

# **East Anglia TWO Offshore Windfarm**

## **Appendix 16.1**

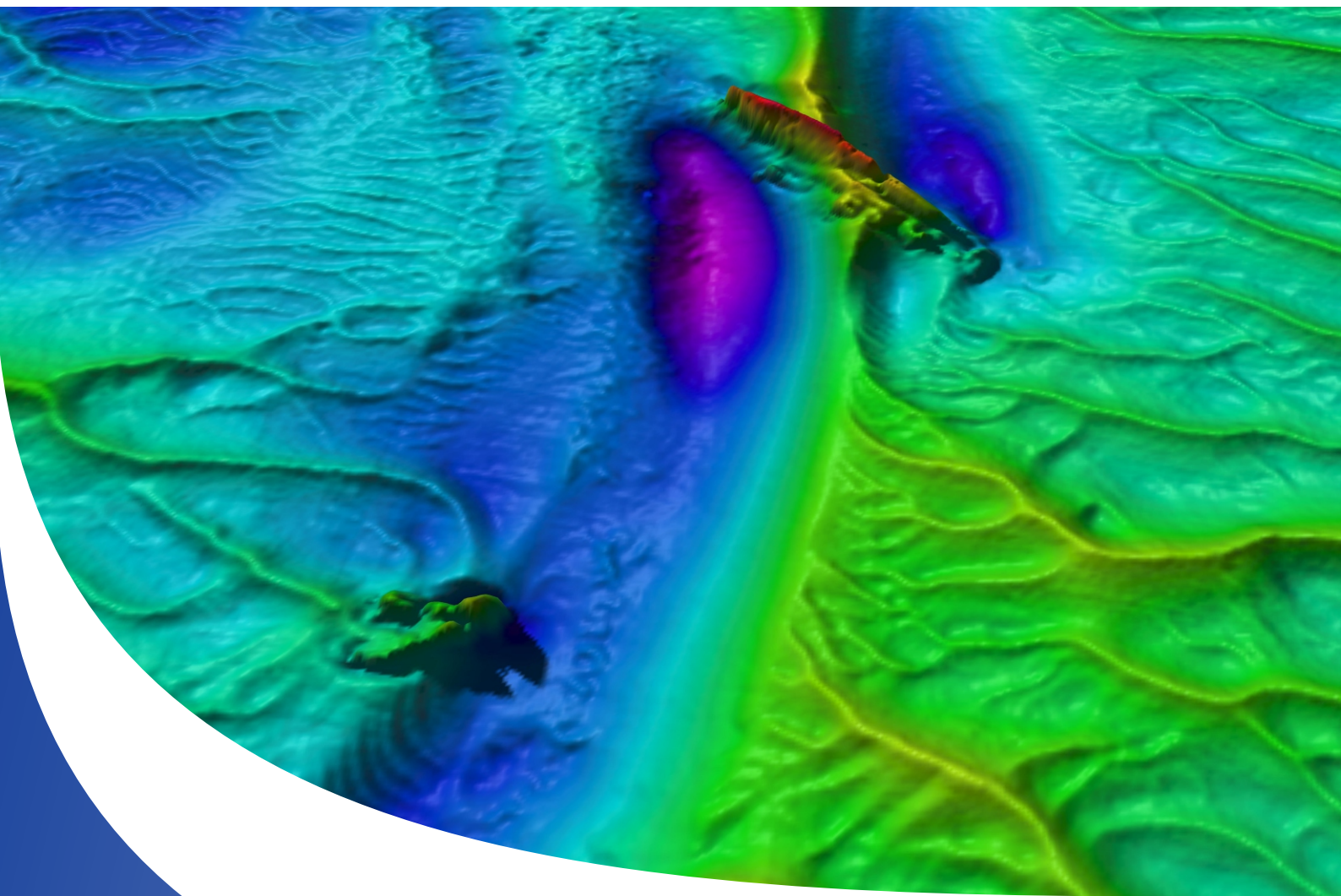
### **East Anglia TWO Offshore Windfarm Archaeological assessment of geophysical data**

Preliminary Environmental Information  
Volume 3  
EA2-DEVWF-ENV-REP-IBR-000811\_001



# East Anglia TWO Offshore Windfarm

Archaeological Assessment of Geophysical Data



Ref: 117810.01  
December 2018



© Wessex Archaeology Ltd 2018, all rights reserved.

Portway House  
Old Sarum Park  
Salisbury  
Wiltshire  
SP4 6EB

[www.wessexarch.co.uk](http://www.wessexarch.co.uk)

Wessex Archaeology Ltd is a Registered Charity no. 287786 (England & Wales) and SC042630 (Scotland)

#### Disclaimer

The material contained in this report was designed as an integral part of a report to an individual client and was prepared solely for the benefit of that client. The material contained in this report does not necessarily stand on its own and is not intended to nor should it be relied upon by any third party. To the fullest extent permitted by law Wessex Archaeology will not be liable by reason of breach of contract negligence or otherwise for any loss or damage (whether direct indirect or consequential) occasioned to any person acting or omitting to act or refraining from acting in reliance upon the material contained in this report arising from or connected with any error or omission in the material contained in the report. Loss or damage as referred to above shall be deemed to include, but is not limited to, any loss of profits or anticipated profits damage to reputation or goodwill loss of business or anticipated business damages costs expenses incurred or payable to any third party (in all cases whether direct indirect or consequential) or any other direct indirect or consequential loss or damage.

## Report Information

Document title	East Anglia TWO Offshore Windfarm
Document subtitle	Archaeological assessment of geophysical data
Document reference	117810.1

Client name	Royal HaskoningDHV
Address	Rightwell House Bretton Peterborough PE3 8DW


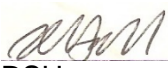
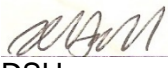
On behalf of	ScottishPower Renewables
Address	ScottishPower House 320 St Vincent St Glasgow G2 5AD

Site location	Southern North Sea
County	Offshore Norfolk, UK

WA project code(s)	74540, 74541, 74542, 74545, 74547
Project management by	David Howell
Document compiled by	Megan Metcalfe and Abby Mynett
Contributions from	Claire Mellett, Louise Tizzard, Sam Strutton
Graphics by	Kitty Foster



## Quality Assurance

Version & issue date	Status	Author	Approved by
V1 28/08/2018	Draft for comment	MM	 LHT
V2 11/09/2018	Final for comment	MM	 DSH
V3 05/12/2018	Final	MM	 DSH

## DATA LICENCES

This product has been derived in part from material obtained from the UK Hydrographic Office with the permission of the UK Hydrographic Office and Her Majesty's Stationery Office.

© Crown Copyright, **2018**. Wessex Archaeology ref. HA294/007/316-01.

The following notice applies:

**NOT TO BE USED FOR NAVIGATION**

**WARNING:** The UK Hydrographic Office has not verified the information within this product and does not accept liability for the accuracy of reproduction or any modifications made thereafter.

Contains Ordnance Survey data © Crown copyright and database rights **2018**



## Contents

Summary .....	iii
Acknowledgements.....	iv
<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 Project background.....	1
1.2 Aims and objectives.....	2
1.3 Co-ordinate system.....	2
<b>2 METHODOLOGY .....</b>	<b>2</b>
2.1 Data sources .....	2
2.2 Geophysical data – technical specifications.....	3
2.3 Geophysical data – processing.....	3
2.5 Geophysical data – anomaly grouping and discrimination.....	5
<b>3 PALAEOGEOGRAPHIC ASSESSMENT .....</b>	<b>6</b>
3.1 Geological baseline and archaeological potential.....	6
3.2 Palaeogeographic assessment results.....	11
<b>4 SEABED FEATURES ASSESSMENT .....</b>	<b>15</b>
4.1 Introduction.....	15
4.2 Seabed features assessment results .....	15
<b>5 CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>20</b>
5.1 Palaeogeographic features .....	20
5.2 Seabed features .....	20
<b>6 REFERENCES .....</b>	<b>23</b>
<b>APPENDICES .....</b>	<b>27</b>
Appendix 1 Palaeogeographic features of archaeological potential.....	27
Appendix 2 Seabed features of archaeological potential.....	30

## List of Tables

<b>Table 1</b>	Summary of past reports overlapping with EA2
<b>Table 2</b>	Summary of survey equipment
<b>Table 3</b>	Software used for geophysical assessment
<b>Table 4</b>	Criteria for assigning data quality rating
<b>Table 5</b>	Criteria discriminating relevance of identified features to proposed scheme
<b>Table 6</b>	Shallow stratigraphy of the study area
<b>Table 7</b>	Anomalies of archaeological potential within the study area
<b>Table 8</b>	Types of anomaly identified
<b>Table 9</b>	Recommended AEZs within the study area

## List of Figures

<b>Figure 1</b>	Location of East Anglia TWO Offshore Windfarm
<b>Figure 2</b>	Sea level curve and chronology of the Southern North Sea landscape
<b>Figure 3</b>	Palaeogeographic features of archaeological potential
<b>Figure 4</b>	Palaeogeographic feature data example – 780003
<b>Figure 5a-d</b>	Seabed features of archaeological potential
<b>Figure 6</b>	Data examples of seabed features

## List of Sheets

<b>Sheet 1</b>	ID 70684 and 700106 – Unknown
<b>Sheet 2</b>	ID 70707 – <i>Dolfijn</i> (Probably)
<b>Sheet 3</b>	ID 70717 – Unknown



**Sheet 4** ID 76951 – Unknown  
**Sheet 5** ID 700104 – Unknown



## Summary

Wessex Archaeology was commissioned by Royal HaskoningDHV, on behalf of ScottishPower Renewables, to undertake an archaeological assessment of geophysical data acquired from the East Anglia TWO Offshore Windfarm. The assessment data comprised sidescan sonar and multibeam bathymetry data acquired in 2017 and magnetometer and sub-bottom profiler data acquired in 2011.

Wessex Archaeology has previously carried out three assessments of geophysical survey data covering the area of the East Anglia TWO Offshore Windfarm. The results of this current assessment have been compared to the results of the previous archaeological assessments.

A total of eleven anomalies were assigned the discrimination A1 (anthropogenic origin of archaeological interest), within the study area. Six of these anomalies (**76951**, **70684**, **70707**, **70717**, **700104** and **700106**) were classified as wrecks, and five as associated wreck debris (**700065**, **700066**, **700107**, **700108** and **700109**).

A total of 331 anomalies have been discriminated as A2 (uncertain origin of possible archaeological interest), and one anomaly was assigned an A3 archaeological discrimination (**70700**) which was previously identified by Gardline Geosurvey Ltd, but which has not been identified by Wessex Archaeology at any phase geophysical assessment.

Archaeological Exclusion Zones are recommended for the six identified wreck sites and the five associated wreck debris. For any identified features not assigned an Archaeological Exclusion Zone, an avoidance strategy is recommended. Further work may be necessary to ascertain the precise nature and archaeological potential of individual features should avoidance prove unfeasible during future post-consent works.

Three palaeochannels, and two dune features are identified within the East Anglia TWO site, which have been given a P1 archaeological rating, which is defined as a feature of probable archaeological interest, either because of its palaeogeography or likelihood for producing palaeoenvironmental material. Some of these features have associated high amplitude reflectors which may be indicative of gaseous organic matter. A further 10 palaeogeographic features were identified within the site and given a P2 archaeological discrimination, which are features of possible archaeological interest.

Should further ground investigation work be undertaken within the study area, it is recommended that the archaeological contractor be consulted to advise on potential samples to be acquired for archaeological purposes, particularly from the interpreted dune features (**780003** and **780004**) and other identified units of archaeological interest identified within the data. It is also recommended that any future geotechnical logs from within the study area be made available for geoarchaeological assessment.

It is recommended that if any objects of possible archaeological interest are recovered during any groundwork operations, that they should be reported using the established Offshore Renewables Protocol for Archaeological Discoveries. This will establish whether the recovered objects are of archaeological interest and recommend appropriate mitigation measures.



## **Acknowledgements**

Wessex Archaeology was commissioned by Royal HaskoningDHV, on behalf of ScottishPower Renewables. Data were provided by Gardline Geosurvey Ltd.

Wessex Archaeology is grateful to the staff of all the above organisations for their co-operation during this project.



# East Anglia TWO Offshore Windfarm

## Archaeological assessment of geophysical data

### 1 INTRODUCTION

#### 1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by Royal HaskoningDHV, on behalf of ScottishPower Renewables, to undertake an archaeological assessment of geophysical data acquired over the East Anglia TWO Offshore Windfarm (hereon referred to as EA2).
- 1.1.2 The survey area covers approximately 255 km<sup>2</sup> and is located approximately 31 km offshore from the town of Lowestoft (Fig.1).
- 1.1.3 Wessex Archaeology has previously undertaken five archaeological assessments of geophysical data over the East Anglia Zone and associated export cable route corridors, three of which overlap in part with the proposed EA2 site.
- 1.1.4 The three previous assessments that cross through, or overlap with, the current EA2 area were undertaken in 2011 (Wessex Archaeology 2011b), using geophysical survey data acquired by Gardline; 2012 (Wessex Archaeology 2012) using geophysical survey data acquired by Gardline and EMU and 2014 (Wessex Archaeology 2014) using data acquired by Coastline Surveys. These past assessments are summarised in Table 1.
- 1.1.5 This report consists of an assessment of geophysical survey data comprising sub-bottom profiler (SBP), sidescan sonar (SSS), magnetometer and multibeam bathymetry (MBES) data sets. All the geophysical data assessed for this report were acquired by Gardline Geosurvey Limited (Gardline); the SSS and MBES data was acquired in 2017 and the SBP and magnetometer data was acquired in 2010.

**Table 1** Summary of past reports overlapping with EA2

Document	Date	Reference	Wessex Archaeology report ref.
East Anglia ONE Offshore Windfarm, Preliminary Environmental Information Report	2011	Wessex Archaeology 2011b	74540
Chapter 17: Archaeology and Cultural Heritage, East Anglia ONE Offshore Windfarm, Environmental Statement, Volume 2: Offshore	2012	Wessex Archaeology 2012	74541
Chapter 17: Archaeology and Cultural Heritage, East Anglia THREE, Preliminary Environmental Information Volume 1 Revision B	2014	Wessex Archaeology 2014	74547
East Anglia TWO Offshore Windfarm; Archaeological Assessment of Geophysical Data	2018	Current document	117810



1.1.6 The study area is defined as the extents of the EA2 boundary (Fig.1) as provided by the client on the 9th May 2017. Any geophysical anomalies identified outside of the defined study area are considered beyond the scope of this report and are not included in the results or gazetteer of anomalies.

1.1.7 The EA2 site is split into different areas, depending on the amount of geophysical coverage from previous surveys (Fig.1). The EA2 Optional Area has been covered by several previous geophysical assessments (Wessex Archaeology 2011b; Wessex Archaeology 2012; Wessex Archaeology 2014), whereas the EA2 Primary Area has only been covered by the 2011 ZEA geophysical assessment Wessex Archaeology 2011b).

## **1.2 Aims and objectives**

1.2.1 The aim of this assessment is to identify any anomalies of archaeological potential within EA2, in order to further inform the planning process ahead of the proposed development scheme. This is to be undertaken through the following objectives:

- identify any buried palaeolandscape features of possible archaeological potential;
- confirm the presence of known or previously located marine sites of archaeological potential and to comment on their apparent character;
- identify, locate and characterise hitherto unrecorded marine sites of archaeological potential;
- provide recommendations for archaeological mitigation.

## **1.3 Co-ordinate system**

1.3.1 The survey data was acquired in WGS84 UTM31N and the results are presented in the same coordinate system.

# **2 METHODOLOGY**

## **2.1 Data sources**

2.1.1 A number of data sources were consulted during this assessment, including:

- Geophysical survey datasets acquired by Gardline Geosurvey Ltd;
- Borehole logs acquired by GEMS in 2010;
- Recorded wreck and obstruction data acquired via the United Kingdom Hydrographic Office (UKHO);
- Relevant background mapping from the area (British Geological Survey (BGS) 1984, admiralty charts received from UKHO);
- Past reports (Wessex Archaeology 2011b; 2012; 2014)
- Client supplied survey reports (Gardline Geosurvey Ltd 2011; 2011b; 2017; 2017b).



## 2.2 Geophysical data – technical specifications

- 2.2.1 Geophysical data were acquired by Gardline in 2010 and 2017. The SSS and MBES data were acquired between 12 May and 22 June 2017 onboard the M.V. *Ivero*. The primary survey lines were orientated 003°/183° with a line spacings of 75 m and cross lines run every 1500 m. The SBP and magnetometer data were acquired between 30 April 2010 and 24 September 2010 onboard the M.V. *Confidante*. The primary survey lines were run at 1000 m and orientated 000°/180° (Gardline 2011). Further details on the equipment used is in Table 2.

**Table 2** Summary of survey equipment

Survey Company	Survey Vessel	Data Type	Equipment	Data Format
Gardline	<i>M.V. Ivero</i> (2017 survey)	MBES	Simrad EM2040D	.xyz
		SSS	Edgetech 4200 (120 / 410 kHz, 75m range)	.xtf
		Positioning	Oceaneering CNav DGNSS	N/A
	<i>M.V. Confidante</i> (2010 survey)	SBP	Sub-tow boomer with 8-element and 20-element Benthos AQ-1 hydrophone streamers	.sgy
		Mag.	Geometrics G882	.xls
		Positioning	Fugero Starfix DGPS	N/A

## 2.3 Geophysical data – processing

- 2.3.1 A number of datasets were assessed over the study area, each dataset was processed separately using the following software (Table 3).

**Table 3** Software used for geophysical assessment

Dataset	Processing Software	Interpretation and rationalisation
SBP	CodaOctopus Survey Engine v5.5	ArcMap v10.5
MBES	QPS Fledermaus v7.7.5	
SSS	CodaOctopus Survey Engine v5.5	
Mag.	MagPick v3.25	

- 2.3.2 The SBP and MBES data were used as the primary datasets for the palaeographic assessment and SSS, MBES and magnetometer datasets were used for the seabed features assessment.
- 2.3.3 The SBP data were processed using CodaOctopus Survey Engine Seismic+ software. This software allows the data to be visualised with user selected filters and gain settings in order to optimise the appearance of the data for interpretation. The software then allows an interpretation to be applied to the data by identifying and selecting sedimentary boundaries and shallow geological features that might be of archaeological interest.

- 2.3.4 The SBP data were interpreted with a two-way travel time (TWTT) along the z-axis. In order to convert from TWTT to depth, the velocity of the seismic waves was estimated to be 1,600 ms<sup>-1</sup>. This is a standard estimate for shallow, unconsolidated sediments.
- 2.3.5 The SBP data can also be used to identify small reflectors, which may indicate buried material such as a wreck site covered by sediment. The position and dimensions of any such objects are noted in a gazetteer, and an image acquired of each anomaly for future reference. It should be noted that anomalies of this type are rare, as the sensors must pass directly over such an object in order to detect an anomaly.
- 2.3.6 The MBES data were analysed to identify any unusual seabed structures that could be shipwrecks or other anthropogenic debris. The data were gridded at 0.5 m and analysed using QPS Fledermaus software, which enables a 3-D visualisation of the acquired data and geo-picking of seabed anomalies. The MBES data were also used in the palaeogeographic assessment.
- 2.3.7 The high frequency .xtf SSS data files were processed using CodaOctopus Survey Engine Sidescan+ software. This allowed the data to be replayed with various gain settings in order to optimise the quality of the images. The data were interpreted for any objects of possible anthropogenic origin. This involves creating a database of anomalies within Coda by tagging individual features of possible archaeological potential, recording their positions and dimensions, and acquiring an image of each anomaly for future reference.
- 2.3.8 A mosaic of the SSS is produced during this process to assess the quality of the sonar towfish positioning. This process allows the position of anomalies to be checked between different survey lines and for the positioning to be further refined if necessary.
- 2.3.9 The form, size and/or extent of an anomaly is a guide to its potential to be an anthropogenic feature and therefore of archaeological interest. A single small but prominent anomaly may be part of a much more extensive feature that is largely buried. Similarly, a scatter of minor anomalies may define the edges of a buried but intact feature, or it may be all that remains as a result of past impacts from, for example, dredging or fishing.
- 2.3.10 The magnetometer data were processed using Geometrics MagPick software in order to identify any discreet magnetic contacts which could represent buried metallic debris or structures such as wrecks.
- 2.3.11 The software enables both the visualisation of individual lines of data and gridding of data to produce a magnetic anomaly map. The data were first smoothed to try and eliminate any spiking. A trend was then fitted to the resulting data, and the trend values subtracted from the smoothed values. This was carried out in an attempt to remove natural variations in the data (such as diurnal variation in magnetic field strength and changes in geology). The processed data were then gridded to produce a map of magnetic anomalies, and individual anomalies tagged based on the grid and individual profile lines. Images are taken in a similar process to that of the SSS data.
- 2.3.12 Magnetic anomalies have been classified as small magnetic anomalies 5 nT to 49 nT; medium sized magnetic anomalies of 50 nT to 99 nT and large magnetic anomalies of greater than 100 nT.
- 2.4 Geophysical data – data quality**
- 2.4.1 Once processed, the geophysical data sets were individually assessed for quality and their suitability for archaeological purposes and rated using the following criteria (Table 4).

**Table 4** Criteria for assigning data quality rating

Data quality	Description
Good	Data which are clear and unaffected or only slightly affected by weather conditions, sea state, background noise or data artefacts. Seabed datasets are suitable for the interpretation of upstanding and partially buried wrecks, debris fields, and small individual anomalies. The structure of wrecks is clear, allowing assessments on wreck condition to be made. Subtle reflectors are clear within SBP data. These data provide the highest probability that anomalies of archaeological potential will be identified.
Average	Data which are moderately affected by weather conditions, sea state and noise. Seabed datasets are suitable for the identification of upstanding and partially buried wrecks, the larger elements of debris fields and dispersed sites, and larger individual anomalies. Dispersed and/or partially buried wrecks may be difficult to identify. Interpretation of continuous reflectors in SBP data is problematic. These data are not considered to be detrimentally affected to a significant degree.
Below Average	Data which are affected by weather conditions, sea state and noise to a significant degree. Seabed datasets are suitable for the identification of relatively intact, upstanding wrecks and large individual anomalies. Dispersed and/or partially buried wrecks, or small isolated anomalies may not be clearly resolved. Small palaeogeographic features, or internal structure may not be resolved in SBP data.
Variable	This category contains datasets where the individual lines range in quality. Confidence of interpretation is subsequently likely to vary within the study area.

- 2.4.2 The quality of the SBP data has been rated as ‘Good’ using the above criteria. Some lines have been affected slightly by the weather, however they are still considered suitable for archaeological assessment. It should be noted however that, due to the 1000 m line spacing, it is not always possible to trace features over larger distances. It is possible that smaller features, such as cut and fill features, may be present in the areas between the surveyed corridors.
- 2.4.3 The MBES data were rated as ‘Good’ using the above criteria. The data quality and resolution of 0.5 m was found to be of a good standard and suitable for archaeological assessment of objects and debris over 0.5 m in size.
- 2.4.4 The SSS data have been rated as ‘Variable’ using the above criteria table. Some lines were affected by sea state, with strong currents affecting the positional accuracy of the lines. However, in general, the data are considered as suitable for archaeological assessment.
- 2.4.5 The magnetometer data have been rated as ‘Good’ using the above criteria table. Occasionally spiking was identified on some lines, however the data are considered suitable for archaeological assessment. It should be noted that, due to the 1000 m line spacing, some areas of the EA2 site have not been covered by magnetometer data and, as such, it is possible that there are ferrous features that have not been identified during this phase of assessment.

## 2.5 Geophysical data – anomaly grouping and discrimination

- 2.5.1 The previous section describes the initial interpretation of all available geophysical datasets which were conducted independently of one another. This inevitably leads to the possibility of any one object being the cause of numerous anomalies in different datasets and apparently overstating the number of archaeological features in the exploration area.
- 2.5.2 To address this fact the anomalies were grouped together; allowing one ID number to be assigned to a single object for which there may be, for example, a UKHO record and multiple SSS anomalies.

- 2.5.3 Once all the geophysical anomalies and desk-based information have been grouped, a discrimination flag is added to the record in order to discriminate against those which are not thought to be of an archaeological concern. For anomalies located on the seabed, these flags are ascribed as follows (Table 5).

**Table 5** Criteria discriminating relevance of identified features to proposed scheme

Feature type	Overview classification	Discrimination	Criteria	Data type
Palaeogeographic	Archaeological	P1	Feature of probable archaeological interest, either because of its palaeogeography or likelihood for producing palaeoenvironmental material	SBP, MBES
	Archaeological	P2	Feature of possible archaeological interest	SBP, MBES
Seabed Features	Archaeological	A1	Anthropogenic origin of archaeological interest	MBES, SSS, Mag.
	Archaeological	A2	Uncertain origin of possible archaeological interest	MBES, SSS, Mag.
	Archaeological	A3	Historic record of possible archaeological interest with no corresponding geophysical anomaly	MBES, SSS, Mag.

- 2.5.4 The grouping and discrimination of information at this stage is based on all available information and is not definitive. It allows for all features of potential archaeological interest to be highlighted, while retaining all the information produced during the course of the geophysical interpretation and desk-based assessment for further evaluation should more information become available.

### 3 PALAEOGEOGRAPHIC ASSESSMENT

#### 3.1 Geological baseline and archaeological potential

- 3.1.1 The following is an overview of the geological and archaeological history of the wider region from the Pleistocene to the Holocene marine transgression. This is based on a range of secondary sources, including academic papers, geological information (e.g. BGS mapping), and previous work undertaken by Wessex Archaeology from the East Anglia area and the wider region. This serves as a baseline for the palaeogeographic assessment, and aids in producing a stratigraphy for the study area, assigning archaeological potential to identified units. The background geology and archaeological potential have previously been reported on in earlier phases of assessment (Wessex Archaeology 2011b; Wessex Archaeology 2012; Wessex Archaeology 2014); however, it has been updated here to include the latest information and findings.
- 3.1.2 The EA2 site is situated within the southern North Sea Basin. The environment within the study area is currently fully marine, and a shallow marine basin has existed in the approximate location of the North Sea since the Early Tertiary (although the exact location and extent has altered over time), which is reflected in the geology of the region (Cameron *et al.* 1992).

- 3.1.3 The recent geological history of the southern North Sea is directly linked to glacial/interglacial cycles experienced by the area during the Pleistocene (2.5 million – 10 ka), which resulted in large areas of the southern North Sea being periodically exposed as a terrestrial environment. This is represented in the geological record, with distinct terrestrial landscape features being present, interspersed with deposits of marine and glacially derived sediments. Due to this fluctuating glacial cycle, the corresponding rises and falls in eustatic sea level, and major reconfigurations of the landscape during the last million years, the archaeological record is phased between periods of occupation and long periods of hiatus when environmental conditions or high sea levels restricted access to Britain (Fig. 2). These changes in relative sea level are recorded as Marine Isotope Stages (MIS).
- 3.1.4 The background geology of the study area is dominated by Tertiary deposits (Red Crag Formation), overlain by a series of Pleistocene deposits, ranging in age from the Lower Pleistocene (Westkapelle Ground Formation) to the Late Ipswichian / Early Devensian (Brown Bank Formation). These were deposited in a range of environments, from terrestrial to marine, and it is the terrestrial sediments, deposited during periods of low relative sea level, that are of the highest archaeological potential.
- 3.1.5 The southern North Sea off the east coast of East Anglia is known to contain relatively well preserved palaeolandscape features such as fluvial channels, created during periods of sea level lowstand but while the landscape was still free of ice. The remains of this terrestrial landscape are frequently recovered by dredging and fishing in numerous areas around the southern North Sea, generally in the form of the remains of extinct megafauna (e.g. mammoths, bison, horse etc.).
- 3.1.6 The discovery of actual human artefacts, such as hand axes and worked bone, is a rarer occurrence, but artefacts have been recovered. Reported finds from offshore activity have, to date, produced a range of early prehistoric lithic artefacts indicating early prehistoric activity in submerged palaeolandscapes from Lower, Middle, and Upper Palaeolithic periods (Tizzard *et al.* 2014; 2015; Wessex Archaeology 2011; 2013b), with notable collections of more recent Mesolithic artefacts from submerged palaeolandscape contexts (Momber *et al.* 2011; Wessex Archaeology 2013b).

*Pre-Anglian (>478 ka; >MIS 12)*

- 3.1.7 Prior to the Anglian glaciation, an extensive estuarine/deltaic landscape existed at the location of the current North Sea basin. This landscape, the Ur-Frisia delta (Cameron *et al.* 1992), drained many major European rivers, including the Bytham/Ingham palaeo-river (Rose 2009; Westaway 2009), the palaeo-Thames-Medway system, which drained northwards through Essex and East Anglia (Bridgland 1994), as well as the Rhine (Hijma *et al.* 2012).
- 3.1.8 At this time a chalk ridge along the axis of the Weald-Artois high, between southeast England and northern France, separated the North Sea and the English Channel into two distinct basins. Any river systems northeast of the ridge flowed northwards across the North Sea basin to the Ur-Frisia delta, whilst those southwest of the ridge flowed along the English Channel towards the Atlantic.
- 3.1.9 The pre-Anglian period represents a significant amount of the Lower Palaeolithic (c. 970,000 to 300,000 BP, >MIS 9). The earliest direct evidence for hominin activity in the UK has been identified at the Lower Palaeolithic sites of Happisburgh, on the Norfolk coast, and Pakefield, on the Suffolk coast, which date from c. 900,000 and 700,000 BP respectively (Parfitt *et al.* 2005; 2010). These sites would have been situated on the edge of an extensive landscape of low-lying estuaries, major river systems, plains and rolling hills.



It was a rich, diverse and productive landscape like any contemporary example, and should not be considered as a temporary land-bridge or intermittent linkage to continental Europe (Coles 1998).

3.1.10 Whilst the archaeology at Pakefield was created during a more Mediterranean climate, around MIS 17 (Fig. 2), the remains at Happisburgh Site 3 are indicative of colder-than-present conditions at the edge the boreal zone (Candy *et al.* 2011), indicating that earlier hominins were capable of surviving in conditions previously thought to be too harsh for habitation (Parfitt *et al.* 2010).

3.1.11 The importance of these sites is international, as they are currently unique at this latitude for this early date (Wessex Archaeology 2013b). Cohen *et al.* (2012) have highlighted the North Sea basin as a key region for understanding Pleistocene hominins within a northerly, coastal environment. The east of England, particularly East Anglia, but also the southeast of England, are important regions for Lower Palaeolithic archaeology in the last 500,000 years during MIS 13 and 11 (Hoxnian interglacial, Fig. 2) (Wymer 1999; Pettitt and White 2012).

