

Area 407
Marine Aggregate Extraction

Archaeological Assessment



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Final

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**AREA 407
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Summary

Wessex Archaeology was commissioned by Fugro EMU Limited (FEMU) on behalf of Cemex UK Marine Ltd., to undertake an archaeological assessment of geophysical survey data for the proposed new aggregate dredging zone in aggregate extraction Area 407. The data consisted of sidescan sonar and multibeam data acquired by FEMU in September 2012. The review included an assessment of these data in conjunction with the results of the previous Environmental Assessment of Area 407 (WA 1998); and the Pre-dredge Survey (WA 2000) and monitoring reports of the previous active dredging zone (EMU 2011).

The overall aim of this report is to provide an archaeological review of the effects of dredging upon known archaeological sites and previously identified geophysical anomalies that may potentially be of archaeological interest; and to assess the areas for new sites and anomalies of potential archaeological interest.

In total 147 anomalies have been identified; 131 within the Licence Area 407 and 16 outside, within a 1km buffer of Area 407. Of these, 69 anomalies have been located within the area covered by the 2012 data, however none of the new anomalies identified are of definite archaeological interest and therefore no exclusion zones have been suggested.

No archaeological exclusion zones are required within the ADZ. However, it is recommended that as a precaution exclusion zones of 100m radius are placed around each of the three recorded wreck sites; *Falloden*, (7069), "Unknown" (7070) and *Faith* (7071), identified in previous reports even though they are outside the current ADZ.

No further mitigation strategies have been recommended for the area; though it is recommended that any artefacts recovered during dredging activities are reported using the established BMAPA Protocol for Reporting Finds of Archaeological Interest (BMAPA & English Heritage 2003).

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Laura Andrews carried out the assessment and compiled the report, with quality control provided by Dr Paul Baggaley. Kitty Foster prepared the illustrations and the project was managed for Wessex Archaeology by Dr Paul Baggaley.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Wessex Archaeology (WA) was commissioned by EMU Limited (now known as Fugro EMU Limited (FEMU)) on behalf of Cemex UK Marine Ltd. to undertake an archaeological assessment of geophysical survey data as part of the heritage impact monitoring process implemented for aggregate extraction Area 407, situated off the South East coast of the Isle of Wight (**Figure 1**).
- 1.1.2 The licenced area (hereafter the Study Area) is delimited by the following co-ordinates (WGS 84, UTM Zone 30N):

Easting	Northing
634735	5592301
637018	5595512
639382	5595574
638282	5592393
638346	5589984
639563	5588718
639661	5585012
634924	5584890

Table 1: Delimiting co-ordinates of Area 407 in UTM Zone 30N, WGS 84

- 1.1.3 Area 407 was initially dredged under a favourable Government View (GV) between April 2000 and March 2010 which has since expired. The current application has been submitted under the Marine and Coastal Access Act 2009 and Marine Works Regulations 2011 (EMU 2011: 3). The current licence application is for permission to continue to extract a maximum of 15 million tonnes (mt) over a 15 year period. CEMEX UK Marine Ltd aims to limit the total area available for active aggregate extraction through spatial zoning of the area with one Active Dredge Zone (ADZ) to be dredged at any given time.
- 1.1.4 This archaeological assessment consists of an overview of previous work undertaken for Area 407 (WA 1998 and 2000; EMU 2011) in order to make recommendations for archaeological exclusion zones whilst also undertaking an assessment of new sidescan sonar and multibeam data acquired by FEMU in September 2012. No new data searches (UKHO, NMR, etc.) were undertaken as part of this assessment.
- 1.1.5 The sidescan survey lines and bathymetry data collected and assessed for this report were a subsection of the Licence Area, as depicted in **Figure 1**.

1.2 PREVIOUS WORK

- 1.2.1 In 1998 WA undertook an environmental assessment (EA) in support of a licence application for Area 407 (WA 1998). The EA included an assessment of known, suspected and potential archaeological sites within and around the Study Area and the interpretation of marine geophysical data for sites of archaeological interest.
- 1.2.2 The EA (WA 1998) compiled and reviewed documentary records of known archaeological sites and assessed the potential for new sites to be discovered. The reviewed material (WA 1998) consisted of:
- Records of wrecks, obstructions and casualties collated by the National Monument Record (NMR);
 - Records from the Sites and Monuments Record (SMR) of Hampshire;
 - Records from the Sites and Monuments Record (SMR) of West Sussex;
 - Records held by the Sites and Monuments Record (SMR) of the Isle of Wight;
 - Records provided by the Receiver of Wreck;
 - Records of wrecks kept by the UK Hydrographic Office (UKHO);
 - Historic charts and surveys kept by the UK Hydrographic Office (UKHO);
 - Records held by the Department for Culture, Media and Sport (DCMS); and
 - Records kept by the Naval Staff Directorate, Ministry of Defence.
- 1.2.3 The geophysical dataset assessed for the EA consisted of bathymetric data (WA 1998). The main aim of interpreting this data was to provide a topographical assessment of the study area, however it could also be used to locate, assess and report on the position, character and nature of known and newly discovered archaeological sites.
- 1.2.4 No archaeological anomalies were noted in Area 407 during the assessment for the EA (WA 1998).
- 1.2.5 A pre-dredge assessment for the initial dredging area was undertaken in 2000 by WA, which reviewed sidescan sonar, magnetometer and bathymetric data acquired by Coastline Surveys Ltd during September 1999 and January 2000 (WA 2000). The report identified 54 sidescan and 11 magnetic anomaly sites characterised as being of uncertain origin and potential archaeological interest (WA 2000).
- 1.2.6 An archaeological assessment of the sidescan sonar, magnetometry and multibeam data was undertaken in 2011 by EMU Limited (EMU 2011), using new data acquired in 2009, as part of the licence renewal process. The report identified eight seabed anomalies, four of medium and four of low archaeological potential (EMU 2011). None of these anomalies corresponded with those previously identified by Wessex Archaeology (WA 2000). Seabed changes noted during the assessment were determined to be caused by natural processes or anomalies of low archaeological potential (EMU 2011).
- 1.2.7 No artefacts have been discovered and reported through the BMAPA Protocol for Reporting Finds of Archaeological Interest since dredging activities commenced (BMAPA & English Heritage 2003).

