCO requirements or dML conditions.
C-60	The offshore export cable, inter-array cables, inter-connector cables and other infrastructure within the array area will avoid all identified marine heritage receptors by utilising archaeological exclusion zones (AEZ) as detailed in the Outline Marine WSI.	Scoping	DCO requirements or dML conditions.
C-111	A decommissioning plan will be prepared for the project in line with the latest relevant available guidance.	PEIR	DCO requirements or dML conditions.

7.1.5 The mitigation strategies outlined below are supported by the embedded environmental measures and have been designed to reduce or eliminate direct impact on known and potential marine heritage receptors. It is assumed that the embedded environmental measures will evolve during the development process and in response to consultation feedback. This approach is also discussed in **Volume 2, Chapter 17**.

Graphic 7-1 Embedded environmental measures flowchart



7.2 Mitigation for known wrecks and obstructions

- 7.2.1 Seventy-five wrecks identified in the data provided by United Kingdom Hydrographic Office (UKHO) and National Record of the Historic Environment (NRHE) are located within the marine archaeology study area. Of the 75 wrecks, 49 are classed as LIVE. In addition, there are 31 foul and seabed obstructions and 85 recorded losses.
- 7.2.2 As per embedded environmental measure C-60 **Table 7-1**, precautionary AEZs of 50m radius of medium potential and 100m radius for high potential anomalies are recommended for all 191 known heritage receptors, as illustrated in **Figure 17.2.** and **Figure 17.2..**
- 7.2.3 Full details of locations and details are in **Appendix 17.1, Annex A**, Section 4.1.

7.3 Mitigation for geophysical anomalies of archaeological potential

- 7.3.1 The combined geophysical data assessments undertaken to identify material of archaeological potential identified anomalies of low, medium and high archaeological potential within the marine archaeology study area as detailed in **Table 7-2.**
- 7.3.2 Anomalies of low archaeological potential and magnetic anomalies > 100 nanotesla (nT) without correlating seabed features have, due to the uncertainty of their archaeological potential, not been assigned AEZs.

Table 7-2 Definition of archaeological potential

Archaeological potential	Archaeological definition
High	Anomalies considered to map material of archaeological significance such as wreck or crash sites, buried and confirmed palaeolandscapes, as well as potential outcropping palaeolandscapes and their margins.
Medium	Anomalies that consist of defined structural outlines or coherent material distributions with strong backscatter, or clearly upstanding objects with shadow, or pronounced scour features; or a combination of these, interpreted as of possible archaeological significance but where further investigation would be required for more detailed interpretation.
Low	Anomalies considered to be of anthropogenic origin but likely related to modern activity with little or no archaeological significance such as modern debris, ropes, chains or fishing gear.

- 7.3.3 As per embedded environmental measure C-57 **Table 7-1** works during the construction, operational and decommissioning phases of the project should implement the project specific protocol for archaeological discoveries (**Annex A**)

and any objects of archaeological potential should be reported, should an archaeologist not be present.

- 7.3.4 As per embedded environmental measure C-60, **Table 7-1**, anomalies assigned medium and high archaeological potential are probably of anthropogenic origin and of archaeological significance and have therefore been assigned AEZs based on the archaeological potential, the archaeological significance and size as understood from the geophysical data assessment. The AEZs have been placed as a radius from the centre point of the feature.
- 7.3.5 Thirty-one high potential anomalies have been assigned 100m AEZ's and twenty-four medium potential anomalies have been assigned 50 AEZs as per **Table 7-2** and **Figure 17.2..**
- 7.3.6 Anomalies of low archaeological potential and magnetic anomalies > 100nT (see **Table 7-2** without correlating seabed features have, due to the uncertainty of their archaeological potential, not been assigned AEZs.

7.4 Mitigation for deposits of geoarchaeological potential

- 7.4.1 The baseline review, **Section 5**, supported by the geophysical survey data, **Section 5.4** has provided information about palaeolandscapes within the marine archaeology study area.
- 7.4.2 It is recognised that all phases of the development may cause direct impact to deposits which have the potential to be of geoarchaeological interest, however, the impact to the mentioned sediments will be restricted to the required burial and penetration depths, as outlined in **Volume 2, Chapter 17**.
- 7.4.3 As per embedded environmental measure C-59 **Table 7-1** any potential impact will be offset by the collection and analysis of geotechnical data. The geoarchaeological assessment will be undertaken using a staged geoarchaeological approach to assessment and analysis of the collected geotechnical data as further outlined in **Section 9.4** (this document).

7.5 Post-construction monitoring plan

- 7.5.1 To confirm the effectiveness of the embedded environmental measures including the established AEZs (C-60, **Table 7-1**) and the stability of marine heritage receptors, it is expected that some marine heritage receptors identified during the pre-construction surveys will require future monitoring as per C-57 **Table 7-1**).
- 7.5.2 Priority will be given to features of high archaeological potential located in proximity to installed infrastructure, particularly where archaeological potential and / or significance has been established through direct observation. In addition to wrecks or wreck assemblages, attention will be given to a range of feature types including discrete objects (historic anchors; aircraft components), magnetic anomalies with some degree of surface expression, possible debris and areas of seabed disturbance. A post-construction monitoring plan will be developed and submitted to the relevant Archaeological Curators which will outline the monitoring methodology and reporting structure.

7.6 Mitigation for unexpected archaeological discoveries

- 7.6.1 Mitigation for unexpected archaeological discoveries is considered under C-58, C-59 to ensure that offshore geophysical and geotechnical surveys are subject to archaeological reviews.
- 7.6.2 Further, as per embedded environmental measure C-57 **Table 7-1**, it is proposed that if any finds believed to be of archaeological potential are recovered by any operating vessels during construction, operation or decommissioning where an archaeologist is not present, they should be reported using the methodology outlined in the project-specific PAD, .
- 7.6.3 The Rampion 2 PAD has been produced based on the Offshore Renewables Protocol for Archaeological Discoveries (The Crown Estate, 2014).
- 7.6.4 The Rampion 2 PAD aims to mitigate impact on the historic environment by enabling people working offshore to report their finds in an effective and convenient manner.
- 7.6.5 The PAD anticipates discoveries being made by project staff who report to a Site Champion (potentially the Client Representative on the vessel or other manager appointed by the contractor), who then reports to RED's nominated person to coordinate implementation of the PAD (the Nominated Contact) (see **Section 12** of this document, **Figure 17.2.1**).
- 7.6.6 All discoveries of archaeological material must be reported by RED, in accordance with the communication plan, to the Nominated Contact, who will inform the Retained Archaeologist. If the find constitutes 'wreck' within the terms of the Merchant Shipping Act 1995 then the Retained Archaeologist will produce a report to the Receiver of Wreck. Full contact details for all relevant parties are included in Annex A of this document.
- 7.6.7 Any finds discovered will be safeguarded for instance, kept in water in a clean, covered container. It is not recommended to remove concretion, clean the finds, or in any other way interfere with them.
- 7.6.8 Following the mitigation works outlined above, there may be other discoveries during offshore works or geophysical data assessments that have not been previously characterised through the archaeological assessments. Any discoveries that are of archaeological potential may require Temporary Exclusion Zones (TEZs) to be established.
- 7.6.9 TEZs must be respected during all activities associated with the wind farm construction, operation and maintenance, and decommissioning phases. Measures must be put in place to communicate the position of TEZs to all contractors and to monitor compliance with the TEZs during construction, operation and maintenance and decommissioning.
- 7.6.10 Following an assessment of the available data for the discovery, the Retained Archaeologist will (in agreement with the curator, Historic England), provide advice on whether the TEZ may be lifted or will form the basis of a permanent AEZ.

