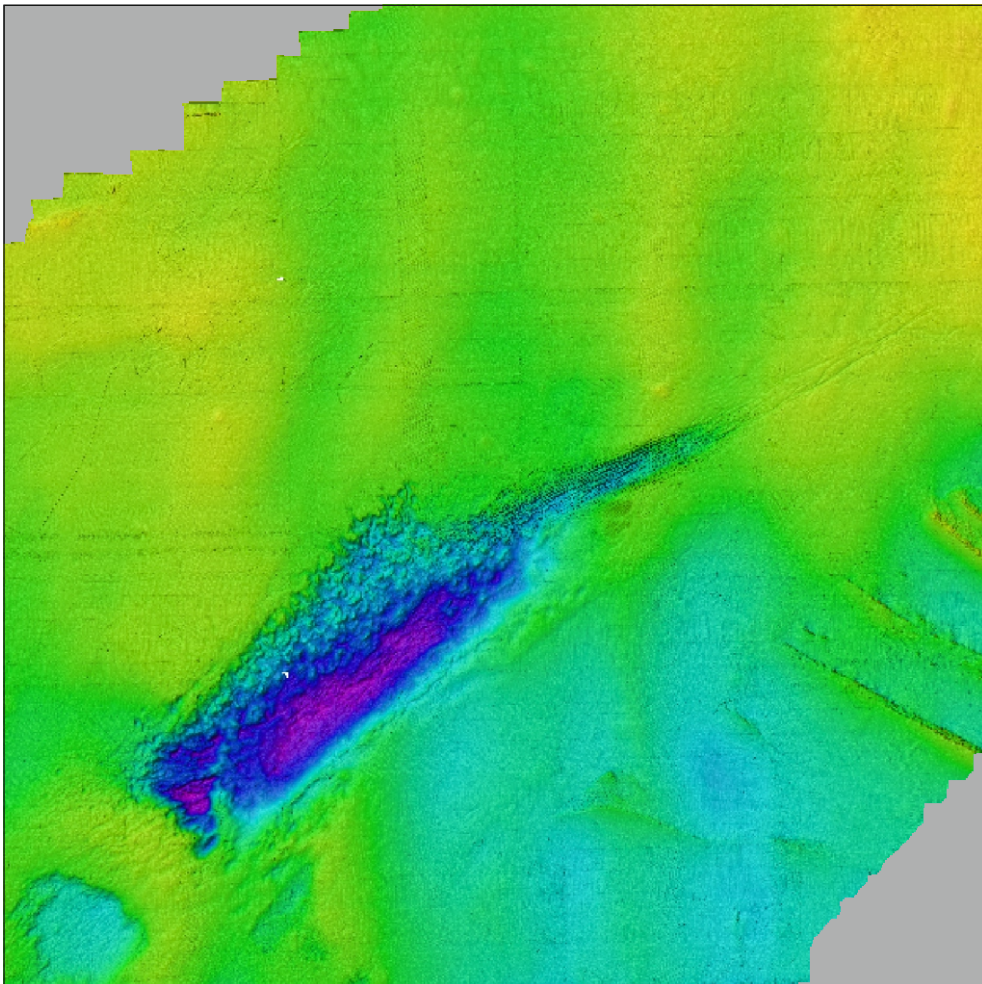




making sense of heritage

Area 372/1 Monitoring

Geophysical Assessment



Ref: 87140.02
March 2013



Area 372/1 Monitoring

Geophysical Assessment

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Area 372/1 Monitoring

Geophysical Assessment

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Area 372/1 Monitoring

Geophysical Assessment

Summary

Wessex Archaeology was commissioned by Hanson Aggregates Marine Ltd to conduct an archaeological assessment of sidescan sonar and multibeam bathymetry data acquired in 2012 over Licence Area 372/1 and the surrounding area. A total of 24 sites of archaeological potential were identified with two located inside the Active Dredge Zone and a further four located within the licence area.

A comparison of the WA identified anomalies to the 13 identified during the Year 4 monitoring assessment in 2011 was also undertaken. Only three of the 2011 anomalies were seen and judged to be potentially archaeological in origin – **EMU_2011_001**, **EMU_2011_002** and **EMU_2011_007**.