1.3 SEABED GEOLOGY

- 1.3.1 Area 407 is situated within the South Wight platform, according to the South Coast Regional Environmental Characterisation (SC REC 2010), which is identified as a flat rock platform with a very low decline from north to south in water depths of 30 to 40m. In the East of this region is the Palaeosolent channel which is 1-3km wide filled

with sediment and in some places level with the surrounding rock platform (SE REC 2010: 83). The bedrock is chalk, with underlying Lower Greensand and Wealden rock. 95% of the area is rock and thin sediment with 5% coarse sediments.

1.4 AIM

- 1.4.1 The aim of this report is to provide FEMU with an archaeological review of the effects of dredging on known archaeological sites and previously identified geophysical anomalies that may be of potential archaeological interest, recommending the implementation of exclusion zones if needed, and to fully assess the new current active dredging area for sites of potential archaeological interest.

2. METHODOLOGY

2.1 DATA SOURCES

- 2.1.1 The geophysical data for this report were provided by FEMU and were collected in September 2012. Further background information was obtained from archaeological assessments of geophysical surveys of the site (WA 1998 and 2000; EMU 2011).
- 2.1.2 The geophysical data used for this report were assessed for quality and their suitability for archaeological purposes, and rated using the following criteria:

Data Quality	Description
Good	Data which are clear and unaffected by weather conditions or sea state. The dataset is suitable for the interpretation of standing and partially buried metal wrecks and their character and associated debris field. These data also provide the highest chance of identifying wooden wrecks and debris.
Average	Data which are affected by weather conditions and sea state to a slight or moderate degree. The dataset is suitable for the identification and partial interpretation of standing and partially buried metal wrecks, and the larger elements of their debris fields. Wooden wrecks may be visible in the data, but their identification as such is likely to be difficult.
Variable	This category contains datasets with the quality of individual lines ranging from good to average to below average. The dataset is suitable for the identification of standing and some partially buried metal wrecks. Detailed interpretation of the wrecks and debris field is likely to be problematic. Wooden wrecks are unlikely to be identified.

Table 2: Criteria for assigning data quality rating

- 2.1.3 The geophysical data have been rated as “Good” using the above criteria.

2.2 GEOPHYSICAL DATA - TECHNICAL SPECIFICATIONS

- 2.2.1 The data assessed were obtained by FEMU during September 2012 on Madog. The dataset consisted of sidescan sonar and multibeam bathymetry data.
- 2.2.2 FEMU used an Edgetech 4200 dual frequency sidescan sonar system, operated at both frequencies (100/420kHz) simultaneously and a range of 100m. The data were recorded digitally and provided to WA as .xtf files.
- 2.2.3 Multibeam bathymetry data were obtained using an R2Sonic 2024 system, which was operated at 250 kHz. The data were recorded digitally and provided to WA as a calibrated and processed .asc file.

- 2.2.4 For this survey all positions were recorded and expressed in WGS 1984, UTM Zone 30N.

2.3 GEOPHYSICAL DATA - PROCESSING

- 2.3.1 The sidescan sonar data were processed by WA using Coda GeoSurvey software. This allowed the data to be replayed with various gain settings in order to optimise the quality of the images. The data were initially scanned to give an understanding of the geological nature of the area and were then 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.
- 2.3.2 A mosaic of the sidescan sonar data is produced during this process to assess the quality of the sonar towfish positioning. The survey lines are smoothed, and the navigation corrected either with .cnv files provided by the survey company who acquired the data or individual fixed laybacks as recorded in the survey logs. This allows the position of anomalies to be checked between different survey lines and for the layback values to be further refined if necessary.
- 2.3.3 The form, size, and/or extent of an anomaly is a guide to its potential to be an anthropogenic feature, and therefore of its potential 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 of a feature as a result of past impacts from, for example, dredging or fishing.
- 2.3.4 The multibeam bathymetry data were analysed to identify any unusual seabed structures that could be shipwrecks or other anthropogenic debris. This was correlated with the sidescan sonar interpretation. The data were gridded and analysed using Fledermaus software, which enables 3-D visualisation of the acquired data and geo-picking of seabed anomalies.

2.4 GEOPHYSICAL DATA - ANOMALY GROUPING AND DISCRIMINATION

- 2.4.1 The previous section describes the initial interpretation of all available geophysical data sets, which were conducted independently of each other. This inevitably leads to the possibility of any one object being the cause of numerous anomalies in different data sets and apparently overstating the number of archaeological features in the Study Area.
- 2.4.2 To address this fact, the anomalies were grouped together along with the results of the EA (WA 1998), pre-dredge survey (WA 2000) and Archaeological Assessment (EMU 2011). This allows one ID number to be assigned to a single object for which there may be, for example, a UKHO record and multiple sidescan sonar anomalies.
- 2.4.3 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. These flags are ascribed as follows:

Non-	U1	Not of anthropogenic origin
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Archaeological	U2	Known non-archaeological feature
	U3	Non-archaeological hazard
Archaeological	A1	Anthropogenic origin of archaeological interest
	A2	Uncertain origin of possible archaeological interest
	A3	Historic record of possible archaeological interest with no corresponding geophysical anomaly

Table 3: Criteria for discriminating archaeological importance of feature

2.4.4 All the sites that have been identified within the Study Area are presented in **Appendix I** and discussed in this report.