- 7.6.11 Further archaeological works required as a result of the discovery will be undertaken subject to a Method Statements and followed by archaeological reporting.

7.7 Further archaeological works

- 7.7.1 There are a range of mitigation requirements related to the various construction, operation and decommissioning activities. The agreed embedded environmental measures; C-58 and C-59 as detailed in **Table 7-1**, can be undertaken prior to construction, other actions are linked to future activities, such as C-60 and C-111 **Table 7-1**, which will ensure that potential impacts during the decommissioning phase will be mitigated.
- 7.7.2 Future planned works which may impact on potential marine heritage receptors and where archaeological assessment will be undertaken will require detailed Method Statements to be agreed by the relevant curator/s as per this WSI.
- 7.7.3 Archaeological works may be undertaken as separate investigations depending on the timing of work or as part of other project campaigns. Reports generated from each site investigation or survey will be made available between relevant contractors as soon as they become available.
- 7.7.4 Any future survey that generates relevant data (both geophysical and geotechnical) will be reviewed, as per embedded environmental measures C-58, C-59 and C-60 (**Table 7-1**). Generally, each phase will provide incrementally greater resolution and more complete coverage as the final scheme footprint becomes more defined.

8. Responsibilities and communication

8.1 Rampion 2

- 8.1.1 The implementation of the final WSI document will be the responsibility of RED.
- 8.1.2 Consultation with Historic England will be maintained throughout the mitigation works. Curatorial responsibility for the aspects of Rampion 2 seaward of MHWS resides with Historic England.
- 8.1.3 Communication with the Archaeological Curators is the responsibility of RED. RED will engage a Retained Archaeologist to implement the final WSI. RED may engage one or more archaeological contractors to deliver the mitigation measures set out within this Outline Marine WSI.
- 8.1.4 RED will advise the Retained Archaeologist of all requirements or responsibilities related to communication with curators and contractors, or in relation to scheme-wide documentation such as Environmental Management Plans.
- 8.1.5 RED is responsible for all communication with contractors engaged for construction activities.

8.2 Retained Archaeologist / Archaeological contractors

- 8.2.1 The Retained Archaeologist will report to RED.
- 8.2.2 The Retained Archaeologist will provide advice to RED to inform communication with the curators and contractors in relation to implementation of the final WSI. The responsibilities of the Retained Archaeologist are as follows:
 - maintaining, reviewing and updating the WSI, as required;
 - advising RED's contractor(s) as to which activities warrant archaeological involvement;
 - advising RED's contractor(s) in the course of evaluating scope of work specifications on their capacity to meet archaeological requirements;
 - advising RED on the necessary interaction with third parties with archaeological interests, including the Archaeological Curators;
 - advising RED on the implementation of generic archaeological requirements applicable to all construction activities;
 - advising RED on Method Statements for archaeological investigations (which will be submitted to the curators);
 - implementing and monitoring the PAD;
 - monitoring the work of and liaising with the archaeological contractor(s) where this is not the Retained Archaeologist;
 - reviewing available geophysical and geotechnical data and/or reports that can inform the location of AEZs;

- monitoring the preparation and submission of archaeological reports as appropriate and making them available to the Archaeological Curators;
- ensuring provision for the management of RED's material archive in consultation with an appropriate museum or suitable repository;
- monitoring the preparation and submission of a post construction monitoring plan as appropriate and making it available to the Archaeological Curators; and
- advising RED on final arrangements for analysis, archive deposition, publication and popular dissemination.

8.3 Archaeological curators

- 8.3.1 As required, Method Statements, reports and deliverables outlining AEZs will be submitted to the Archaeological Curators by RED. Method Statements or other documents related to scheme-specific programming will be highlighted to the curators as requiring their agreement/ acceptance within a particular timescale (typically 12 weeks). If no response is received from the curator within a reasonable period to be agreed with the curator(s), then it will be assumed that the curator(s) agree with the proposals/documentation.

8.4 Construction contractors

- 8.4.1 The construction contractors will report to RED and will further:
- familiarise themselves with the applicable requirements of the final WSI and make it available to their staff;
 - obey legal obligations in respect of 'wreck' and 'treasure' under the Merchant Shipping Act 1995 and the Treasure Act 1996 respectively;
 - respect constraint maps, AEZs and TEZs;
 - assist and afford access to archaeologists employed by RED;
 - inform the Retained Archaeologist of any environmental constraint or matter relating to health, safety and welfare of which they are aware that is relevant to the archaeologists' activities; and
 - implement the project-specific PAD.

9. Scheme of investigations

9.1 Introduction

- 9.1.1 This scheme of investigation represents a general foundation for all further archaeological works that may eventually be a condition of consent and will be updated, post-consent, to detail the specific packages of archaeological works that have been agreed. Individual Method Statements for each package of works will be produced to detail the nature of archaeological works to be carried out.
- 9.1.2 The Method Statements and specifications in this document are based on archaeological best practice and guidance for offshore development. The principal sources are:
- A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (Second Edition) (Historic England, 2011);
 - Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (COWRIE, 2008);
 - Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England, 2015);
 - Deposit Modelling and Archaeology Guidance for Mapping Buried Deposits (Historic England, 2020);
 - Historic Environment Guidance for the Offshore Renewables Energy Sector (COWRIE, 2007);
 - Joint Nautical Archaeology Policy Committee (JNAPC) Code for Practice for Seabed Development (JNAPC, 2006);
 - Marine Geophysics Data Acquisition, Processing and Interpretation (Historic England, 2013);
 - Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010);
 - Protocol for Archaeological Discoveries: Offshore Renewables Projects (ORPAD) (The Crown Estate, 2014);
 - Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials (ClfA, 2014a);
 - Standard and Guidance for Commissioning Work on, or Providing Consultancy Advice on, Archaeology and the Historic Environment (ClfA, 2014b);
 - Standard and Guidance for Archaeological Field Evaluation (ClfA, 2014c);
 - Standard and Guidance for Nautical Archaeological Recording and Reconstruction (ClfA, 2014d); and
 - Standard and Guidance for an Archaeological Watching Brief (ClfA, 2014e).

9.1.3 The scheme of investigation below includes guidance outlining the requirements and expected standards in relation to:

- recording, reporting, data management and archiving;
- samples and artefacts;
- AEZs;
- marine geophysical investigations;
- marine geoarchaeological investigations;
- investigations using divers and/or ROVs; and
- watching briefs.

9.2 Archaeological recording, reporting, data management and archiving

9.2.1 Any future archaeological works will be accompanied by written reports pursuant to the requirements of those works and demonstrating appropriate planning, recording and data management and commitment to archiving and public dissemination of results according to the guidance summarised in the below sections and set out in Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010) and Historic Environment Guidance for the Offshore Renewables Energy Sector (COWRIE, 2007).