*Anglian to Ipswichian (c. 478 ka – 115 ka; MIS 12 – 5e)*

3.1.12 The Anglian glacial period was the most extensive glaciation of the Pleistocene and saw ice sheets extending further south than at any time in the past 2.5 million years (Fig. 3). The exact southern extent of the Anglian glaciation is currently debated, although a series of enclosed bathymetric deeps identified within multibeam echo sounder data, most notably two large features located between the Shipwash and Inner Gabbard sand banks offshore Felixstowe, Suffolk, have been interpreted as being glacial in origin. This suggests at least a lobe of ice may have extended further south than the established main ice sheet limit (Emu 2009).

3.1.13 The advancing ice sheets gradually pushed the courses of major rivers, including the Thames-Medway system, further south, until they eventually reached their approximate current positions. During this period the study area will have been covered by ice, and the climate around the remaining ice-free areas of the UK would have been too cold for hominin habitation.

3.1.14 During deglaciation and retreat of the ice sheet at the end of the Anglian, it is thought that the emptying of an ice-dammed lake within the North Sea created a volume of water large enough to breach the chalk ridge along the Weald-Artois high. This connected the North Sea to the English Channel, incising the Lobourg Channel off the Kent coast and some of the English Channel palaeovalleys in the process (Gupta *et al.* 2017; Hamblin *et al.* 1992). This initial catastrophic breaching of the Weald-Artois ridge is thought to have been followed by further erosive events leading to the permanent breaching of the English Channel approximately 150 kya (Hijma *et al.* 2012). However, the precise timing and mechanism of breaching is still under debate.

3.1.15 The breaching of Weald-Artois ridge had a major impact on the palaeogeography of Britain, turning Britain from an island at times of high sea level, to a peninsula of Europe when sea levels dropped. In periods associated with lower sea levels since the Anglian, the Lobourg Channel is likely to have formed the main drainage route of the major northern European rivers flowing into the dry North Sea Basin (Cameron *et al.* 1992). During periods of lowered sea levels, these river systems, including the Thames, Medway, Great Ouse, and palaeo-Yare, extended across these now submerged landscapes, resulting in cyclical deposition of associated terrace and flood plain deposits laid down in relation to relative sea level (Wessex Archaeology 2010).

- 3.1.16 As the area off East Anglia, including the study area, has only experienced at the most one glacial advance during the Pleistocene, these palaeolandscape features from periods of low relative sea level are more likely to be preserved here rather than further north (approximately north of the north Norfolk coast), where they have been removed during the subsequent Saalian and Devensian glacial advances. Any surviving Pleistocene deposits are likely to have been reworked or redeposited to a certain extent during subsequent marine transgressions (Hamblin *et al.* 1992), but some are likely to survive on the seabed.
- 3.1.17 During the interglacial periods between the Anglian and Devensian glaciations (Hoxnian and Ipswichian), warmer climate conditions meant the UK was again available to be recolonised by hominin communities. The foreshore, cliffs and hinterland at Clacton-on Sea (Essex) comprise an important Middle Pleistocene site and is a designated geological Site of Special Scientific Interest (SSSI). Channel sediments from the area are also an important site for the Lower Palaeolithic Clactonian flint industry, and have yielded a rare wooden spear alongside lithic artefacts. The site dates from the Hoxnian interglacial period (MIS 11, c. 423,000 - 380,000 BP, Fig. 2) (Sumbler 1996; Bridgland *et al.* 1999), and the type site for the Hoxnian (the Hoxne Brick Pit) is located a relatively short distance inland outside of Diss, Suffolk.
- 3.1.18 Artefactual evidence from Clacton suggests two phases of lithic technology; earlier Clactonian pebble tools in the earlier warming phase of MIS 11 (Fig. 2), and Acheulean-type tools in the later cooling phase of the Hoxnian, suggesting that at the same site two different groups of hominins were producing tools (Pettitt and White 2012).
- 3.1.19 During the Saalian glaciation (MIS 10, Fig. 2) there was a hiatus in hominin activity in Britain (Pettitt and White 2012). When hominins returned, *H. neanderthalensis*, they brought a new lithic technology: the Levallois prepared core technique developing from MIS 9, c. 300,000 BP (Scott and Ashton 2011). They were hunters adapted to a 'mammoth steppe' environment (Ashton and Lewis 2002).
- 3.1.20 The international importance of Early Middle Palaeolithic archaeology in the southern North Sea is highlighted by the numerous sites preserved within the Thames river terraces (White *et al.* 2006; Scott *et al.* 2011) and, in particular, by the submerged prehistoric Levallois lithic assemblage from marine aggregates licence Area 240 in the palaeo-Yare catchment. Over 120 artefacts have now been recovered from this locale, some of which are identifiable as Levallois, with many recovered from *in situ* or near *in situ* contexts (Tizzard *et al.* 2014; 2015; Wessex Archaeology 2013b; 2013c).
- 3.1.21 The substantial, mixed assemblage of handaxes also recovered from Area 240 may be of older Lower Palaeolithic origin (e.g. >MIS 9, Fig. 2), or may date to the Later Middle Palaeolithic when technologically similar artefacts were made (c. MIS 3, Fig. 2) (Boismier *et al.* 2012). However, based on palaeoenvironmental and sedimentological evidence an Early Middle Palaeolithic date is most likely (Tizzard *et al.* 2015).
- 3.1.22 Palaeogeographically, Area 240 is one of the most northerly Neanderthal sites in northwest Europe and of primary archaeological importance for defining Middle Palaeolithic potential and the contemporary palaeogeography across the southern North Sea basin (Tizzard *et al.* 2014). The site highlights the archaeological potential of preserved Pleistocene fluvial deposits within the southern North Sea.



*Devensian to Late Glacial Maximum (c. 115 ka – 18 ka; MIS 5d – 2)*

- 3.1.23 Deterioration of the climate during the Late Pleistocene resulted in the most recent glaciation of the North Sea during the Devensian period. Currently there is no definitive evidence of a hominin presence in Britain during MIS 5 (Lewis *et al.* 2011).
- 3.1.24 Within the context of early prehistory and submerged palaeogeography, however, substantial areas of the southern North Sea basin would have been dry land during the warming and cooling limbs of the various sub-stages (MIS 5a to 5e, Fig. 2). Recent analysis has suggested that eight relatively brief phases of human activity within the UK are represented by the existing Upper Palaeolithic archaeological record (Jacobi and Higham 2011), with six occurring before the Devensian glacial maximum. Therefore, the potential exists for human activity to have occurred in Doggerland, the area of exposed terrestrial environment within the southern North Sea basin, during and after the Devensian glaciation.
- 3.1.25 Again, East Anglia provides early evidence for Neanderthal recolonisation of Britain after the hiatus between MIS 6 to 4, around 60,000 BP (Fig. 2). The Lynford Quarry material highlights a new lithic technology visually similar to Lower Palaeolithic Acheulean lithics, so-called Mousterian of Acheulean Tradition handaxes and tools (Boismier *et al.* 2012).
- 3.1.26 Climatically, MIS 3 was significantly colder than now but did not attain the glacial conditions of later or earlier glacial periods (e.g. MIS 6 or 2, Fig. 2) (Pettitt and White 2012). For the Neanderthals that may have occupied the region at this time, surviving in Doggerland during this period may have been subject to a variety of technological and cultural adaptations (White 2006).

*Post-Late Glacial Maximum and early Holocene (18,000 – 6000 BP; MIS 2 – 1)*

- 3.1.27 Following the Devensian glacial maximum, ice sheet retreat once again left significant areas of the southern North Sea exposed as a terrestrial environment, with deposition of fluvially derived sediments continuing from the Late Pleistocene into the Early Holocene.
- 3.1.28 In the Early Upper Palaeolithic, at the end of the Late Pleistocene, there was a transition period for hominins. Neanderthals died out around 40,000 BP, and modern humans then colonised Doggerland, arriving in Britain around 34,000 BP (Jacobi and Higham 2011; Bicket and Tizzard 2015). Archaeological evidence for this period is relatively sparse, but submerged palaeolandscapes provide key contextual evidence for recovered artefacts and provides a background landscape within which to place these human communities.
- 3.1.29 During the LGM, the environment within the southern North Sea was relatively poor for human colonisation, and was situated at the north-western extents of possible habitation. However, there was increasing human exploitation after 15,000 BP. Humans at this time were hunting game, such as mammoth and deer, and evidence of these animals has been reported through marine aggregate dredging, and the associated reporting requirements (Bicket and Tizzard 2015).
- 3.1.30 The onshore archaeological record of Upper Palaeolithic activity is relatively sparse, and offshore locations may provide unique and important context for coastal and lowland human activity during this period (Wessex Archaeology 2013c). For example, a Maglemosian harpoon artefact from trawled peat in the early 20th century was subsequently radiocarbon dated to around 12,000 years ago (Housely 1991), and archaeological and palaeoenvironmental material has been reported from North Sea contexts for over a century (Reid 1913; Godwin and Godwin 1933).

- 3.1.31 The Mesolithic period began in the early Holocene. Around 10,000 BP, sea levels were still more than 60 m below current levels, and during this period, an extremely large area of the southern North Sea and English Channel was dry land, suitable for human occupation. Evidence of this environment has been identified from the foreshore at Jaywick, Essex, where layers of peat dating from the Early Holocene are present along with a preserved land surface from which Mesolithic artefacts have been recovered (Wilkinson and Murphy 1995).
- 3.1.32 Considerable attention has been paid to Mesolithic Doggerland in the last decade (Gaffney *et al.* 2007; Tappin *et al.* 2011) and the geoarchaeology (Boomer *et al.* 2007), submerged forests (Hazell 2008), and palaeo-river systems around the current North Sea coast (Wessex Archaeology 2013b; Limpenny *et al.* 2011; EMU 2009). Increasingly, a maritime perspective has developed for understanding the early prehistoric archaeological record, where coasts, estuaries and wetlands are key landscape elements (Ransley *et al.* 2013).
- 3.1.33 It is clear from numerous research and development-led investigations that postglacial marine transgression has not destroyed Pleistocene and Holocene palaeogeography by default (Wessex Archaeology 2013c). Areas of preserved palaeogeographic features do remain, and detailed reconstructions of palaeoenvironments and palaeogeography can be achieved for large parts of the North Sea basin (Tappin *et al.*, 2011; Limpenny, 2011; Dix and Sturt, 2011). By the early Holocene, Mesolithic hunter-fisher-gatherers in Doggerland were active in a familiar ecosystem of mixed deciduous woodland with oak, elm, alder and lime populated by deer and a wide variety of other mammals (Tappin *et al.* 2011).
- 3.1.34 However, between 7,000 and 5,000 BP, much of the land was inundated by eustatically driven sea level change (Bicket and Tizzard 2015), and by 6,000 BP sea level was only approximately 7 m below the present level (Cameron *et al.* 1992). Around this time, Britain became an island again (Coles 1998). Settlements at the time were often transitory and seasonal, and therefore leave little trace in the archaeological record, however, new types of stone tools were introduced during this period. It is possible that the now submerged environment of which the study area was a part was occupied up until the final marine transgression between 7,000 and 5,000 BP.
- 3.1.35 The marine transgression resulted in the deposition of sands, gravels and muds, which represent the modern marine sediment but can also incorporate reworked sediment from the underlying Pleistocene deposits. Holocene seabed features of note within the wider area are the sand banks known as the Great Yarmouth Banks, located off the Norfolk coast to the north of the study area. These are a system of ridges of reworked outwash sediments from the last glaciation, formed and maintained by tidal meander channels. These mostly overlie the pre-glacial Pleistocene sediments.

Post the Holocene marine transgression, the archaeological potential of the southern North Sea, including the study area, shifts to the maritime history of the UK which is presented in Appendix 2 and summarised in Section 4.

## 3.2 Palaeogeographic assessment results

- 3.2.1 A number of palaeogeographic features of archaeological potential have been identified within the study area. These features are discussed below, individually described in gazetteer format in Appendix 1, and their distribution is illustrated in Fig. 3.
- 3.2.2 The identified geology within the study area has been divided into 8 phases, as described below:

**Table 6** Shallow stratigraphy of the study area

Unit	Unit Name	Geophysical Characteristics <sup>(1)</sup>	Sediment Type <sup>(2)</sup>	Archaeological Potential
8	Holocene Seabed Sediments (post-transgression) (Marine Isotope Stage (MIS) 1)	Generally observed as a veneer or thickening into large sand wave and bank features. Boundary between surficial sediments and underlying units not always discernible.	Gravelly sand with shell fragments, sand waves and ripples indicate sediment is mobile.	Considered of low potential in itself, but possibly contains re-worked artefacts and can cover wreck sites and other cultural heritage.
7	Holocene Sediments (Pre-transgression) (MIS 2 to 1)	Small shallow infilled channels with either seismically transparent fill, or fill characterised by sub-parallel internal reflectors. Can contain high amplitude reflectors or areas of acoustic blanking which may indicate organic matter such as peat	Fluvial, estuarine and terrestrial.	Potential to contain <i>in situ</i> and derived archaeological material, and palaeoenvironmental material.
6	Brown Bank Formation (Late Ipswichian to Lower Devensian) (MIS 5d to 3)	Observed largely as a deposit infilling hollows or channels; however on occasion seen as broad blanket deposit. Fill is generally either acoustically transparent or characterised by sub-horizontal layered reflectors.	Clayey silty sand deposited in an intertidal / lagoon environment.	<i>In situ</i> Lower Palaeolithic artefacts may be protected. Middle Palaeolithic <i>in situ</i> and derived artefacts may be associated dependent on the age of the fill. Palaeoenvironmental information. Basal contact may cover old land surfaces.
5	Lower Brown Bank (Lower Devensian) (MIS 5e to 5d)	Observed at the base of the BNB formation. Characterised by low relief basal and either an acoustically transparent or well-layered fill.	Silty sand and sandy silt, possible fluvial, intertidal or shallow marine deposits.	<i>In situ</i> Lower Palaeolithic artefacts may be protected. Middle Palaeolithic <i>in situ</i> and derived artefacts may be associated particularly with channel edges dependent on the age of the fill. Palaeoenvironmental information.

Unit	Unit Name	Geophysical Characteristics <sup>(1)</sup>	Sediment Type <sup>(2)</sup>	Archaeological Potential
4	Yarmouth Roads Formation (Lower to Middle Pleistocene) (MIS 62 to 13)	Thick unit characterised by layered sub-parallel internal reflectors. Top of unit generally a well-defined regional erosion surface.	Silty sand with occasional layers of clay. Generally becoming silty, lagoonal clay with depth. Sediments deposited as part of delta complex.	Possibility of <i>in situ</i> finds in later part of formation if not eroded. Contemporaneous with terrestrial Cromer Forest Bed Formation (Pakefield and Happisburgh). Has been found to contain plant debris, wood and peat in some areas of possible palaeoenvironmental importance. Potential greatest where associated with river valleys.
3	Smith's Knoll Formation (Lower Pleistocene) (MIS 65 to 63)	Acoustically unstructured unit with some faint subparallel reflectors.	Fine grained, glauconitic marine sand with some silty clay.	Pre-Earliest occupation of the UK
2	Westkapelle Ground Formation (Lower Pleistocene) (MIS 103 to 63)	Acoustically unstructured unit with a generally faint basal reflector.	Deltaic silty clays and sands.	Pre-Earliest occupation of the UK
1	Red Crag Formation (Late Pliocene)	Acoustically unstructured unit with some parallel internal reflectors.	Glauconitic marine sands	Pre-Earliest occupation of the UK
<sup>(1)</sup> Based on geophysical data				
<sup>(2)</sup> Based on borehole data and Cameron <i>et al.</i> , (1992)				

- 3.2.3 The above stratigraphy is a combination of the all the interpreted shallow geological units from across the three study areas (East Anglia ONE North, East Anglia TWO and the East Anglia ONE North and East Anglia TWO Offshore Windfarm Export Cable Route). The entire stratigraphy was not identified in any one single study area; as such, the exact number of units present will differ depending on the area.
- 3.2.4 The lower (oldest) identified unit (Unit 1) is expected to be present, either directly below the seabed (BSB) or beneath a unit of modern marine sediments, throughout much of the EA2 site. This unit is thought to comprise glauconitic marine sands. Towards the north of the site, a blanket deposit of Westkapelle Ground formation (Unit 2) is present, overlaying Unit 1. Both these units pre-date the earliest occupation of the UK and, as such, is unlikely that they contain any archaeological artefacts or palaeoenvironmental material archaeological interest.
- 3.2.5 In the centre of the EA2 site, a unit of interpreted Brown Bank (BNB) Formation (Unit 6) is interpreted, infilling a large depression in the top of Unit 1 (**780002**). The feature is seen to

have a distinct, occasionally undulating base and numerous subparallel internal reflectors indicating well-layered fill. The unit appears to have different phases of fill, indicating multiple phases of deposition.

- 3.2.6 Within **780002**, two areas (**780003** and **780004**) of poorly developed possible dune features have been identified, situated just above the base of Unit 3 (Fig. 4). The features are seen to have relatively acoustically chaotic fill, with some dipping internal reflectors. The features are interpreted as being possibly terrestrial in origin, however there is the possibility of them being subaqueous in formation. If terrestrial, it suggests they formed during a significant period of aerial exposure and may protect a buried land surface. As such, these features are classified as of high archaeological potential.
- 3.2.7 The BNB Formation is generally interpreted as a lagoon deposit (Cameron *et al.* 1992). However, the number of internal reflectors suggests it may have a much more complex history, including changes of sediment input and potential periods of drying out/exposure. If this is the case, these surfaces could be of high archaeological potential as they would represent buried land surfaces. The archaeological potential of the BNB Formation is variable depending on its depositional environment. Due to the complexity and internal features seen within the BNB formation in this area, the archaeological potential is interpreted to be relatively high, with the possibility of derived artefacts, and some *in situ* Lower and middle Palaeolithic artefacts.
- 3.2.8 Three channel features were identified stratigraphically situated directly above, and cutting into, the top of either Unit 1 (**75585**) or Unit 2 (**75588** and **75589**), all orientated NNW – SSE. These are likely to have been formed during the periods of low sea level, when the area would have been exposed as a terrestrial landscape. The unit fill of features **75585** and **75589** is generally acoustically quiet, which may indicate that the sediments are fine-grained and/or deposited in a low energy environment.
- 3.2.9 Of these features, only one (**75589**) was identified during both this phase and the previous phase (Wessex Archaeology 2014) of data interpretation. This is likely due to differences in survey line spacing and orientation. The age of these features is uncertain; however, it is likely that they are either Devensian (Unit 6) or possibly Post-Devensian (Unit 7) in age.
- 3.2.10 These features represent former terrestrial landscapes and, as such, the sediments associated with these features are deemed to be of high archaeological potential. This is due to the fact they could contain *in situ* or derived anthropogenic artefacts and preserved palaeoenvironmental material.
- 3.2.11 Features **780000**, **780001**, **780005-7**, **75584** and **75586** are thought to likely be of a similar age as the channels described above however, as they could not be traced any distance as coherent palaeochannels, they are interpreted as simple cut and fill features. It is possible that they are the remnants of eroded palaeochannel systems but, as their nature is less certain, they are considered of lower archaeological potential. Feature **780008** is similar to the aforementioned cut and fill features however, as it appears to have more than one phase of fill, it has been classified as a complex cut and fill feature.
- 3.2.12 One feature (**75401**) has been interpreted as an erosion surface. During the latest phase of assessment, the feature was identified as a well-layered unit with a distinct basal reflector, cut into the top of Unit 1. This corresponded with an erosion surface interpreted during the 2014 assessment (Wessex Archaeology 2014). Although the shapes of the features appear to differ slightly between the two assessments, this is likely due to differences in line spacing

and line orientation and, as such the two features have been grouped together. The age of the feature is unknown however it is possibly Devensian (Unit 6).

- 3.2.13 Unit 8 is a modern marine sediment deposited since the Holocene marine transgression. The unit is described by BGS as gravelly sands (BGS 1984) and is likely present as a thin veneer across much of the site, although this is not always clearly visible on the SBP data. In areas across the site, Unit 8 thickens into large sand waves.
- 3.2.14 Due to its age and depositional environment, Unit 5 is not considered of archaeological potential in itself. However, in areas of mobile sediment, Unit 8 has the potential to periodically bury seabed archaeological sites such as shipwrecks and associated debris.

## 4 SEABED FEATURES ASSESSMENT

### 4.1 Introduction

- 4.1.1 The geophysical data were assessed to identify features of archaeological potential relating to maritime and aviation activity.
- 4.1.2 Seabed features identified during previous phases of interpretation (Wessex Archaeology 2011b; 2012; 2014) have been re-assessed and updated if seen in the latest dataset. Features that were in previous assessments, but not during this phase of interpretation, have been retained as a precaution, as it is possible that they may have been buried by mobile sediments since the previous data were acquired.

### 4.2 Seabed features assessment results

- 4.2.1 The results of this assessment are collated in gazetteer format detailed in Appendix 2 and illustrated in Fig. 5a-d.
- 4.2.2 A total of 343 features have been identified as being of possible archaeological potential within the study area and are discriminated as shown in Table 7.

**Table 7** Anomalies of archaeological potential within the study area

Archaeological discrimination	Quantity	Interpretation
A1	11	Anthropogenic origin of archaeological interest
A2	331	Uncertain origin of possible archaeological interest
A3	1	Historic record of possible archaeological interest with no corresponding geophysical anomaly
<b>Total</b>	<b>343</b>	

- 4.2.3 Furthermore, these anomalies can be classified by probable type, which can further aid in assigning archaeological potential and importance (Table 8).



**Table 8** Types of anomaly identified

Anomaly classification	Definition	Number of anomalies
Wreck	Areas of coherent structure including wrecks of ships, submarines and some aircraft (where coherent structure survives)	6
Debris field	A discrete area containing numerous individual debris items that are potentially anthropogenic, and can include dispersed wreck sites for which no coherent structure remains	9
Debris	Distinct objects on the seabed, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin	67
Seabed disturbance	An area of disturbance without individual, distinct objects. Potentially indicates wreck debris or other anthropogenic features buried just below the seabed.	30
Rope/chain	Curvilinear dark reflectors, often with a small amount of height, indicating rope or chain (if ferrous)	7
Bright reflector	Individual objects or areas of low reflectivity, characteristic of materials that absorb acoustic energy, such as waterlogged wood or synthetic materials. Precise nature is uncertain	12
Dark reflector	Individual objects or areas of high reflectivity, displaying some anthropogenic characteristics. Precise nature is uncertain	100
Mound	A mounded feature with height not considered to be natural. Mounds may form over wreck sites or other debris.	5
Magnetic	No associated seabed surface expression, and have the potential to represent possible buried ferrous debris or buried wreck sites	106
Recorded Wreck	Position of a recorded wreck at which previous surveys have identified definite seabed anomalies, but for which no associated feature has been identified within the current data set.	1
<b>Total</b>		<b>343</b>

- 4.2.4 Within the EA2 site, a total of 11 anomalies have been assigned an A1 archaeological discrimination, which are defined as features of anthropogenic origin of archaeological interest. Of these 11 anomalies, six have been classified as wrecks (**70684**, **700106**, **70707**, **70717**, **76951** and **700104**) and five as associated wreck debris (**700065-6** and **700107-9**).
- 4.2.5 Feature **70684** is a large but poorly defined wreck measuring 69.3 x 17.2 x 10.6 m (Wreck Sheet 1), thought to correspond with the UKHO record for an unknown ship (ID 10942). The wreck is seen on the MBES data as being orientated north-west to south-east, within an area of sand waves. Several mounds are identified along its south-western edge, possibly indicating associated debris or partial disintegration. On the SSS data, it is identified as a large wreck with a broad distinct shadow. The wreck has associated scour extending towards the north and the south.
- 4.2.6 The wreck is charted and included in the UKHO database (ID 10942) as an unidentified wreck originally detected in 1961 and last seen in 1995. The wreck is reported as having sonar dimensions of height 7.2 m x length 60 m x width 10 m. The UKHO record also stated that the wreckage is in two parts, therefore it is thought that nearby feature **700106** is a secondary section of wreck **70684**.



- 4.2.7 Wreck **700106** is identified approximately 91 m of wreck **70684** (Wreck Sheet 1) and is thought to be a separate section of wreck, or associated wreck debris. On the sonar data the feature is identified as a large area of debris, measuring 24.6 x 13.2 x 7.2 m, with a broad, distinct shadow. There is one long, distinct shadow, indicating a particularly tall structure. In the MBES, the wreckage is visible as an irregularly shaped mound, orientated NNE – SSW, with scour extending to the south-west.
- 4.2.8 Features **700107**, **700108** and **700109** are interpreted as being items of debris associated with wreck **70684** and have been assigned an A1 archaeological discrimination. The largest of these is debris item **700109**, which is a curvilinear dark reflector, measuring 8.7 x 0.4 x 0.2 m, located approximately 19 m north-west of the wreck.
- 4.2.9 Wreck **70707** is a large, well defined wreck measuring 43.9 x 9.8 x 7.6 m (Wreck Sheet 2) with a corresponding UKHO record (ID 10941). On the sonar data, the wreck appears to be fairly intact and is seen to be upright with clear structure and superstructure. On the MBES data, two square compartments are seen in the centre of the vessel. The wreck is orientated approximately NNE - SSW and is listing slightly to the east. Some slight, associated scour can be seen around the vessel.
- 4.2.10 In the associated UKHO record, the wreck is reported as possibly being that of the Belgian trawler *Dolfijn*, which was lost on the 17th August 1970 in gales and heavy seas. The wreck is described as being intact and upright with superstructure, covering an area of 57x10m with a height of 7m and orientated 010/190 degrees. Although of low archaeological significance it has been retained in the gazetteer.
- 4.2.11 Two small items of debris (**700065** and **700066**) thought to be associated wreck **70707** are identified, situated approximately 5 m east of the wrecks northern end. As the wreck is identified in an area of sand waves, there is the potential for other debris items to be in the vicinity, buried by mobile sediments.
- 4.2.12 Feature **70717** (Wreck Sheet 3) is a small possible wreck with an associated UKHO record (ID 11189). The wreck is seen on the SSS data as a large, right angled dark reflector measuring 9.9 x 3.7 x 0.9 m, with some slight scour. On the MBES data, the wreck is seen as a small mound, orientated north to south, and lying perpendicular to a crest of a sand wave. Due to the wrecks form as seen on the SSS data, and its position amongst the sand waves, it is possible that the wreck is partially buried by mobile sediments.
- 4.2.13 The corresponding UKHO record reports a small wreck, originally detected in 1988, abreast a sand wave which was shallower than the wreck. The wreck is reported as having a length of 22m, beam 6m and orientated 012/192 degrees. The wreck is recorded as not being located during survey in 1995 and amended to foul.
- 4.2.14 Wreck **76951** is a large area of debris, measuring 20.8 x 14.2 x 2.4 m (Wreck Sheet 4) identified in an area of rippled seabed. On the SSS data, the wreck is found to comprise several linear items of debris with height. The feature has a large, distinct shadow; however, there is no clearly defined object suggesting it may be very broken up and poorly preserved. In the MBES data, the wreck is visible as a large, elongated mound, orientated east to west, identified in an area of textured seafloor. The wreck has a very large associated magnetic anomaly, measuring 1,424 nT, indicating a significant amount of ferrous material. The wreck was not recorded prior to the assessment in 2014 (Wessex Archaeology 2014).
- 4.2.15 Wreck **700104** is a distinct edged wreck, measuring 25.0 x 6.8 m, that is lying perpendicular to and cutting through the sand waves (Wreck Sheet 5). In the SSS data, the wreck appears

to be relatively intact, with slatted dark reflectors in its centre. In the MBES data, the wreck is visible as a poorly defined, irregular mound, orientated NNE – SSW within an area of sand waves. Although the wreck is not particularly distinct in the MBES data, it is seen to disrupt some of the natural seabed features. The wreck appears to have very little height, which might suggest that it is partially buried or in a poorly preserved state. The wreck has not been recorded in previous geophysical assessments by Wessex Archaeology, or by the UKHO.

- 4.2.16 A further 331 anomalies have been assigned an A2 discrimination, which is defined as features of uncertain origin, but of possible archaeological interest (see Appendix 2 for full list of anomalies).
- 4.2.17 Of these A2 anomalies, nine have been classified as debris fields (**76958**, **70065**, **70137**, **700023**, **700057**, **700073**, **700114**, **700116** and **700118**). These are defined as discrete areas containing numerous individual debris items that are potentially anthropogenic and can include dispersed wreck sites for which no coherent structure remains.
- 4.2.18 Two of these eight debris fields have an associated magnetic anomaly (**700023** and **700073**), indicating the presence of ferrous material. The largest of these is anomaly **700023** (Fig. 6), which is identified on the SSS data as a spread of small dark reflectors, with some occasional, slightly linear objects. The feature corresponds with a small magnetic anomaly measuring 22 nT. The debris field is identified in an area of sand waves which may be partially burying some of the features.
- 4.2.19 The remaining six debris fields appear to have no associated magnetic anomaly. However, due to the magnetometer line spacing, it is not possible to discern whether this is related to their distance from the magnetometer lines ran, or the material of the debris. As such, the possibility remains for some of the other debris fields to also contain ferrous material. The largest of these seemingly non-ferrous debris fields is anomaly **700114**, measuring 34.3 x 20.0 m, which is seen on the sonar data to comprise several bright and dark reflectors.
- 4.2.20 A further 62 of the A2 anomalies have been classified as items of debris, which are defined as objects visible on the seabed, generally exhibiting height or with evidence of structure, that are considered potentially anthropogenic in origin based on their form or associated magnetic anomaly.
- 4.2.21 Of these 62 anomalies, six have an associated magnetic anomaly (**70080**, **72392**, **76959**, **700003**, **700004** and **700074**). The largest of these features, identified during this phase of data assessment, is anomaly **72392** which is a large, poorly defined dark reflector measuring 10.6 x 5.5 x 1.9 m, with a linear feature extending 30.3 m towards the SSW, which is possibly part of the feature, or an associated length or rope/chain. The feature has an associated magnetic anomaly of 14 nT.
- 4.2.22 The remaining 56 debris items have no associated magnetic anomaly (for full list see Appendix 2). However, as with the debris fields, it is possible that more of the debris items have an associated magnetic anomaly, however this cannot be confirmed due to the magnetometer line spacing. The largest of these features is anomaly **700113**, which is seen as a thin, distinct curvilinear dark reflector, measuring 30.4 x 0.4 x 0.3 m (Fig. 6) the feature is an intermittent circle and possibly represents a partially buried feature, or a length of coiled rope/chain.
- 4.2.23 Twenty-four debris items were identified in previous phases of assessment (Wessex Archaeology 2011b; 2014), but not on the most recent geophysical datasets (anomalies

**70060-3, 70066, 70069-9, 70075-7, 70080, 70125, 70127-9, 70132, 70135, 70136, 70208, 76927, 76943, 76950, 76955 and 76959**). It is possible that that these features have since been buried by mobile sediment and, as such, have been retained as a precaution.