2.4.5 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. RESULTS

3.1 SEABED FEATURES

3.1.1 In total 147 records and anomalies have been identified within Area 407 and the 1km buffer zone (**Figure 2, Appendix I**). These have been classified as “Archaeological” in **Table 4** below:

Classification	Date and Anomaly Type	Number
A1	-	0
A2	WA 2012 SSS	69
	EMU 2011 SSS	8
	WA 2000 SSS	54
	WA 2000 Mag	11
A3	EMU 2011 NMR	3
	EMU 2011 UKHO & NMR	2

Table 4: Classification of the anomalies found in Area 407

3.1.2 Of the 78 anomalies highlighted in previous surveys, 73 have been classified as A2 – Uncertain origin of possible archaeological interest; as per the discrimination scheme outlined in **Table 3**. There are five NMR records, two with corresponding UKHO numbers but none of which have recorded geophysical anomalies, found within the Study Area and Buffer zone. These have therefore been classified as A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly; as per the discrimination scheme outlined in **Table 3**. 69 of the total records were inside the Study Area, including the Unidentified Wreck (**7070**). Named wrecks *Faith* (**7071**) and *Falloden* (**7069**) were located in the buffer zone along with seven other identified anomalies (**Figure 2, Appendix I**).

3.1.3 Interpretation of the 2012 geophysical data identified a total of 69 sidescan sonar anomalies of possible archaeological potential, 62 within the Study Area, and seven within the buffer zone (**Figure 2, Appendix I**). All anomalies were classified as A2 – Uncertain origin of possible archaeological interest; as per the discrimination scheme outlined in **Table 3**. These 69 anomalies have been classified by type as seen in **Table 5**:

Classification	Number
Dark Reflector	56

Bright Reflector	4
Linear	0
Wreck	0
Debris Field	1
Seafloor Disturbance	8

Table 5: Classification of the Sidescan Sonar anomalies from 2012 data

The table shows that of all the recorded anomalies, most were “Dark Reflectors”. Nearly all the boundaries were classified as “Seafloor Disturbance” with only one identified as a definite “Debris Field”. Further information about these anomalies can be seen in **Appendix I**.

- 3.1.4 Of the five A3 records identified within the Study Area and the Buffer Zone, three are recorded as wrecks (two with corresponding UKHO numbers) and the remaining two as an “Obstruction”, as can be seen in **Table 6** below and **Appendix I**.

Wreck	Records	Allocated location	Study Area/Buffer	Information
<i>Falloden</i> 7069	UKHO 18948 NMR 895329	624828 5588602	Buffer	Wreck " SS Falloden" Welsh cargo vessel sunk by a German U-boat UC71 in December 1917.
“Unknown” 7070	UKHO 18947 NMR 1027982	637197 5588662	Study Area	Wreck "Unknown" Reference: “Chart1”
<i>Faith</i> 7071	NMR 1397761	634055 5590994	Buffer	Wreck of British cargo vessel, located 10 miles SE of St. Catherine's Point which foundered in 1855 on her delivery voyage, en route from London to Istanbul carrying a general cargo
7072	NMR 1028084	640127 5596067	Buffer	Obstruction indicative of a possible wreck or submerged feature
7073	NMR 766519	640148 5596067	Buffer	Obstruction indicative of a possible wreck or submerged feature

Table 6: Information on the A3 records in Area 407

To identify three single locations for the “unknown” wreck (**7070**), *SS Falloden* (**7069**) and *Faith* (**7071**); only records from the UKHO and NMR (EMU 2011) were used as the coordinates printed in the EA (WA 1998) were deemed to include errors. Neither the original nor the new grouped locations were thought to have definite corresponding geophysical anomalies found in the 2012 survey area or from previous work (EMU 2011).

- 3.1.5 All five A3 records seem to have been outside the previous survey boundaries of EMU (2011) and are definitely outside the most recent survey area (See **Figure 2**). The two NMR records which have both been classed as an “Obstruction indicative of a possible wreck or submerged feature” are recorded as being 21m apart. They

have been left as two separate records even though with their close proximity they could be related; being seen twice also strengthens the likelihood of their existence. These two NMR records were not further discussed in the previous report (EMU 2011) because they are within the buffer zone and therefore should not be impacted by the proposed dredging.

- 3.1.6 The wreck *Fallden* (**7069**) is situated on the edge of the Study Area and the Buffer zone (EMU 2011 and **Figure 2**). According to the recent EMU report (2011), the UKHO has declared this wreck as “dead”. However, this exact area has not been covered by the 2012 geophysical survey, therefore it is recommended that a temporary exclusion zone of 100m radius be placed around this location while this area is under license.
- 3.1.7 The “Unknown” wreck (**7070**) is within the Study Area, but is just outside the limits of the 2012 geophysical survey area (EMU 2011 and **Figure 2**). Although the UKHO has declared this wreck as “dead”, this exact area has not been covered by the 2012 geophysical survey, and so it is recommended that a temporary exclusion zone of 100m radius be placed around this location while this area is under license even though greater than 100m outside of the licence area.
- 3.1.8 From **Table 6** above it can be seen that the wreck *Faith* (**7071**) has only an NMR record. It is also in the buffer zone of Area 407 and so was not commented on in the previous EMU report (2011). Although there is no corresponding UKHO record within the Study Area it is recommended an exclusion zone of 100m radius be placed around the recorded location until the site has been properly investigated.
- 3.1.9 Of the 69 anomalies found within the licence area, none are of definite archaeological origin and therefore no exclusion zones have been recommended for them.

3.2 BATHYMETRY DATA

- 3.2.1 The bathymetry data from the 2012 survey were processed by Wessex Archaeology.
- 3.2.2 There are no obvious anthropogenic anomalies that can be seen in the bathymetric data, only natural features. A depression, which is thought to be a section of the palaeosolent, has been identified along the South edge of the survey area, in the South East of the licence area.

4. MITIGATION

- 4.1.1 According to heritage agencies and the principles outlined in Marine Aggregate Dredging and the Historic Environment, the preferred approach to the presence of potential archaeological sites is ‘to preserve *in situ*’ or ‘preservation by record’ (BMAPA and English Heritage 2003). The mitigation suggested for marine aggregate extraction is avoidance, reduction, or remedying and offsetting, and monitoring.
- 4.1.2 No archaeological exclusion zones are required within the ADZ. However it is recommended that temporary exclusion zones of 100m in radius be placed around each of the three wreck locations whilst dredging is taking place even though they are outside of the current ADZ.
- 4.1.3 No geophysical anomalies of definite archaeological potential were identified in the 2012 data therefore no new exclusion zones are considered necessary at this point.