9.3 Method statements

9.3.1 Any future archaeological works, including those required as a condition of consent, will be subject to a Method Statement being prepared.

9.3.2 Each Method Statement will be submitted to the Archaeological Curators 20 working days before the commencement of planned works and archaeological works will not commence unless the Archaeological Curators have confirmed their agreement.

9.3.3 Method Statements will include provision for Archaeological Curators to monitor the conduct of the archaeological work as appropriate.

9.3.4 Unless otherwise agreed, the Method Statements will address the following matters:

- form of commission and contractual relationship with RED;
- relations between licence condition(s), WSI and the Method Statement;
- context in terms of relevant construction works;
- summary results of previous archaeological investigations in the vicinity;
- archaeological potential;
- specific objectives of archaeological works;

- extent of investigation;
- investigation methodology, to cover:
 - ▶ intrusive methods;
 - ▶ recording system;
 - ▶ finds, including the policy for selection, retention and disposal and provision for immediate conservation and storage;
 - ▶ environmental sampling strategy; and
 - ▶ anticipated post-investigation actions, including processing, assessment and analysis of finds and samples.
- reporting, including Intellectual Property Rights in the report and associated data, confidentiality and timescale for deposition of the report in a publicly accessible archive;
- timetable, to include investigation and post investigation actions;
- monitoring arrangements, including monitoring by Archaeological Curators; and,
- health, safety and welfare.

9.4 Archaeological campaigns

- 9.4.1 For all aspects of marine geophysical investigations, RED will adhere to standards and guidance as set out in the Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010) document. The archaeological assessment of new marine geophysical data will aim to avoid significant impacts through aiding further identification and clarification of known and potential marine heritage receptors as stated in C-58 (**Table 7-1**). The acquisition and review of new data for archaeological purposes will also contribute to any requirements to offset unavoidable impacts to potential archaeology.
- 9.4.2 The specification of any proposed marine geophysical surveys whose primary aim is non-archaeological will be subject to advice from an archaeological contractor to ensure that archaeological input is provided at the planning stage and to enable archaeological considerations to be considered without compromising the primary objective of the survey. Where a survey is carried out primarily to meet archaeological objectives, the specification shall be prepared by the Retained Archaeologist and carried out by a survey contractor.
- 9.4.3 Where archaeological objectives have been added to a survey whose primary objectives are non-archaeological (for example, engineering or environmental), consideration will be given to the option of having an archaeologist or geophysicist with appropriate archaeological expertise onboard during the acquisition of data. If archaeologists are onboard, they will advise on the suitability for archaeological purposes of the data being acquired and be able to propose minor changes to the survey method, settings, etc. in order to optimise archaeological results, and thereby minimise the need for repeat surveys.

- 9.4.4 New geophysical survey data will be interpreted by an archaeologist with an appropriate level of expertise. Raw survey data, together with factual reports and track plots, will be made available in digital formats to an archaeological contractor. The results of further geophysical interpretation will be compiled as an archaeological report consistent with guidance within Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010).
- 9.4.5 Archaeological involvement in the planning, acquisition and review of any geotechnical surveys including pre-construction and future monitoring surveys will be provided. Any necessary archaeological analysis of any material obtained, will follow a staged approach as outlined in Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (COWRIE, 2011), to satisfy the requirements of the Archaeological Curators and ensure that the required mitigation measures are delivered as outlined in C-59 (**Table 7-1**).
- 9.4.6 It is possible that certainty of the nature and extent of individual marine heritage receptors or anomalies may only be achieved through the use of diver and/or ROV survey. For all aspects of archaeological investigations using divers or ROVs, RED will adhere to standards and guidance as set out in the Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010) document.
- 9.4.7 In order to maximise the potential benefits of any proposed diver/ROV surveys undertaken primarily for engineering, ecological or other non-archaeological purposes, RED will seek archaeological input at the planning stage of any such works. Where the primary objectives of dive survey are non-archaeological, consideration will be given to having an archaeological contractor present during any diver or ROV surveys, either as observers or participating divers to optimise archaeological results and thereby reduce the need for repeat survey. Following the completion of a non-archaeological diver/ROV survey, all data, including video footage, will be reviewed by an archaeological contractor with appropriate expertise.
- 9.4.8 Archaeological diver or ROV-based investigations will take place where the primary objectives are archaeological, and the diving is led by archaeologists. An archaeological diver or ROV-based assessment may be required where it is not possible to protect an archaeological site through avoidance. The results of which will be compiled as an archaeological report consistent with guidance within the Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010).
- 9.4.9 Archaeological Watching Briefs by a suitably qualified archaeologist may be applicable where material will be moved or removed from the seabed and can be visibly assessed.
- 9.4.10 A Watching Brief is a formal programme of archaeological monitoring and will involve attendance by an archaeological contractor during offshore works as described below;
- excavated surfaces and material will be, where possible, inspected by the archaeological contractor;

- any finds will be collected and allocated a record number and their position will be logged;
- archaeological features or structures will be examined;
- where possible, a sufficient sample of each layer/feature type will be investigated in order to elucidate the date, character, relationships and function of the feature/structure;
- works may have to be halted for consultation with client and archaeological curators;
- recording will include written, drawn, and photographic elements as conditions allow; and
- the results of will be compiled as an archaeological report consistent with the Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (The Crown Estate, 2010) on reporting.

9.5 Reporting and publication

- 9.5.1 Any reports will be prepared in accordance with the guidance provided in the relevant Chartered Institute for Archaeologists (CIfA) Standard and Guidance and with reference to any other activity or analysis specific guidance.
- 9.5.2 Reports will detail the work undertaken and the archaeological evidence encountered. They will discuss the importance of the results including their potential contribution to archaeological knowledge and understanding.
- 9.5.3 The reports will typically include:
- a non-technical summary;
 - the aims and methods of the work;
 - the results of the work including finds and environmental remains;
 - a statement of the potential of the results;
 - proposals for further analysis and publication; and
 - illustrations and appendices to support the report.
- 9.5.4 Where appropriate the report will provide recommendations for further assessment and/ or analysis requirements. Each report will be submitted by RED to the curator, as well as to appropriate National and Regional repositories.

9.6 Artefacts

- 9.6.1 Artefacts that are exposed in the course of scheme works will be recovered by the archaeological contractor or, where recovery is impracticable, recorded. From the point of discovery, all finds will be held by the archaeological contractor in appropriate conditions pending further recording, investigation, study or conservation.

- 9.6.2 Recovered objects will be selected, retained or disposed of in accordance with the policy agreed with the institution receiving the archive, and in consultation with the Archaeological Curators.
- 9.6.3 Contingency will be made for specialist advice and conservation needs on-site should unexpected, unusual or extremely fragile and delicate objects be recovered.

9.7 Post-fieldwork assessment

- 9.7.1 Post-fieldwork assessment of archaeological materials is currently not expected. Should the recovery of archaeological material be deemed necessary then decisions regarding the scope of post-fieldwork assessment will be made by agreement between RED and Archaeological Curators following submission of investigation reports. These decisions will be based on the possible importance of the results in terms of their contribution to archaeological knowledge, understanding or methodological development.

9.8 Ordnance

- 9.8.1 In the event that any item(s) of ordnance is discovered, it will be treated with extreme care as it may not be inert. Industry guidelines provided by RED must be followed prior to any recording of items for archaeological purposes.