A single exclusion zone was implemented in the Year 4 monitoring assessment. This was a 30m radius exclusion zone around **EMU_2011_003**. The current 2012 assessment did not interpret this feature as archaeological in origin but the data quality was not good enough to allow the exclusion zone to be removed.

The remaining 23 sites of archaeological potential do not require exclusion zones but should be avoided during dredging operations. The implementation of the BMAPA Protocol for Reporting Finds of Archaeological Interest (BMAPA 2005) is already a condition of the Licence.



Area 372/1 Monitoring

Geophysical Assessment

Acknowledgements

Wessex Archaeology was commissioned by Hanson Aggregates Marine Ltd. Thanks are due to Rob Langman of MarineSpace for his assistance.

The geophysical survey data were provided by EMU Limited.

Archaeological interpretation of the geophysical data was undertaken by Dr Stephanie Arnott. The report was produced by Stephanie Arnott and Patrick Dresch with illustrations by Kitty Foster. The project was managed by Dr Paul Baggaley.



Area 372/1 Monitoring

Geophysical Assessment

1 INTRODUCTION

1.1 Project Background

- 1.1.1 Wessex Archaeology (WA) was commissioned by Hanson Aggregates Marine Limited to carry out an archaeological assessment of geophysical data acquired over Licence Area 372/1.
- 1.1.2 This forms part of the heritage impact monitoring process required by the Government View issued in 2007 (Section 6) for the 10 year period for the revised application area. The Government View includes measures for the protection of wrecks, marine war graves and archaeology. These include the reporting of finds under the British Marine Aggregate Producers Association (BMAPA) protocol for reporting finds, and mitigation measures to be agreed with English Heritage (EH). Under section 8.6 the Government View also makes provision for ongoing monitoring following dredging that will include consultation with EH.

Area	Easting	Northing
Licence Area	638394	5610565
	639637	5611896
	641914	5611958
	641325	5611200
	641132	5611102
	640791	5610629
Active Dredge Zone	639257	5610893
	640047	5611901
	640516	5611913
	640258	5611412
	641262	5611933
	641914	5611951
	641702	5611679
640119	5611030	

Table 1: Coordinates of Licence Area 372/1 and the Active Dredge Zone (WGS84 UTM30N)

- 1.1.3 Area 372/1, known as North Nab, lies off the southeastern coast of the Isle of Wight in the English Channel, approximately 7km east of Shanklin (**Figure 1**). The licence area and Active Dredge Zone are delimited by the coordinates in **Table 1**.
- 1.1.4 The geophysical data assessed consists of sidescan sonar and multibeam bathymetry data acquired by EMU Limited (EMU) during July to September 2012.



Although the geophysical data covers a somewhat larger area than that of the licence area, particularly to the west (**Figure 1**), an archaeological assessment was required of the entire datasets. The results were then to be compared to those of the preceding 2011 assessment conducted by EMU (EMU 2011).

1.2 Previous Work

- 1.2.1 WA previously conducted an archaeological assessment of Dredging Application Areas 372/1 North Nab and 372/2 South East Nab (WA 2003). This assessment was carried out on the original Dredging Application Areas, which were subsequently revised. The sidescan sonar data evaluated during this assessment were acquired in 1998 to 1999 and were of much lower resolution and of poorer quality than the current dataset.
- 1.2.2 Area 372/1 also lies within the much larger study areas of the South Coast Regional Environmental Assessment (WA 2007, 2012), South Coast Regional Environmental Characterisation (James *et al* 2010) and English Channel synthesis study (James *et al* 2011).
- 1.2.3 The licence conditions for the area require yearly monitoring assessments to be undertaken with a Five Year Archaeological Monitoring Review assessing the effects of dredging on the historic environment of the licence area during the previous five years. The Five Year Review was produced in 2012 by EMU (EMU 2012) and contained a summary and re-evaluation of all sites of potential archaeology identified during the Year 1 to Year 4 monitoring assessments as well as those from the baseline Desk-Based Assessment in support of the licence application (WA 2003) and the pre-dredge monitoring assessment.
- 1.2.4 The most recent archaeological assessment of geophysical data took place in 2011 with the Year 4 monitoring assessment (EMU 2011). A total of 13 sites of varying archaeological potential were identified. They were distributed across the licence area and surroundings as detailed in **Table 1**.