- 4.1.4 It is recommended that if any objects of possible archaeological interest are recovered during dredging operations from Area 407, that they should be reported using the established BMAPA Protocol for reporting finds of archaeological interest.

5. REFERENCES

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6. APPENDIX I: ANOMALIES OF POSSIBLE ARCHAEOLOGICAL POTENTIAL

WA ID	Name/ Classification	Easting	Northing	Archaeological Discrimination	Length	Width	Height	Description	Internal references	External references	Study Area or buffer
7000	Dark Reflector	638435	5593311	A2	2.2	1	0.1	Small but strong arrow shaped dark reflector in an area of smooth seabed.	6001		Study Area
7001	Dark Reflector	638307	5593000	A2	4.2	1.1	0.5	Small but strong dark reflectors, very close together, in a disturbed area of the seabed.	6002, 6003		Study Area
7002	Dark Reflector	638279	5592283	A2	5	0.9	0.4	Strong dark reflector in an area of sandwaves on the seabed. Data stripey.	6004		Study Area
7003	Bright Reflector	638402	5591941	A2	13.6	3	0	Anomalous wide strip of irregular bright reflector in an area of relatively smooth seabed.	6005		Buffer
7004	Dark Reflector	638407	5590332	A2	5.2	1.5	0.3	Indistinct dark reflector with bright shadow in an area of smooth seabed.	6007		Buffer
7005	Dark Reflector	638436	5589727	A2	4.5	2.7	0.3	Indistinct dark reflector. Seems to be a large object within an area of sandwaves in the seabed.	6008		Study Area
7006	Bright Reflector	638368	5589652	A2	4.8	3.1	0	Irregular diamond shaped bright reflector near the end of sandwaves in the seabed and the inside edge of the trackplot.	6009		Study Area
7007	Dark Reflector	637607	5591076	A2	3.7	1.2	0.9	Anomalous dark reflector in an area of smooth seabed.	6010		Study Area
7008	Dark Reflector	637467	5590876	A2	3.4	0.9	0.6	Sharp dark reflector with straight edged shadow.	6011		Study Area

								Situated next to a couple of other dark reflectors, probably rocks, in an area of very smooth seabed. Also data looks slightly stretched here.			
7009	Dark Reflector	637475	5590870	A2	2.2	0.8	0.5	Larger of two dark reflectors, probably rocks, but along with tag 3011 anomalous to the rest of the smooth seabed.	6012		Study Area
7010	Dark Reflector	637462	5590744	A2	3.3	0.5	0.7	Very strong dark reflector, data stretched, but strength and shadow anomalous to the rest of the seabed.	6013		Study Area
7011	Dark Reflector	637636	5590697	A2	4.7	0.8	0.1	Irregularly shaped dark reflector with bright shadow in front	6014		Study Area
7012	Debris Field	637504	5590420	A2	10.4	6.7	0	Group of dark reflectors in an area of smooth seabed.	6015		Study Area
7013	Dark Reflector	637614	5590238	A2	5.6	1.9	1.1	Large dark reflector with definitive squared corner, anomalous to the rest of the seabed.	6017		Study Area
7014	Dark Reflector	637603	5590034	A2	7.9	1.6	0.4	Irregular dark reflector with anomalous shadow. Data looks stretched here.	6019		Study Area
7015	Dark Reflector	637625	5590016	A2	5.1	1.8	0.3	Indistinct dark reflector, though with a distinct edge along one side, possibly curved at one end. Shadow seems to corroborate this.	6020		Study Area
7016	Dark Reflector	637609	5589414	A2	2.6	1.9	0.6	Indistinct patch of dark reflector with flared shadow behind	6022		Study Area

7017	Dark Reflector	637435	5590592	A2	3.8	0.7	0.1	Short linear dark reflector in an area of smooth seabed. Shadow anomalous	6023		Study Area
7018	Dark Reflector	637526	5590732	A2	2.1	1.1	0.4	Small circular dark reflector with anomalous height and surrounded by bright reflector.	6024		Study Area
7019	Dark Reflector	637433	5590838	A2	3.4	1.1	1	Small rounded dark reflector with large bright shadow. Anomalous to the other small reflectors on the seabed	6025		Study Area
7020	Seafloor Disturbance	637547	5588525	A2	27.6	25.3	0	Group of dark and bright reflectors, not uniform so doesn't look like a sandwave at this angle. Surrounding seabed is very smooth.	6026		Study Area
7021	Dark Reflector	637524	5588533	A2	5.5	2.6	0	Bright and dark reflector, obviously associated to tag 3026	6027		Study Area
7022	Dark Reflector	638323	5592561	A2	2.9	0.8	0.3	Small, short dark reflector in the middle of a sand wave.	6031		Study Area
7023	Dark Reflector	638304	5592661	A2	4.7	1.1	0.4	Dark reflector with a distinct edge and corner. Anomalous to the surrounding seabed	6032		Study Area
7024	Seafloor Disturbance	638325	5593128	A2	117.8	53.8	0	Irregular area of lighter reflected seabed. Contains indistinct dark and bright reflector but data stripey so hard to make out. Extends East out of the trackplot	6033		Study Area
7025	Dark Reflector	638307	5590958	A2	4.1	1.2	0.3	Short, thin dark reflector with anomalous shadow. However data is	6035		Study Area