9.9 Human remains

- 9.9.1 In the case of the discovery of human remains, at all times they will be treated with due decency and respect. For each situation, the following actions are to be undertaken, and in any event, the Retained Archaeologist will inform RED and Archaeological Curators:
- for human remains on land and in intertidal areas, an application should be made to the Ministry of Justice for an exhumation licence under the Burial Act 1857;
 - for human remains within territorial waters where the remains have been intentionally buried, an application should be made to the Ministry of Justice for an exhumation licence; and
 - in all other cases, the Retained Archaeologist will immediately inform the Coroner and the Police.
- 9.9.2 Where practical, the human remains will be left *in situ*, covered and protected. Where human remains have been found and development will unavoidably disturb them, the remains will be fully recorded, excavated, and removed from the site in accordance with the granted exhumation license.

9.10 Aircraft

- 9.10.1 The majority of aircraft wrecks are military and so fall under the legal protection of the Protection of Military Remains Act 1986.
- 9.10.2 Any finds that are suspected of being military aircraft will be reported immediately to the Retained Archaeologist (where appointed). In the case of a military aircraft being investigated under license, any human remains will be reported immediately.

9.11 Wreck

- 9.11.1 Archaeological artefacts that have come from a ship are 'wreck' for the purposes of the Merchant Shipping Act 1995. RED, via their archaeological contractors, will ensure that the Receiver of Wreck is notified within 28 days, either on behalf of or directly by RED for all items of wreck that have been recovered.

9.12 Conservation and storage

- 9.12.1 All recovered materials, on land and underwater, will be subject to a Conservation Assessment to gauge whether special measures are required while the material is being held.
- 9.12.2 This Conservation Assessment will be carried out by the Retained Archaeologist or an archaeological contractor with an appropriate level of expertise, with advice from appropriate specialists.
- 9.12.3 The Retained Archaeologist (where appointed) or an archaeological contractor with appropriate expertise will implement recommendations arising from the Conservation Assessment.
- 9.12.4 Where no special measures are recommended, finds will be conserved, bagged, boxed and stored in accordance with industry guidelines. The cost of long-term care and conservation of recovered artefacts will be the responsibility of RED.

9.13 Archiving

- 9.13.1 Archiving will follow best practice as laid out within:
- Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation. Archaeological Archives Forum (Brown, 2011);
 - Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (ClfA, 2014f); and
 - Model Clauses for Archaeological Written Schemes of Investigation, Offshore Renewables Projects (Section 2.8: Archiving) (The Crown Estate, 2010).
- 9.13.2 Archive planning will be included within the relevant detailed Method Statement. Agreement with the Archaeological Curators will be sought on the most appropriate archiving repository for either individual reports or the Proposed Development as a whole.

- 9.13.3 As a minimum, copies of all reports will be submitted to the NRHE of England. An Online Access to the Index of Archaeological Investigations (OASIS) form will be produced for the Proposed Development and copies of associated reports will be attached to this report. The NRHE of England will also be provided with notice of submission of the OASIS form.
- 9.13.4 An accession number will be obtained from the receiving repository and the Project archive will then be deposited with any potential finds. The receiving repository will be notified of archaeological investigations in advance of fieldwork. For offshore digital data, it may be appropriate to archive this with a Marine Environmental Data and Information Network (MEDIN) Digital Archive Centre (DAC).
- 9.13.5 All costs of archiving (whether digital, paper or object) will be met by RED. Tenders for such works will include provision for the preparation and deposition of expected archive.

10. Arrangements for review of the WSI

- 10.1.1 This Outline Marine WSI has presented mitigation measures based on the archaeological assessments undertaken in preparation of the Rampion 2 PEIR.
- 10.1.2 It is expected that the requirement for a WSI to be in place and approved will be outlined in the dMLs which will form the draft DCO.
- 10.1.3 The Outline Marine WSI will need to be refined and updated, for approval by the MMO in consultation with Historic England, once the final distribution footprint of turbines (including quantity and spacing), offshore substation locations, and offshore export cable routes are determined, if they are likely to impact the AEZs or other archaeological material, as well as the identification of new marine heritage receptors, or changed understanding of existing receptors.
- 10.1.4 The revision will constitute a final project specific WSI to be prepared prior to commencement of relevant licensed activities, to which detailed Method Statements will be appended.
- 10.1.5 Method Statements will be produced and submitted to the Archaeological Curators for all planned archaeological works and include provision for the monitoring of progress of the investigations.

11. Glossary of terms and abbreviations

Table 11-1 Glossary of terms and abbreviations

Term (acronym)	Definition
Archaeological Exclusion Zones (AEZs)	Buffers around known marine heritage receptors that should be avoided during construction works.
Before Present (BP)	Time scale referring to the years before 1950.
Bronze Age	This period follows on from the Neolithic and is characterized by the increasing use of Bronze work. It is subdivided in the Early, Middle and Late Bronze Age. Archaeological period lasting from 2,600-700 BC.
ClfA	Chartered Institute for Archaeologists
DAC	Digital Archive Centre
Deemed Marine Licence (dML)	If a Development Consent Order (DCO) is granted, this may include provision deeming a marine licence to have been issued under Part 4 of the Marine and Coastal Access Act 2009.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Decommissioning	The period during which a development and its associated processes are removed from active operation.
Drop Down Video (DDV)	A survey method in which imagery of habitat is collected, used predominantly to survey marine environment.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Geophysical	Relating to the physical properties of the Earth.

Term (acronym)	Definition
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
Historic England	The public body that champions and protects England's historic places.
Historic Seascape Characterisation (HSC)	Maps and describes historic cultural influences which shape seascape perceptions across marine areas and coastal land.
Impact	The changes resulting from an action.
Intertidal	The area of the shoreline which is covered at high tide and uncovered at low tide.
JNAPC	Joint Nautical Archaeology Policy Committee
Last Glacial Maximum (LGM)	Most recent time during the last glacial period that the ice sheets were at their greatest extents, approximately 26,500-19,000 years ago.
LIVE	Wreck considered to exist as a result of detection through survey
MAG	Magnetometer
Marine archaeology study area	Defined as the PEIR Boundary area up to MHWS and surrounded by a 2km buffer.
Marine Heritage Receptors	Physical resources such as shipwrecks, remains of aircraft, archaeological sites, archaeological finds and material including pre-historic deposits as well as archival documents and oral accounts recognised as of historical/archaeological or cultural significance.
Marine Management Organisation (MMO)	MMO is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs. MMO license, regulate and plan marine activities in the seas around England so that they're carried out in a sustainable way.
Mesolithic	The Middle Stone Age, falling between the Palaeolithic and the Neolithic; marks the beginning of a move from a hunter gatherer society towards food producing society. Archaeological period lasting from 10,000-4,000 BC.
MBES	Multi-beam Echo Sounder