Area	No. of sites
Active Dredge Zone (ADZ)	0
Licence area outside ADZ	2
100m buffer around licence area	0
Beyond 100m buffer	11

Table 2: Sites of archaeological potential identified by EMU in 2011 (taken from data in EMU 2011)

- 1.2.5 A comparison of the results of the current assessment with these 2011 results is presented in **Section 3.4**.

1.3 Seabed Geology

- 1.3.1 Area 372/1 lies within an area of Lower Cretaceous geology on the Wight-Bray monocline with the majority of the licence area underlain by Wealden Group rocks and the northeastern corner by Lower Greensand, Gault and Upper Greensand. The Wealden Group consists primarily of mudstones with subsidiary siltstones and



sandstones and occurs within a narrow, <2km wide area stretching approximately 20km southeast from Sandown Bay (James *et al* 2010).

1.3.2 The Gault and Greensand appear as a narrow, approximately 1km wide, band on the steep northern limb of the Wight-Bray monocline. The Lower Greensand comprises principally grey-green or green muddy sands with brown grey silty muds, silts and fine sands and sometimes thin conglomerates near the top of the succession. The Gault is mainly dark grey soft silty mudstones while the overlying Upper Greensand includes silts, sandy muds and fine muddy sands (James *et al* 2010).

1.3.3 The Quaternary sediments overlying the solid geology consist of Pleistocene sandy gravels, which comprise the aggregate resource. The licence area is located over part of the Palaeosolent channel which is a sediment filled channel orientated approximately north-south and which forms part of the complex system of palaeochannels within the eastern English Channel.

1.4 Aims

1.4.1 The aims of this report are to:

- *Provide an assessment of geophysical anomalies of potential archaeological interest identified within the 2012 geophysical dataset;*
- *Compare the results to those of EMU from the 2011 dataset given in the Year 4 archaeological monitoring assessment (EMU 2011);*
- *Provide recommendations for the mitigation of sites of archaeological potential within the licence area.*

2 METHODOLOGY

2.1 Data Sources

2.1.1 The geophysical data consisted of sidescan sonar and multibeam bathymetry data acquired by EMU during July to September 2012.

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.
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Table 3: Criteria for assigning data quality rating

- 2.1.3 The sidescan sonar data were slightly affected by weather with most lines showing banding with some stretching or distortion. The data have therefore been rated as of average quality using the criteria above. In addition, the navigation information in the data appears to be poor quality with the same feature appearing up to 35m apart in overlapping lines.
- 2.1.4 The multibeam bathymetry data appear to be of good quality but were supplied gridded at 1m so are not suitable for the detection of very small objects.
- 2.1.5 Both datasets are adequate for the purposes of this assessment but the poor navigation quality of the sidescan sonar data will significantly reduce the positional accuracy of anomalies identified in this dataset.
- 2.1.6 Details of wrecks and obstructions recorded by the United Kingdom Hydrographic Office (UKHO) were also obtained to provide information on the known archaeology within the survey area.

2.2 Geophysical Data – Technical Specifications

- 2.2.1 The geophysical data were acquired by EMU over a number of days between 21st July and 19th September 2012 aboard three survey vessels – *Silver Spray*, *Valkyrie* and *MV Madog*. No survey report was provided to WA but a list of the survey dates and equipment used was received.
- 2.2.2 EMU state that they used a Klein 3000 dual frequency sidescan sonar system for the majority of the survey with a Klein 3900 used for the first few days. However, the header information in the data files shows that a Klein 3000 was used for all lines assessed, which were acquired between the 24th July and 3rd September 2012.
- 2.2.3 The Klein 3000 is a dual frequency sidescan sonar towfish and can acquire data at both 100kHz and 500kHz simultaneously. The sidescan sonar was operated with a range of 100m and the east/west oriented main lines were acquired with a spacing of 75m. Additionally, north-south oriented cross lines were acquired with a spacing of 400m.
- 2.2.4 The data were acquired using Klein Associates SonarPro software and processed by EMU using Chesapeake Technology SonarWiz software. Data files were provided to WA in the form of .xtf files containing both the high frequency and low frequency channels. Only the high frequency data were assessed, being of higher resolution and thus more suitable for archaeological assessment.
- 2.2.5 The multibeam bathymetry data were acquired using a Reson Seabat 7125 system between 20th July and 3rd September with additional data acquired on