- 4.2.24 Thirty features have been classified as seabed disturbances (for full list see Appendix 2). These are defined as an area of disturbance without individual, distinct objects, which may indicate wreck debris or other anthropogenic features buried just below the seabed. The largest of these is anomaly number **70073**, which was a seabed disturbance, measuring 42.0 x 6.0 x 0.2 m, identified in the 2011 assessment of geophysical data (Wessex Archaeology 2011b).
- 4.2.25 The largest seabed disturbance identified in the most recent data set was anomaly **700079**, which was seen on the SSS data as a slightly oval shaped area of disturbed seabed lying perpendicular to, and cutting through, the sand waves. This feature was identified approximately 103 m north-east of recorded wreck **70700**.
- 4.2.26 Seven anomalies have been classified as rope/chain (**76938, 700055, 700086, 700122, 700133, 700161 and 700169**). These are defined as curvilinear dark reflectors, often with a small amount of height, indicating a rope or chain (if ferrous). The longest of these is anomaly **700122**, which is seen on the SSS data as a lone, very faint wavy dark reflector with very slight height.
- 4.2.27 None of these anomalies had an associated magnetic anomaly, possibly suggesting that they are more likely to be lengths of rope. However, due to the magnetometer line spacing, it is possible that some of the features may have an associated magnetic anomaly that was not detected on this magnetometer data set. If lengths of rope, the features may not be of archaeological potential in themselves, but they may be attached to archaeological features (e.g. anchors) or be snagged on mostly buried debris not visible in the SSS or MBES data.
- 4.2.28 Twelve anomalies have been classified as bright reflectors (**700038, 700064, 700098, 700115, 700121, 700128, 700140, 700144, 700149, 700152, 700158 and 700167**), which are defined as individual objects or areas of low reflectivity, characteristic of materials that absorb acoustic energy, such as waterlogged wood or synthetic materials. These range in size from the largest (**700158**), measuring 11.7 x 2.8 m, to the smallest (**700152**), measuring 2.7 x 2.3 m.
- 4.2.29 One hundred anomalies have been classified as dark reflectors, which are defined as individual objects or areas of high reflectivity that display some anthropogenic characteristics, although their precise nature is uncertain (for full list see Appendix 2). These range in size from the smallest (**76942**), measuring 0.6 x 0.5 x 0.5, to the largest (**700164**), measuring 10.2 x 9.0 x 0.9 m. These could represent individual pieces of debris or natural features.
- 4.2.30 Five anomalies have been classified as mounds (**78154, 78156-7 and 700194-5**) which is a mounded feature with height, not considered to be natural. Mounds may form over wreck sites or other debris. Mound **78156**, measuring 28.0 x 14.5 x 0.8 m, and **78157**, measuring 27.0 x 16.0 x 0.8 m, are both located close to a small magnetic anomaly measuring 9 nT. Due to the position of the magnetic anomaly, it is not possible to tell whether it relates to one or both mound features.
- 4.2.31 The remaining 106 A2 anomalies have features are magnetic anomalies with no associated seabed surface expression, which have the potential to represent possible buried ferrous debris. These magnetic anomalies range in size from 5 nT (anomalies **70067, 70071,**

**70074, 70131, 70207, 78028 and 78035** to 175 nT (anomaly **77921**) (for full list see Appendix 2).

- 4.2.32 As discussed in Section 2.4, due to the magnetometer line spacing, it cannot be guaranteed that all ferrous items have been identified within the EA2 site.
- 4.2.33 One feature has been given an A3 discrimination within the EA2 site (**70700**). This is defined as a historic record of possible archaeological interest with no corresponding geophysical anomaly. Feature **70700** is a possible wreck that was previously identified by Gardline (Gardline Geosurvey 2011), reported as measuring 107.2 x 17.3 x 1.7 m. The wreck has not been identified by Wessex Archaeology during this, or previous, geophysical data assessments.

## 5 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Palaeogeographic features

- 5.1.1 The assessment of the geophysical data within the study area resulted in a total of 15 features of palaeogeographic interest. These are summarised as follows:
- a total of five features were assigned an P1 archaeological rating;
  - a total of 10 features were assigned an P2 archaeological rating.
- 5.1.2 As terrestrial features interpreted as being deposited during periods of known human occupation of the UK, those features given a P1 archaeological rating are considered of high archaeological potential. Those features with a P2 discrimination are considered of medium archaeological potential, partly due to the uncertainty of features formation and fill. Geoarchaeological work would aid in refining the interpretation and therefore help determine the archaeological potential of the area.
- 5.1.3 Should further ground investigation work be undertaken within the study area, it is recommended that the archaeological contractor be consulted to advise on potential samples to be acquired for archaeological purposes, particularly from the interpreted dune features (**780003** and **780004**) and other identified units of archaeological interest identified within the data. It is also recommended that any future geotechnical logs from within the study area be made available for geoarchaeological assessment.
- 5.1.4 Furthermore, it is recommended that any samples acquired containing material of archaeological potential, particularly those within the interpreted Pleistocene/early Holocene features, be made available for geoarchaeological assessment.

### 5.2 Seabed features

- 5.2.1 The assessment of the geophysical data within the study area resulted in a total of 343 anomalies identified as being of possible archaeological interest. These are summarised as follows:
- a total of 11 were assigned an A1 archaeological rating;
  - a total of 331 were assigned an A2 archaeological rating;
  - One item, a recorded wreck, was assigned an A3 archaeological discrimination.

- 5.2.2 As features of high archaeological potential, it is recommended that Archaeological Exclusion Zones (AEZs) are implemented around all 11 A1 anomalies.
- 5.2.3 For the six wrecks, an AEZs of 50 m around the wrecks extents is recommended (Table 9). For the five items of wreck debris, an AEZ of 15 m has been recommended. However, in all cases this is already covered by the wreck's recommended 50 m AEZ.

**Table 9** Recommended AEZs within the study area

ID Number	Classification	Original Assessment (report ref.)	Position (WGS84 UTM31N)		Exclusion Zone
			Easting	Northing	
<b>76951</b>	Wreck	74547	444987	5793299	50 m buffer around current feature extent
<b>70684</b>	Wreck	74540	443175	5776176	50 m buffer around current feature extent
<b>700107</b>	Debris	117810	443140	5776163	15 m buffer around feature
<b>700108</b>	Debris	117810	443144	5776172	15 m buffer around feature
<b>700109</b>	Debris	117810	443141	5776217	15 m buffer around feature
<b>70707</b>	Wreck	74540	445607	5775865	50 m buffer around current feature extent
<b>700065</b>	Debris	117810	445621	5775879	15 m buffer around feature
<b>700066</b>	Debris	117810	445620	5775875	15 m buffer around feature
<b>70717</b>	Wreck	74540	447661	5768102	50 m buffer around current feature extent
<b>700104</b>	Wreck	117810	445160	5785231	50 m buffer around current feature extent
<b>700106</b>	Wreck	117810	443119	5776076	50 m buffer around current feature extent

- 5.2.4 For features assigned an A2 archaeological discrimination rating, no AEZs are recommended at this time. However, avoidance is recommended with further mitigation to be implemented (e.g. high resolution geophysical survey, visual inspection (divers or ROV)) if they are proposed to be directly impacted by development in the future.
- 5.2.5 For the feature assigned an A3 archaeological discrimination, based on the fact it has not been seen by Wessex Archaeology at any phase of geophysical assessment and has no associated UKHO record, no AEZ is recommended at this time. However, avoidance of this feature is recommended if it is proposed to be directly impacted by development in the future.
- 5.2.6 It is recommended that if any objects of possible archaeological interest are recovered during any groundwork operations, that they should be reported using the established Offshore Renewables Protocol for Archaeological Discoveries (ORPAD, The Crown Estate



2014). This will establish whether the recovered objects are of archaeological interest and recommend appropriate mitigation measures.



## 6 REFERENCES

- Ashton, N, and Lewis, S 2002 Deserted Britain: Declining Populations in the British Late Middle Pleistocene. *Antiquity* 76, 388–396
- Bicket, A and Tizzard, L 2015 A Review of the Submerged Prehistory and Palaeolandscapes of the British Isles, *Proceedings of the Geologist's Association* Volume 126, Issue 6, p.643-663
- Boismier, W, Gamble, C, and Coward, F 2012 Neanderthals among Mammoths: Excavations at Lynford Quarry, Norfolk, UK. English Heritage
- Boomer, I, Waddington, C, Stevenson, T, and Hamilton, D 2007 Holocene Coastal Change and Geoarchaeology at Howick, Northumberland, UK. *The Holocene* 17(1), 89–104.
- Bridgland, D R 1994 The Pleistocene of the Thames. In Bridgeland, D (ed.) *Quaternary of the Thames*. London, Geological Conservation Review Series No. 7., Chapman and Hall
- British Geological Survey 1984 Flemish Bight 52°N - 02°E Quaternary Geology. 1: 250 000 Series, Crown Copyright
- Cameron, T D J, Crosby, A, Balson, P S, Jeffery, D H, Lott, G K, Bulat, J and Harrison, D J 1992 The Geology of the Southern North Sea. British Geological Survey United Kingdom Offshore Regional Report, London, HMSO
- Candy, I, Silva, B and Lee, J 2011 Climates of the Early Middle Pleistocene in Britain: Environments of the Earliest Humans in Northern Europe. In Ashton N, Lewis, S G, and Stringer, C (eds.) *The Ancient Human Occupation of Britain*. Vol. 14, 11–22, Amsterdam, Netherlands, Elsevier B.V.
- Cohen, K M, MacDonald, K, Joordens, J C A, Roebroeks, W and Gibbard, P L 2012 The Earliest Occupation of North-West Europe: a Coastal Perspective. *Quaternary International* 271, 70-83
- Coles, B 1998 Doggerland: a speculative survey. *Proceedings of the Prehistoric Society* 64, 45-81
- Dix, J and Sturt, F 2011 The Relic Palaeo-landscapes of the Thames Estuary. Southampton, University of Southampton for MALSF
- East Anglia ONE 2012. Environmental Statement Volume 2- Offshore- Archaeology and Cultural Heritage, East Anglia Offshore Wind, Chapter 17
- Emu Ltd. 2009 Outer Thames Estuary Regional Environmental Characterisation. MALSF, Crown Copyright 2009, ISBN 978-00907545-28-9
- Gaffney, V, Thomson, K and Fitch, S 2007 Mapping Doggerland: The Mesolithic Landscapes of the Southern North Sea. Oxford, Archaeopress
- Gardline Geosurvey Ltd. 2011 East Anglia Offshore Wind Geophysical Survey, Areas A and B, April to September 2010, Operations Report. Great Yarmouth, unpubl report, ref: 8402.4
- Gardline Geosurvey Ltd. 2011b East Anglia Offshore Wind Geophysical Survey, Area B, April to August 2010, Survey Report. Great Yarmouth, unpubl report, ref: 8402.2



- Gardline Geosurvey Ltd. 2017 East Anglia Two Geophysical Survey, Survey Report. Great Yarmouth, unpubl report ref.11003.2
- Gardline Geosurvey Ltd. 2017b East Anglia Two Geophysical Survey, Operations Report. Great Yarmouth, unpubl report ref.11003.1
- Godwin, H, and Godwin, M E 1933 British Maglemose Harpoon Sites. *Antiquity* 7, 36–48
- Gupta, S, Collier, J S, Garcia-Moreno, D, Oggioni, F, Trentesaux, A, Vanneste, K, De Batist, M, Camelbeeck, T, Potter, G, Van Vliet, B, and Arthur, J C R 2017 Two-Stage Opening of the Dover Strait and the Origin of Island Britain. *Nature Communications* 8, 15101
- Hamblin, R J., Crosby, A, Balson, P S, Jones, S M, Chadwick, R A, Penn, I E and Arthur, M J 1992 The Geology of the English Channel. British Geological Survey United Kingdom Offshore Regional Report, London HMSO
- Hazell, Z J 2008 Offshore and Intertidal Peat Deposits, England — A Resource Assessment and Development of a Database. *Environmental Archaeology* 13(2), 101–110
- Hijma, M P, Cohen, K M, Roebroeks, W, Westerhoff, W E and Busschers, F S 2012 Pleistocene Rhine-Thames Landscapes: Geological Background for Hominin Occupation of the Southern North Sea Region. *Journal of Quaternary Science* 27(1), 17–39
- Housley, R A 1991 AMS Dates from the Late Glacial and Early Postglacial in North-West Europe: A Review. In Barton, N, Roberts, A J, and Roe, D A (eds.) *The Late Glacial in North-West Europe: Human Adaptation and Environmental Change at the End of the Pleistocene*. London, Council for British Archaeology, 25-36
- Jacobi, R, and Higham, T 2011 The Later Upper Palaeolithic Recolonisation of Britain: New Results from AMS Radiocarbon Dating. In Ashton N, Lewis, S G, and Stringer, C (eds.) *The Ancient Human Occupation of Britain*. Vol. 14, 223–247, Amsterdam, Netherlands, Elsevier B.V.
- Lewis S G, Ashton N and Jacobi, R 2011 Testing Human Presence during the Last Interglacial (MIS 5e): A Review of the British Evidence, In Ashton N, Lewis, S G, and Stringer, C (eds.) *The Ancient Human Occupation of Britain*. Vol.14, 125-247, Amsterdam, Netherlands, Elsevier
- Limpenny, S E, Barrio Froján, C, Cotterill, C, Foster-Smith, R L, Pearce, B, Tizzard, L, Limpenny, D L, Long, D, Walmsley, S, Kirby, S, Baker, K, Meadows, W J, Rees, J, Hill, J, Wilson, C, Leivers, M, Churchley, S, Russell, J, Birchenough, A C, Green, S L and Law, R J 2011 The East Coast Regional Environmental Characterisation. MEPF
- Momber, G, Tomalin, D, Scaife, R, Satchell, J and Gillespie, J 2011 Mesolithic Occupation at Bouldner Cliff and the Submerged Prehistory Landscapes of the Solent. CBA Report 164, Council for British Archaeology
- Parfitt, S A, Ashton, N M, Lewis, S G, Abel, R L, Coope, G R, Field, M H, Gale, R, Hoare, P G, Larkin, N R, Lewis, M D, Karloukovski, V, Maher, B A, Peglar, S M, Preece, R C, Whittaker, J E, and Stringer, C B 2010 Early Pleistocene Human Occupation at the Edge of the Boreal Zone in Northwest Europe. *Nature* 466(7303), 229–33
- Parfitt, S A, Barendregt, R W, Breda, M, Candy, I, Collins, M J, Coope, G R, Durbidge, P, Field, M H, Lee, J R, Lister, A M, Mutch, R, Penkman, K E H, Preece, R C, Rose, J, Stringer, C B,

Symmons, R, Whittaker, J E, Wymer, J, and Stuart, A J 2005 The Earliest Record of Human Activity in Northern Europe. *Nature* 438(7070), 1008–12

Pettitt, P, and White, M J 2012 *The British Palaeolithic: Human Societies at the Edge of the Pleistocene World*. Abingdon, Routledge

Reid, C 1913 *Submerged Forests*. London, Cambridge University Press

Rose, J 2009 Early and Middle Pleistocene Landscapes of Eastern England. *Proceedings of the Geologists' Association* 120(1), 3-33

Scott, B, and Ashton, N 2011 The Early Middle Palaeolithic: The European Context. In Ashton, N, Lewis, S G, and Stringer, C (eds.) *The Ancient Human Occupation of Britain*. Volume 14, 91–112, Amsterdam, Netherlands, Elsevier B.V. Sumbler, M. G., 1996, *British Regional Geology; London and the Thames Valley*, London: HMSO

Scott, B, Ashton, N, Lewis, S G, Parfitt, S, and White, M, 2011 Technology and Landscape Use in the Early Middle Palaeolithic of the Thames Valley. In Ashton N, Lewis, S G, and Stringer, C (eds.) *The Ancient Human Occupation of Britain*. Volume 14, 67-89, Amsterdam, Netherlands, Elsevier B.V.

Tappin, D R, Pearce, B, Fitch, S, Dove, D, Gearey, B, Hill, J M, Chambers, C, Bates, R, Pinnion, J, Diaz Doce, D, Green, M, Gallyot, J, Georgiou, L, Brutto, D, Marziales, S, Hopla, E, Ramsay, E, and Fielding, H 2011 *The Humber Regional Environmental Characterisation*. British Geological Survey Open Report OR/10/54

Tizzard, L, Bicket, A R, Benjamin, J, and De Loecker, D 2014 A Middle Palaeolithic Site in the Southern North Sea: Investigating the Archaeology and Palaeogeography of Area 240. *Journal of Quaternary Science* 29, 698–710

Tizzard, L, Bicket, A. R, Benjamin, J and De Loecker, D 2015 A Middle Palaeolithic Site in the Southern North Sea: Investigating the Archaeology and Palaeogeography of Area 240. Salisbury, Wessex Archaeology Monograph no 35

Wessex Archaeology 2010 Appendix III-IV: Technical Report: Archaeology, in ERM 2010, Thames Estuary Dredging Association, Marine Aggregate Regional Environmental Assessment. Salisbury, unpubl report, ref: 66061.04

Wessex Archaeology 2011 Seabed Prehistory: Site Evaluation Techniques (Area 240). Salisbury, unpubl report, ref: 70754.04

Wessex Archaeology 2011b East Anglia ONE Offshore Windfarm, Preliminary Environmental Information Report, Volume 2, unpubl rept

Wessex Archaeology 2012 Chapter 17: Archaeology and Cultural Heritage, East Anglia ONE Offshore Windfarm, Environmental Statement, Volume 2: Offshore, unpubl rept

Wessex Archaeology 2013b Audit of Current State of Knowledge of Submerged Palaeolandscapes and Sites. Salisbury, unpubl report, ref: 84570.01

Wessex Archaeology 2013c Palaeo-Yare Catchment Assessment. Salisbury, unpubl report, ref: 83740.04



Wessex Archaeology 2014 Chapter 17: Archaeology and Cultural Heritage, East Anglia THREE, Preliminary Environmental Information Volume 1 Revision B, unpubl rept

Westaway, R 2009 Quaternary Vertical Crustal Motion and Drainage Evolution in East Anglia and Adjoining Parts of Southern England: Chronology of the Ingham River Terrace Deposits. *Boreas* 38(2), 261-284

Wilkinson, T J and Murphy, P L 1995 The Archaeology of the Essex Coast, Volume I: The Hullbridge Survey. East Anglian Archaeology Report No. 71, Essex County Council

White, M 2006 Things to Do in Doggerland when you're Dead: Surviving OIS3 at the North-western-Most Fringe of Middle Palaeolithic Europe. *World Archaeology* 44(April), 0–28

Wymer, J J 1999 The Lower Palaeolithic Occupation of Britain. Wessex Archaeology and English Heritage



## APPENDICES

### Appendix 1 Palaeogeographic features of archaeological potential

ID number	Classification	Archaeological discrimination	Description	Age	Report ref.
780000	Simple cut and fill	P2	Small simple cut and fill identified BSB, cut into the top of the interpreted RCG formation. Unit fill is relatively acoustically chaotic, with a faint basal reflector that is not always clearly discernible. Depth range: 0.6 - 6.6 m BSB.	Unknown	117810
780001	Simple cut and fill	P2	Small simple cut and fill identified BSB, cut into the top of the interpreted RCG formation, possibly through a thin unit of overlying WK formation. Unit fill is relatively acoustically chaotic with a faint basal reflector. Depth range: 0.7 - 13.3 m BSB.	Unknown	117810
780002	Base of BNB	P2	BNB channel identified BSB, infilling a depression the top of the interpreted RCG formation. Feature has a distinct, occasionally undulating base and multiple phases of well layered fill, indicating multiple phases of deposition. Some possible dune features are identified within (780003 and 780004) which may indicate a significant period of aerial exposure. Depth range 0.7 - 12.8 m BSB.	Devensian	117810
780003	Dune features	P1	Possible relict dune features identified above the base of, and beneath a unit of interpreted BNB formation, possibly indicative of terrestrial land formations, however may also be subaqueous in formation. If terrestrial, it suggests they formed during a significant period of aerial exposure and may protect a buried land surface. The unit fill is relatively acoustically chaotic. Depth range 3.2 - 6.6 m BSB.	Devensian	117810
780004	Dune features	P1	Possible relict dune features identified above the base of, and beneath a unit of interpreted BNB formation, possibly indicative of terrestrial land formations, however may also be subaqueous in formation. If terrestrial, it suggests they formed during a significant period of aerial exposure and may protect a buried land surface. The unit fill is relatively acoustically chaotic. Depth range 3.1 - 6.7 m BSB.	Devensian	117810



ID number	Classification	Archaeological discrimination	Description	Age	Report ref.
75401	Erosional surface	P2	A well layered unit with a distinct, occasionally undulating basal reflector, was identified BSB during the latest phase of geophysical data assessment, cut into the top of the interpreted RCG formation. The feature appears to correspond with a broad, relatively shallow reflector slightly cut into the overlying sediment, interpreted as being an erosion surface overlain by later sediment rather than a cut and fill, in the CRSA palaeogeographic assessment (Wessex Archaeology 2012). Although the shapes of the features appear to differ slightly between the two assessments, this is likely due to differences in line spacing and line orientation and, as such the two features have been grouped together. The fill is unknown although could possibly be part of BNB, however as this is uncertain, the age of the feature is unknown. Depth range 0.7 - 19.9 m BSB.	Unknown	117810, 74541
75589	Channel	P1	A channel feature with a distinct basal reflector and acoustically quiet fill was identified BSB during the latest phase of geophysical data assessment, cut into the top of the interpreted WK formation. The feature corresponds with a channel identified in the EA3 OFTO palaeogeographic assessment (Wessex Archaeology 2014), which was identified as a NNW-SSE trending channel with a single phase of acoustically unstructured fill and a generally well-defined basal reflector and interpreted as being a possible remnant eroded fluvial system of an uncertain date, although it could be Devensian (BNB) or Post-Devensian. The boundaries of the feature vary slightly between the two data assessments, likely due to differences in line spacing and line orientation and, as such, the boundaries have been extended slightly to include both stages of data assessment. Depth Range: 0.7m - 11.3 m BSB.	Unknown	117810, 74547
780005	Simple cut and fill	P2	Possible small simple cut and fill identified BSB, or beneath a unit of modern marine sand, cut into the top of the interpreted WK formation. Feature has relatively acoustically chaotic fill, possibly with more than one phase of fill although this is not clearly discernible, and a fairly indistinct basal reflector. Feature is close to channel feature <b>75589</b> , however they have not been grouped due to apparent differences in form and unit fill. It may be however that the two features are associated. Depth range: 1.1 - 8.2 m BSB.	Unknown	117810
780006	Simple cut and fill	P2	Possible small simple cut and fill identified BSB, cut into the top of the interpreted WK formation. Feature has acoustically chaotic fill and a relatively distinct basal reflector. Depth range: 1.1 - 5.7 m BSB.	Unknown	117810
780007	Simple cut and fill	P2	Possible small simple cut and fill identified BSB, cut into the top of the interpreted WK formation. Feature has acoustically chaotic fill and a relatively distinct basal reflector. Depth range: 1.0 - 5.6 m BSB.	Unknown	117810
780008	Complex cut and fill	P2	Complex cut and fill with more than one phase of fill. Identified BSB cutting into the top of interpreted WK formation. Depth range: 0.5 - 7.8 m BSB.	Unknown	117810



ID number	Classification	Archaeological discrimination	Description	Age	Report ref.
75584	Simple cut and fill	P2	A possible poorly defined simple cut and fill feature cut into WK was identified in the EA3 OFTO palaeogeographic assessment (Wessex Archaeology report 74547), however was not identified during this assessment of the geophysical data, likely due to differences in survey line spacing and orientation. Single phase of acoustically chaotic fill, overlain by an accumulation of seabed sediment which is causing diffractions and partially obscuring the feature. Possible remnants of an eroded fluvial feature, though only identified on two survey lines. Depth Range: 0.8m - 6.5m BSB.	Unknown	74547
75585	Channel	P1	Shallow cut and fill feature cut into WK, well defined basal reflector with single phase of acoustically transparent fill was identified in the EA3 OFTO palaeogeographic assessment (Wessex Archaeology 2014), however was not identified during this assessment of the geophysical data, likely due to differences in survey line spacing and orientation. Possible fluvial/channel feature though date is uncertain - could be Devensian (BNB) or Post-Devensian.	Unknown	74547
75586	Simple cut and fill	P2	Shallow cut and fill feature cut into WK, well defined basal reflector with single phase of acoustically transparent fill was identified in the EA3 OFTO palaeogeographic assessment (Wessex Archaeology report 74547), however was not identified during this assessment of the geophysical data, likely due to differences in survey line spacing and orientation. Possible remnants of an eroded fluvial feature, though only identified on two survey lines. Depth Range: 0.5m - 3.7m BSB.	Unknown	74547
75588	Channel	P1	Approximately NNW-SSE trending cut and fill feature cut into WK, generally well-defined, low relief basal reflector with single phase of acoustically unstructured fill was identified in the EA3 OFTO palaeogeographic assessment (Wessex Archaeology report 74547), however was not identified during this assessment of the geophysical data, likely due to differences in survey line spacing and orientation. Appears as a channel on some survey lines but more as a layer on others, generally towards its northern end. Possible channel feature filled with BNB sediments. Depth Range: 0.8m - 11.7m BSB.	Devensian	74547



## Appendix 2 Seabed features of archaeological potential

ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
70071	Magnetic	441004	5782017	A2	-	-	-	5	Isolated weak magnetic anomaly.	-	74540
70072	Magnetic	440937	5782734	A2	-	-	-	26	Moderate strength isolated magnetic anomaly with no surface expression, possibly buried ferrous object.	-	117810, 74540
70073	Seabed disturbance	441063	5782930	A2	42.0	6.0	0.2	-	Distinctive area of disturbed seabed. Has a linear alignment that is interrupted in places. There are a number of raised anomalies with height within this area. The local seafloor is dominated by sand waves. Observed in the bathymetry data as a linear feature oriented 010/190 (N/S). Consists principally of 2 linear, parallel features. Passes through a sand wave. Appears to stop each end at more sand waves. General seabed depth is approximately -46.0m.	-	74540
70074	Magnetic	441009	5783338	A2	-	-	-	5	Isolated weak magnetic anomaly.	-	74540
70075	Debris	440843	5783501	A2	4.8	0.4	0.0	-	Small elongated anomaly located in an area of sand waves.	-	74540
70076	Debris	441070	5783993	A2	0.6	0.6	0.2	-	Small sub-circular shaped anomaly with an associated scour. The surrounding seabed is dominated by sand waves. Anomaly found during previous ZEA phase, but not during current phase. Possibly due to sand wave cover.	-	74547
70077	Debris	440881	5784370	A2	1.6	0.2	0.1	-	Small sub-oval shaped anomaly located in an area of relatively flat seabed. Some banding in the data. Anomaly found during previous ZEA phase, but not during	-	74547





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									current phase. Possibly due to sand wave cover.		
70078	Magnetic	441073	5784514	A2	-	-	-	8	Isolated weak magnetic anomaly.	-	74540
70079	Magnetic	441008	5784677	A2	-	-	-	9	Isolated weak magnetic anomaly.	-	74540
70080	Debris	440954	5784854	A2	2.6	0.4	0.2	7	Small irregular shaped anomaly with an associated scour. Located near the edge of some prominent sand waves in an area of relatively flat seabed. Anomaly found during previous ZEA phase, but not during current phase. Possibly due to sand wave cover.	-	74547
70081	Magnetic	441009	5785836	A2	-	-	-	7	Isolated weak magnetic anomaly.	-	74540
70139	Seabed disturbance	446985	5782043	A2	9.3	5.3	-0.9	-	Irregular shaped area of seafloor disturbance, surrounded by sand waves. Observed in the bathymetry data as a disturbance in sand wave crest. General seabed depth is approximately -38.5m.	-	74540
70142	Magnetic	446956	5783586	A2	-	-	-	9	Isolated weak magnetic anomaly.	-	74540
70143	Magnetic	446956	5783657	A2	-	-	-	16	Isolated weak magnetic anomaly.	-	74540
70144	Magnetic	447070	5784232	A2	-	-	-	6	Isolated weak magnetic anomaly.	-	74540
72306	Seabed disturbance	447505	5781953	A2	7.2	14.4	0.5	-	Small elongated, irregular shaped spread of disturbed seabed characterised by sub-oval shaped dark reflectors. Located in an area of sand waves.	-	74541
72319	Magnetic	448186	5783840	A2	-	-	-	13	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
72320	Magnetic	448006	5784042	A2	-	-	-	74	Medium magnetic anomaly with no surface expression, possibly buried ferrous object.	-	117810, 74541
72321	Magnetic	448251	5783590	A2	-	-	-	13	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72322	Magnetic	448211	5783695	A2	-	-	-	32	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72323	Dark reflector	444690	5782178	A2	2.9	0.4	0.2	-	Elongate feature with height, large sand ripples nearby.	-	74541
72324	Magnetic	444861	5784370	A2	-	-	-	22	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72325	Magnetic	443726	5782660	A2	-	-	-	29	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72326	Magnetic	443746	5782750	A2	-	-	-	25	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72328	Dark reflector	441466	5783089	A2	3.3	0.9	0.8	-	Elongated object with height, lies at end of sand wave at edge of area of sand waves.	-	74541



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
72329	Debris	442296	5782520	A2	10.6	5.5	1.9	14	A large, elongated dark reflector with significant height identified with an associated linear feature extending out to form a 'V' shape. The linear feature (measuring 30.3 x 0.5 x 0.1 m) may be part of the same feature or possibly an associated length of rope/chain. This feature has been identified within an area of mega ripples and appears to be relatively elongated. In the MBES this is visible as a broad mound with seabed disturbance extending ~25 m north-northwest. There is a small magnetic anomaly associated with this feature indicating ferrous material is present. The feature was identified in both the 2012 assessment (report number 74541) and the most recent 2017 geophysical data assessment.	-	117810, 74541
72330	Magnetic	441731	5782255	A2	-	-	-	9	Small magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72332	Dark reflector	441223	5783781	A2	3.2	0.4	0.3	-	Short linear anomaly located in an area of sand waves.	-	74541
72333	Magnetic	440921	5782730	A2	-	-	-	50	Large magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541
72334	Dark reflector	440807	5782706	A2	3.3	2.0	0.5	-	Indistinct object with clear shadow, within flat area amongst small sand waves	-	74541
72382	Magnetic	447431	5782150	A2	-	-	-	14	Medium magnetic anomaly without an associated sidescan sonar contact. May indicate buried ferrous debris.	-	74541