Term (acronym)	Definition
MEDIN	Marine Environmental Data and Information Network
MHWS	Mean High Water Springs
MIS	Marine Isotope Stage
Nanotesla (nT)	Measurement describing the magnetic field (flux) of ferrous materials as measures by a magnetometer. (one nanotesla equals 10 ⁻⁹ tesla)
Neolithic	This period follows on from the Palaeolithic and the Mesolithic and is itself succeeded by the Bronze Age. This period is characterized by the practice of a farming economy and extensive monumental constructions. Archaeological period lasting from 4,000-2,200 BC.
NRHE	National Record of the Historic Environment
OASIS	Online Access to the Index of Archaeological Investigations
Offshore	The sea further than two miles from the coast.
Offshore Wind Farm	An offshore wind farm is a group of wind turbines in the same location (offshore) in the sea which are used to produce electricity.
ORPAD	Offshore Renewables Protocol for Archaeological Discoveries
Palaeolithic	The period is defined by the practice of hunting and gathering and the use of chipped flint tools. This period is usually divided up into the Lower, Middle and Upper Palaeolithic. Archaeological period lasting from 50,000-10,000 BC.
Preliminary Environmental Information Report (PEIR)	Presents the results of the Environmental Impact Assessment to date and the results of the potential impacts of Rampion 2 Offshore Wind Farm on marine archaeology heritage receptors.
PEIR Assessment Boundary	The PEIR Assessment Boundary combines the search areas for the offshore and onshore infrastructure associated with the Proposed Development. It is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.

Term (acronym)	Definition
Proposed Development	The development that is subject to the Application for development consent.
Protocol for Archaeological Discoveries (PAD)	A document detailing how finds made during the lifetime of the Proposed Development should be reported.
Receiver of Wreck	Official of the British Government whose main task is to administer the law in relation to Wreck and Salvage.
RED	Rampion Extension Development Limited.
ROV	Remotely Operated Vehicle
SBP	Sub-Bottom Profiler
Scour	A localised sediment erosion feature caused by local enhancement of flow speed and turbulence due to interaction with an obstacle.
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
SoS	Secretary of State
SSS	Side Scan Sonar
Study area	Area where potential impacts from the Proposed Development could occur, as defined for each aspect.
TEZ	Temporary Exclusion Zones
UHRS	Ultra-High Resolution Seismic
United Kingdom Hydrographic Office (UKHO)	Database of known wrecks and obstructions held and maintained by the UKHO.
UXO	Unexploded Ordnance
Written Scheme of Investigation (WSI)	A document forming the agreement between the client, the appointed archaeologists, contractors and the relevant stakeholders. The document sets out methods to mitigate the effects on all the known and

Term (acronym)	Definition
	potential marine heritage receptors within the development area.
WTG	Wind Turbine Generator

12. Figures

Figure 17.2.1 Marine archaeology study area

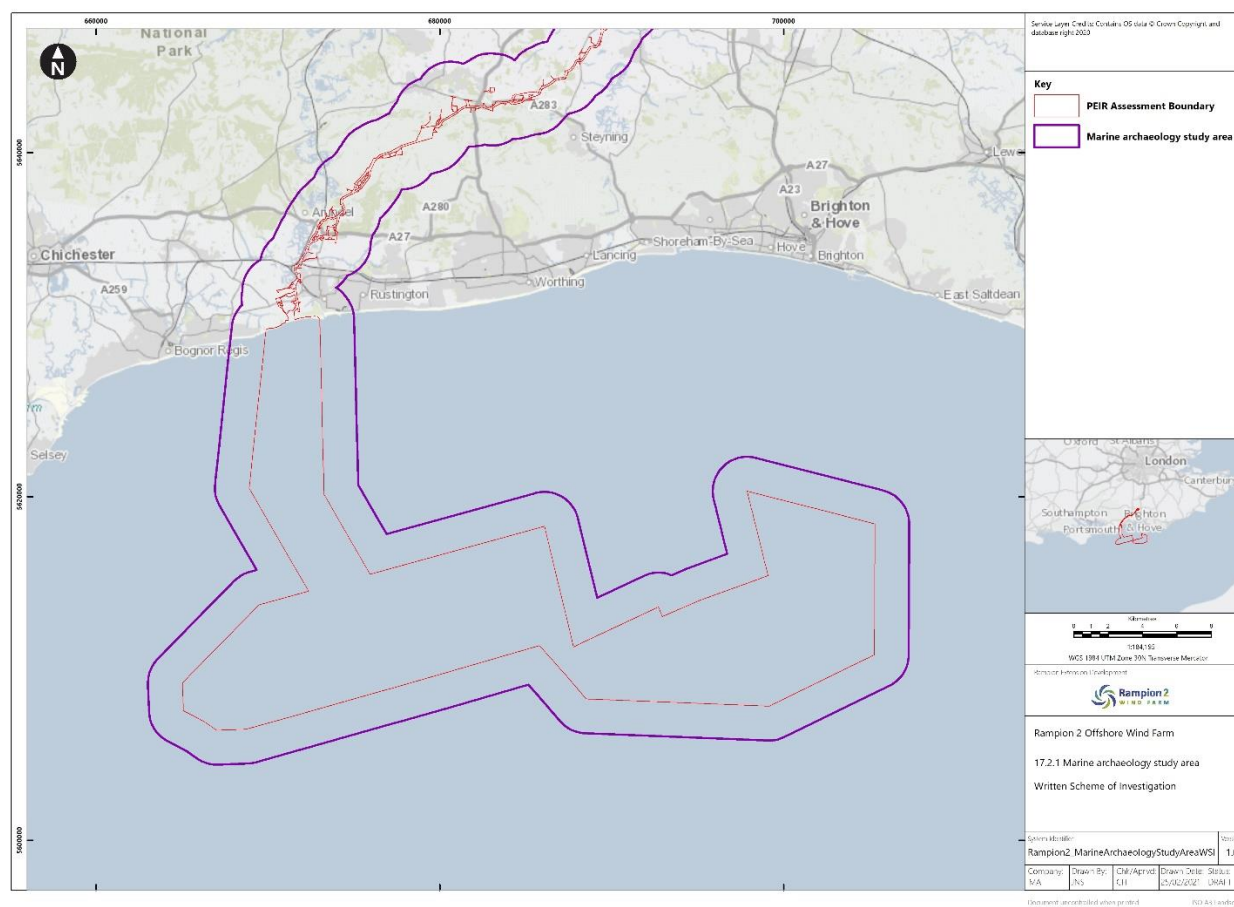


Figure 17.2.2 Archaeological exclusion zones recommended for high and medium potential anomalies