19th September using a R2Sonic system. The multibeam data were provided to WA in processed form with a .pts file containing points gridded at 1m. The job information document from EMU states that the data are referenced to Chart Datum at Sandown.

- 2.2.6 Survey positioning was provided using an Applanix POS MV system with EGNOS corrections. This also acted as the motion reference unit and provided GPS tidal information. POSpac MMS software was used to process the tidal data.
- 2.2.7 The sidescan sonar data were recorded and provided to WA in WGS84 latitude and longitude and were subsequently projected by WA into UTM Zone 30N. The multibeam bathymetry data were provided in WGS84 UTM 30N projected coordinates.
- 2.2.8 All coordinates in this report are given in WGS84 UTM 30N projected coordinates.

2.3 Geophysical Data – Processing

- 2.3.1 The sidescan sonar data (main lines only) 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 made into a surface using IVS Fledermaus software which enables three dimensional visualisation of a dataset. The dataset was assessed for the presence of large sites of archaeological potential and positions of all sidescan sonar anomalies and UKHO records were specifically examined. Details of observed features were recorded and images made for each one.



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 UKHO data. This allows one ID number to be assigned to a single object for which there may be, for example, a UKHO record, a multibeam bathymetry anomaly 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-Archaeological	U1	Not of anthropogenic origin
	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 4: 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 for further evaluation should more information become available.

3 RESULTS

3.1 Introduction

- 3.1.1 The results of this assessment are summarised and presented in a gazetteer in **Appendix I**. As the majority of UKHO records in the area are classified as dead, with several of these being confirmed of natural and not archaeological origin, many do not appear in the gazetteer. They are therefore included in **Section 3.2** below.
- 3.1.2 The number of features in each category of archaeological discrimination that have been identified in the survey area are summarised in the table below.



Archaeological Discrimination	Number of anomalies	Interpretation
A1	0	Anthropogenic origin of archaeological interest
A2	19	Uncertain origin of possible archaeological interest
A3	5	Historic record of possible archaeological interest with no corresponding geophysical anomaly
Total	24	

Table 5: Sites of archaeological potential

3.1.3 These sites of potential archaeological interest have been classified by probable type (**Table 6**), which can aid in assigning archaeological potential and importance. Detailed descriptions of each feature are included in **Section 3.3**.

Anomaly Classification	Number of Anomalies
Bright reflector	3
Dark reflector	11
Mound	3
Seafloor disturbance	2
UKHO obstruction	5
Total	24

Table 6: Types of anomalies identified

3.2 UKHO Records

3.2.1 There are a total of 13 UKHO records that lie within the survey area (**Figure 2**). Of these, 10 are reported as 'dead' and three as 'live'. Of the 13, eight are assessed as being non-archaeological in origin and are therefore not included in the gazetteer of potential archaeological sites. These records are summarised in the table below.

WA ID	UKHO information				Summary
	ID	Position	State	Category	
2000	UKHO 19032	638089E 5611029N	DEAD	Undefined	UKHO - Vessel sank in 1975. Not found during surveys.
					WA - Not seen. Believed to be modern wreck, if existing.
2003	UKHO 19044	639051E 5612508N	DEAD	Dangerous wreck	UKHO - Originally reported as a wreck but subsequent surveys revealed it to be a rocky ridge.
					WA - Confirmed as natural.
2010	UKHO 20006	642957E 5611858N	LIVE	Foul ground	UKHO - Rocky outcrop.
					WA - Confirmed as natural.
2011	UKHO 20007	642484E 5612012N	DEAD	Foul ground	UKHO - First reported as an obstruction but subsequently not found. In an area of rocky outcrops.