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
76920	Debris	445496	5789466	A2	9.3	3.2	0.8	-	A very distinct, dark reflector object with a large and bright shadow and significant height. Possible linear debris situated within sand waves. There is some disturbance to the surrounding sediment and associated scour. In the MBES data this is visible as a small, slightly elongated mound identified within a depression. The feature was identified in both the 2014 assessment (report number 74547) and the most recent 2017 geophysical data assessment.	-	117810, 74547
76923	Dark reflector	444265	5789809	A2	5.6	0.4	0.3	-	Medium sized linear dark reflector anomaly with a bright shadow. Hard edged anomaly located on the crest of a sand wave. Possibly natural geology.	-	74547
76924	Dark reflector	442934	5789167	A2	2.6	0.7	0.6	-	Medium sized rectangular hard edged dark reflector with bright shadow. Anomaly is located on a crest of a sand wave.	-	74547
76925	Dark reflector	442855	5789104	A2	1.4	0.2	0.4	-	Small hard edged dark reflector with shadow. Rectangular shaped and located on a rough and uneven part of the seabed.	-	74547
76927	Debris	441822	5788695	A2	1.9	0.5	0.3	-	Distinct, hard edged dark reflector anomaly with bright shadow. Possible piece of debris, isolated on a sandy part of the seabed, scouring to the north for approximately 10m.	-	74547
76931	Dark reflector	444935	5790951	A2	5.3	1.4	0.1	-	Hard edged dark reflector anomaly with a very small shadow. Distinct anomaly on a rough part of the seabed with frequent sand waves.	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
76932	Dark reflector	445794	5791516	A2	4.0	0.4	0.1	-	Hard edged linear dark reflector with shadow, anomaly is distinct and located between sand waves.	-	74547
76935	Dark reflector	443413	5790451	A2	5.6	1.0	0.0	-	Hard edged and distinct oval dark reflector with no shadow. Isolated anomaly located on a flat and even part of the seabed.	-	74547
76938	Rope/chain	444459	5791191	A2	29.2	0.4	0.2	-	Long, thin and diffuse possible rope/chain/abandoned cable remains. Anomaly is a diffuse dark reflector with indistinct shadow, located on a fairly even part of the seabed.	-	74547
76939	Seabed disturbance	443223	5790706	A2	33.4	16.7	0.5	-	Very diffuse and discreet possible seafloor disturbance. Medium-large sized anomaly made up of linear and rectangular diffuse dark reflectors with large shadows. Located on a very sandy and even part of the seabed.	-	74547
76942	Dark reflector	442470	5790825	A2	0.6	0.5	0.5	-	Small square shaped hard edged dark reflector anomaly with shadow. Distinct and isolated anomaly with a scour to the north. Lots of similar anomalies across the cable route and could be natural geology.	-	74547
76943	Debris	444728	5792178	A2	6.7	0.3	0.8	-	Hard edged, linear piece of possible debris visible as a dark reflector with long and bright shadow. Located on a flat and even sandy part of the seabed.	-	74547
76949	Debris	442619	5791813	A2	4.5	3.5	0.5	-	An indistinct oval shaped area containing a medium sized object, rectangular shaped anomaly on a flat, even and sandy part of the seabed. Very distinct with scouring to the north west and south east. This is visible in the MBES data as a distinct	-	117810, 74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									mound within a depression (depression measures 17.7 x 9.3 x -0.4 m). This is interpreted as being a possible item of debris. The feature was identified in both the 2014 assessment (report number 74547) and the most recent 2017 geophysical data assessment.		
76950	Debris	445242	5793287	A2	4.9	0.5	0.2	-	Hard edged, thin, linear anomaly that could be possible debris, anomaly looks anthropogenic to surrounding seabed and lies perpendicular to the sand waves.	-	74547
76951	Wreck	444987	5793299	A1	20.8	14.2	2.4	1424	A large debris field comprising several linear items of debris with height was identified in the 2017 geophysical survey data. The feature has a large, distinct shadow; however, there is no clearly defined object suggesting it may be very broken up and poorly preserved. In the MBES data this is visible as a large, elongated, distinct mound identified in an area of textured seafloor and orientated east to west. In the 2014 data assessment (Wessex Archaeology 2014), a medium sized area of debris was identified, visible as a large diffuse dark reflector with a large and bright shadow, which was interpreted as being a wreck located in a rough and uneven part of the seabed. The wreck has a very large associated magnetic contact, suggesting a significant amount of ferrous material.	-	117810, 74547
76955	Debris	444406	5793025	A2	1.6	1.1	0.4	-	Small rectangular possible piece of debris, located in fine, sandy sediments with	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									scouring to the north west, diffuse dark reflector with shadow.		
76958	Debris field	445254	5793839	A2	20.4	9.2	0.9	-	Possible spread of debris, very diffuse looking dark reflectors with shadows, located in an area of megaripples and possibly partially buried. A distinct, irregular shaped mound is visible in the MBES with a slight depression to the north east and some sediment disturbance surrounding it. This could be a debris field partially covered by sand. The feature was identified in both the 2014 assessment (report number 74547) and the most recent 2017 geophysical data assessment.	-	117810, 74547
76959	Debris	443377	5792831	A2	13.3	0.5	0.6	9	Very distinct long, thin linear debris. Curvilinear shaped anomaly visible as a hard-edged dark reflector with a long and bright shadow. Located on a sandy and fairly even part of the seabed. Associated with small magnetic contact. Possible piece of ferrous debris.	-	74547
76960	Dark reflector	442490	5792666	A2	4.1	0.9	0.0	-	Hard edged, thick linear dark reflector anomaly with no shadow, looks distinct on the seabed in variable quality data.	-	74547
77921	Magnetic	443389	5791502	A2	-	-	-	175	Distinct strong dipolar anomaly amongst sandripples. No associated SSS or multibeam bathymetry contact.	-	74547
77922	Magnetic	444997	5791508	A2	-	-	-	18	Small distinct dipolar anomaly in magnetically quiet area. No associated SSS or multibeam bathymetry contact.	-	74547





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
77925	Magnetic	445753	5789530	A2	-	-	-	20	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77926	Magnetic	442029	5785681	A2	-	-	-	160	Strong asymmetric dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77930	Magnetic	441408	5788683	A2	-	-	-	41	Dipolar anomaly present across two lines, in magnetically quiet area. No associated SSS or multibeam bathymetry contact.	-	74547
77963	Magnetic	444055	5791867	A2	-	-	-	11	Distinct dipolar anomaly. No associated SSS or multibeam bathymetry contact.	-	74547
77964	Magnetic	445564	5791813	A2	-	-	-	9	Distinct asymmetric dipolar anomaly, amongst sand waves, just to the west of pipeline/cable identified in magnetic data. No associated SSS or multibeam bathymetry contact.	-	74547
77965	Magnetic	444417	5790511	A2	-	-	-	15	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77966	Magnetic	445009	5790673	A2	-	-	-	16	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77967	Magnetic	445630	5789917	A2	-	-	-	15	Distinct dipolar anomaly on ridge of sand wave. No associated SSS or multibeam bathymetry contact.	-	74547
77969	Magnetic	444909	5789174	A2	-	-	-	14	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
77970	Magnetic	443806	5789015	A2	-	-	-	55	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77971	Magnetic	444001	5788317	A2	-	-	-	9	Weak, slightly broader dipolar anomaly, possibly natural and amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77972	Magnetic	443160	5788783	A2	-	-	-	26	Dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77973	Magnetic	443440	5789158	A2	-	-	-	17	Distinct dipolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77974	Magnetic	443306	5788350	A2	-	-	-	45	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77975	Magnetic	442851	5790349	A2	-	-	-	8	Small asymmetric dipolar anomaly at interface between sand waves and featureless seabed sediment. No associated SSS or multibeam bathymetry contact.	-	74547
77976	Magnetic	443266	5788594	A2	-	-	-	77	Distinct asymmetric dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77977	Magnetic	442947	5790464	A2	-	-	-	9	Narrow peaked negative monopolar anomaly. No associated SSS or multibeam bathymetry contact.	-	74547
77978	Magnetic	443122	5790812	A2	-	-	-	20	Distinct asymmetric dipolar anomaly in discrete area of sand waves. No associated SSS or multibeam bathymetry contact.	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
77979	Magnetic	442363	5792140	A2	-	-	-	37	Narrow peaked negative monopolar anomaly at ridge of sand wave. No associated SSS or multibeam bathymetry contact.	-	74547
77981	Magnetic	442533	5789365	A2	-	-	-	42	Broader peaked positive monopolar anomaly in magnetically quiet area, possibly natural. No associated SSS or multibeam bathymetry contact.	-	74547
77982	Magnetic	441900	5787893	A2	-	-	-	33	Complex looking positive peaked anomaly in a magnetically quiet area, possibly natural. No associated SSS or multibeam bathymetry contact.	-	74547
77983	Magnetic	442563	5787454	A2	-	-	-	17	Narrow negative monopolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77984	Magnetic	442795	5784743	A2	-	-	-	9	Weak narrow peaked positive monopolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77986	Magnetic	442273	5784352	A2	-	-	-	11	Small narrow peaked positive monopolar anomaly amongst medium sand waves, possibly natural. No associated SSS or multibeam bathymetry contact.	-	74547
77987	Magnetic	442324	5784664	A2	-	-	-	11	Small narrow negative monopolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77988	Magnetic	441670	5784337	A2	-	-	-	15	Small asymmetric dipolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
77989	Magnetic	441525	5784364	A2	-	-	-	8	Small asymmetric dipolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77990	Magnetic	441243	5784349	A2	-	-	-	12	Small negative monopolar anomaly at edge of area with medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77991	Magnetic	441856	5785766	A2	-	-	-	7	Narrow peaked positive monopolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77992	Magnetic	441681	5785492	A2	-	-	-	12	Small distinct dipole anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
77993	Magnetic	441064	5786038	A2	-	-	-	8	Small distinct dipolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78016	Magnetic	441868	5786170	A2	-	-	-	17	Distinct asymmetric dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78017	Magnetic	441018	5785834	A2	-	-	-	11	Distinct dipolar anomaly amongst medium sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78018	Magnetic	442729	5785913	A2	-	-	-	18	Dipolar anomaly amongst medium sand waves, possibly natural. No associated SSS or multibeam bathymetry contact.	-	74547
78020	Magnetic	442276	5786830	A2	-	-	-	123	Distinct dipolar anomaly in magnetically quiet area between sand waves. No associated SSS or multibeam bathymetry contact.	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
78021	Magnetic	444616	5793649	A2	-	-	-	9	Small distinct dipolar anomaly in magnetically quiet area between sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78022	Magnetic	443291	5787866	A2	-	-	-	7	Small dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78023	Magnetic	441301	5784383	A2	-	-	-	16	Asymmetric dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78024	Magnetic	443113	5788895	A2	-	-	-	7	Negative monopolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78025	Magnetic	444240	5789593	A2	-	-	-	12	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78027	Magnetic	445864	5790580	A2	-	-	-	13	Asymmetric dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78028	Magnetic	445636	5790728	A2	-	-	-	5	Small dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78030	Magnetic	445740	5791228	A2	-	-	-	22	Distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78032	Magnetic	443526	5790715	A2	-	-	-	6	Small distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
78035	Magnetic	444738	5791945	A2	-	-	-	5	Small positive monopolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78038	Magnetic	444084	5792452	A2	-	-	-	7	Small negative monopolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78039	Magnetic	444055	5792941	A2	-	-	-	7	Small distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78042	Magnetic	442882	5792822	A2	-	-	-	6	Small narrow negative monopolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78044	Magnetic	445497	5789938	A2	-	-	-	6	Small narrow positive monopolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78047	Magnetic	445236	5788987	A2	-	-	-	7	Small distinct dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78051	Magnetic	441420	5787350	A2	-	-	-	9	Asymmetric dipolar anomaly amongst sand waves. No associated SSS or multibeam bathymetry contact.	-	74547
78154	Mound	444069	5788900	A2	22.0	12.0	1.5	-	Flat topped crescent shaped mound in a region of sand waves. North west to south east orientated - perpendicular to that of the surrounding sand waves.	-	74547
78156	Mound	443162	5791647	A2	28.0	14.5	0.8	9	A distinct elongated mound on a rocky seabed with a possible continuation running at right angles a further 24m into the seabed. Orientated north-west to south-east. Located 50 m to the north west of 78157. It is unclear whether this	-	117810, 74547



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									anomaly, or 78157, is associated with a small magnetic contact. The feature was identified in both the 2014 assessment (report number 74547) and the most recent 2017 geophysical data assessment.		
78157	Mound	443208	5791618	A2	27.0	16.0	0.8	9	Triangular mound with smaller continuation to the east. Located 50m to the south east of anomaly <b>78156</b> . It is unclear whether this anomaly, or <b>78156</b> , is associated with a small magnetic contact.	-	74547
78186	Dark Reflector	441345	5784630	A2	2.7	1.1	0.3	-	Isolated rounded anomaly amongst sand waves with a clear sub-oval shadow visible.	-	74547
78187	Dark Reflector	441883	5784714	A2	2.8	0.6	0.3	-	Elongated anomaly with an indistinct sub-oval shadow amongst the sand waves.	-	74547
78188	Dark Reflector	441838	5784840	A2	2.6	0.7	0.5	-	Indistinct elongated anomaly with a sub-oval shadow visible.	-	74547
78189	Debris	443191	5786823	A2	5.4	1.7	1.1	-	Distinctly irregular object with a distinct and rounded shadow visible and significant height off the seabed. Irregular, and partially hollow, features with slight perpendicular scour and depression before anomaly. Possibly partially buried debris object. The feature was identified in both the 2014 assessment (report number 74547) and the most recent 2017 geophysical data assessment.	-	117810, 74547





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
78190	Dark Reflector	441533	5786811	A2	3.5	1.0	0.7	-	Isolated and distinct dark reflector anomaly with a clear sub-oval shadow visible amongst the dense sand waves. There is possible scour before the anomaly. This could be a natural feature or item of debris. The feature was identified in both the 2014 assessment (report number 74547) and the most recent 2017 geophysical data assessment.	-	117810, 74547
78191	Dark Reflector	445009	5788833	A2	1.6	0.4	0.0	-	Three similar anomalies in a linear formation with distinct shadows at the location of a known pipeline and amongst dense sand waves. The largest of the three is the southernmost anomaly (1.8m x 0.3m x 0.2m) which as a scour. The smallest is the central anomaly (0.9m x 0.5m x 0.1m) with an undefined rounded shadow. The final anomaly is the most northern (1.6m x 0.4m). These anomalies may be partially buried.	-	74547
70145	Magnetic	447070	5786442	A2	-	-	-	7	Isolated weak magnetic anomaly.	-	74540
70059	Debris	440994	5769465	A2	3.3	2.3	1.5	-	A small irregular shaped anomaly with an angular shadow and significant height off the seabed, the feature has a long scour running away from the feature to the southwest. In the MBES data this is visible as a fairly rounded and defined mound with sediment build up and scour around it (entire area measures 10 x 6 m). This is interpreted as being a possible item of debris. The feature was identified in both the 2010 assessment (report number	-	117810, 74540



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									74540) and the most recent 2017 geophysical data assessment.		
70060	Debris	440899	5770722	A2	0.6	0.2	0.4	-	Small rounded anomaly. Feature is located in an area of flat seabed with some small sand waves present in places.	-	74540
70061	Debris	440852	5771528	A2	3.2	0.3	0.8	-	Small elongated anomaly with a long shadow, a scour is visible running away from the object. The anomaly is situated in an area of flat seabed with sand waves close by.	-	74540
70062	Debris	441075	5772640	A2	1.9	0.4	0.2	-	Small sub-circular anomaly with an associated scour. Surrounded by narrow sand waves.	-	74540
70063	Debris	441047	5774051	A2	1.1	0.3	0.3	-	Small sub-circular shaped anomaly in an area of narrow sand waves.	-	74540
70064	Magnetic	440943	5774399	A2	-	-	-	6	Isolated weak magnetic anomaly.	-	74540
70065	Debris field	440935	5774563	A2	36.6	8.2	0.0	-	Two pieces of debris located close together. One is a small elongated anomaly with an angular shadow and the other is a small sub-oval shaped anomaly with an associated scour. Surrounded by narrow sand waves.	-	74540
70066	Debris	441087	5774631	A2	3.4	0.5	0.0	-	Irregular shaped anomaly in an area of sand waves. Two smaller anomalies adjacent to this one.	-	74540
70067	Magnetic	440943	5774893	A2	-	-	-	5	Isolated weak magnetic anomaly.	-	74540



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
70068	Debris	440959	5775192	A2	1.6	0.6	0.7	-	Small sub-oval shaped anomaly with an angular shadow. Located in an area with narrow sand waves.	-	74540
70069	Debris	441066	5776221	A2	0.8	0.2	0.4	-	Small sub-rounded anomaly with an associated scour. The surrounding seabed is relatively smooth with sand waves close by.	-	74540
70070	Magnetic	441014	5781286	A2	-	-	-	7	Isolated weak magnetic anomaly.	-	74540
70123	Seabed disturbance	446904	5768265	A2	35.0	14.0	1.5	-	The shape of the anomaly is linear with some hints of structural elements. The local seafloor is dominated by sand waves. Observed in the bathymetry data as a large sand wave that curves sharply. It is not a separate feature. Looks natural. General seabed depth is approximately - 46.0m. This anomaly has been retained due to its interesting shape in the sidescan sonar data.	-	74540
70124	Magnetic	447052	5768302	A2	-	-	-	6	Isolated weak magnetic anomaly.	-	74540
70125	Debris	446916	5770125	A2	1.7	0.4	0.4	-	Small sub-oval anomaly in an area with fairly large sand waves.	-	74540
70126	Dark reflector	446983	5771556	A2	1.4	0.5	0.4	-	Sub-rounded anomaly with diffuse edges. Located in an area of sand waves.	-	74540
70127	Debris	446902	5771764	A2	0.8	0.6	0.3	-	Small sub-oval shaped anomaly in an area of fairly large sand waves.	-	74540
70128	Debris	446917	5771796	A2	2.3	0.6	0.5	-	Sub-rectangular anomaly with a wide shadow that tapers to a sharp point. Located in an area of fairly large sand waves.	-	74540



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
70129	Debris	447001	5771931	A2	1.3	0.3	0.2	-	Small sub-rectangular anomaly located in an area of sand waves.	-	74540
70131	Magnetic	447046	5774034	A2	-	-	-	5	Isolated weak magnetic anomaly.	-	74540
70132	Debris	446961	5774826	A2	0.8	0.4	0.3	-	Irregular shaped anomaly with an angular shadow and a slight scour. Surrounded by narrow sand waves.	-	74540
70133	Dark reflector	447030	5775919	A2	2.1	1.0	0.5	-	A small and irregularly shaped anomaly with an angular shadow, that is surrounded by sand waves. This could be a natural feature or item of debris. The feature was identified in both the 2010 assessment (report number 74540) and the most recent 2017 geophysical data assessment.	-	117810, 74540
70134	Dark reflector	446945	5777525	A2	8.8	0.8	0.8	-	A slightly curvilinear shaped dark reflector anomaly with significant height off the seabed with a scour in an area of sand waves. Identified in both 2011 and 2017 geophysical survey data. This could be a natural feature or item of debris. The feature was identified in both the 2010 assessment (report number 74540) and the most recent 2017 geophysical data assessment.	-	117810, 74540
70135	Debris	447006	5778881	A2	1.2	0.2	0.6	-	Small irregular shaped anomaly with an angular shadow. Surrounded by sand waves.	-	74540
70136	Debris	447013	5780482	A2	2.0	0.4	0.2	-	Small sub-oval anomaly with slight scour visible. Surrounded by narrow sand waves.	-	74540



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
70137	Debris field	447021	5781412	A2	13.3	9.4	0.2	-	Diamond shaped area that looks to define a cluster of objects. Surrounded by sand waves. Two large pieces of debris fall within this debris field and another lies close by and is most likely related to this spread. Not observed in the MBES data. This is a possible large spread of debris objects identified in 2010 and 2017 geophysical data.	-	117810, 74540
70206	Dark reflector	453079	5766796	A2	8.7	1.9	0.0	-	Irregular anomaly with diffuse edges. Located in an area with sand waves. Not observed in the bathymetry data.	-	74540
70207	Magnetic	453052	5768528	A2	-	-	-	5	Isolated weak magnetic anomaly.	-	74540
70208	Debris	453016	5768615	A2	0.9	0.2	0.0	-	Sub-oval anomaly in an area of sand waves.	-	74540
70209	Magnetic	452953	5769848	A2	-	-	-	12	Isolated weak magnetic anomaly.	-	74540
70684	Wreck	443175	5776176	A1	69.3	17.2	10.6	-	A very large but poorly defined wreck with a broad and distinct shadow is identified on the SSS data. The wreck appears to be partially disintegrated with some objects with height visible in the immediate vicinity. There may be more associated objects buried in the sand waves surrounding this vessel. In the MBES data this is visible as a large wreck orientated north-west to south-east, identified in an area of sand waves. Several, slightly separate mounds along the south-western edge and southern end of the wreck suggest partial disintegration. Wreck has scour extending towards the north and south of feature. In the UKHO database this is recorded as an	UKHO 10942	117810, 74540



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									unidentified wreck originally detected in 1961 and last seen in 1995, with sonar dimensions of height 7.2 m x length 60 m x width 10 m. The wreck is in two parts (or two wrecks close together (anomaly <b>700106</b> ). The feature was identified in both the 2010 assessment (report number 74540) and the most recent 2017 geophysical data assessment.		
70700	Recorded Wreck	445051	5777289	A3	-	-	-	-	Possible wreck identified by Gardline, reported as measuring 107.2 x 17.3 x 1.7 m. The feature was not identified by Wessex Archaeology at this location during this, or previous, assessments.	-	74540
70707	Wreck	445607	5775865	A1	43.9	9.8	7.6	-	A large wreck with clear structure and superstructure preserved, the wreck is upright with multiple levels and appears intact. In the MBES this is visible as a clear defined structure of a wreck, with two compartments situated end to end along the vessel. The wreck is orientated approximately NNE - SSW and is listing slightly to the east. There is some slight scour around the vessel and it is situated within sand waves. Associated debris is visible next to the wreck ( <b>700065</b> and <b>700066</b> ). The wreck is identified in an area of mobile sediments, therefore there is the possibility of additional debris items to be buried in the vicinity. In the UKHO this is thought to be the remains of the <i>Dolfijn</i> , a Belgian trawler lost on the 17th August	UKHO 10941	117810, 74540



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									1970 in gales and heavy seas. The wreck is described as being intact and upright with superstructure, covering an area of 57x10m with a height of 7m and an orientation of 010/190 degrees. The feature was identified in both the 2010 assessment (report number 74540) and the most recent 2017 geophysical data assessment.		
70717	Wreck	447661	5768102	A1	9.9	3.7	0.9	-	A large right angled dark reflector with height and some scour was identified on the sidescan sonar data. In the MBES data this is visible as a small mound aligned north to south and lying perpendicular to the sand wave crest. The corresponding UKHO record records a small wreck, originally detected in 1988, abreast a sand wave which was shallower than the wreck (length 22m x beam 6m orientation 012/192 degrees). The wreck is recorded as not being located during survey in 1995 and amended to FOUL.	UKHO 11189	117810, 74540
700001	Seabed disturbance	452820	5767398	A2	13.0	5.4	0.5	-	A large area of disturbed seabed comprising an indistinct single linear object measuring 7.4 x 0.8 m. The feature appears to be an interrupted bed form possibly containing debris objects	-	117810
700002	Dark reflector	452140	5768419	A2	3.1	1.0	0.5	-	A slightly curvilinear shaped dark reflector with a bright and tapered shadow that is situated within sand waves. This could be a natural feature or debris.	-	117810





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700003	Debris	452042	5768278	A2	5.0	1.1	0.0	13	Two elongated dark reflector objects with no clear height, this is situated amongst sand waves indicating the full feature may be partially buried. This anomaly is possibly associated with a small magnetic anomaly indicating ferrous debris may be present.	-	117810
700004	Debris	451891	5766891	A2	5.4	0.6	0.0	10	A distinct linear dark reflector in line with the sand waves, there is a possible continuation of this linear feature however which may indicate a larger, partially buried linear feature, however this is not always clearly discernible. This feature is possibly associated with a small magnetic anomaly. The magnetic anomaly is located approximately 30 m ESE of the feature, however due to differences in line spacing and orientation, it is thought that the features may be associated indicating some ferrous material may be present.	-	117810
700005	Dark reflector	451626	5772820	A2	2.6	1.2	0.3	-	A small but distinct slightly pointed dark reflector object with some scour and slight height off the seabed. This object may be partially covered by fine sands. This could be a natural feature or debris.	-	117810
700006	Dark reflector	451650	5773866	A2	3.6	0.8	0.3	-	A medium sized distinct dark reflector with height and some slight scouring, this is situated 7 m to the east of a similar object and may be related. This could be a natural feature or debris.	-	117810
700007	Dark reflector	451644	5773867	A2	3.4	0.9	0.3	-	A medium sized distinct dark reflector with height and some slight scouring, this is situated 7 m to the west of a similar object	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									and may be related. This could be a natural feature or debris.		
700008	Debris	451451	5769635	A2	7.9	0.4	0.0	-	A long, thin and indistinct linear dark reflector feature situated on an area of megaripples. This is a possible linear item of debris or a natural feature.	-	117810
700009	Dark reflector	451180	5771583	A2	3.7	0.5	0.2	-	A slightly elongated distinct dark reflector with a bright, short shadow. This object is isolated in an area of sand waves and could be a natural feature or debris.	-	117810
700010	Seabed disturbance	450958	5767330	A2	5.5	0.4	0.2	-	An area of disturbed seabed comprising dark reflector objects with height in three lines. This feature looks anomalous to the surrounding seabed and may contain partially buried objects.	-	117810
700011	Debris	450845	5774666	A2	4.7	0.2	0.0	-	A long and thin linear dark reflector with a small shadow but no height off the seabed. This object looks distinct and isolated in a sand wave rich area of the seabed. This may be a linear item of debris.	-	117810
700012	Debris	450620	5772377	A2	15.8	0.6	0.1	-	A very long and thin slightly curvilinear item of debris, very distinct dark reflector with slight height is visible lying perpendicular to the sand waves.	-	117810
700013	Dark reflector	450348	5771752	A2	2.7	0.5	0.0	-	An elongated dark reflector with a slight shadow but no height off the seabed, looks slightly distinct and anomalous to the surrounding seabed. This could be a natural feature or debris.	-	117810
700014	Dark reflector	450598	5776296	A2	2.2	0.7	0.3	-	A small dark reflector with a tapered shadow and slight scour in a depression.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									This feature is isolated and distinct within an area of sand waves. This could be a natural feature or debris.		
700015	Debris	450389	5775450	A2	6.0	2.2	0.3	-	A long and thick dark reflector object with a slight shadow. The object is possibly partially buried or poorly defined and is situated between sand waves. This is a possibly item of debris	-	117810
700016	Dark reflector	449977	5768861	A2	3.2	1.1	0.3	-	A medium sized dark reflector with slight height off the seabed, this object is situated amongst sand waves and may be partially buried. This could be a natural feature or debris.	-	117810
700017	Dark reflector	451654	5773235	A2	3.4	1.4	0.1	-	A medium sized, slightly indistinct or partially buried dark reflector with slight height off the seabed. This object may be broken up and is situated within sand waves. This could be a natural feature or debris.	-	117810
700018	Dark reflector	448150	5777039	A2	6.9	0.7	0.1	-	A distinct and elongated dark reflector with a small but bright shadow and slight scour. This feature is situated within sand waves and could be a natural feature or debris.	-	117810
700019	Seabed disturbance	448764	5781789	A2	9.6	6.0	0.2	-	A medium sized area of disturbed seabed with a possible small and straight linear bright reflector in its centre. This feature looks anomalous to the surrounding seabed. In the MBES data this is visible as a small and elongated mound identified in an area of megaripples.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700020	Dark reflector	448894	5774570	A2	3.6	1.1	0.0	-	A medium sized indistinct dark reflector object with no associated height. The object has some slight seabed disturbance surrounding it and could be a natural feature or debris.	-	117810
700021	Dark reflector	449107	5778149	A2	3.6	1.1	0.4	-	A distinct and elongated dark reflector object with a bright shadow. This is an isolated object situated within sand waves and could be a natural feature or debris.	-	117810
700022	Debris	449218	5777914	A2	10.2	3.5	1.4	-	A large slightly angular shaped dark reflector with substantial height off the seabed. This object is situated within sand waves and is possibly in a slight depression. In the MBES data this is visible as a small and slightly elongated mound identified in an area of sand waves. The feature has some scour along its eastern edge and may be a large item of debris.	-	117810
700023	Debris field	449031	5771773	A2	33.2	31.0	0.0	22	A large spread of possible debris objects comprising very small and occasionally indistinct dark reflectors, some with slight shadows but no significant height off the seabed. A number of objects are slightly linear shaped and are situated within sand waves. The full extent of these features may be buried. This debris field has a small magnetic anomaly associated indicating ferrous material is present. This is a possible ferrous debris field.	-	117810
700024	Dark reflector	448956	5769002	A2	2.8	0.4	0.0	-	A slightly elongated dark reflector situated amongst sand waves. The object is slightly indistinct and may be partially buried by	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									sands. This could be a natural feature or debris.		
700025	Seabed disturbance	449039	5770611	A2	13.7	5.0	0.4	-	An oval shaped area of indistinct dark reflectors objects, some with height and some without situated within sand waves. Appears as a mound in MBES data orientated in an east to west direction. This is a possible seabed disturbance that may contain debris objects.	-	117810
700026	Dark reflector	449040	5769048	A2	5.4	0.3	0.1	-	A distinct and elongated dark reflector object with slight height off the seabed. The object is lying perpendicular to the sand waves and could be a natural feature or debris.	-	117810
700027	Debris	450035	5774188	A2	6.4	1.7	2.5	-	A long linear dark reflector object with height that is situated in a depression, the feature may be slightly broken up or a collection of items. The surrounding seabed is slightly disturbed. In the MBES data this is visible as a mound orientated approximately east-southeast to west-northwest and is located in the trough of a depression	-	117810
700028	Debris	449981	5770458	A2	6.2	0.4	0.0	-	A long and thin slightly curvilinear shaped dark reflector with no off the seabed within sand waves. This object is situated close to a smaller dark reflector ( <b>700029</b> ) and may be related. This has been interpreted as an item of debris.	-	117810
700029	Dark reflector	449983	5770453	A2	2.5	0.7	0.1	-	A small but distinct oval shaped dark reflector with slight height off the seabed. This object is situated close to a linear	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									dark reflector ( <b>700028</b> ) and may be related. This could be a natural feature or debris.		
700030	Dark reflector	447722	5773623	A2	3.0	1.1	0.9	-	A pointed dark reflector object with significant height off the seabed, this feature is isolated and distinct on a sand wave rich area of the seabed. This could be a natural feature or debris.	-	117810
700031	Debris	447836	5775135	A2	10.3	0.2	0.0	-	A long thin and indistinct slightly curvilinear shaped dark reflector with slight height off the seabed. This object is situated within sand waves with a similar object located to the south ( <b>700032</b> ). This is a possible item of debris.	-	117810
700032	Debris	447831	5775103	A2	11.6	0.1	0.0	-	A long thin and indistinct slightly curvilinear shaped dark reflector with slight height off the seabed. This object is situated within sand waves with a similar object located to the north ( <b>700031</b> ). This is a possible item of debris.	-	117810
700033	Seabed disturbance	447531	5771413	A2	15.4	7.7	1.3	-	A group of small and distinct dark reflector objects with shadows situated on the edge of a large sand wave. In the MBES data this is visible as a mound, or possibly two mounds orientated north-northwest to south-southeast. This is a possible seabed disturbance that may contain debris objects.	-	117810
700034	Debris	447210	5769207	A2	14.5	3.5	0.0	-	A long and thin group of linear dark reflectors or a partially buried linear item of debris. The feature might be partially buried by fine sand or broken up.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700035	Seabed disturbance	447449	5771896	A2	7.6	7.3	0.5	-	A medium sized oval group of dark reflector objects with height situated within sand waves and possibly partially buried by fine sands. This feature is identified in the MBES data as an indistinct oval mound orientated approximately east to west. This could be a natural feature or buried debris.	-	117810
700036	Dark reflector	447141	5770638	A2	3.8	1.8	0.8	-	A long and slightly tapered dark reflector with height, possibly in a slightly scour or depression, in the MBES this is visible as a small mound in the trough of a bedform. This could be a natural feature or debris.	-	117810
700037	Dark reflector	446693	5769238	A2	3.4	0.9	0.3	-	A slightly elongated dark reflector with a short and bright shadow situated amongst sand waves. This isolated object possibly has some slightly scour associated. This could be a natural feature or debris.	-	117810
700038	Bright reflector	446844	5773976	A2	8.6	4.5	0.7	-	An irregularly shaped bright reflector object or possibly a collection of items. In the MBES data this is visible as a larger mound with much smaller mound next to it. This feature is in the track of a trawler and may be natural disturbance, however it has been retained based on its anomalous nature.	-	117810
700039	Dark reflector	447103	5778301	A2	2.9	0.8	0.6	-	A rounded and distinct dark reflector object with a long, bright shadow, situated within an area of sand waves. There is some slight scour possibly associated with this object. This could be a natural feature or debris.	-	117810