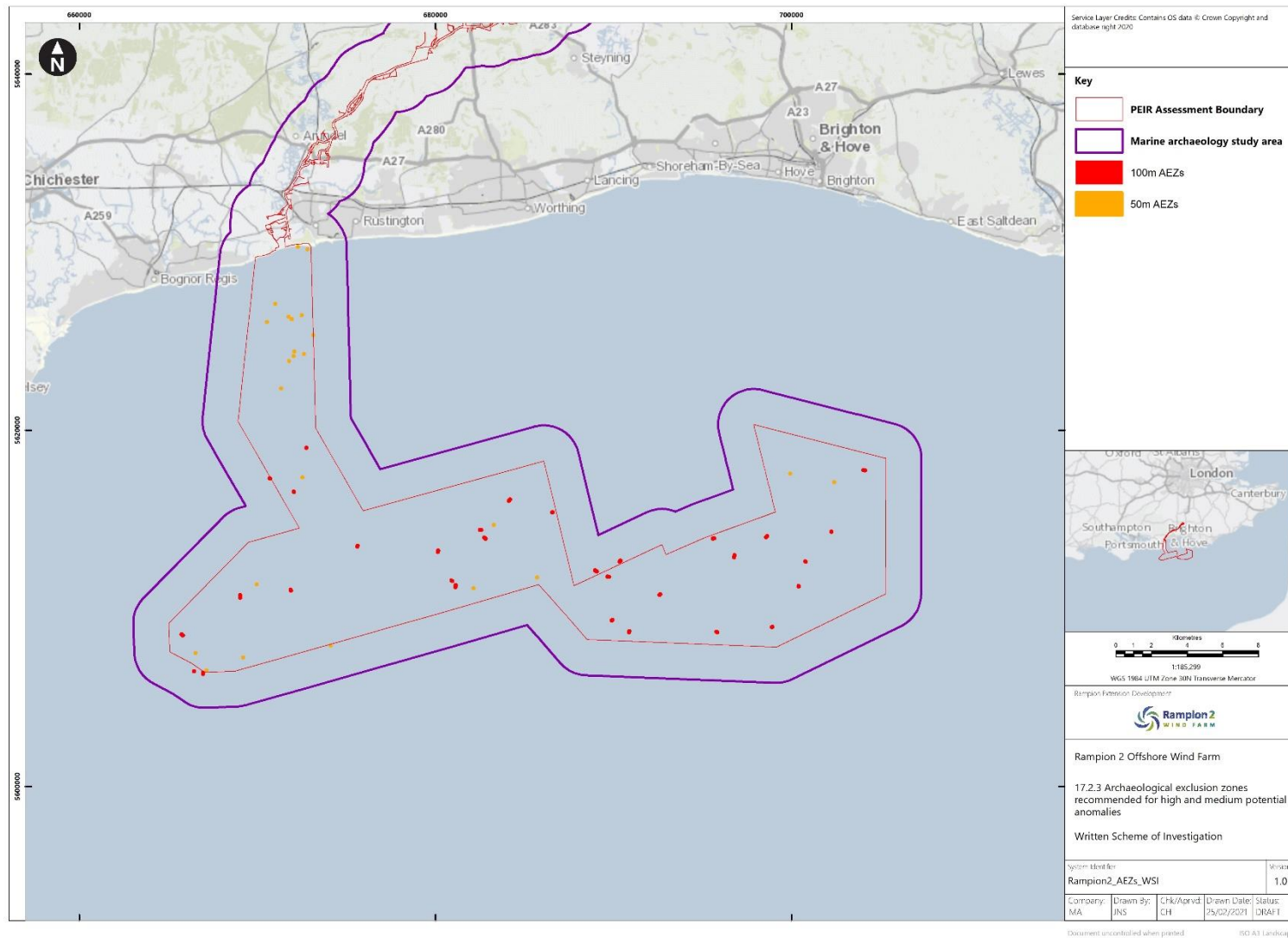


Figure 17.2.3 Valleys and channels with geoarchaeological potential

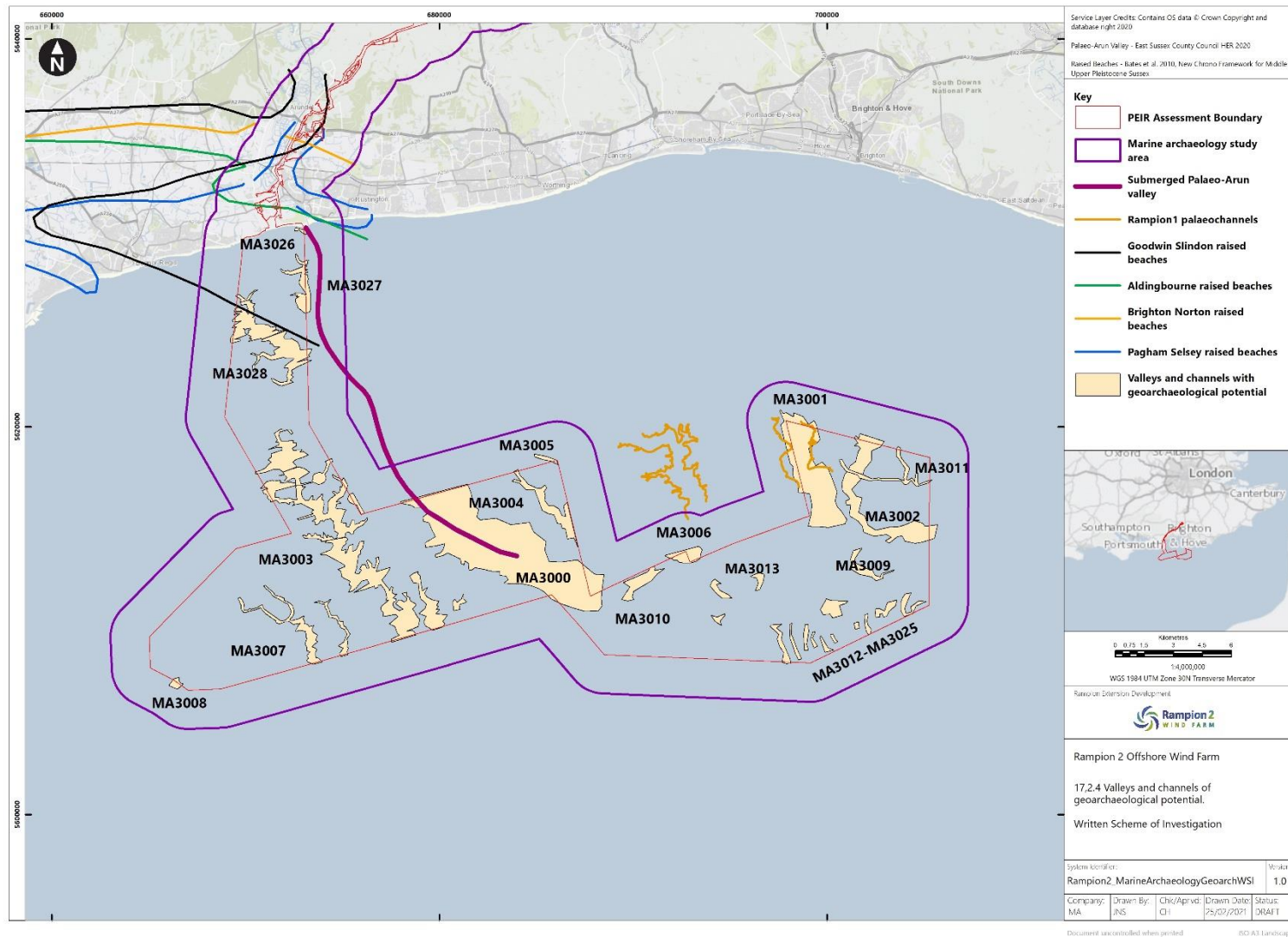
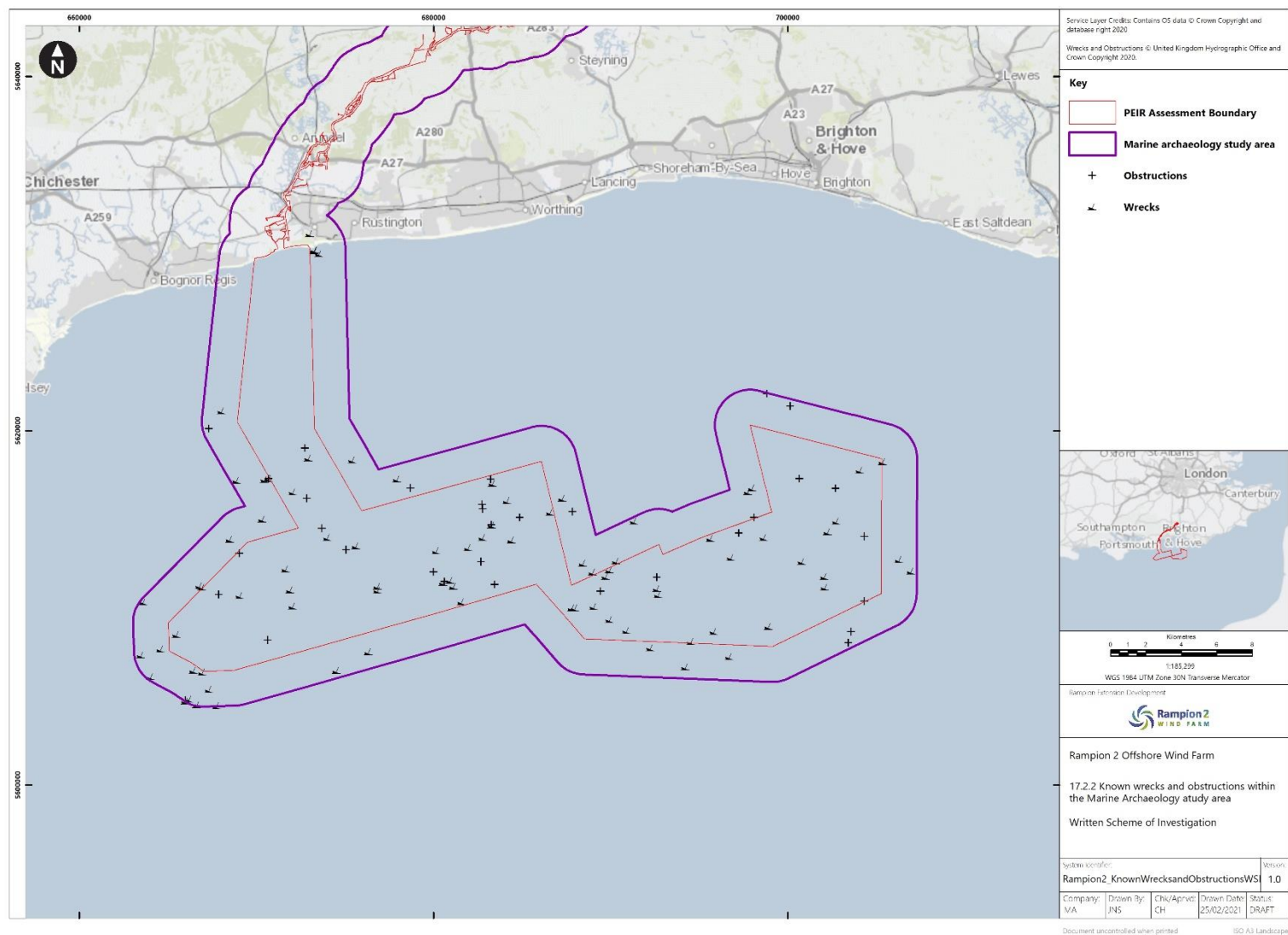