WA ID	UKHO information				Summary
	ID	Position	State	Category	
					WA - Confirmed as natural
2012	UKHO 20011	642276E 5612077N	DEAD	Dangerous wreck	UKHO - Originally reported as a wreck but a dive and subsequent surveys revealed it to be a rocky outcrop.
					WA - Confirmed as natural.
2016	UKHO 20230	642081E 5612087N	LIVE	Foul ground	UKHO - Originally reported as a possible wreck. Last located as a small object, probable minor seabed feature.
					WA - Not seen. Believed to be natural.
2017	UKHO 20231	643541E 5612876N	DEAD	Undefined	UKHO - Located as a small rock and then as a 10m object. Believed to be a minor seabed feature.
					WA - Not seen. Believed to be natural.
2021	UKHO 57224	642671E 5612950N	DEAD	Foul ground	UKHO - Anchor lost in 1999. Not located during last survey.
					WA - Not seen. Believed to be modern debris, if existing.

Table 7: UKHO records of non-archaeological interest in the survey area

3.3 Sites of Potential Archaeological Interest

3.3.1 There were no wrecks identified in the geophysical datasets. The 24 sites of potential archaeological interest are distributed across the survey area as listed in **Table 2** and illustrated in **Figure 2**. The gazetteer in **Appendix I** includes a location column to make it clear which area each site falls within. The locations used follow those of the 2012 EMU Five Year Review with the exception of the '2012 survey area'. This last is necessary as the 2012 geophysical survey covered a slightly larger area than that of 2011.

Area	No. of sites
Active Dredge Zone (ADZ)	2
Licence area outside ADZ	4
100m buffer around licence area	1
2011 survey area (beyond 100m buffer)	15
2012 survey area (beyond 2011 survey area)	2

Table 8: Distribution of sites across the licence area and surroundings

3.3.2 Dark reflectors were the commonest type of feature identified. A total of 11 dark reflectors were seen distributed across the survey area (**7002, 7004-7009, 7012-**

- 7014** and **7022**), with a southwest to northeast trend. They range in size from 3.0m to 9.3m in length with the majority, eight features, being less than 5m in size (**Figure 3**). All of the features have height.
- 3.3.3 The largest dark reflector is site **7009**. This is a linear feature measuring 9.3x0.7x0.2m and is possibly a continuation of the similar smaller feature **7008**. Neither feature was visible in the bathymetry data.
- 3.3.4 Only two areas of seabed disturbance were identified. Site **7016** is the larger of the two, measuring 35.2x21.5x0.3m. It is visible in the sidescan sonar data as an area of principally bright reflectors containing linear dark reflectors, some with possible height. It may be an area of debris that is partially buried. In the bathymetry data the site appears as an irregular, slightly raised area surrounded by a flat and featureless seabed.
- 3.3.5 The second area of seafloor disturbance, **7000**, is rather smaller at 8.4x4.2x0m (**Figure 4**). It is an indistinct feature principally consisting of bright reflectors and is very different to the surrounding seabed. It may be a debris field but there is no feature visible in the bathymetry data at this location. A bright reflector, **7001**, lies a few metres to the southwest of **7000**. It is a curvilinear feature only visible in the sidescan sonar data and may be an item of debris (**Figure 4**). These two features are the only ones that are located in the Active Dredging Zone.
- 3.3.6 A further two bright reflectors are seen in the north of the survey area. They are very different with **7015** being a small object measuring 3.3x3.0x0m and **7023** being a large indistinct feature of 34.6x17.6x0m. There was no feature in the bathymetry data at the **7015** location and **7023** is outside the bathymetry data coverage.
- 3.3.7 There are three features classified as mounds, **7003**, **7010** and **7011**. They are all small features between 4m and 7m in length and with a height of 0.6m. All three features are visible in both the sidescan sonar and bathymetry data.
- 3.3.8 Of the UKHO records in the area that may have an archaeological origin four are categorised as foul ground (**7018** to **7021**) and one as undefined (**7017**). None of these sites were seen in the geophysical data. Only one of these five records is considered to be live – **7021**. This is a small object measuring 2.9x2.4x0.5m with no clue as to its origin.
- 3.3.9 Of the other sites recorded as foul ground, both **7018** and **7020** were initially reported as wrecks. **7018** was reported as a wreck in 1919 but subsequent surveys did not find evidence of a wreck and the record was amended to dead in 1990. **7020** was first located in 1974 and detected by further surveys. The wreck was described as being aligned east-west, 15m in length and with a height of 2.4m above the base of a scour. It was last located in 2003 as a weak magnetic anomaly. Following a later survey in 2009 during which the wreck was not detected the record was amended to dead.