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700040	Seabed disturbance	447063	5778951	A2	27.7	6.6	0.4	-	A large slightly oval shaped area possibly containing indistinct dark reflector anomalies or small mounds, situated within sand waves it is possible that the bulk of this feature is buried. In the MBES data this is visible as a curvilinear mound orientated in a rough 'L' shape aligned south to northwest.	-	117810
700041	Dark reflector	446934	5776295	A2	2.9	0.6	0.5	-	A small slightly rectangular shaped dark reflector with a bright and square shadow. This could be a natural feature or item of debris.	-	117810
700042	Debris	446504	5769071	A2	5.1	0.6	0.8	-	An isolated dark reflector with significant height, situated within an area of sand waves. This is a distinct and straight edged object and possible item of debris.	-	117810
700043	Debris	447114	5781787	A2	6.3	0.5	0.3	-	A distinct, thin linear dark reflector with a slight shadow that is lying perpendicular to the sand waves and may be partially buried. This is a possible linear item of debris.	-	117810
700044	Seabed disturbance	447238	5783951	A2	11.0	5.2	0.0	-	Seabed disturbance seen in the bed forms, possibly a linear item. Identified in an area of textures seafloor, therefore may be linked to natural outcropping, however the potential remains for a partially buried item and, as such, the feature has been retained.	-	117810
700045	Seabed disturbance	446335	5771214	A2	7.0	3.8	0.0	-	A medium sized, rounded area of possibly disturbed seabed visible as mostly shadows in the SSS data. There is possible outcropping or partially buried	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									items within the area. This is possibly natural or an area of disturbed seabed containing debris objects.		
700046	Dark reflector	446467	5773274	A2	1.9	0.8	0.5	-	A small and distinct dark reflector with a bright and tapered shadow and some slight scour. This object is situated amongst sand waves and could be natural or a possible item of debris.	-	117810
700047	Dark reflector	446451	5774804	A2	2.5	1.3	0.8	-	A distinct and slightly rounded dark reflector with a bright shadow and significant height off the seabed. The object has some slight scour associated, this may be a natural feature or item of debris.	-	117810
700048	Dark reflector	446545	5776702	A2	4.2	2.1	0.5	-	A medium sized dark reflector object with a bright and tapered shadow and with slight scour surrounding it. In the MBES data this is a small mound sat within an elongated oval depression (the depression measures 9.6 x 5.6 x -0.3 m). This could be natural or an item of debris.	-	117810
700049	Seabed disturbance	446497	5778010	A2	18.5	6.2	0.3	-	A large area of possibly disturbed seabed with some indistinct possible linear dark reflector objects visible in places. In the MBES data this is visible as an elongated oval mound orientated north to south with a slight depression in its centre. This possible seabed disturbance is on a relatively featureless area of seabed and may contain buried debris objects.	-	117810
700050	Debris	446489	5779295	A2	6.3	0.5	0.4	-	An indistinct elongated dark reflector object with height possibly situated in a	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									slight depression, this may be a partially buried item of debris.		
700051	Dark reflector	447029	5788240	A2	1.8	0.5	0.1	-	A distinct slightly right angled dark reflector object with a bright shadow but little height off the seabed, this may be partially buried. This may be a natural feature or item of debris.	-	117810
700052	Seabed disturbance	445900	5768983	A2	27.6	9.4	1.6	-	A large area of disturbed seabed which appears to contain two-pointed dark reflector objects within sand waves with significant height off the seabed. In the MBES data this is visible as a small but distinct mound amongst the bedforms which may contain a partially buried item. This could be a seabed disturbance containing debris items.	-	117810
700053	Dark reflector	445954	5772321	A2	3.2	0.4	0.2	-	A slightly elongated dark reflector object with slight height off the seabed and faint scour, the object appears to be slightly linear. This could be a natural feature or item of debris.	-	117810
700054	Dark reflector	446467	5781073	A2	2.3	1.4	0.5	-	A small and slightly rounded/irregularly shaped dark reflector object with a bright and tapered shadow and some slight scour. This feature looks anomalous to the surrounding seabed anomalies and may be a natural feature or item of debris.	-	117810
700055	Rope/chain	446825	5787888	A2	6.6	0.1	0.0	-	A slightly coiled long and thin linear dark reflector object that appears to be partially buried in the bed forms. This feature is very indistinct and may be a rope or chain.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700056	Dark reflector	445686	5766983	A2	5.4	1.3	0.2	-	A medium sized distinctive dark reflector with a bright pointed shadow, this is an irregularly shaped object and is possibly more than one item. This may be a natural feature or item of debris.	-	117810
700057	Debris field	445718	5770911	A2	7.7	2.9	0.6	-	An irregularly shaped rounded dark reflector object with a bright shadow and seabed disturbance around it, there are possibly partially buried items within this. This is a medium sized possible debris field.	-	117810
700058	Dark reflector	445735	5772890	A2	2.1	0.8	0.5	-	A rounded dark reflector object with a long and bright shadow situated within a depression and next to second depression. This is slightly visible in the MBES as a slight depression on a featureless area of the seabed. This may be a natural feature or item of debris.	-	117810
700059	Debris	445964	5778832	A2	3.7	1.7	0.6	-	A slightly rounded dark reflector with a bright and irregularly shaped shadow and significant height off the seabed. This is an isolated object possibly in a slight depression. This may be an item of debris.	-	117810
700060	Dark reflector	445791	5772969	A2	2.7	1.1	0.8	-	A distinct rounded dark reflector object with a long and tapered shadow and significant height off the seabed. This may be a natural feature or item of debris.	-	117810
700061	Dark reflector	445619	5771346	A2	1.7	0.9	0.2	-	A curved dark reflector anomaly with a tapered shadow situated within sand waves. This may be a natural feature or item of debris.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700062	Seabed disturbance	445930	5779788	A2	11.7	4.2	0.7	-	An area of seabed disturbance visible in the SSS data as an uneven area of seabed with a possible linear feature measuring 5.1 x 4.2 m within it. In the MBES data this is visible as a distinct mound within a depression (depression measuring approximately 11 x. 9 x -0.2 m). This is a possible seabed disturbance that may contain debris objects.	-	117810
700063	Dark reflector	446025	5782377	A2	1.7	0.2	0.1	-	A small but relatively distinct elongated dark reflector object with slight height off the seabed. This anomaly is situated on a rough and uneven area of the seabed and may be a natural feature or item of debris.	-	117810
700064	Bright reflector	445891	5779489	A2	5.7	0.5	0.0	-	An elongated and slightly curved bright reflector object that may be linked to a natural depression however, due to its isolated position and anomalous nature, it has been retained as a potential feature of archaeological interest.	-	117810
700065	Debris	445621	5775879	A1	2.0	1.0	0.1	-	A small and indistinct dark reflector object that may be partially buried situated next to wreck <b>(70707)</b> and likely associated wreck debris.	-	117810
700066	Debris	445620	5775875	A1	2.0	0.2	0.0	-	A slightly curvilinear, indistinct dark reflector object with slight height or slight scour that is situated next to wreck <b>(70707)</b> and is likely associated wreck debris.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700067	Seabed disturbance	445759	5778975	A2	14.6	13.9	1.3	-	A seabed disturbance comprising a large mound measuring 15.1 x 2.2 x 1.3 m with a collection of smaller dark reflector objects exposed. In the MBES data this is visible as a large, poorly defined and slightly rounded mound. The feature is quite tall and distinct and has associated scour. This is a seabed disturbance, possibly containing debris objects.	-	117810
700068	Dark reflector	445464	5774426	A2	3.5	2.5	0.8	-	A medium sized slightly curved dark reflector with significant height and possible scour. In the MBES data this is visible as a small mound with scour located amongst the bedforms. This may be a natural feature or item of debris.	-	117810
700069	Dark reflector	445411	5776373	A2	3.4	0.5	0.5	-	A long and thin dark reflector with a very angular pointed shadow and height seabed. The object is situated within megaripples and may be partially buried in a depression which is visible in the MBES data. This may be a natural feature or item of debris.	-	117810
700070	Dark reflector	445028	5769231	A2	6.0	3.5	0.3	-	An indistinct, elongated dark reflector object with a dull shadow. In the MBES data this is visible as a small mound orientated north-northeast to south-southwest with slight scour situated on an area of flat seabed. This may be a natural feature or item of debris.	-	117810
700071	Seabed disturbance	444825	5767101	A2	12.9	6.7	0.0	-	A large area of disturbed seabed seen as slightly darkened reflectors with very slight height. The feature is isolated is a slightly	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									linear alignment. This maybe a seabed disturbance containing debris objects.		
700072	Dark reflector	444851	5768068	A2	5.0	3.0	0.3	-	A slightly irregularly shaped dark reflector with a slightly bulbous shadow. In the MBES data this is visible as a small mound with no clear scour the mound is orientated roughly north to south and is isolated. This may be a natural feature or item of debris.	-	117810
700073	Debris field	445040	5769433	A2	15.0	7.0	0.4	63	A medium sized debris field comprising bright reflectors and lower reflectivity, the feature appears to be a mound on an otherwise featureless area of seabed. In the MBES data this is visible as a large mound with a smaller mound (4 x 3 m) on top and appears to be partially buried in sediment. There is no scour present around the feature and it is orientated in a roughly north to south direction. This debris field has a magnetic anomaly associated indicating ferrous material is present.	-	117810
700074	Debris	445052	5770024	A2	2.5	0.7	0.1	7	A small dark reflector with a small shadow and in a slight depression. A small magnetic anomaly has been associated with this feature which may indicate the presence of ferrous material.	-	117810
700075	Magnetic	444986	5770108	A2	-	-	-	23	Small dipole with no surface expression, possibly buried ferrous object. A dark reflector, interpreted as being natural, is identified 30 m to the north. However, based on distance between the anomalies,	-	117810





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									and the form of the sonar anomaly, it is not thought that the features are associated.		
700076	Dark reflector	444829	5768191	A2	2.3	1.0	0.8	-	A small and slightly angular dark reflector with a long, bright shadow and significant height off the seabed. This feature is situated within an area of megaripples and could be a natural feature or item of debris	-	117810
700077	Dark reflector	444776	5767679	A2	5.3	1.6	0.2	-	A very indistinct disjointed linear dark reflector with a bright shadow. This is a fairly isolated feature on a sandy area of seabed and could be a natural feature or item of debris.	-	117810
700078	Debris	444606	5768578	A2	7.3	0.5	0.5	-	A long and thin linear dark reflector with a bright shadow on the crest of a sand wave. Isolated and distinct object that may be a linear item of debris.	-	117810
700079	Seabed disturbance	445148	5777353	A2	32.6	7.3	0.4	-	A slightly oval shaped area of disturbed seabed lying perpendicular to the sand waves and cutting through them in a north south orientation. There are indistinct dark reflector objects buried within this disturbance. In the MBES data this is visible as a slightly irregular, relatively oval shaped mound identified in an area of megaripples. Not particularly distinct however there is some disruption to natural formations and, as such, the feature has been retained. This feature is located 103 m northeast of Gardline identified wreck (Wessex Archaeology anomaly number <b>70700</b> ).	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700080	Dark reflector	444603	5767811	A2	3.6	1.5	0.4	-	A small and indistinct slightly right angled dark reflector with a bright shadow. Isolated anomaly on a sandy area of the seabed. This is visible in the MBES data as a small and rounded mound. This could be a natural feature or item of debris.	-	117810
700081	Dark reflector	444632	5792248	A2	2.6	0.3	0.3	-	A small and thin elongated dark reflector object with slight height. The feature is relatively isolated on the seabed and may be a natural feature or item of debris.	-	117810
700082	Debris	443611	5773742	A2	5.7	0.5	0.2	-	Two straight linear dark reflector objects with height identified in an area of sand waves. This may be a partially buried linear item of debris.	-	117810
700083	Dark reflector	443654	5774338	A2	3.2	0.5	0.1	-	A slightly elongated, thin dark reflector object with a very slight shadow within an area of sand waves. This could be a natural feature or item of debris.	-	117810
700084	Debris	444273	5784876	A2	6.4	0.5	0.2	-	An elongated, poorly defined linear dark reflector with slight height off the seabed. Identified in an area of sand waves. This could be a natural feature or item of debris. Identified close to a cable, therefore the possibility remains that is an associated feature, however as it does not lie directly on the charted position, the feature has been retained.	-	117810
700085	Dark reflector	443436	5769432	A2	4.0	1.0	0.4	-	A thick and elongated dark reflector with a distinct, angular shadow. This has been identified in an area of sand waves and could be a natural feature or item of debris.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700086	Rope/chain	444729	5792822	A2	10.3	0.4	0.2	-	A long and thin curvilinear faint dark reflector with slight height off the seabed identified within area of megaripples. The feature is lying perpendicular to the megaripples and may be a rope or chain.	-	117810
700087	Debris	444668	5791252	A2	3.3	1.3	0.5	-	A very faint poorly defined dark reflector object with a dull shadow identified in an area of sand waves. The object appears to be slightly jagged and irregular and may be an item of debris.	-	117810
700088	Dark reflector	443878	5773787	A2	2.5	1.4	0.7	-	A small but distinct dark reflector with a long, narrow shadow and significant height off the seabed. Feature appears to have an additional elongated dark reflector; however, it is possible that this is part of the surrounding natural formations. Identified in an area of sand waves this could be a natural feature or item of debris.	-	117810
700089	Dark reflector	443993	5776881	A2	7.1	3.8	1.2	-	A large, poorly defined dark reflector with a broad but tapered shadow with significant height off the seabed. This feature has been identified in an area of sand waves and could be a natural feature or item of debris.	-	117810
700090	Seabed disturbance	444898	5794214	A2	17.9	16.6	0.0	-	Small patch of disturbed seabed. Comprised few, elongated, relatively straight bright reflectors. Possibly a natural feature; however, the bright reflectors appeared to be straighter than other similar features and, as such, has been retained as a precaution.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700091	Dark reflector	444276	5777998	A2	3.4	1.0	0.5	-	A faint and slightly rounded dark reflector with a distinct but tapered shadow identified in an area of mega ripples. This could be a natural feature or item of debris.	-	117810
700092	Dark reflector	444546	5780587	A2	9.5	3.0	0.3	-	A relatively large dark reflector with a possible broad distinct shadow that is situated on the flank of a sand wave. In the MBES data this is visible as an elongated, irregularly shaped mound identified in sand waves. This could be a natural feature or item of debris.	-	117810
700093	Dark reflector	444353	5775528	A2	4.7	1.2	0.4	-	An elongated dark reflector object with a broad, distinct shadow that is situated within an area of sand waves. The object may be situated in a slight depression and could be a natural feature or item of debris.	-	117810
700094	Dark reflector	444997	5788790	A2	4.1	0.4	0.2	-	A thin and elongated dark reflector object with a slight shadow identified in an area of sand waves. This could be a natural feature or item of debris.	-	117810
700095	Dark reflector	444327	5773737	A2	8.6	1.9	1.0	-	A medium sized irregularly shaped dark reflector with a long, narrow but faint shadow and significant height. This feature looks anomalous to the surrounding seabed. This could be a natural feature or item of debris.	-	117810
700096	Debris	444111	5768648	A2	7.7	3.9	0.4	-	A relatively large, irregularly shaped dark reflector object with a jagged shadow. The feature is possibly in a depression and situated on a flat and even area of seabed	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									with trawl scars. A slightly small mound is visible in the MBES data. This could be an item of debris.		
700097	Debris	444312	5774828	A2	9.6	0.8	0.0	-	Two linear dark reflectors in line with each other and close together with no height off the seabed. This is a possible partially buried item of linear debris.	-	117810
700098	Bright reflector	445288	5791830	A2	4.7	1.3	0.0	-	A medium sized irregularly shaped distinct bright reflector object identified in an area of mega ripples. This could be a natural feature or item of debris.	-	117810
700099	Dark reflector	444919	5784481	A2	5.0	0.2	0.1	-	A wavy linear dark reflector object with a very slight shadow, this object is situated within an area of sand waves and could be a natural feature or item of debris.	-	117810
700100	Dark reflector	444890	5782034	A2	4.4	2.1	0.8	-	A slightly irregularly shaped dark reflector with a long shadow and significant height off the seabed. This is an indistinct object that has been identified in an area of sand waves and could be a natural feature or item of debris.	-	117810
700101	Seabed disturbance	444184	5768648	A2	5.3	5.8	0.0	-	A small to medium sized area of disturbed seabed comprising several small bright reflector objects. This feature is quite distinct on a featureless and sandy area of the seabed and could be a seabed disturbance containing debris objects.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700102	Seabed disturbance	444741	5779556	A2	10.9	10.4	0.7	-	A large area of disturbed seabed comprising a main and distinct dark reflector object with height with three possibly buried dark reflectors around this. This feature has been identified in an area of mega ripples. In the MBES data this is visible as an elongated mound within a depression. There is possibly associated scour and some disturbance to surrounding formations. This could be an area of disturbed seabed containing debris objects.	-	117810
700103	Debris	444607	5777221	A2	14.2	0.2	0.1	-	A straight and disjointed in places linear dark reflector with height identified in an area of mega ripples. This is a possible partially buried item of debris.	-	117810
700104	Wreck	445160	5785231	A1	25.0	6.8	0.0	-	A distinct edged wreck that is lying perpendicular to and cutting through the sand waves. The wreck appears to have slatted dark reflectors in its centre and is intact, although with little height which might suggest that is partially buried or in a poorly preserved state. In the MBES data this is visible as a poorly defined, irregular mound identified in an area of sand waves. The wreck is not particularly distinct; however, it causes some disruption to natural seabed formations. The wreck is orientated NNE to SSW and has some very slight scour along its western edge.	-	117810
700105	Dark reflector	445126	5782375	A2	3.1	0.9	1.0	-	A medium sized slightly rectangular shaped dark reflector with a long and distinct shadow and significant height off the seabed. This feature had been	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									identified in an area of textured seabed. This could be a natural feature or item of debris.		
700106	Wreck	443119	5776076	A1	24.6	13.2	7.2	-	A large and poorly defined area of debris objects with a broad, distinct shadow and significant height off the seabed. There is one long, narrow shadow present indicating a particularly tall structure and three large objects discernible. In the MBES data this is visible as an irregularly shaped mound, orientated NNE - SSW. The feature is located approximately 91 m south-west of wreck <b>70684</b> , which has a UKHO record stating that it is possibly in two parts. It is possible therefore that this is a separate section of wreck, or associated wreck debris. The feature has associated scour extending approximately 50 m to the south-west.	UKHO 10942	117810
700107	Debris	443140	5776163	A1	1.8	1.2	0.8	-	A small and indistinct dark reflector object with a relatively broad shadow and significant height off the seabed. This object is situated close to wreck <b>70684</b> and may be an associated item of debris.	-	117810
700108	Debris	443144	5776172	A1	3.8	2.7	2.2	-	A small dark reflector object with a relatively broad shadow and significant height off the seabed. This object is not very distinct however it is situated close to wreck <b>70684</b> and therefore may be an associated item of debris.	-	117810
700109	Debris	443141	5776217	A1	8.7	0.4	0.2	-	A slightly curvilinear shaped dark reflector with a short and bright shadow that has	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									been identified close to wreck <b>70684</b> . This is a possible associated item of wreck debris		
700110	Dark reflector	443808	5783042	A2	3.7	0.6	0.2	-	An elongated dark reflector with height identified in an area of sand waves. Close to another similar feature ( <b>700111</b> ) and may be related. This could be a natural feature or item of debris	-	117810
700111	Dark reflector	443809	5783051	A2	2.6	0.2	0.1	-	An elongated dark reflector with height identified in an area of sand waves. Close to another similar feature ( <b>700110</b> ) and may be related. This could be a natural feature or item of debris	-	117810
700112	Debris	443619	5779579	A2	12.6	2.8	1.6	-	A large dark reflector object with a broad, distinct shadow and significant height. The object has some associated scour and is situated within sand waves. In the MBES data this is visible as a small mound identified in an area of megaripples. The feature has some associated scour extending approximately 30 m south-southwest. This is a possibly item of debris.	-	117810
700113	Debris	443102	5779986	A2	30.4	0.4	0.3	-	A distinct, thin curvilinear dark reflector object with height. The feature is in an intermittent circle and is possibly partially buried. This is an isolated possible item of debris.	-	117810
700114	Debris field	443812	5791914	A2	34.3	20.0	0.0	-	A large area of disturbed seabed comprising several bright reflectors and dark reflectors in a group on a rough and uneven area of the seabed. This feature	-	117810





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									looks anomalous to the surrounding seabed and may be a debris field.		
700115	Bright reflector	443084	5776721	A2	8.6	3.0	0.0	-	A very indistinct and slightly elongated bright reflector within an area of sand waves, the object is lying perpendicular to the sand waves and could be a natural feature or item of debris.	-	117810
700116	Debris field	442662	5770229	A2	12.3	19.0	0.4	-	Small medium sized area comprising several small and angular shaped dark reflectors with height. This feature has been identified on flank of sand wave and may be a debris field.	-	117810
700117	Dark reflector	443797	5792242	A2	6.1	1.2	0.3	-	An elongated dark reflector with a distinct shadow. There is some disturbance to the surrounding seabed sediment. This could be a natural feature or item of debris.	-	117810
700118	Debris field	442904	5771434	A2	14.4	7.3	0.4	-	A patch of disturbed seabed containing several small dark reflectors with height. The feature has been identified in an area of sand waves and further anomalies may be buried. This looks quite distinct and may be a debris field	-	117810
700119	Dark reflector	442752	5768247	A2	2.4	0.6	0.5	-	A small, thin, slightly rounded dark reflector object with a relatively broad and distinct shadow. Identified in an area of sand waves and could be a natural feature or item of debris.	-	117810
700120	Debris	443760	5785043	A2	8.0	0.5	0.1	-	A very indistinct, slightly curved, narrow linear dark reflector with height situated in	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									between sand waves. This is a possible linear item of debris.		
700121	Bright reflector	443052	5771182	A2	6.3	0.7	0.0	-	Straight elongated bright reflector identified in an area of sand waves. Possibly natural however looks quite distinct.	-	117810
700122	Rope/chain	444311	5794394	A2	40.8	0.3	0.1	-	A long dark reflector with a slight shadow that appears to continue as a very faint wavy dark reflector with very slight height, this might be a rope or chain.	-	117810
700123	Seabed disturbance	443736	5781896	A2	23.5	17.1	0.0	-	A large area of possible seabed disturbance comprising some bright reflectors and indistinct dark reflector objects. This looks anomalous to the surrounding seabed and may contain buried debris objects.	-	117810
700124	Dark reflector	441755	5771679	A2	2.9	2.1	1.0	-	A small and indistinct dark reflector object with a long, narrow shadow and significant height off the seabed. This has been identified in an area of disturbed seabed and could be a natural feature or item of debris.	-	117810
700125	Dark reflector	442724	5791054	A2	3.0	0.5	0.1	-	A straight and elongated dark reflector object with a slight shadow. Identified in a relatively featureless area of seabed. This could be a natural feature or item of debris.	-	117810
700126	Debris	442397	5787684	A2	12.4	0.4	0.3	-	A long and thin curvilinear dark reflector object with slight height. Identified on the edge of an area of mega ripples and orientated in a north to south orientation	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									on the seabed. This is a possible linear item of debris.		
700127	Dark reflector	442436	5780497	A2	4.4	0.5	0.2	-	A medium sized slightly elongated dark reflector with height identified in an area of sand waves. This could be a natural feature or item of debris.	-	117810
700128	Bright reflector	442376	5787731	A2	3.1	3.2	0.0	-	A small, semi-circular shaped bright reflector with a slight dark reflector at the back. This feature looks slightly anomalous to the surrounding seabed and could be a natural feature or item of debris.	-	117810
700129	Seabed disturbance	441497	5771530	A2	17.7	11.6	0.4	-	A medium sized area of disturbed seabed containing dark and bright reflector objects and covered by sands. In the MBES data this is visible as a mound that appears to extend to the southeast, with scour encompassing it. This feature is situated on a flat and even area of the seabed and possibly contains debris objects.	-	117810
700130	Dark reflector	443275	5796442	A2	4.0	1.2	0.4	-	A medium sized irregularly shaped dark reflector object with a distinct shadow and some associated scour. This feature is possibly situated in a depression on a sandy area of seabed. This could be a natural feature or item of debris.	-	117810
700131	Dark reflector	442853	5787696	A2	3.8	0.4	0.2	-	A faint and elongated dark reflector object with a slight shadow. This feature is not particularly distinct however it appears to be perpendicular to the natural formations. This could be a natural feature or item of debris.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700132	Dark reflector	442690	5781547	A2	4.7	1.4	0.5	-	A medium sized and distinct dark reflector within an area of mega ripples. The feature has a distinct shadow and some slight disturbance to the surrounding sediment. This could be a natural feature or item of debris.	-	117810
700133	Rope/chain	443368	5795116	A2	32.0	0.7	0.0	-	A very faint, long and thin curvilinear dark reflector with a slight shadow but no height on a featureless area of the seabed. This could be a rope or chain or natural feature.	-	117810
700134	Dark reflector	443016	5786098	A2	8.0	1.0	0.2	-	A narrow and elongated, angular dark reflector with a distinct shadow that is located on the flank of a sand wave. This could be a natural feature or item of debris.	-	117810
700135	Dark reflector	442534	5777109	A2	4.0	0.2	0.1	-	A small and indistinct elongated dark reflector object with a slight shadow identified in an area of sand waves. This could be a natural feature or item of debris.	-	117810
700136	Dark reflector	442503	5776973	A2	7.2	1.2	0.1	-	A slightly curvilinear shaped dark reflector with a very slight shadow that is situated within an area of sand waves. The object is not particularly distinct however looks slightly anomalous to the surrounding seabed. This could be a natural feature or item of debris.	-	117810
700137	Dark reflector	442380	5773579	A2	2.6	2.0	1.0	-	A distinct and slightly rounded dark reflector with a broad shadow and significant height. This feature is situated in an area of sand waves and is visible in the MBES data as a small mound at the	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									end of a bedform, that appears to disrupt the surrounding bedforms. This could be a natural feature or item of debris		
700138	Dark reflector	443652	5796423	A2	2.4	0.4	0.9	-	A small dark reflector with a distinct, irregular shadow and significant height. Identified in a relatively featureless area of seabed. This could be a natural feature or item of debris.	-	117810
700139	Dark reflector	442718	5777978	A2	5.6	0.8	0.2	-	A semi-circular dark reflector object with a very slight shadow, that is possibly detached identified within an area of sand waves. This could be a natural feature or item of debris.	-	117810
700140	Bright reflector	440606	5767682	A2	4.9	0.6	0.0	-	A very indistinct, straight and elongated bright reflector object identified in a relatively isolated area of seabed. This could be a natural feature or item of debris.	-	117810
700141	Seabed disturbance	440601	5767746	A2	6.0	3.7	0.2	-	An indistinct round seabed disturbance possibly containing some small dark reflector objects with height. This feature is isolated on the seabed and a little anomalous compared to its surroundings. This is a possible seabed disturbance containing possibly buried debris objects.	-	117810
700142	Seabed disturbance	440585	5769126	A2	17.0	15.2	0.4	-	A large area of disturbed seabed containing possible small dark reflector object and with a jagged shadow. This is possibly a natural feature however it is isolated and anomalous to the surrounding seabed.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700143	Dark reflector	441081	5776444	A2	3.8	0.9	0.3	-	A distinct and slightly elongated dark reflector with height identified in an area of mega ripples. This could be a natural feature or item of debris.	-	117810
700144	Bright reflector	440952	5769388	A2	5.0	0.9	0.0	-	A small and indistinct curved bright reflector object. This is an isolated object on a very flat and even area of seabed and could be an item of debris.	-	117810
700145	Dark reflector	441127	5773805	A2	4.7	0.8	0.6	-	A distinct and elongated dark reflector object with a broad, distinct shadow. Identified in an area of mega ripples this could be a natural feature or item of debris.	-	117810
700146	Debris	441539	5778041	A2	8.2	0.8	0.3	-	An elongated dark reflector with an object with height at either end. This feature looks anomalous to the surrounding seabed and may be a natural feature or item of debris.	-	117810
700147	Seabed disturbance	441152	5771107	A2	15.1	7.7	0.7	-	A large rounded area of disturbed seabed that may contain one or two dark reflector objects, on object measures 4 x 1.2 m. In the MBES this is visible as a mound orientated approximately north-northeast to south-southwest, with scour encompassing the feature. This could be a seabed disturbance containing possible debris objects.	-	117810
700148	Dark reflector	441358	5773989	A2	4.7	1.3	0.3	-	A faint dark reflector with a distinct but tapered shadow. Identified in a relatively featureless area of seabed. This could be a natural feature or item of debris.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700149	Bright reflector	442394	5791808	A2	4.2	2.2	0.0	-	Slightly irregular, elongated bright reflector on a featureless area of seabed. This could be natural or an item of debris.	-	117810
700150	Debris	441068	5767355	A2	7.5	0.7	0.2	-	A small dark reflector with height with an associated elongated dark reflector attached. This could be two separate features and is a possible item of debris on a sandy and featureless area of the seabed.	-	117810
700151	Debris	441551	5774638	A2	4.5	0.7	0.5	-	An elongated dark reflector with a distinct, slightly curved shadow. This is an isolated object that could be a natural feature or item of debris.	-	117810
700152	Bright reflector	442572	5792748	A2	2.7	2.3	0.0	-	A small irregular bright reflector object with some dark reflectors associated. The feature is possibly related to a depression however, as this is uncertain and due to its anomalous nature, it has been retained as it has the potential of being an item of debris.	-	117810
700153	Dark reflector	441477	5773173	A2	3.4	0.8	0.4	-	A distinct and slightly rounded dark reflector object with a slightly jagged shadow that has been identified in an area of sand waves. This could be a natural feature or item of debris	-	117810
700154	Dark reflector	442118	5783489	A2	2.1	2.0	0.9	-	A small and slightly angular dark reflector object with significant height identified in an area of sand waves. This is visible in the MBES data as a small, isolated and distinct mound within a slight depression. This could be a natural feature or item of debris.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700155	Dark reflector	442116	5782717	A2	4.5	1.3	0.9	-	A medium sized, poorly defined dark reflector with a slightly jagged shadow. Identified in an area of rippled seabed. This could be a natural feature or item of debris.	-	117810
700156	Dark reflector	441769	5777733	A2	4.7	0.5	0.3	-	An elongated dark reflector with height identified in an area of sand waves. This could be a natural feature or item of debris.	-	117810
700157	Dark reflector	442494	5791635	A2	4.7	0.9	0.2	-	An elongated dark reflector with a slight shadow identified within a slight depression. This could be a natural feature or item of debris.	-	117810
700158	Bright reflector	442390	5789905	A2	11.7	2.8	0.0	-	An elongated, irregularly shaped bright reflector that is relatively isolated on the seabed. This could be a natural feature or a large item of debris.	-	117810
700159	Dark reflector	441595	5789425	A2	3.7	0.8	0.4	-	A faint, slightly elongated dark reflector with height identified in an area of mega ripples and may be partially buried. This could be a natural feature or item of debris.	-	117810
700160	Dark reflector	441234	5780536	A2	4.3	3.5	1.2	-	A very indistinct and slightly rounded dark reflector with a long, distinct shadow and significant height. This feature identified in an area of sand waves and may be partially buried, there is also so possible scour from the object. This could be a natural feature or item of debris.	-	117810





ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700161	Rope/chain	440371	5771569	A2	27.0	0.4	0.0	-	A very indistinct curvilinear shaped dark reflector with no discernible height identified in an area of numerous trawl scars. This may be a scar; however, it appears to be more distinct compared to the surrounding seabed anomalies and has been retained as a possible rope or chain.	-	117810
700162	Seabed disturbance	440477	5775879	A2	6.7	3.1	0.0	-	A small and isolated rounded patch of disturbed seabed situated on a very flat and even area of seabed. There is an irregularly shaped dark reflector object visible within a bright reflector, which is possibly a depression. This could be a seabed depression containing debris objects.	-	117810
700163	Debris	440773	5781128	A2	1.7	1.4	0.1	-	A small but distinct circular dark reflector with a very slight shadow, and a bright, possibly hollow section in its centre. Feature is identified within an area of mega ripples and is a possible item of debris.	-	117810
700164	Dark reflector	441135	5788944	A2	10.2	9.0	0.9	-	A long and slightly angular shaped dark reflector with a broad and rectangular shadow with significant height. This feature has been identified in an area of rippled seabed and could be a natural feature or item of debris.	-	117810
700165	Dark reflector	440268	5768693	A2	3.3	0.7	0.8	-	A small dark reflector object with a distinct, relatively broad, slightly tapered shadow and significant height off the seabed. This feature has been identified within a slight depression and is isolated on a flat and	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									ever area of the seabed. This could be a natural feature or item of debris.		
700166	Debris	441717	5795427	A2	12.2	0.4	0.1	-	A long and thin curvilinear dark reflector with a very slight shadow identified within an area of rippled seabed. The object is a slightly different orientation to natural formations and therefore interpreted as a possible linear item of debris.	-	117810
700167	Bright reflector	440480	5768497	A2	2.7	2.3	0.0	-	An irregularly shaped bright reflector with a darker reflector at its rear isolated on the seabed. This could be a natural feature or item of debris.	-	117810
700168	Magnetic	446036	5766884	A2	-	-	-	19	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700169	Magnetic	450985	5771091	A2	-	-	-	39	Small negative monopole with no surface expression, possibly buried ferrous object.	-	117810
700170	Magnetic	444003	5771767	A2	-	-	-	26	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700171	Magnetic	447464	5773006	A2	-	-	-	21	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700172	Magnetic	448948	5773279	A2	-	-	-	29	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700173	Magnetic	449473	5773006	A2	-	-	-	10	Small negative monopole with no surface expression, possibly buried ferrous object.	-	117810
700174	Magnetic	447940	5778700	A2	-	-	-	14	Small positive monopole with no surface expression, possibly buried ferrous object.	-	117810
700175	Magnetic	447940	5778308	A2	-	-	-	10	Small positive monopole with no surface expression, possibly buried ferrous object.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700176	Magnetic	446953	5780380	A2	-	-	-	8	Small positive monopole with no surface expression, possibly buried ferrous object.	-	117810
700177	Magnetic	445938	5781717	A2	-	-	-	18	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700178	Magnetic	445938	5781084	A2	-	-	-	9	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700179	Magnetic	444993	5781416	A2	-	-	-	32	Small asymmetric dipole with no surface expression, possibly buried ferrous object.	-	117810
700180	Magnetic	443999	5778543	A2	-	-	-	45	Small negative monopole with no surface expression, possibly buried ferrous object.	-	117810
700181	Magnetic	442039	5780373	A2	-	-	-	19	Small irregular negative monopole with no surface expression, possibly buried ferrous object.	-	117810
700182	Magnetic	441126	5785039	A2	-	-	-	49	Small negative monopole with no surface expression, possibly buried ferrous object.	-	117810
700183	Magnetic	443033	5784080	A2	-	-	-	14	Small positive monopole with no surface expression, possibly buried ferrous object.	-	117810
700184	Magnetic	445945	5784097	A2	-	-	-	23	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700185	Magnetic	446015	5784398	A2	-	-	-	42	Small dipole with no surface expression, possibly buried ferrous object.	-	117810
700186	Magnetic	446036	5786435	A2	-	-	-	19	Small positive with no surface expression, possibly buried ferrous object.	-	117810
700187	Magnetic	447940	5784671	A2	-	-	-	69	Medium dipole with no surface expression, possibly buried ferrous object.	-	117810
700188	Magnetic	441934	5786715	A2	-	-	-	18	Small dipole with no surface expression, possibly buried ferrous object.	-	117810



ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
700189	Magnetic	444034	5788896	A2	-	-	-	20	Small negative monopole with no surface expression, possibly buried ferrous object.	-	117810
700190	Magnetic	444944	5789057	A2	-	-	-	129	Large dipole identified over two lines with no surface expression, possibly buried ferrous object.	-	117810
700191	Magnetic	444993	5791584	A2	-	-	-	8	Small positive monopole with no surface expression, possibly buried ferrous object.	-	117810
700192	Magnetic	445823	5777045	A2	-	-	-	60	Medium positive monopole with no surface expression, possibly buried ferrous object.	-	117810
700193	Seabed disturbance	448279	5770075	A2	5.0	4.0	0.2	-	In the MBES data this is visible as a possible collection of items causing a seabed disturbance and a depression at the crest of a bedform. In the SSS data there is no clear feature distinction, however it may be that the feature is obscured by the shadow of a natural bedform.	-	117810
700194	Mound	443229	5782813	A2	12.6	7.7	0.6	-	In the MBES data this is an elongated mound identified in an area of sand waves. This feature is not particularly distinct however looks relatively anomalous to the surrounding seabed. This is visible in the SSS data as a mound of darker sediment at one end of a patch of higher reflectivity. This may be outcropping sediment or debris object.	-	117810
700195	Mound	442451	5782392	A2	3.0	2.8	0.5	-	An irregular mound comprising several smaller objects with height. This feature has been identified on the flank of a sand wave. This is not visible in the SSS data; however, it looks distinct in the MBES data. Possibly a natural feature however it	-	117810



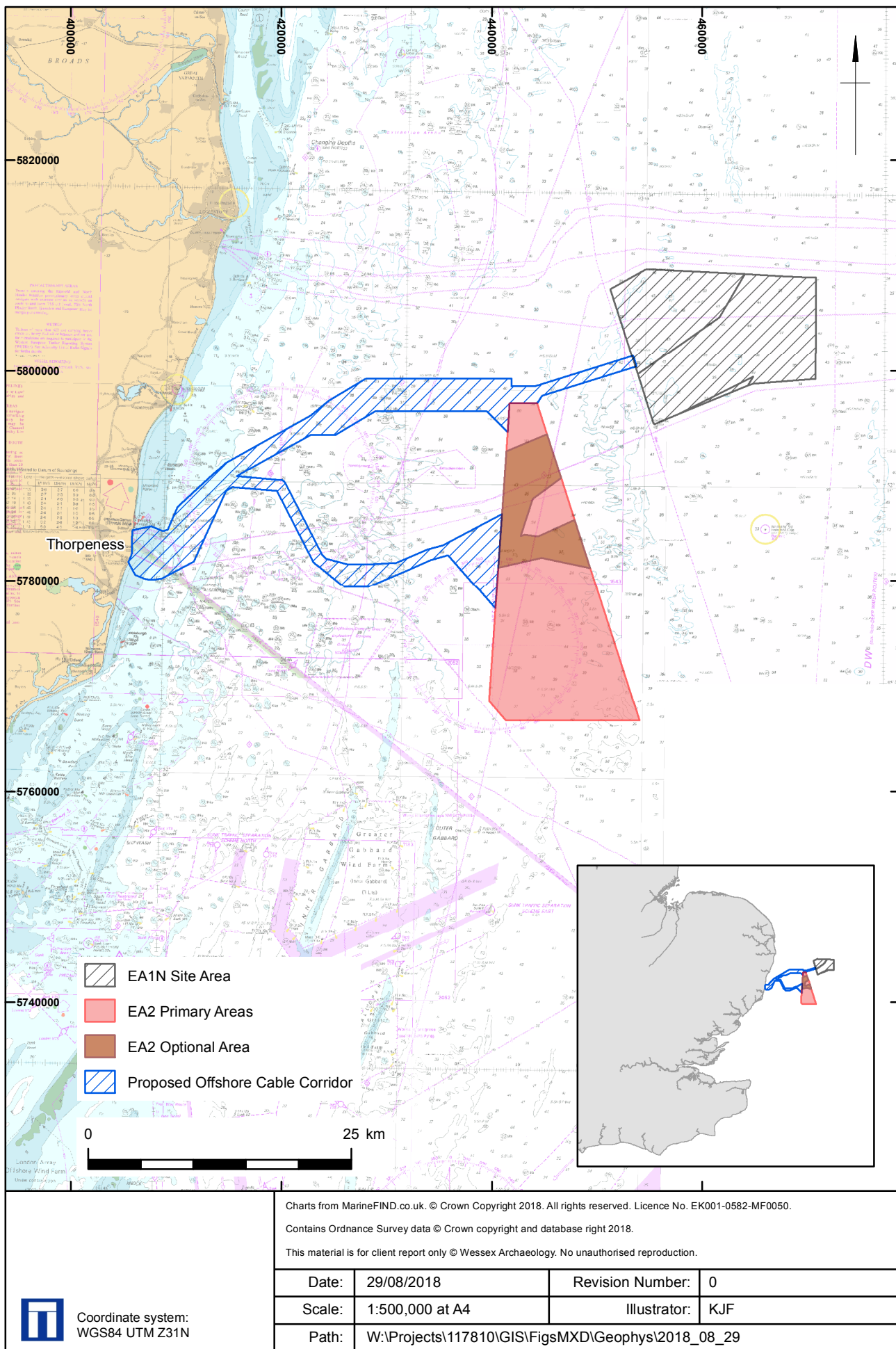
ID Number	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External references	Report ref.
									has the potential of being a partially buried debris field and, as such, has been retained.		
700196	Rope/chain	445925	5768962	A2	54.0	0.8	0.4	-	A very long, curvilinear dark reflector anomaly with slight height - seen in two sections (approx. 13 m and 32 m in length) and may be broken up or buried by sands across its extents. The feature appears to be partially covered by bedforms and is lying perpendicular to the sand waves. This feature may be related to seabed disturbance ( <b>700052</b> ). This could be a possible long length of rope or chain or a natural feature.	-	117810

1. Co-ordinates are in WGS84 UTM31N
2. Positional accuracy estimated  $\pm 15$  m



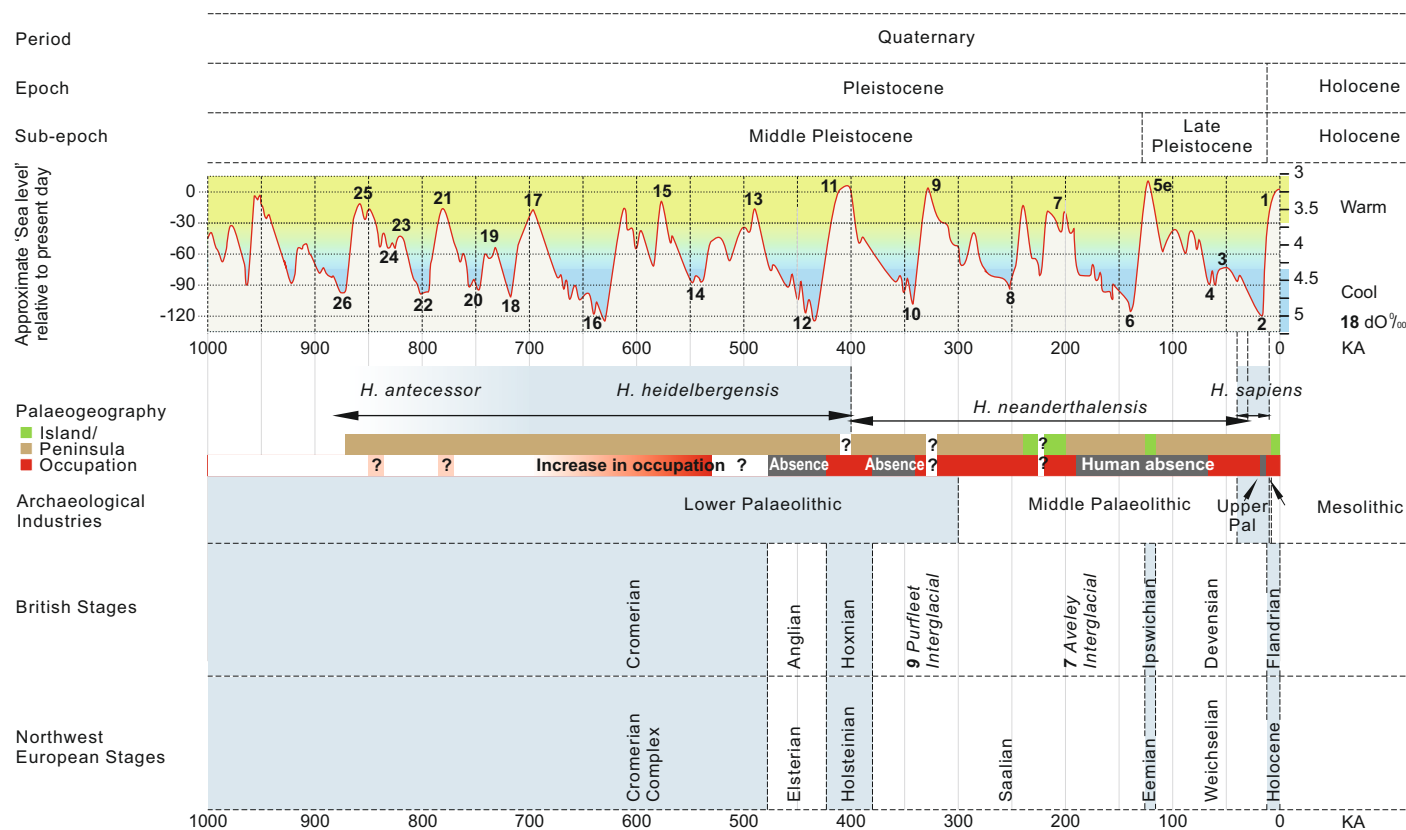
Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB  
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk





Location of East Anglia TWO Offshore Windfarm

Figure 1

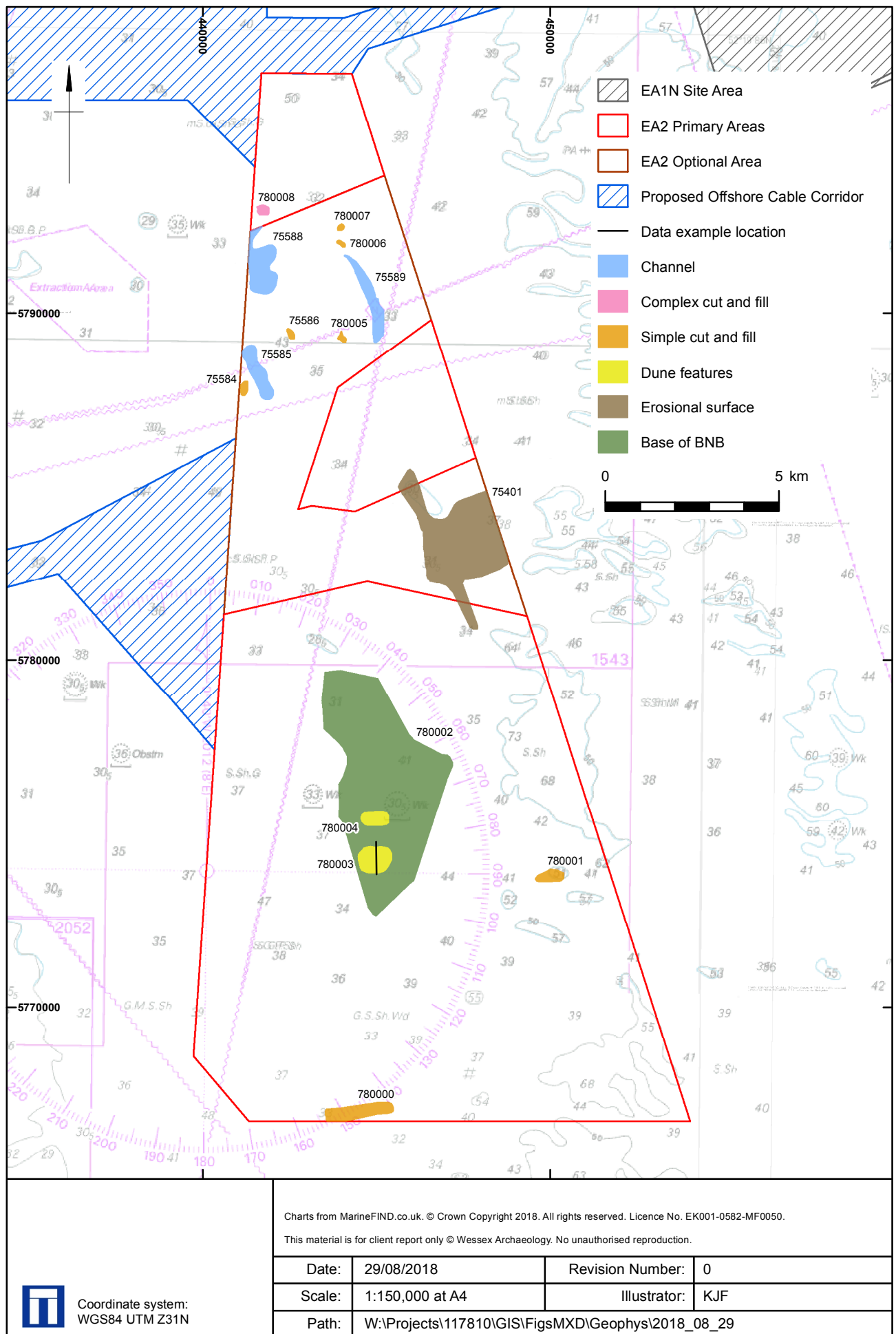


The figure presents information derived from several references: the global sea-level curve is from Lisiecki and Raymo (2005) and Jelgersma (1979). Details on the geology and archaeology were provided by Dix and Westley (2004); Funnel (1995); Gibbard and van Kolfschoten (2004); Kukla et al. (2002); Lee et al. (2006); Lowe and Walker (1997) and Wymer (1999).

This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

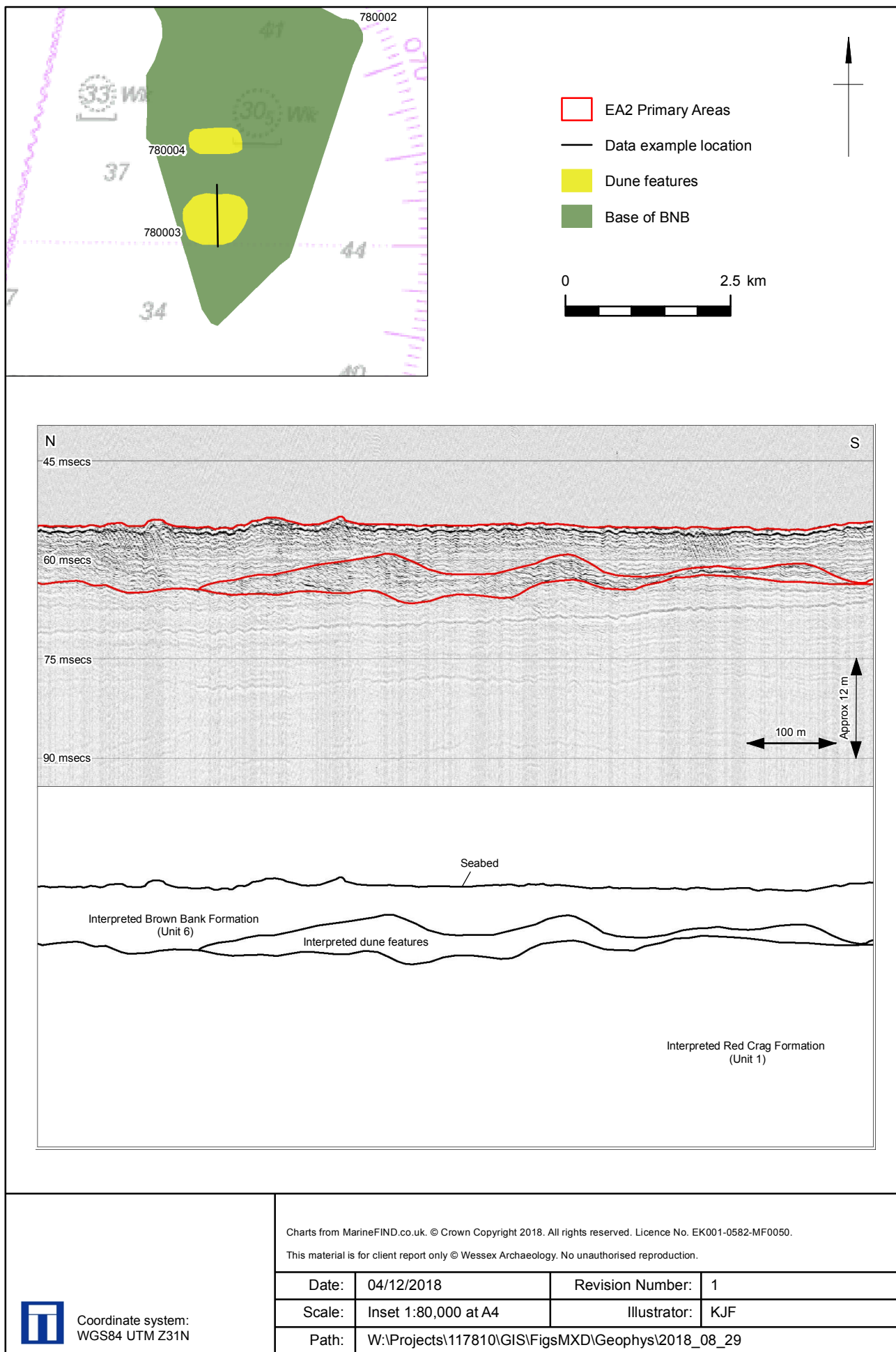
Date:	31/08/2018	Revision Number:	0
Scale:	NTS @ A4	Illustrator:	KJF
Path:	W:\Projects\117810\Graphics_Office\Rep figs\Geophys\2018_08_29		





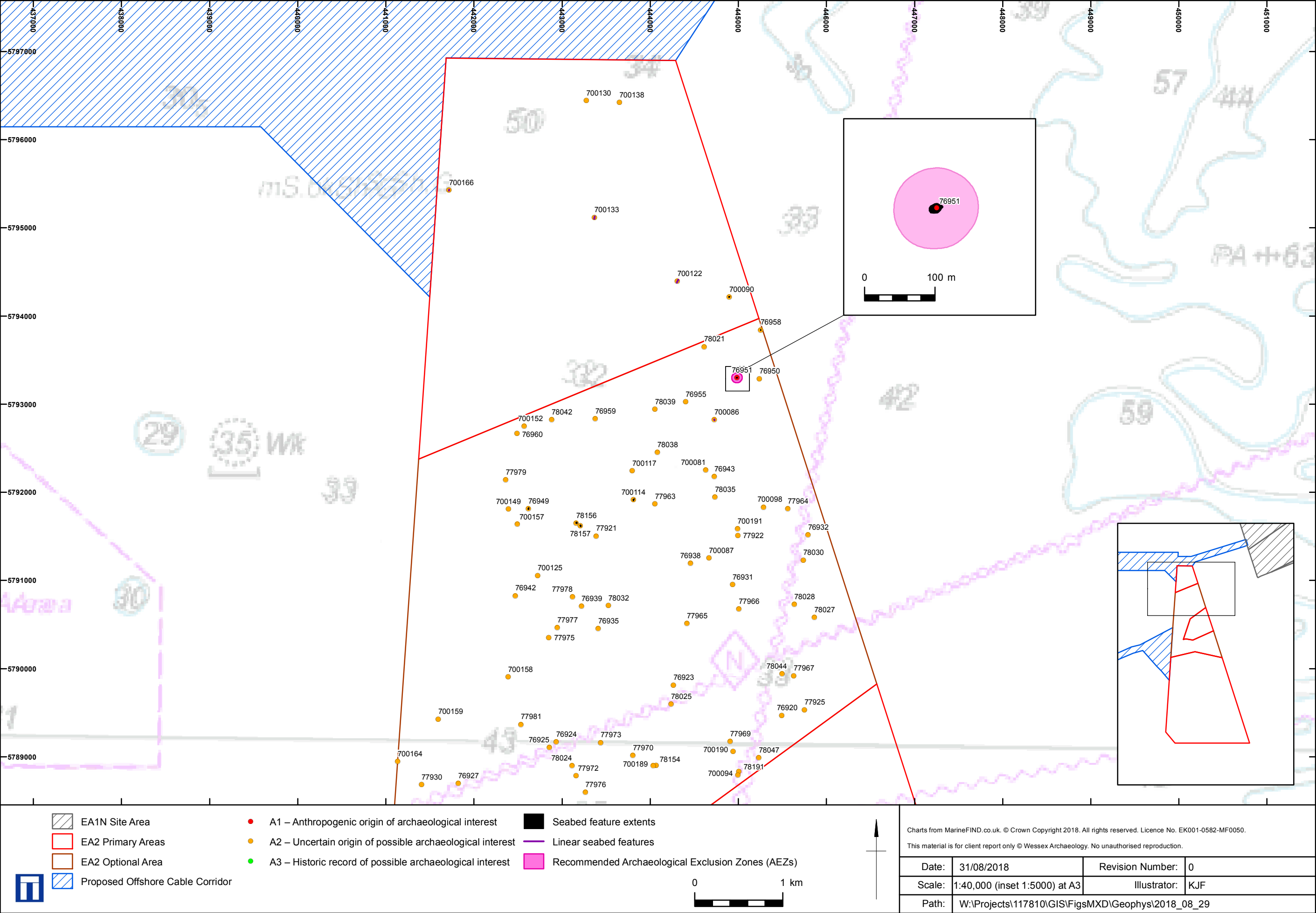
Palaeogeographic features of archaeological potential