Figure 17.2.4 Known wrecks and obstructions within the marine archaeology study area



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Annex A Outline project-specific Protocol for Archaeological Discoveries (PAD)

The Protocol for Archaeological Discoveries: Offshore Renewables projects (ORPAD) is a system developed for monitoring and reporting unexpected and incidental archaeological and historical finds, sites, objects or deposits where an archaeologist is not present on site or immediately available. The ORPAD document should be used at all stages of the development process and should be considered as a safety net and not as a replacement for other archaeological mitigation strategies.

This Outline PAD for Rampion 2 summarises the Protocol for Archaeological Discoveries, the roles and responsibilities of RED and relevant contractors, and contains contact details for RED's reporting chain.

This Outline PAD has been developed based the Protocol for Archaeological Discoveries: Offshore Renewables Project (The Crown Estate, 2014).

Aims and objectives

The aim of this Outline PAD is to set out the proposed approach to mitigating the impact of Rampion 2 on the historic environment by implementing a project specific protocol for unexpected archaeological discoveries encountered during the course of site investigation or construction activities.

The key objectives for this protocol are to:

- set out the proposed procedures to be followed in order to avoid impacts on unexpected archaeology encountered during the course of the development programme; and
- ensure that all contractors are familiar with the requirements of the protocol through the provision of awareness training and guidance on how to implement the protocol for on-site and office-based staff. Such training will focus on identifying, recording and reporting archaeologically significant features and material that may be encountered during development, operation and decommissioning of the wind farm.

Roles

To ensure that the PAD is being implemented, personnel assigned a role will be required to confirm that they are willing and competent to undertake the tasks requested. All relevant personnel will be provided with an introductory presentation outlining the tasks and procedures involved for successful implementation.

Curators

The Historic England Marine Planning Unit will be the Archaeological Curator responsible for heritage matters offshore. Historic England will be kept informed of any archaeological finds in relation to Rampion 2. For intertidal matters, the Historic England Regional Science Advisor and the relevant Local Authority Archaeologist will be contacted. For Rampion 2 the relevant personnel are;

- Pip Naylor, Historic England Marine Planning Unit; and
- Chris Pater, Historic England Marine Planning Unit.

Retained Archaeologist

The Retained Archaeologist, when appointed by RED, will act on behalf of RED and will act as liaison between the Nominated Contact and the Curators. See Figure A1. A Retained Archaeologist is not appointed, advice can be sought from the PAD Implementation Service provided by Wessex Archaeology.

The Retained Archaeologist will:

- advise on TEZs and mitigation strategies;
- advise on the need for a Watching Brief;
- advise on material conservation, identification and character of finds;
- advise on immediate actions to be taken in respect of the find;
- advise on resolving ownership issues; and
- liaise with the relevant local authorities, museums and curators with regard to reported finds.

Nominated Contact

The Nominated Contact will be the Environment Manager and/or Principal Contractor within Rampion 2's project team. The Nominated Contact will be responsible for all communications regarding archaeology recovered during the development of the project. The Nominated Contact will take part in the introductory training session and, if the role is passed on to another member of staff, then the new Nominated Contact will ensure that they receive suitable training to undertake the responsibilities in the Protocol.

The Nominated Contact will:

- take part in PAD training;
- keep updated records of the Retained Archaeologist and Curator contact details;
- Designate Site Champion(s) and liaise with the Site Champion(s);

- notify the Retained Archaeologist of any finds, sites, objects or deposits as soon as possible;
- ensure that the records produced by the Site Champion are correct and pass all information on to the Retained Archaeologist;
- if necessary, ensure that a TEZ is established and maintained until further advice is received from the Retained Archaeologist and / or the Curator; and
- make finds available for inspection by the Retained Archaeologist and /or the Curator.