								stretched, though can't tell by how much.			
7026	Dark Reflector	638074	5589946	A2	5.7	3.4	0	Small dark feature in an otherwise smooth seabed. A small rock seems to be associated.	6036		Study Area
7027	Bright Reflector	638226	5587658	A2	7.1	4.7	0	Small area of bright reflector with dark reflector at each end.	6037		Study Area
7028	Dark Reflector	638239	5591970	A2	4.9	1	0.2	Small, thin dark reflector in an area of relatively empty seabed. Bright shadow extends out of the trackplot.	6038		Study Area
7029	Bright Reflector	638172	5590446	A2	7.1	4.8	0	Sub-circular bright feature on the seabed. Indistinguishable.	6040		Study Area
7030	Dark Reflector	638020	5591472	A2	2.9	0.2	0.1	Small dark reflector, looks slightly bent, anomalous feature.	6041		Study Area
7031	Seabed Disturbance	638152	5592396	A2	11.6	1.9	0	Two dark reflectors close to each other, shadow goes out of the trackplot.	6042		Study Area
7032	Dark Reflector	637999	5588772	A2	9.1	1.3	0.3	Indistinct long, curved stripe in the seabed, with bright shadow behind	6043		Study Area
7033	Dark Reflector	637987	5589992	A2	2.7	1.2	0.2	Small round dark reflector with irregular bright shadow, anomalous to surrounding objects.	6046		Study Area
7034	Dark Reflector	638121	5590549	A2	3.5	0.5	0.5	Small rectangular object with long bright shadow, data may be stretched	6047		Study Area
7035	Dark Reflector	637859	5589868	A2	2.9	0.7	0.8	Dark edge with straight bright shadow. Seems to have caused scour	6048		Study Area
7036	Dark Reflector	637884	5589832	A2	3.3	1.5	0.3	Series of 4 small dark reflectors very close	6049		Study Area

								together. Associated scour around them.			
7037	Dark Reflector	637835	5589954	A2	2.1	0.8	0.5	Small, thin, linear dark reflector with bright shadow and within scour.	6050		Study Area
7038	Dark Reflector	637875	5589966	A2	5	0.7	0.3	3 linear dark reflectors, possible stretched, one has a long shadow than the others	6051		Study Area
7039	Dark Reflector	637836	5590240	A2	3.4	0.6	0.5	Small, thin, linear dark reflector with bright shadow. Data possibly stretched.	6052		Study Area
7040	Dark Reflector	637871	5590577	A2	2.2	1.3	0.7	Small, rounded dark reflector surrounded by bright reflector, possibly scour, and an anomalous large shadow.	6053		Study Area
7041	Dark Reflector	637863	5591100	A2	2.7	0.5	0.2	Small, thin dark reflector, probably stretched data, but anomalous to the rest of the seabed.	6054		Study Area
7042	Dark Reflector	637886	5591241	A2	1.3	0.9	0.3	Small square dark reflector with large shadow. Data probably stretched.	6055		Study Area
7043	Dark Reflector	637811	5591899	A2	3.4	1.6	0.4	Thick dark reflector, data possibly stretched, shadow longer at the ends of the object.	6056		Study Area
7044	Dark Reflector	637885	5593387	A2	19.1	2.1	0.3	Linear dark reflector, with a distinct object very near one end.	6057, 6058		Study Area
7045	Dark Reflector	637808	5589179	A2	1.3	0.9	0.4	Solid dark reflector within small scour.	6060		Study Area
7046	Dark Reflector	637833	5589229	A2	5.6	0.6	0.4	Linear dark reflector with shadow, though data looks stretched here.	6061		Study Area

7047	Dark Reflector	637807	5589558	A2	2.9	0.2	0.1	Linear dark reflector with surrounding bright shadow	6062		Study Area
7048	Dark Reflector	637860	5589787	A2	3.1	2.8	0.7	Indistinct partially buried feature with crescent shaped bright shadow. Possible surrounding disturbance of the seabed	6063		Study Area
7049	Dark Reflector	638028	5590191	A2	3.5	0.9	0.5	Small dark reflector, with hard corner edge within large seabed scour. Data stretched.	6065		Study Area
7050	Dark Reflector	638010	5589884	A2	5.4	1.2	0.4	Three small dark reflectors behind a mound.	6066		Study Area
7051	Dark Reflector	638031	5588636	A2	6.6	2.9	0.3	Dark shadow in the seabed with bright shadow behind, right on the edge of the trackplot.	6067		Study Area
7052	Dark Reflector	637879	5593318	A2	2.6	1.7	0.2	Rectangular dark reflector with flared shadow, slight bright shadow in front.	6068		Study Area
7053	Dark Reflector	637312	5590559	A2	2.9	0.6	0.4	Small dark reflector with scour at each end. Data is stretched.	6070		Study Area
7054	Dark Reflector	637416	5590114	A2	2.3	2	0.3	Square object with hard edge, similar shadow. Data may be stretched.	6072		Study Area
7055	Dark Reflector	637302	5589950	A2	5.2	0.6	0.2	Dark reflector, stretched, with white shadow	6073		Study Area
7056	Seafloor Disturbance	637432	5589769	A2	11.5	7.7	0	Dark Reflectors with bright shadow	6074		Study Area
7057	Dark Reflector	637272	5589220	A2	6.8	2.5	0.6	One small arrow shaped dark reflector with another, much stronger behind it.	7059, 7060		Study Area
7058	Seafloor Disturbance	638998	5592977	A2	45.5	11.3	0	Group of bright reflectors linking two long linear of bright reflector, possibly seabed scars or edges of long sandwaves	6077		Buffer