- 3.3.10 The undefined site, **7017**, was also originally reported as a wreck. No details were given other than the date of discovery in 1964. After being undetected by subsequent surveys the record was amended to dead in 1990.
- 3.3.11 The remaining site recorded as foul ground, **7019**, was originally charted as a foul in 1978. No length or width measurements are given but a height of 1.5m and an orientation of 030/210 were specified. It was not detected by later surveys and amended to dead.

3.4 Comparison with 2011 results

- 3.4.1 The 2011 Year 4 monitoring assessment conducted by EMU (EMU 2011) identified 13 sites of archaeological potential. Of these 13 sites, three were also identified by WA in the 2012 dataset as being of archaeological potential. The remaining 10 sites were either not seen or were deemed unlikely to be archaeological in origin.
- 3.4.2 Site **7011** corresponds to **EMU_2011_002**. In 2011 the feature was described by EMU as an upstanding, isolated piece of possible debris measuring approximately 5.4x4.9x0.7m with an associated scour to the northeast. In the 2012 data the feature appears as a small mound, possibly debris, measuring 6.5x5.5x0.6m with a slight scour on the eastern side.
- 3.4.3 Site **7003** corresponds to **EMU_2011_007**. It was described by EMU as a possible piece of debris measuring approximately 8.4x3.3x0.1m and with an angular appearance. An associated shallow scour was located to the northwest. In the 2012 data the feature was seen as a mound measuring 8.5x4.5x0.6m. Possibly debris the feature has no scour associated with it.
- 3.4.4 Site **7016** corresponds to **EMU_2011_001**. The feature was described by EMU as a large mound of debris, possibly indicative of a wreck or structure, consisting of a large cluster of angular objects. The dimensions were given as 34.5x17.9x0.6m and the site was described as partially buried. In the 2012 data the site was seen as a seafloor disturbance measuring 35.2x21.5x0.3m. A possible debris field it consists principally of bright reflectors with some linear dark reflectors with possible height. It is an indistinct feature and possibly partially buried.
- 3.4.5 There are some discrepancies in dimensions but that is to be expected as different datasets were used for the 2011 and 2012 assessments.

4 MITIGATION

- 4.1.1 The preferred approach to the presence of known or potential archaeological sites is 'to preserve *in situ*' or 'preservation by record', as outlined in the guidance document Marine Aggregate Dredging and the Historic Environment (BMAPA and English Heritage 2003). The mitigation proposed for marine extraction is avoidance, reduction, or remedying and offsetting, and monitoring.
- 4.1.2 Archaeological Exclusion Zones (AEZ) are recommended around all historic records of possible archaeological interest. Those historic records which have been observed in the geophysical data to be natural do not require mitigation.



Historic records believed by the UKHO to be natural but not confirmed as such in the geophysical data should be avoided, as should those believed to be of modern anthropogenic origin. Details are given below in **Table 9**.

WA ID	UKHO information				Origin
	ID	Position	State	Category	
2000	UKHO 19032	638089E 5611029N	DEAD	Undefined	Possible modern wreck
2016	UKHO 20230	642081E 5612087N	LIVE	Foul ground	Believed to be natural
2017	UKHO 20231	643541E 5612876N	DEAD	Undefined	Believed to be natural
2021	UKHO 57224	642671E 5612950N	DEAD	Foul ground	Possible modern debris