Figure 3



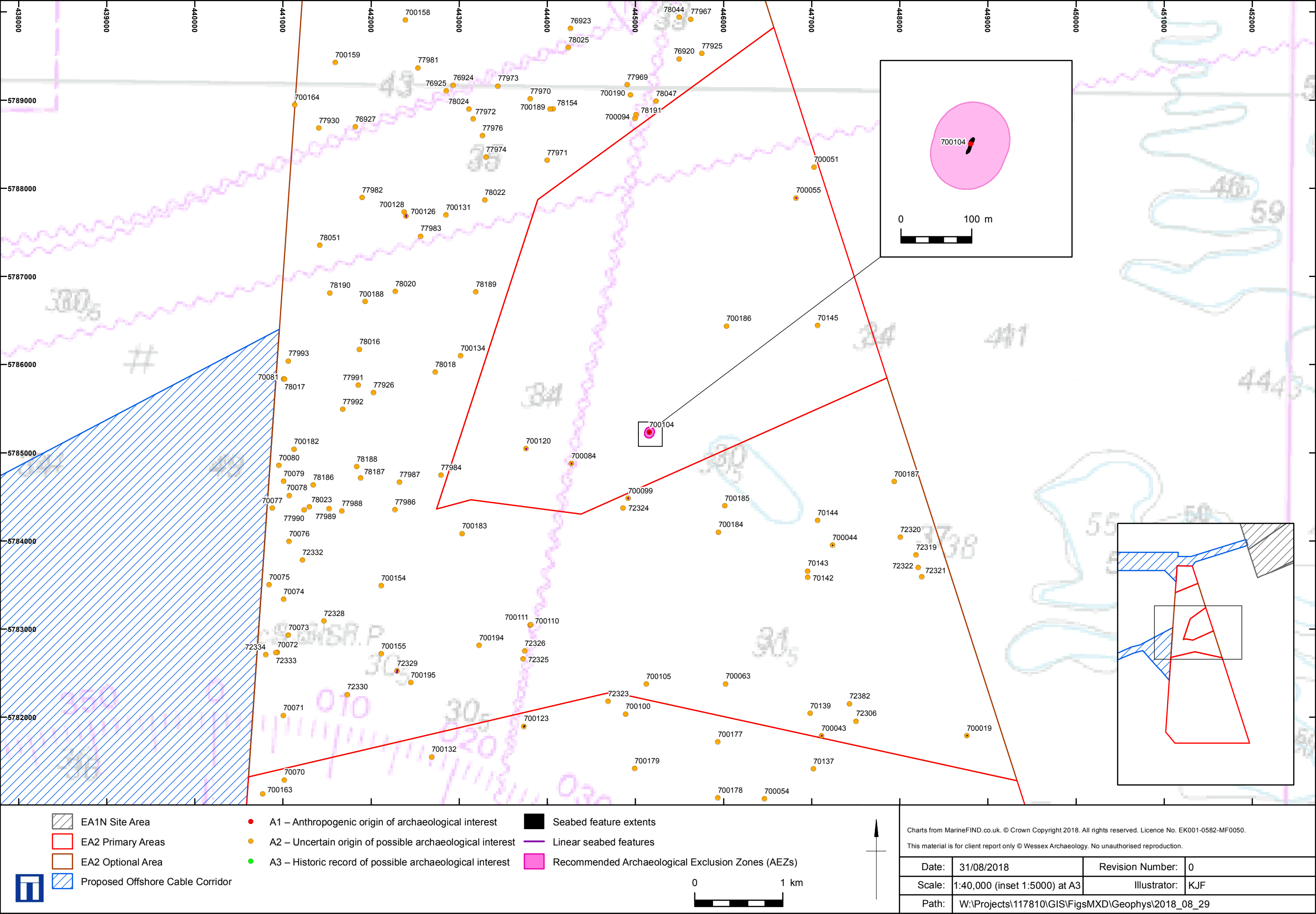
Palaeogeographic feature data example – 780003

Figure 4



Seabed Features of Archaeological Potential

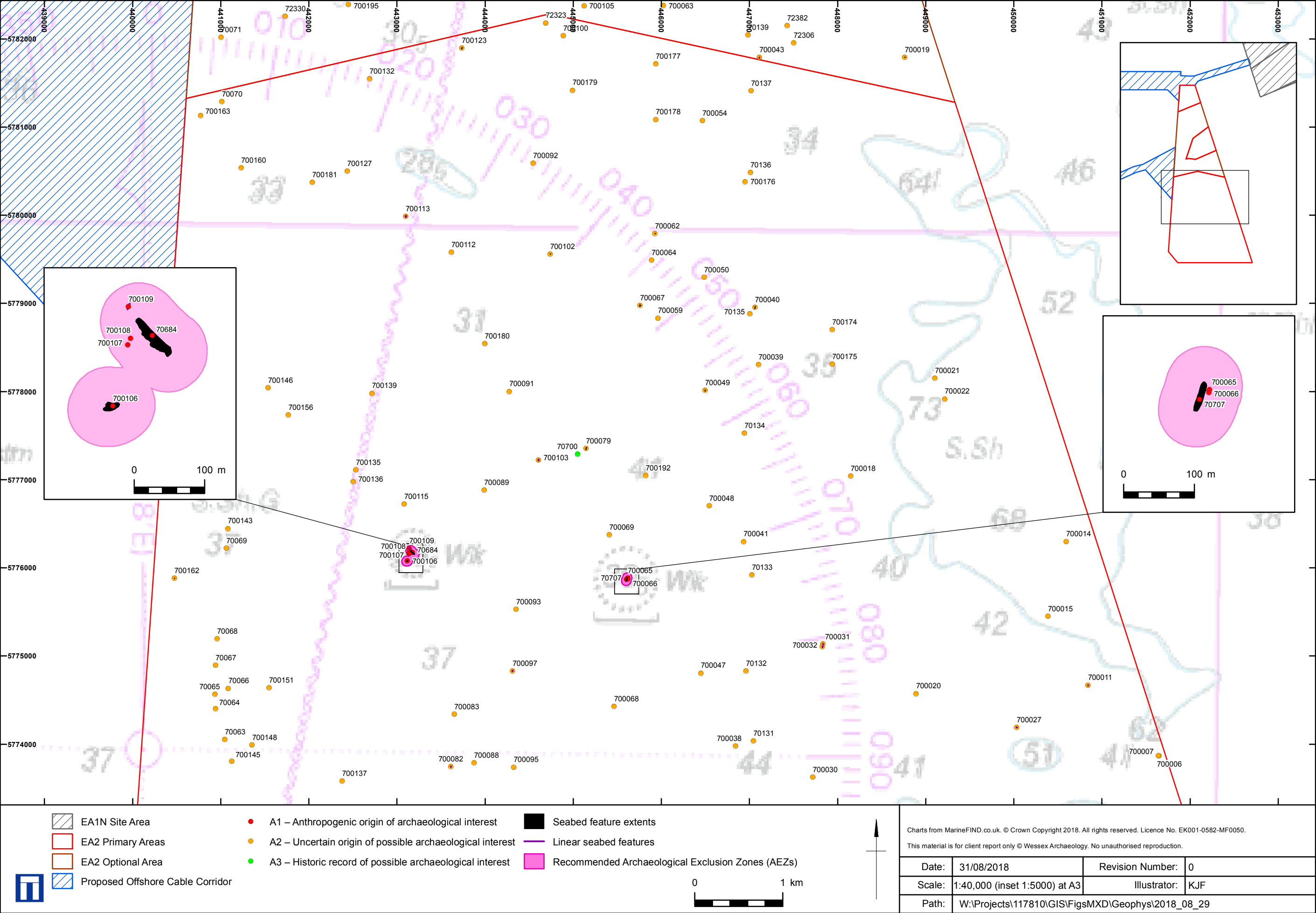
Figure 5a



Seabed Features of Archaeological Potential

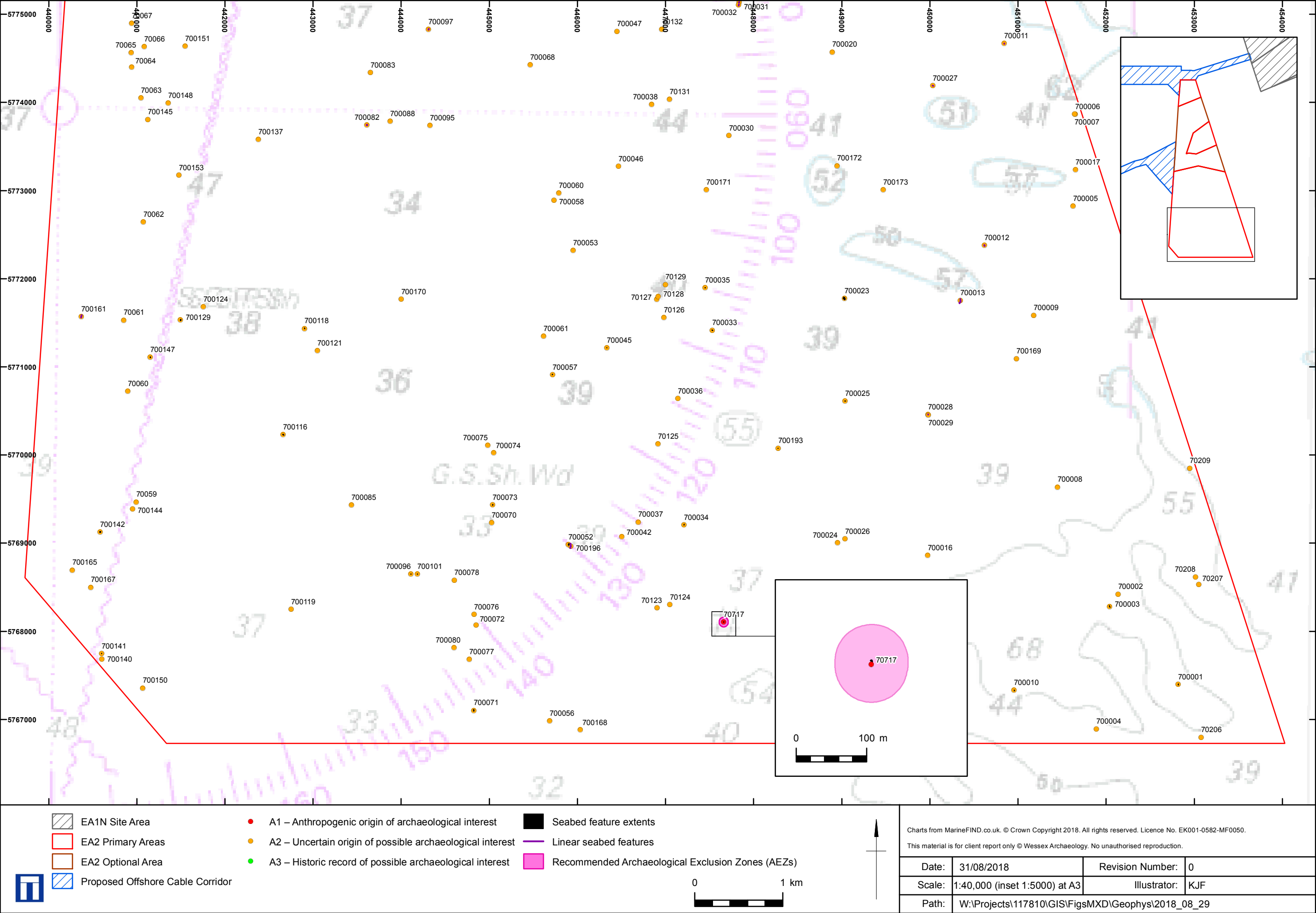
Figure 5b





Seabed Features of Archaeological Potential

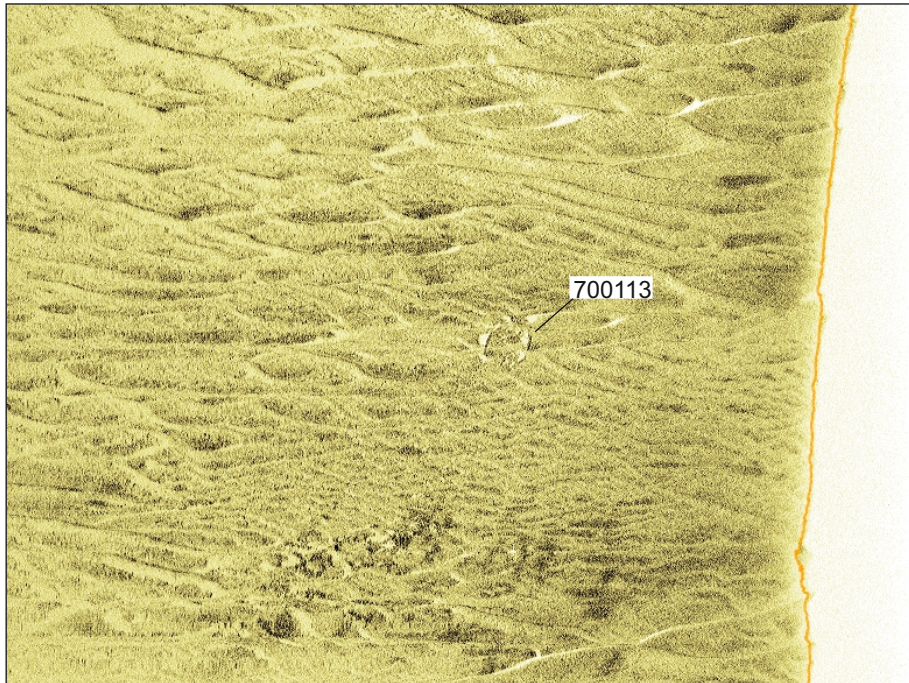
Figure 5c



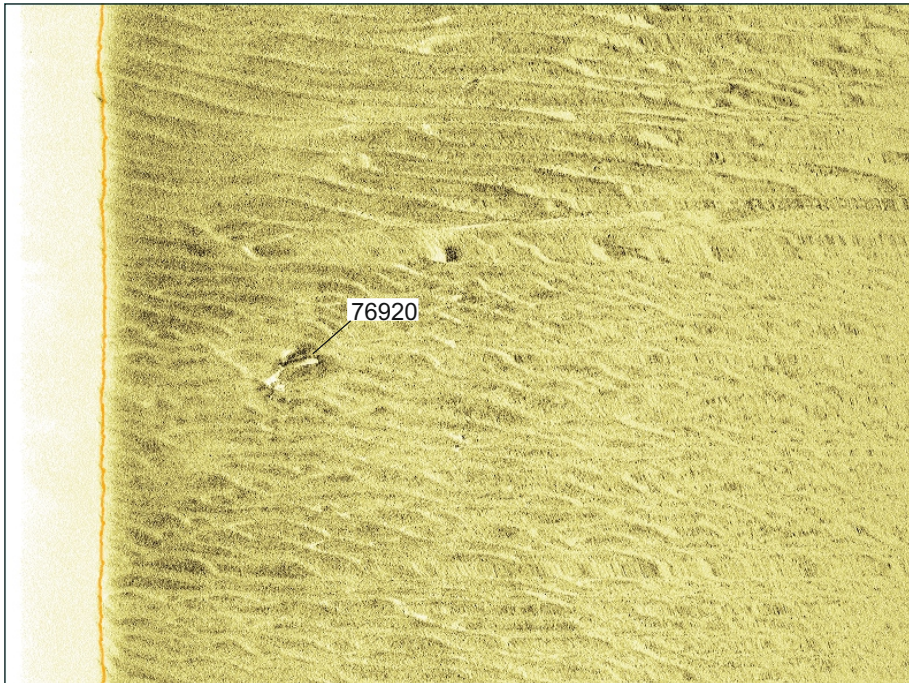
Seabed Features of Archaeological Potential

Figure 5d

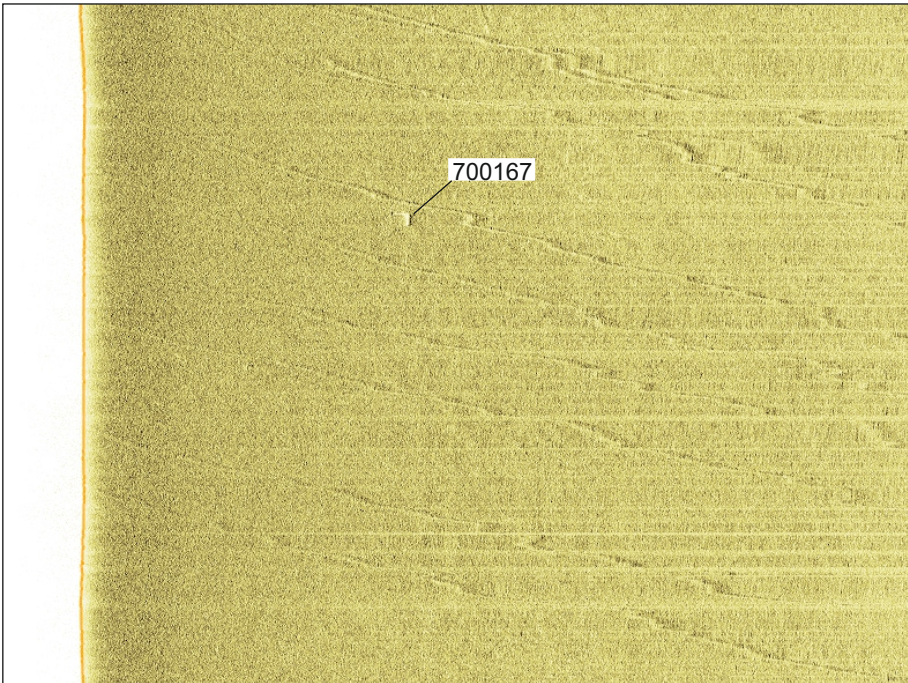




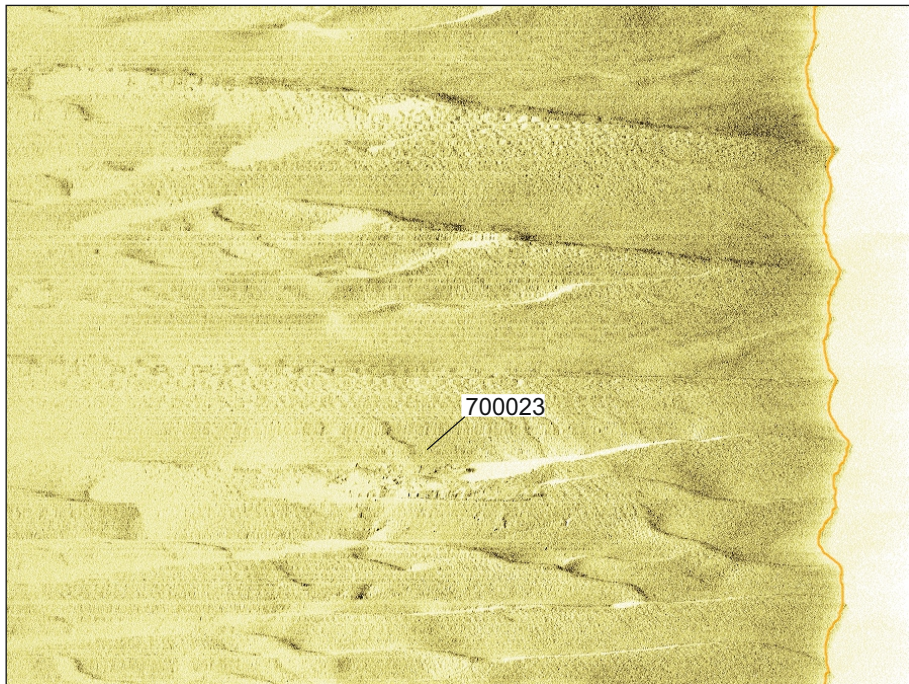
Sidescan sonar image at 100 m range of debris item 700113, measuring 30.4 x 0.4 x 0.3 m



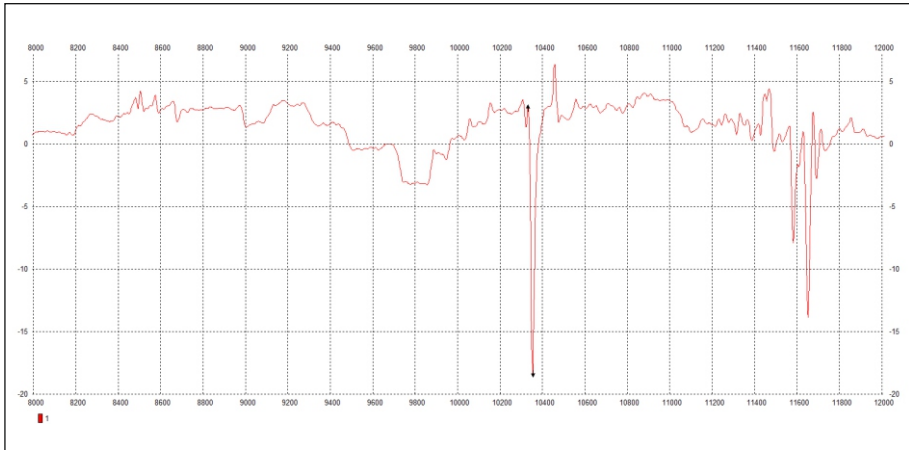
Sidescan sonar image at 100 m range of debris item 76920, as seen on the 2017 data, measuring 9.3 x 3.2 x 0.8 m



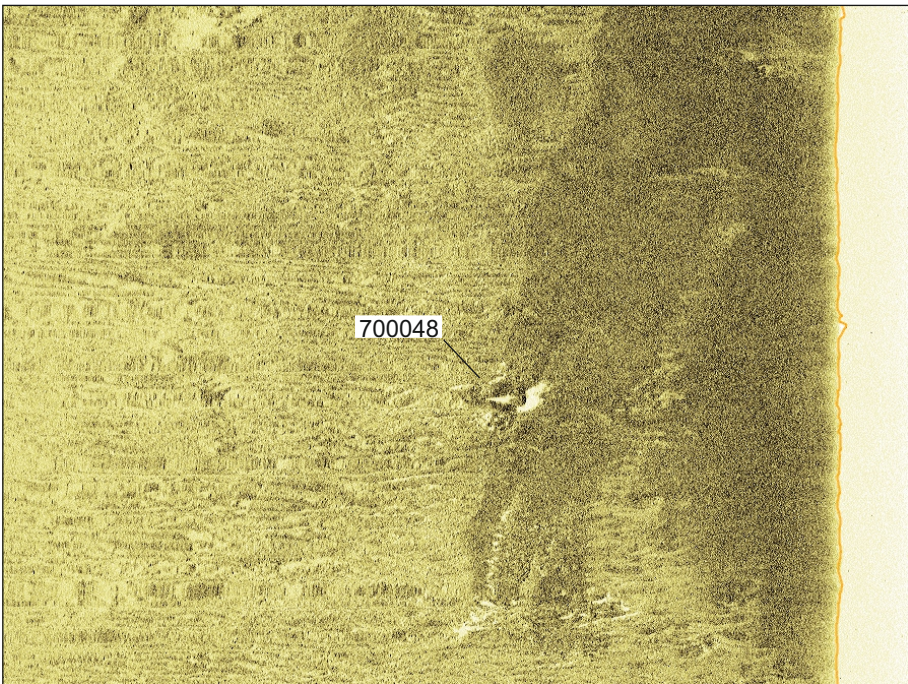
Sidescan sonar image at 100 m range of bright reflector 700167, measuring 2.7 x 2.3 x 0.0 m



Sidescan sonar image at 100 m range of ferrous debris field 700023, measuring 33.2 x 31.0 x 0.0 m



Associated magnetic anomaly, measuring 22 nT, of ferrous debris field 700023

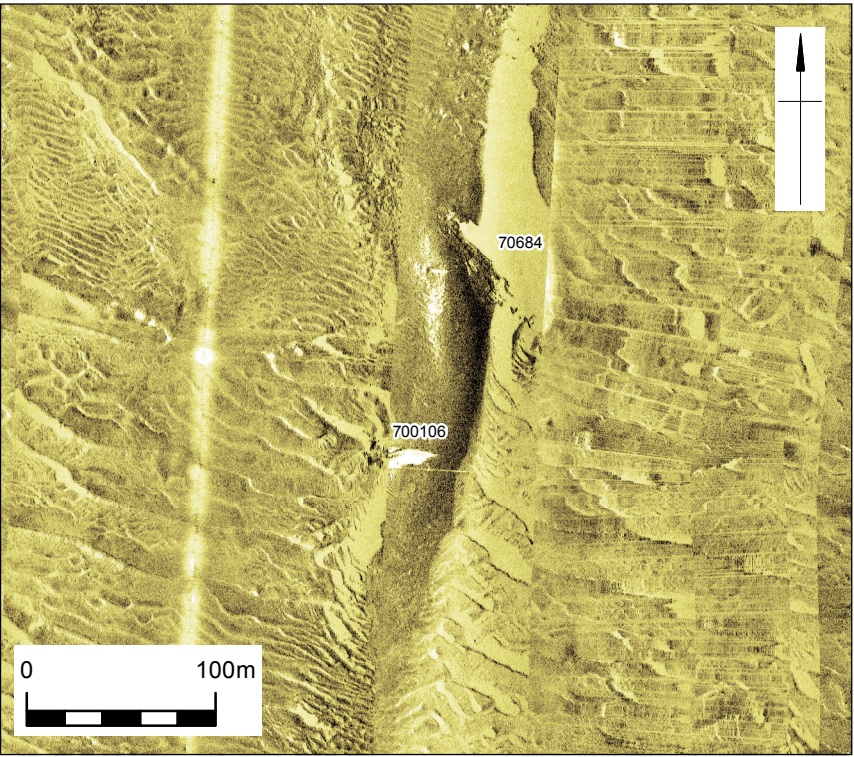
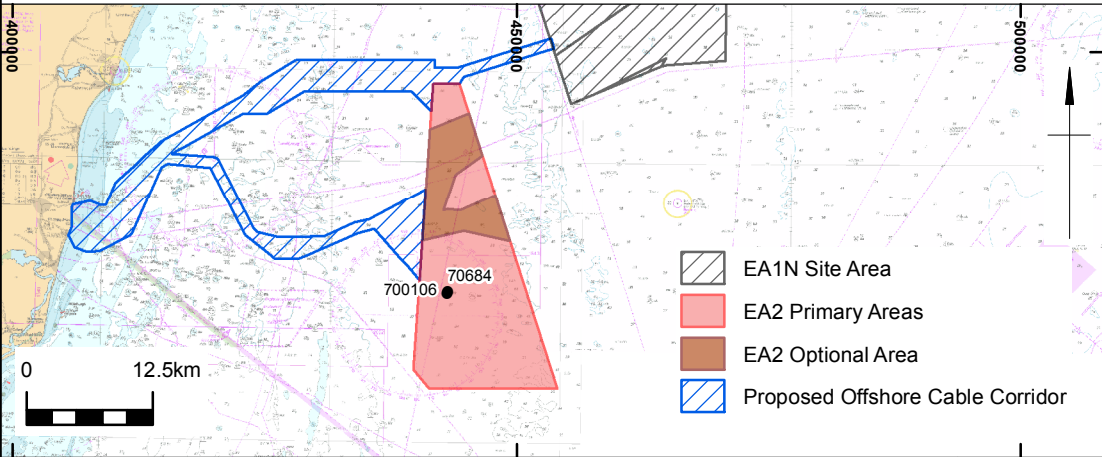


Sidescan sonar image at 100 m range of dark reflector 700048, measuring 4.2 x 2.1 x 0.5 m

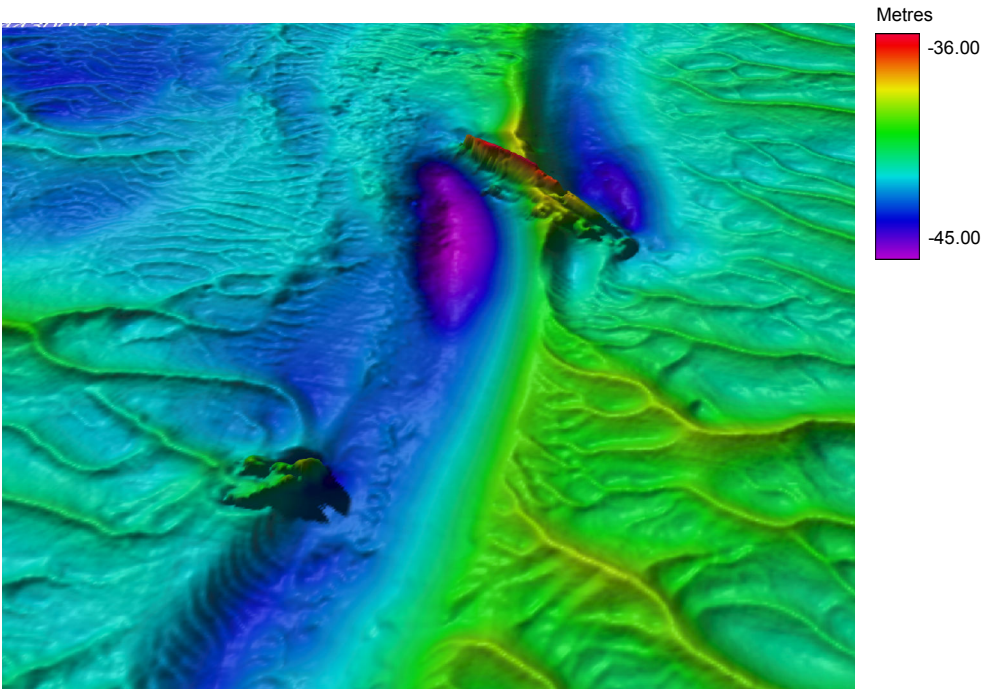
 <p>This material is for client report only © Wessex Archaeology. No unauthorised reproduction.</p>		Date:	31/08/2018	Revision Number:	0
		Scale:	NTS @ A3	Illustrator:	KJF
		Path:	W:\Projects\117810\Graphics_Office\Rep figs\Geophys\2018_08_29		



Location		443175E, 57761761N	Area	EA2
Archaeological Importance		High		
Geophysical survey dimensions and notes		Wreck 70684 is seen in the sidescan sonar data as a large but poorly defined wreck measuring 69.3 x 17.2 x 10.6 m. A separate feature (anomaly number 700106), located approximately 91 m southwest (443119E, 5776076N) and interpreted as being a separate section of the wreck based on the UKHO record. The second section of the wreck is seen as a large, poorly defined area of debris measuring 24.6 x 13.2 x 7.2 m.		
		On the MBES data, the main section of wreck is identified as a large mound, orientated northwest to southeast, with scour extending to the north and the south. The second section of wreck is seen as a smaller, irregular mound with a small amount of scour extending to the south. Due to the magnetometer line spacing and the wrecks position, is it not possible to discern whether the wrecks have an associated magnetic anomaly.		
		In the UKHO record, the wreck is identified as an unknown wreck (ID 10942), first identified in 1961 and last surveyed in 1995. During the last recorded survey of the wreck, the wreckage was identified as being in two pieces. The remains of this vessel are classed as a non-dangerous wreck.		
Build	Type	Unknown		
	Construction	Unknown		
	Dimensions	Unknown		
	Shipyard	Unknown		
Loss	Cause	Unknown		
Extent of Survival		In the geophysical data sets, the wreck appears to be broken up into two sections (wrecks 79684 and 700106). The main structure appears to be partially disintegrated, with some mounds along its western edge, possibly representing partial disintegration.		
		The secondary section of the wreck appears to be largely broken up, however a distinct, narrow shadow suggests a taller structure amongst the debris. The two sections of wreckage are identified in an area of sand waves, therefore it is possible that there may be associated debris buried by mobile sediments.		