7059	Seafloor Disturbance	638292	5592972	A2	57.8	16.2	0	Area of small bright and dark reflectors, anomalous to the rest of the seabed.	6078		Study Area
7060	Seafloor Disturbance	638531	5590971	A2	13.6	5.6	0	Group of dark and bright reflectors. Data quite stretched so difficult to make out.	6083		Buffer
7061	Dark Reflector	637583	5589841	A2	4.5	0.8	0.5	Small square dark reflector with anomalous shadow and a dark shadow behind, surrounded by scour	6085		Study Area
7062	Dark Reflector	638636	5592950	A2	7.5	2.9	0.2	Object with a distinct edge. Dark reflector and bright shadow behind. Surrounded by other reflectors that look like sandwaves but data is quite bad here.	6088		Buffer
7063	Dark Reflector	638818	5592228	A2	4.8	0.7	0.4	Dark reflector with slight scour in front, anomalous height shadow, but has been stretched.	6092		Buffer
7064	Dark Reflector	639048	5592036	A2	6.6	1.1	0.2	Slightly bent dark reflector, though data is stretched.	6093		Buffer
7065	Seafloor Disturbance	637802	5589449	A2	66	2.1	0	Very straight line of about 8 small dark reflectors	6094		Study Area
7066	Dark Reflector	637628	5590308	A2	4.2	2.1	0.7	Large dark reflector with distinct edge and slanted bright shadow. Anomalous to the rest of the seabed so possibly slightly stretched.	6096		Study Area
7067	Dark Reflector	637585	5589633	A2	2.1	0.9	0.3	Rectangular dark reflector with shadow behind and bright reflector in front	6099		Study Area
7068	Dark Reflector	637692	5589671	A2	2	0.6	0.6	Small rectangular dark reflector with bright	6100		Study Area

								shadow and bright reflector in front			
7069		634828	5588602	A3				Wreck " SS Falloden" Welsh cargo vessel sunk by a German U-boat UC71 in December 1917.		UKHO 18948 / EMU ID_ U1, NMR 895329 / EMU ID_ N6	Buffer
7070		637197	5588662	A3				Wreck "Unknown" Ref: "Chart1"		UKHO 18947/ EMU ID_ U2, NMR 1027982 / EMU ID_ N1	Study Area
7071		634055	5590994	A3				Wreck "Faith" Wreck of British cargo vessel, located 10 miles SE of St. Catherine's Point which foundered in 1855 on her delivery voyage, en route from London to Istanbul carrying a general cargo		NMR 1397761/ EMU ID_ N4	Buffer
7072		640127	5596067	A3				Obstruction indicative of a possible wreck or submerged feature		NMR 1028084 / EMU ID _ N2	Buffer
7073		640148	5596067	A3				Obstruction indicative of a possible wreck or submerged feature		NMR 766519 / EMU ID_ N3	Study Area
7074	Seabed Disturbance	635716	5585897	A2	13.4	3.9	-	An area of lower reflectivity backed by a well defined area of high reflectivity. Possibly scour revealing a solid object.		EMU ID_ Contact 1002	Study Area

7075	Seabed Disturbance	636103	5589294	A2	15.2	14	1.7	Three rectangular areas of higher reflectivity parallel to one another with 2 connecting areas of lower reflectivity. Not sedimentary in aspect. Possible buried object.	EMU ID_Contact 1003	Study Area
7076	Debris	636678	5586513	A2	14.5	2.4	-	Two linear objects with low relief and reflectivity and small areas of lower reflectivity. Possible largely buried object.	EMU ID_Contact 1004	Study Area
7077	Debris	638024	5586453	A2	8.6	7.6	0.3	Two square shaped, partially buried, low reflectivity areas with strongly right-angular corners.	EMU ID_Contact 1005	Study Area
7078	Debris	639182	5588362	A2	15.7	2.4	0.5	A curvilinear flat area of possible debris. A straight edge is apparent.	EMU ID_Contact 1006	Study Area
7079	Debris	638713	5593819	A2	14.5	0.5	0.1	A long, straight very high reflectivity object of constant width and shadow. Possible pole/mast.	EMU ID_Contact 1007	Study Area
7080	Seabed Disturbance	636237	5591891	A2	23.4	17.4	-	A large, possibly flat disturbance with equi-depth, well defined scour indication.	EMU ID_Contact 1008	Study Area
7081	Debris	636275	5591774	A2	13.6	1.6	0.4	A collection of several stark areas of high reflectivity with straight shadows. Possible anthropogenic debris field within active dredge area.	EMU ID_Contact 1009	Study Area
7082		637560	5593432	A2				Irregular oval shadow 15m diameter. Trace error?	WA 2000 SSS Hit No 1	Study Area
7083		637067	5593272	A2				Slight hard contact with	WA 2000	Study

								diffuse shadow.		SSS Hit No 2	Area
7084		638362	5593044	A2				75m long-oval shadow E-W. Disturbed seabed?		WA 2000 SSS Hit No 3	Study Area
7085		635160	5592220	A2				Small hard return and shadow. Cf. 40		WA 2000 SSS Hit No 4	Study Area
7086		637016	5592520	A2				Oval depression and hard central return.		WA 2000 SSS Hit No 5	Study Area
7087		635157	5592470	A2				Return and shadow E-W.		WA 2000 SSS Hit No 6	Study Area
7088		637160	5591842	A2				Bed disturbance or outcrop?		WA 2000 SSS Hit No 7	Study Area
7089		634735	5591752	A2				Small return with small shadow. Outcrop?		WA 2000 SSS Hit No 8	Buffer
7090		637008	5591524	A2				Bed disturbance and hollow?		WA 2000 SSS Hit No 9	Study Area
7091		636987	5591366	A2				Bed disturbance and linear furrows? Geology?		WA 2000 SSS Hit No 10	Study Area
7092		637044	5591248	A2				Bed disturbance and linear furrows? Geology?		WA 2000 SSS Hit No 11	Study Area
7093		636985	5591037	A2				Bed disturbance and linear furrows? Geology.		WA 2000 SSS Hit No 12	Study Area
7094		635101	5590933	A2				Small oval return		WA 2000 SSS Hit No 13	Study Area
7095		636889	5590840	A2				Disturbance. Geology?		WA 2000 SSS Hit No 14	Study Area