Site Champion

One Site Champion on each vessel will be appointed by the Nominated Contact. The Site Champion will:

- take part in PAD training;
- act as the first point of contact for technical staff and crew working on the vessel;
- liaise with the Nominated Contact;
- ensure that no operations take place where a feature, anomaly or artefact has been located until the Nominated Contact and Retained Archaeologist have been informed and further advice has been received;
- examine any deployed equipment to ensure that archaeological material has not been trapped, if relevant;
- note the occurrence, time and exact position of any finds in the vessel's log;
- fill in a Preliminary Record Form;
- notify the Nominated Contact as soon as possible and pass on all logs, drawings and photos; and
- ensure that all finds recovered are stored appropriately in accordance with the training provided.

All staff

Staff on-board vessels that have “eyes on the seabed” or operate in a supervisory role as well as staff from the onshore facilities at a management level with responsibilities regarding the offshore zone (particularly environmental planning) will be provided with training, where relevant, to ensure that they are aware of the reporting procedures and will report all finds, sites, objects or deposits to their Site Champion. The staff will follow the flowchart presented below when reporting finds of archaeological potential.

Finds identification

Finds and sites can encompass one object or a collection of objects. **Table A-1** outlines a summary of materials that should be reported to the Retained Archaeologist.

Table A-1 Materials of archaeological potential

Material	Report to the Retained Archaeologist	Archaeological potential
Rubber plastic and modern materials found with aluminium objects	Yes	Potential aircraft. Military aircraft are also subject to legal requirements under the Protection of Military Remains Act 1986
Rubber, plastic, Bakelite and other modern materials	No	n/a
Iron and steel	Yes	Wreck/ aircraft
Concretions – iron/steel covered by a thick concrete like coating	Yes	Wreck
Aluminium, copper, copper alloy (bronze, brass) and precious metals	Yes	Archaeologically important objects
Ordnance (cannonballs, bullets, shells)	Yes	Unexploded Ordnance (UXO) guidance should always take precedence over archaeological requirements
Animal bone, teeth and tusks	Yes	Prehistoric animals, evidence of transport, butchering and consumption
Human bones	Yes	Human bones are also subject to legal requirements under the Burial Act 1857
Objects made out of bone (combs, harpoon points, decorative items)	Yes	Archaeologically important objects
Light coloured wood, or wood that floats easily	No	Unlikely to be of archaeological interest
Roundwood with bark – such as branches	No	Unlikely to be of archaeological interest
Roundwood that has clearly been shaped or made into a point	Yes	Part of a structure

Material	Report to the Retained Archaeologist	Archaeological potential
Pieces of wood that have been shaped, jointed or fixed with wooden pegs, bolts or nails	Yes	Structure or wreck
Objects made out of dark, waterlogged wood (bowls, handles, shafts etc.)	Yes	Archaeologically important objects
Small to medium size stones that are shaped, polished and/or pierced	Yes	Prehistoric objects (axe heads, knife blades) of archaeological importance
Large blocks of stone that have been pierced or shaped	Yes	Anchors or weights of archaeological importance
Large collection of stones in the same area	Yes	Ballast mound or navigational cairn
Pottery	Yes	All fragments possess archaeological potential
Bricks with modern proportions and v-shaped hollows ('frogs')	No	n/a
Bricks that are unfrogged, 'small', 'thin' or otherwise unusual	Yes	Archaeologically important objects
Peat (black or brown fibrous soil)	Yes	Likely of geoarchaeological interest

Finds handling and conservation procedures

Table A-2 summarises how the finds or objects, if recovered to the surface should be handled and stored until passed on to the Retained Archaeologist ('wet finds' refers to finds still wet when found; 'dry finds' are finds that have dried out or were found dry).

Table A-2 Finds handling procedures

Wet finds	Dry finds
Photograph the find ► Use a scale	Photograph the find ► Use a scale

Wet finds	Dry finds
<ul style="list-style-type: none"> ▶ Focus on the object ▶ One item at a time ▶ Additional close-ups of important details 	<ul style="list-style-type: none"> ▶ Focus on the object ▶ One item at a time ▶ Additional close-ups of important details
Fill in the Preliminary Record Form.	Fill in the Preliminary Record Form.
Place the finds in separate watertight plastic containers of appropriate size.	Do not put in water.
Check the container regularly and top up with water when needed.	Label the container and ensure that associated finds are kept together.
Label the container and ensure that associated finds are kept together.	Do not clean or empty the find.
Do not clean or empty the find.	If the item breaks, do not glue it back together.
If the item breaks, do not glue it back together.	Place the container in a dark, cold place.
Place the container in a dark, cold place.	

Preliminary record form

The reporting form as shown in **Table A-3** is to be used as guidance when reporting a find of archaeological potential. The information can be provided via email and presented in any format used by the contractors.

Table A-3 Preliminary record form

Company Name:
Vessel/Team Name:
Site Name:
Date:
Time of compiling information:
Name of compiler (Site Champion):
Name of finder (if different to above):
Time at which discovery was encountered:
Vessel position at time when anomaly was encountered:
(If on land) Name of vessel from which find originated:
(If on land) Name of area from which find originated:
(If on land) Date on which find was located:
Original position of the anomaly on the seabed, if known:
Notes on likely accuracy of original position stated above (how accurate is the position and is the position the original position or has the material been moved by operations?)
Description of the find:
Apparent size of the find:
Details of any other finds recovered from the same area:
Details of photographs, drawings or other records made of the find.
Details of treatment or storage of find.
Date and time Nominated Contact informed:
General notes:
Signed: Date:

Project specific roles

Appointed personnel as detailed in the final PAD will be responsible for the implementation of the PAD.

The appointments will be made by RED in agreement with the Retained Archaeologist. The PAD document will be circulated among relevant staff and if any changes to named personnel should occur, the document will be immediately updated and re-circulated.

Relevant legislation

- **Burial Act 1857.** The Act requires a licence to be granted prior to the removal of human remains from deliberately deposited contexts.
- **Protection of Military Remains Act 1986.** The Act protects the resting places of military personnel from unauthorised disturbance. It allows the Ministry of Defence (MoD) to protect vessels and aircraft that were in military service when they were lost or wrecked.
- **The Treasure Act 1996.** The Act is supplemented by the Treasure (Designation) Order 2002. Finders of gold and silver objects (over 300 years old) and some base metal assemblages (prehistoric) as defined in the Act are required to report such finds by contacting the Coroner and delivering the items for hand over as per the Coroners' instructions.
- **Protection of Wrecks Act 1973.** Under the 1973 Act, shipwrecks and wreckage of historical, archaeological or artistic importance within UK territorial waters can be protected by way of designation. Once a wreck has been designated it is an offence to carry out certain activities on or around the site without a licence.
- **Merchant Shipping Act 1995.** If any material is recovered which falls within the definition of 'wreck' the Receiver of Wreck has to be notified and will seek to identify the original owner so that it can be claimed.
- **Ancient Monuments and Archaeological Areas Act 1979.** Monuments that are of national importance within UK territorial waters can be protected by being added to the schedule of monuments protected under this Act. It is an offence to damage or carry out a range of specified activities on such a 'scheduled monument' unless authorised to do so.

Graphic A-1 Protocol for Archaeological Discoveries