Sidescan sonar mosaic of wrecks **70684** and **700106**, measuring 69.3 x 17.2 x 10.6 m (**70684**) and 24.6 x 13.2 x 7.2 m (**700106**)



Multibeam bathymetry image of **70684** and **700106**, looking north (1x vertical exaggeration)



Coordinate system:  
WGS84 UTM Z31N

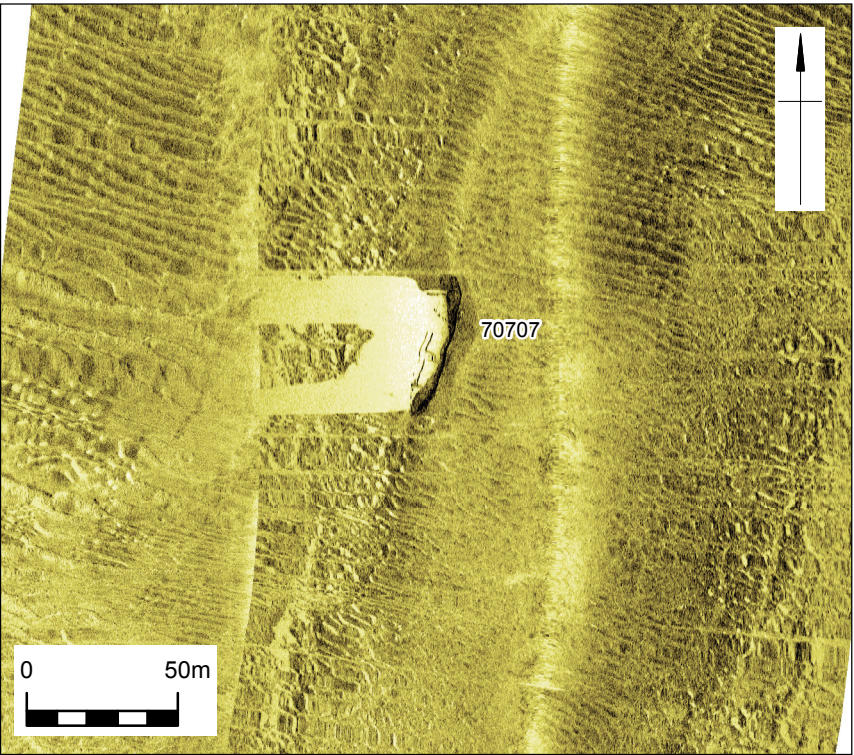
Charts from MarineFIND.co.uk. © Crown Copyright 2018. All rights reserved. Licence No. EK001-0582-MF0050.  
This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

Date:	31/08/2018	Revision Number:	0
Scale:	Sidescan 1:4000 at A3	Illustrator:	KJF
Path:	W:\Projects\117810\Graphics_Office\Rep figs\Geophys\2018_08_29		

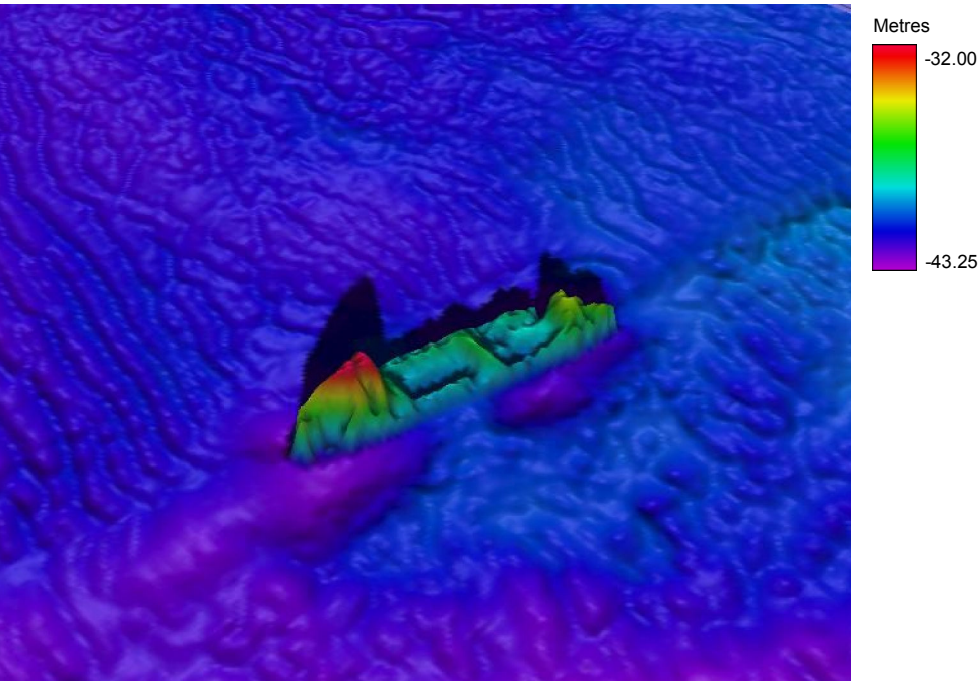


ID 70707 – Dolfijn (Probably)

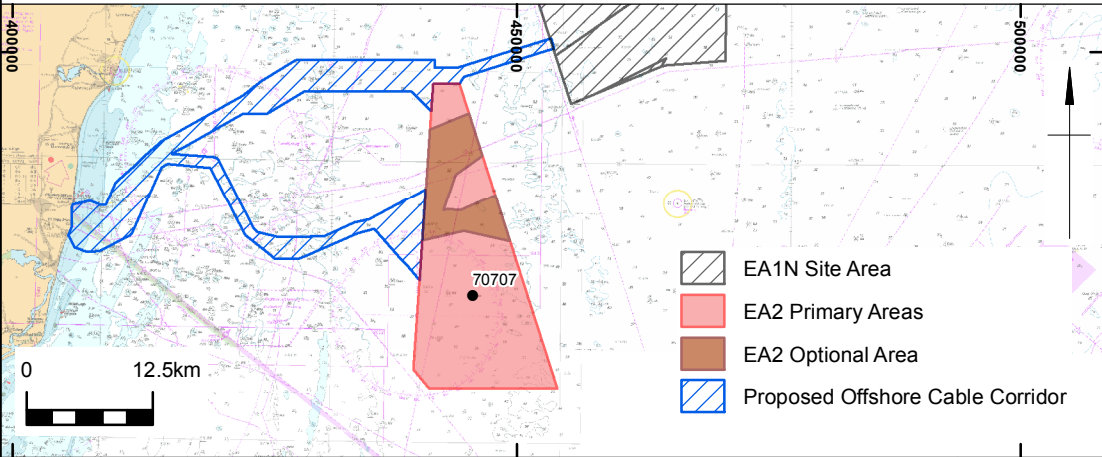
Location		445607E, 5775865N	Area	EA2
Archaeological Importance		High		
Geophysical survey dimensions and notes		Wreck 70707 is seen in the sidescan sonar data as a large, intact wreck with clear structure and super structure preserved. The dimensions of the wreck is 43.9 x 9.8 x 7.6 m.		
		On the MBES data, the wreck is identified as a well-defined wreck, with two separate compartments in its central section. The wreck is orientated approximately NNE - SSW and is listing slightly to the east. There is some slight scour around the vessel. Due to the magnetometer line spacing, and the wreck's position, is it not possible to discern whether the wreck has an associated magnetic anomaly.		
		In the UKHO record, the wreck is identified as being possibly Belgian trawler <i>Dolfijn</i> (ID 10941), which sank on the 17th August 1970 in gales and heavy seas. The wreck is described as being intact and upright with superstructure, covering an area of 57x10m with a height of 7m and orientated 010/190 degrees. The remains of this vessel are classed as a non-dangerous wreck.		
Build	Type	Trawler		
	Construction	Unknown		
	Dimensions	Unknown		
	Shipyard	Unknown		
Loss	Cause	Sank during gales and heavy seas		
Extent of Survival		In the geophysical data sets, the wreck appears to be intact and well preserved. Two items of associated debris (Anomalies <b>700065</b> and <b>700066</b> ) were identified close to the wreck on the sidescan sonar data, suggesting some slight disintegration.		



Sidescan sonar mosaic of wreck **70707**, measuring 43.9 x 9.8 x 7.6 m



Multibeam bathymetry image **70707**, looking south-east (1x vertical exaggeration)



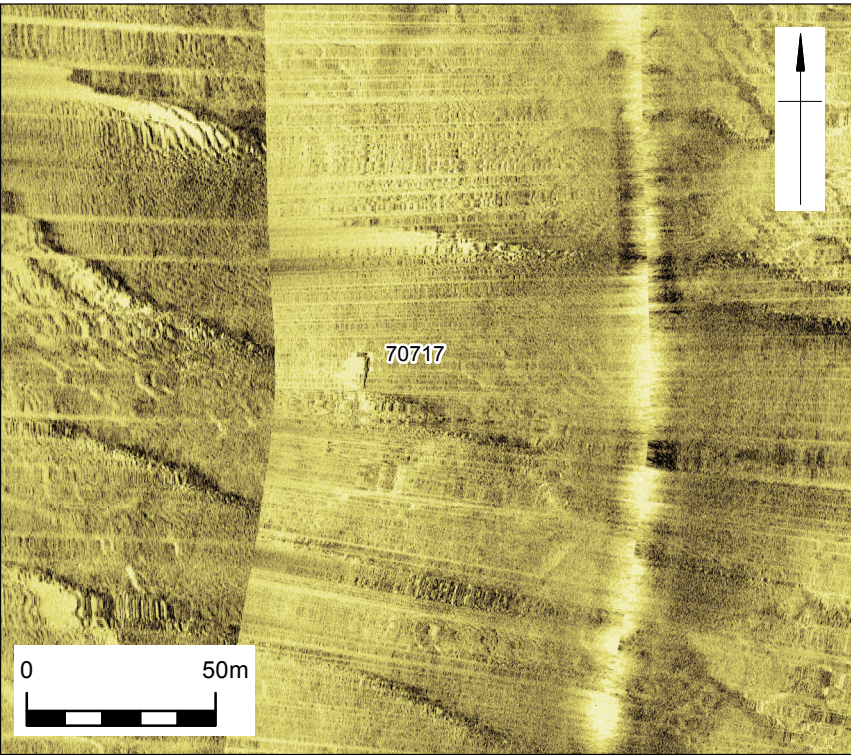
Coordinate system:  
WGS84 UTM Z31N

Charts from MarineFIND.co.uk. © Crown Copyright 2018. All rights reserved. Licence No. EK001-0582-MF0050.  
This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

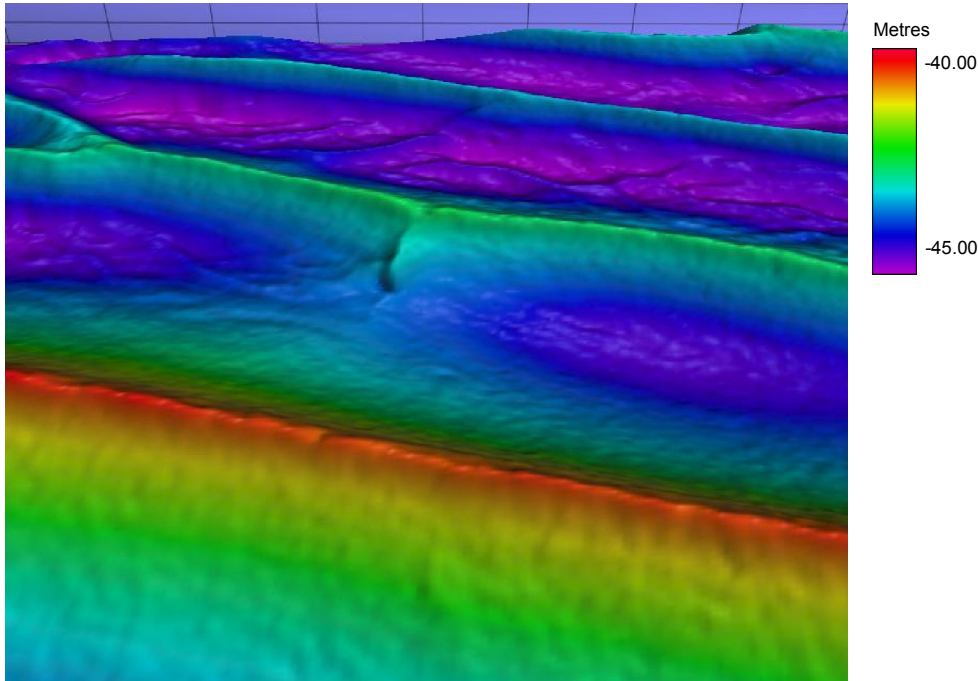
Date:	31/08/2018	Revision Number:	0
Scale:	Sidescan 1:4000 at A3	Illustrator:	KJF
Path:	W:\Projects\117810\Graphics_Office\Rep figs\Geophys\2018_08_29		



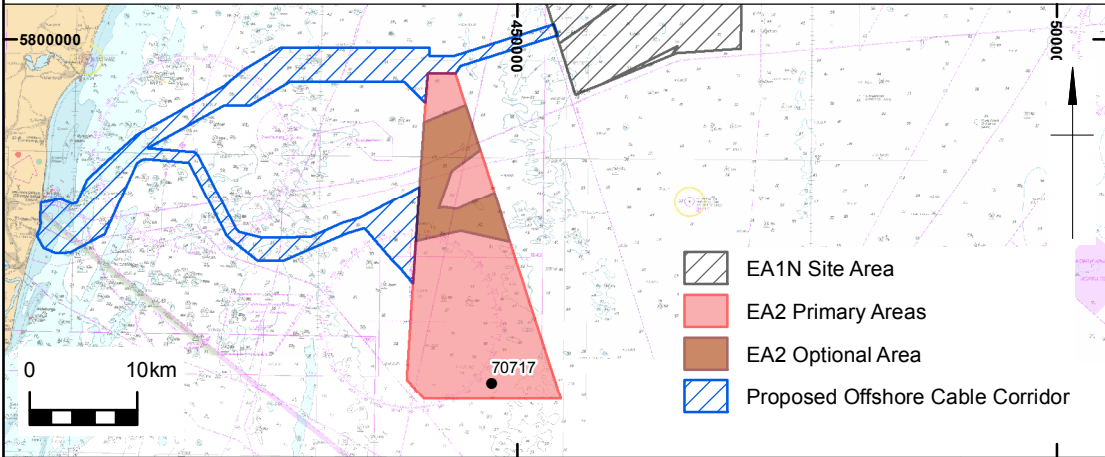
Location		447661E, 5768102N	Area	EA2
Archaeological Importance		High		
Geophysical survey dimensions and notes		Wreck 70717 is seen in the sidescan sonar data as a large, angular dark reflector with height. The feature measures 9.9 x 9.8 x 7.6 m and is identified close to a large sand wave.		
		On the MBES data, the wreck is identified as a small mound, orientated north to south, lying perpendicular to the crest of the sand wave. Due to the magnetometer line spacing, and the wreck's position, is it not possible to discern whether the wreck has an associated magnetic anomaly.		
		In the UKHO record, the wreck is identified as being an unknown wreck (ID 11189), which was first detected in 1988 abreast a sand wave which was shallower than the wreck (length 22m x beam 6m orientation 012/192 degrees). During the last recorded survey of the wreck, the wreckage was not identified, and the record was amended to 'foul'.		
Build	Type	Unknown		
	Construction	Unknown		
	Dimensions	Unknown		
	Shipyard	Unknown		
Loss	Cause	Unknown		
Extent of Survival		In the geophysical data sets, the wreck appears to be a well-defined, coherent structure. The full extent of the feature is difficult to discern due to the proximity to, and possibly partial burial by, the nearby sand wave.		



Sidescan sonar mosaic of wreck **70717**, measuring 9.9 x 9.8 x 7.6 m



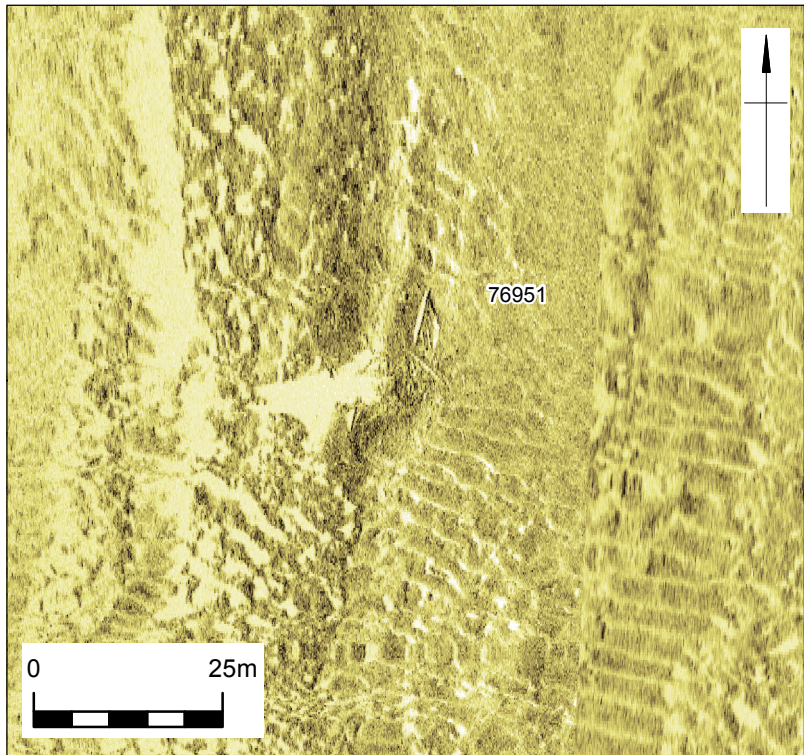
Multibeam bathymetry image of **70717**, looking south (2x vertical exaggeration)



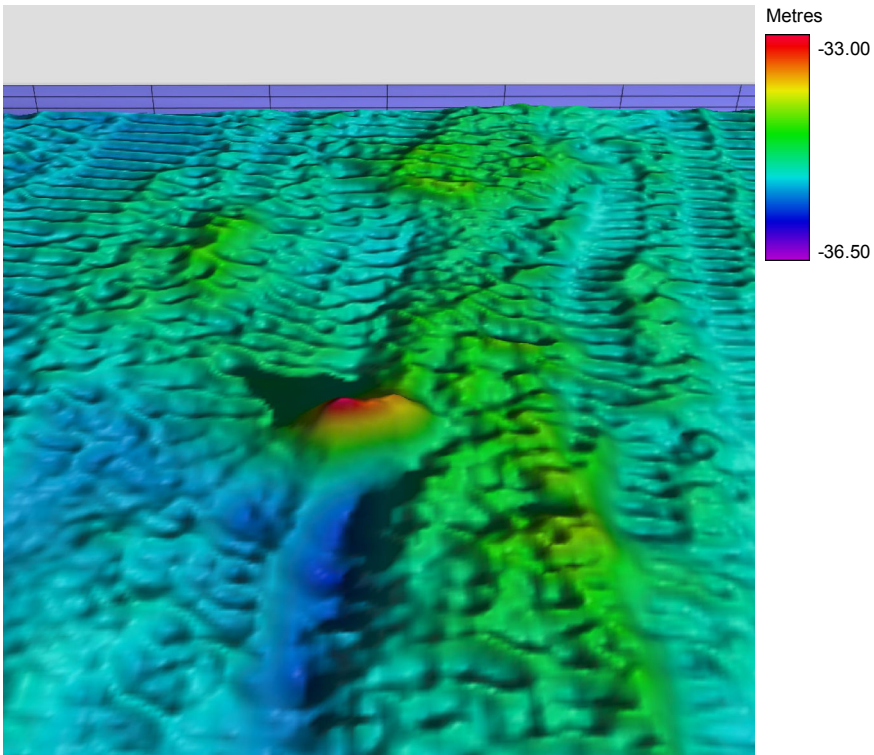


ID 76951 – Unknown

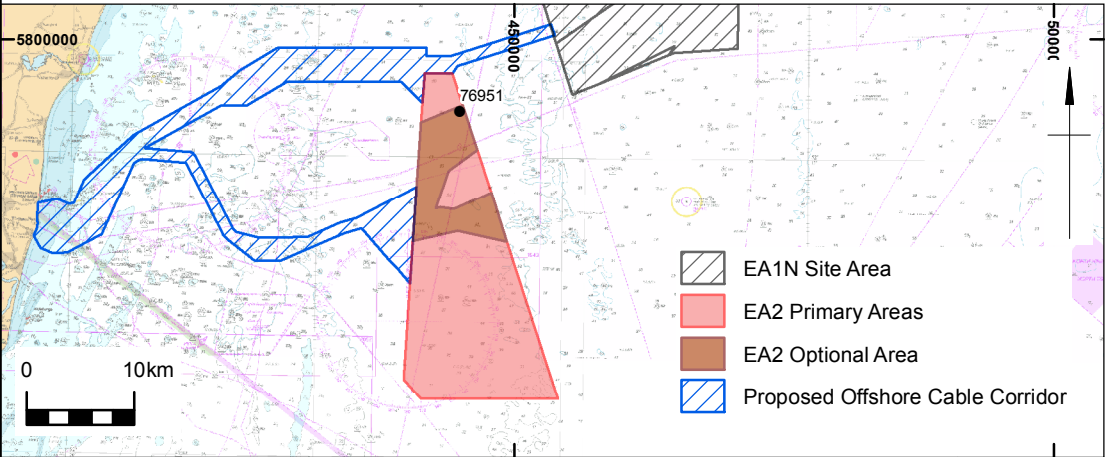
Location		444987E, 5793299N	Area	EA2
Archaeological Importance		High		
Geophysical survey dimensions and notes		Wreck 76951 is seen in the sidescan sonar data as a large area of debris comprising several linear dark reflectors with height. The overall dimensions of the spread of debris is 20.8 x 14.2 x 2.4 m. The wreck was previously identified during the 2014 data assessment (Wessex Archaeology 2014) as a large diffuse dark reflector with a large and bright shadow.		
		On the MBES data, the wreck is identified as a large, elongated mound, orientated east to west, located in an area of textured seabed. The feature also corresponds with a very large magnetic anomaly, measuring 1,424 nT, suggesting a significant amount of ferrous material.		
Build	Type	Unknown		
	Construction	Unknown		
	Dimensions	Unknown		
	Shipyard	Unknown		
Loss	Cause	Unknown		
Extent of Survival		In the geophysical data sets, the wreck appears to be very broken up and poorly preserved.		



Sidescan sonar mosaic of wreck **76951**, measuring 20.8 x 14.2 x 2.4 m



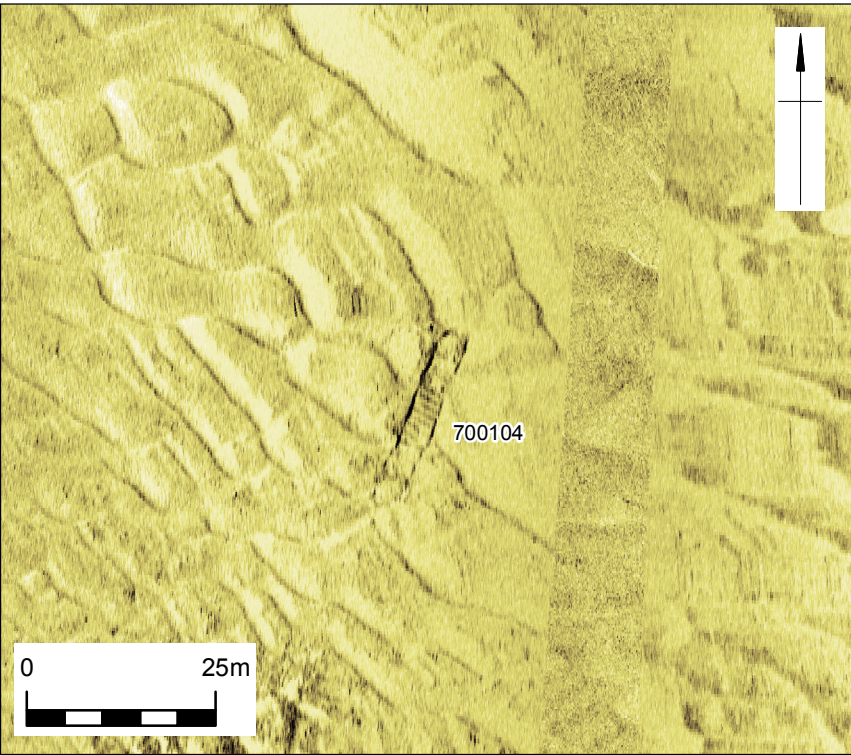
Multibeam bathymetry image of **76951**, looking south (1x vertical exaggeration)



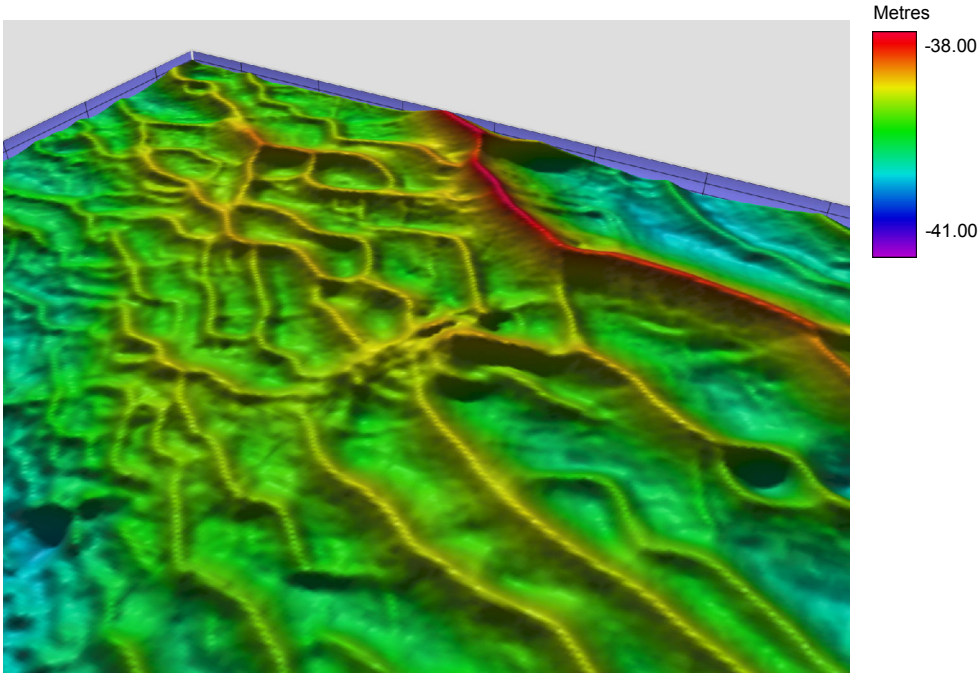
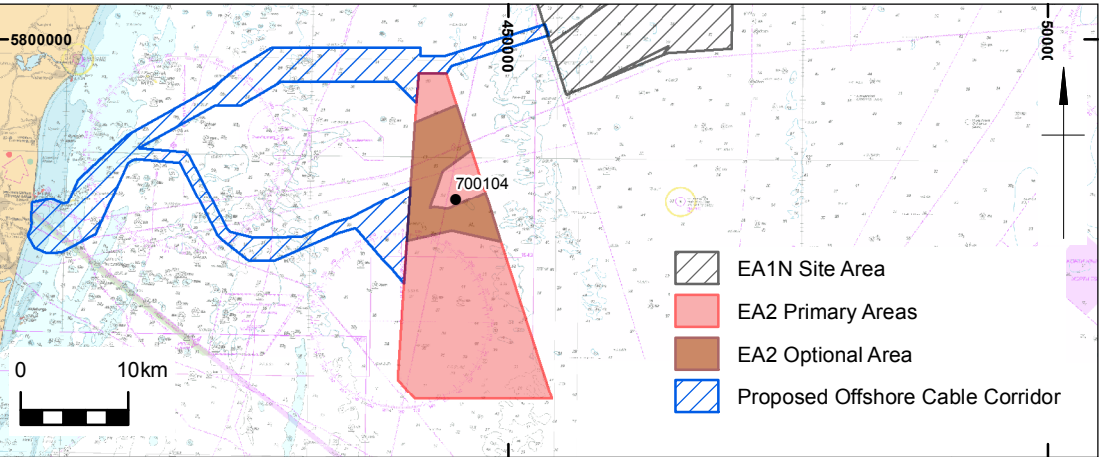
Magnetic profile of **76951** measuring 1,424 nT



Location		445160E, 5785231N	Area	EA2
Archaeological Importance		High		
Geophysical survey dimensions and notes		Wreck 700104 is seen in the sidescan sonar data as a distinct edged wreck that is lying perpendicular to, and cutting through, the sand waves. The wreck appears to have slatted dark reflectors in its centre and is intact, although with little height off the seabed. The overall dimensions of the wreck are 25 x 6.8 x 0.0 m.		
		On the MBES data, the wreck is visible as a poorly defined, irregular mound identified in an area of sand waves. The wreck is not particularly distinct; however, it causes some disruption to natural seabed formations. The wreck is orientated NNE to SSW and has some very slight scour along its western edge. Due to the magnetometer line spacing, and the wreck's position, is it not possible to discern whether the wreck has an associated magnetic anomaly.		
Build	Type	Unknown		
	Construction	Unknown		
	Dimensions	Unknown		
	Shipyard	Unknown		
Loss	Cause	Unknown		
Extent of Survival		In the geophysical data sets, the wreck appears to a distinct, coherent structure; however, the feature has little height, which might suggest that is partially buried or in a poorly preserved state.		



Sidescan sonar mosaic of wreck **700104**, measuring 25 x 6.8 x 0.0 m



Multibeam bathymetry image of **700104**, looking NNW (2x vertical exaggeration)