7096		636761	5590634	A2				Disturbance. Geology?		WA 2000 SSS Hit No 15	Study Area
7097		636697	5590433	A2				Disturbance. Geology?		WA 2000 SSS Hit No 16	Study Area
7098		637018	5590442	A2				Disturbance. Geology?		WA 2000 SSS Hit No 17	Study Area
7099		636724	5590176	A2				Disturbance. Geology?		WA 2000 SSS Hit No 18	Study Area
7100		635591	5590227	A2				Disturbance. Geology? Cf. 46		WA 2000 SSS Hit No 19	Study Area
7101		636652	5590032	A2				Disturbance. Geology?		WA 2000 SSS Hit No 20	Study Area
7102		636803	5589764	A2				Disturbance. Geology?		WA 2000 SSS Hit No 21	Study Area
7103		635482	5589451	A2				Ridge and low shadow? Geology? Cf. 42		WA 2000 SSS Hit No 22	Study Area
7104		636855	5589615	A2				Disturbance. Geology?		WA 2000 SSS Hit No 23	Study Area
7105		635053	5589219	A2				Liner plus indistinct contact		WA 2000 SSS Hit No 24	Study Area
7106		635106	5589220	A2				50-100m long anomalies E-W		WA 2000 SSS Hit No 25	Study Area
7107		635304	5589227	A2				50-100m long anomalies E-W		WA 2000 SSS Hit No 26	Study Area
7108		635475	5589231	A2				50-100m long anomalies E-W		WA 2000 SSS Hit No	Study Area

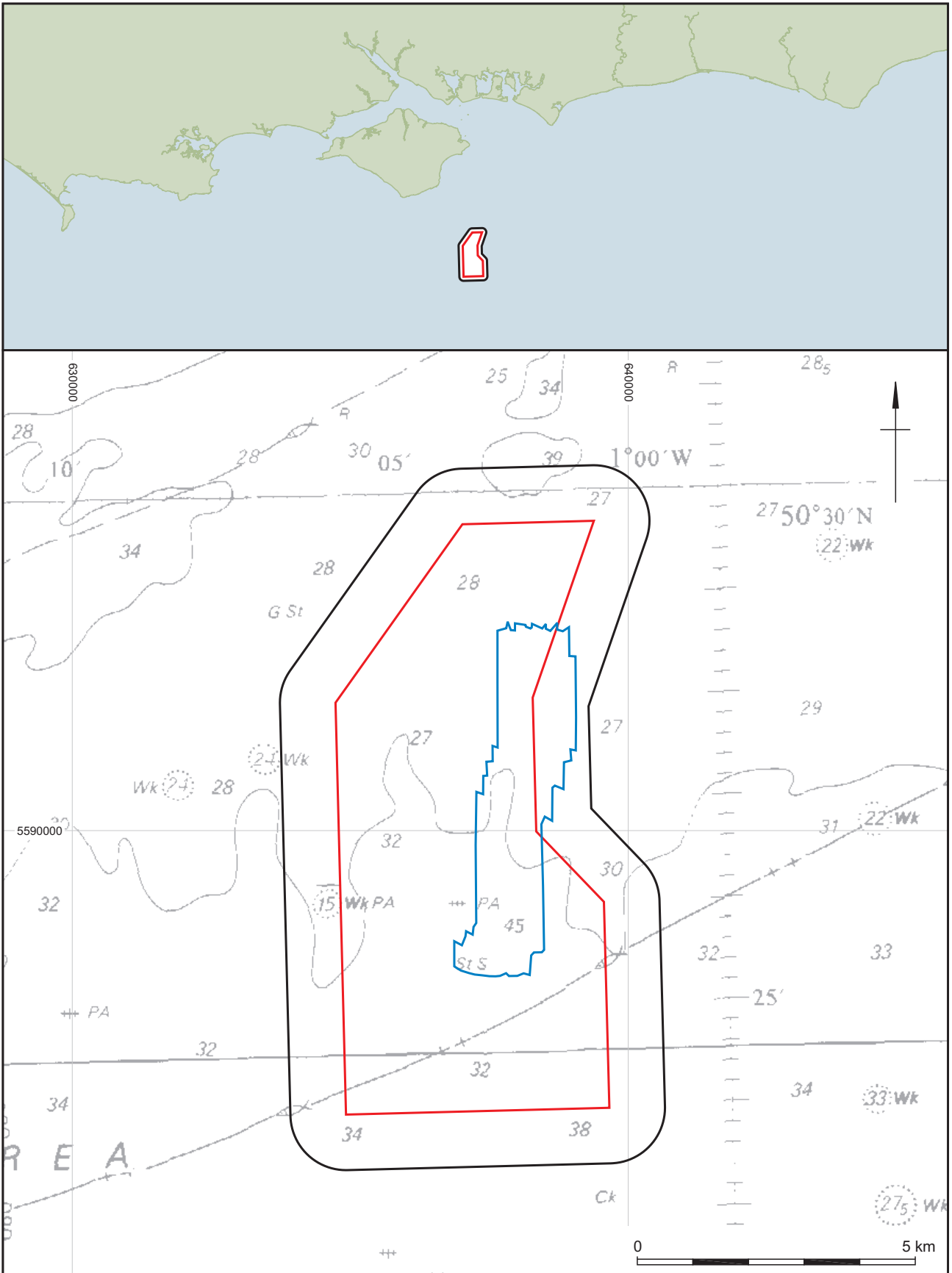
										27	
7109		635587	5589232	A2				50-100m long anomalies E-W		WA 2000 SSS Hit No 28	Study Area
7110		636774	5589107	A2				Point contact with shadow		WA 2000 SSS Hit No 29	Study Area
7111		636305	5588849	A2				Indistinct with shadow		WA 2000 SSS Hit No 30	Study Area
7112		635904	5588843	A2				Indistinct with vague shadow		WA 2000 SSS Hit No 31	Study Area
7113		635823	5589047	A2				Return with shadow. North-South		WA 2000 SSS Hit No 32	Study Area
7114		635948	5588597	A2				Bed disturbance? And area of strong return		WA 2000 SSS Hit No 33	Study Area
7115		637155	5588693	A2				Two linear shadows perpendicular to track		WA 2000 SSS Hit No 34	Study Area
7116		635983	5588688	A2				Linear return with scour in front? Plus disturbed area.		WA 2000 SSS Hit No 35	Study Area
7117		634601	5588502	A2				Small indistinct return with shadow.		WA 2000 SSS Hit No 36	Buffer
7118		635383	5587979	A2				Large area of shadow. Poorly defined.		WA 2000 SSS Hit No 37	Study Area
7119		636961	5587743	A2				Smudge? Shadow?		WA 2000 SSS Hit No 38	Study Area
7120		635050	5590364	A2				Line return. No shadow.		WA 2000 SSS Hit No 39	Study Area
7121		635196	5592237	A2				Two solid returns with		WA 2000	Study

								shadow. Cf. 04		SSS Hit No 40	Area
7122		635271	5590309	A2				Three indistinct hits.		WA 2000 SSS Hit No 41	Study Area
7123		635455	5589475	A2				Indistinct return. Cf. 22		WA 2000 SSS Hit No 42	Study Area
7124		635429	5590210	A2				Indistinct return		WA 2000 SSS Hit No 43	Study Area
7125		635415	5592290	A2				Small contact with some shadow		WA 2000 SSS Hit No 44	Study Area
7126		635587	5589273	A2				Teardrop shaped outline		WA 2000 SSS Hit No 45	Study Area
7127		635597	5590211	A2				Long disturbance in seabed. Cf. 19		WA 2000 SSS Hit No 46	Study Area
7128		635901	5588949	A2				Indistinct hard return		WA 2000 SSS Hit No 47	Study Area
7129		635809	5592284	A2				Indistinct area of hard return		WA 2000 SSS Hit No 48	Study Area
7130		635963	5592724	A2				Discrete disturbed area Cf. 51		WA 2000 SSS Hit No 49	Study Area
7131		636128	5592713	A2				Bed disturbance		WA 2000 SSS Hit No 50	Study Area
7132		635953	5592710	A2				Bed disturbance over smaller area. Cf. 49		WA 2000 SSS Hit No 51	Study Area
7133		636239	5590164	A2				Oval raised return with long shadow		WA 2000 SSS Hit No 52	Study Area

7134		636652	5589255	A2				Long oval. Depression in seabed		WA 2000 SSS Hit No 53	Study Area
7135		636909	5591540	A2				Indistinct anomaly. Geology?		WA 2000 SSS Hit No 54	Study Area
7136		634942	5592775	A2				Large anomaly, 50m N-S by 30m E-W		WA 2000 Mag Source ID 1	Buffer
7137		635473	5592682	A2				Large Anomaly, 100m N-S by 40m E-W		WA 2000 Mag Source ID 2	Study Area
7138		637286	5589515	A2				Large Anomaly, 70m by 70m		WA 2000 Mag Source ID 3	Study Area
7139		634250	5589915	A2				Large Anomaly, 90m N-S by 30m E-W		WA 2000 Mag Source ID 4	Buffer
7140		636106	5593210	A2				Small Anomaly		WA 2000 Mag Source ID 5	Study Area
7141		635687	5593195	A2				Small Anomaly		WA 2000 Mag Source ID 6	Study Area
7142		637968	5593136	A2				Small Anomaly		WA 2000 Mag Source ID 7	Study Area
7143		636721	5589908	A2				Small Anomaly		WA 2000 Mag Source ID 8	Study Area
7144		634365	5589596	A2				Small Anomaly		WA 2000 Mag Source ID 9	Buffer
7145		634587	5589419	A2				Small Anomaly		WA 2000 Mag Source ID 10	Buffer
7146		635572	5589102	A2				Small Anomaly		WA 2000	Study

										Mag Source ID 11	Area
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1. *Co-ordinates are in WGS84 UTM30N*
2. *Positional accuracy estimated ±10m*



<p>Drawing projection: UTM WGS84 z30N Admiralty Chart: 2450 (dated 2000)</p> <p> Licensed Dredging Area 1 km buffer 2012 Survey Area</p> <p> Wessex Archaeology</p>	<p>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 Stationary Office. ©Crown Copyright, 2000. (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 right 2012. This material is for client report only © Wessex Archaeology. No unauthorised reproduction.</p>	
	Date: 23/11/12	Revision Number: 0
	Scale: 1:100,000 @A4	Illustrator: KJF
	Path: W:\Projects\87680\DrawingOffice\Report figs\Monitoring\12_11_23	

Site location

Figure 1



	<ul style="list-style-type: none"> ▭ Licensed Dredging Area 1 km buffer Active Dredging Zone 2012 Survey Area 2009 Geophysical Survey Area 	<ul style="list-style-type: none"> ● 2012 recorded anomaly (WA) - A2: Uncertain origin of possible archaeological interest ● Previously recorded anomaly (WA 2000 and EMU 2011) - A2: Uncertain origin of possible archaeological interest ● A3: Historic record of possible archaeological interest 	<p>Drawing projection: UTM WGS84 z30N Admiralty Chart: 2450 (dated 2000)</p> <p>This material is for client report only © Wessex Archaeology. No unauthorised reproduction.</p>												
	<p>0 1 2 km</p>		<table border="1"> <tr> <td>Date:</td> <td>30/01/13</td> <td>Revision Number:</td> <td>1</td> </tr> <tr> <td>Scale:</td> <td>1:40,000 @A3</td> <td>Illustrator:</td> <td>KJF</td> </tr> <tr> <td>Path:</td> <td colspan="3">W:\Projects\87680\DrawingOffice\Report figs\Monitoring\13_01_30</td> </tr> </table>	Date:	30/01/13	Revision Number:	1	Scale:	1:40,000 @A3	Illustrator:	KJF	Path:	W:\Projects\87680\DrawingOffice\Report figs\Monitoring\13_01_30		
	Date:	30/01/13	Revision Number:	1											
	Scale:	1:40,000 @A3	Illustrator:	KJF											
Path:	W:\Projects\87680\DrawingOffice\Report figs\Monitoring\13_01_30														

Sidescan anomalies

Figure 2



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