Table 9: UKHO record positions to be avoided

- 4.1.3 There is only one existing EZ from the 2011 assessment. EMU recommended a 30m radius EZ around **EMU_2011_003**, which they interpreted as being debris. This feature appears in the 2012 sidescan sonar data as an indistinct area of seafloor disturbance that is probably natural in origin. As such the feature was not classified as of potential archaeological interest and is not included in the gazetteer. Owing to the indistinct nature of the feature and the average quality of the sidescan sonar data it is recommended that the EZ be retained as there is not sufficient evidence to remove it.
- 4.1.4 Future monitoring of geophysical data should take place for Licence Area 372/1 in accordance with the conditions of the Government View.
- 4.1.5 It is also a condition of the licence for Area 372/1 that if any objects of possible archaeological interest are recovered during operations they should be reported using the established *BMAPA Protocol for the Reporting of Finds of Archaeological Interest* (BMAPA 2005).



5 REFERENCES

- BMAPA, 2005, 'Protocol for the Reporting of Finds of Archaeological Interest', Salisbury: British Marine Aggregate Producers Association/English Heritage/Wessex Archaeology
- EMU Ltd, November 2011, 'Licence Area 372/1: Archaeological Monitoring Assessment 2011', Unpublished Report (Ref: 11/J/1/26/1824/1195)
- EMU Ltd, July 2012, 'Licence Area 372/1: Five Year Archaeological Monitoring Review', Unpublished Report (Ref: 11/J/1/26/1824/1219)
- James, J W C, Pearce, B, Coggan, R A, Arnott, S H L, Clark, R, Plim, J F, Pinnion, J, Barrio Frójan, C, Gardiner, J P, Morando, A, Baggaley, P A, Scott, G, Bigourdan, N. 2010. The South Coast Regional Environmental Characterisation. British Geological Survey Open Report OR/09/51. 249 pp.
- James, J W C, Pearce, B, Coggan, R A, Leivers, M, Clark, R W E, Plim, J F, Hill, J M, Arnott, S H L, Bateson, L, De-Burgh Thomas, A and, Baggaley, P A. 2011. The MALSF synthesis study in the central and eastern English Channel. British Geological Survey Open Report OR/11/01. 159pp.
- Wessex Archaeology , May 2003, 'Dredging Application Areas 372/1 North Nab and 372/2 South East Nab: Archaeological Assessment, Technical Report' Unpublished Report (Ref: 50494.02)
- Wessex Archaeology, July 2007, 'South Coast Dredging Association: South Coast Regional Environmental Assessment, Archaeological Data Scoping Report (Draft)', Unpublished Report (Ref: 65780.01)
- Wessex Archaeology, June 2012, 'EMU / South Coast Dredging Association: Marine Aggregate Regional Environmental Assessment', Unpublished Report (Ref: 65781.10)



APPENDIX I: SITES OF ARCHAEOLOGICAL POTENTIAL

WA_ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	Source	External References	Location
7000	Seafloor disturbance	641166	5611622	A2	8.4	4.2	0	Indistinct area of seabed, principally consisting of bright reflectors, very different to surrounding sandy seabed. Possible debris field. No feature visible in the bathymetry data at this location.	6012	-	ADZ
7001	Bright reflector	641158	5611616	A2	6	0.4	0	Curvilinear feature probably associated with 7000. May be a very indistinct object of debris with the bright reflector its shadow. No feature visible in the bathymetry data at this location.	6013	-	ADZ
7002	Dark reflector	641180	5611901	A2	3.9	2.5	0.4	Visible in the sidescan sonar data as a small isolated linear object with height measuring 3.9x1.5x0.4m, lying on sandy seabed. In the bathymetry data it appears as a small object measuring 3x2.5x0.05m surrounded by a very shallow scour. Indistinct feature at junction between 2 lines. Seabed depth 17.4m.	6000	-	Licence area
7003	Mound	640696	5611788	A2	8.5	4.5	0.6	Visible in the sidescan data as an indistinct elongate feature measuring 6.9x1.3x0.6m on an area of sandy seabed. In the bathymetry data it appears as an isolated mound measuring 8.5x4.5x0.4m. Possible debris.	6007	EMU_2011_007	Licence area



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	Source	External References	Location
7004	Dark reflector	641077	5611078	A2	4	2	0.6	Appears in the sidescan data as a rectangular object with some structure, measuring 3.9x1.0x0.6m. Possible debris. Lies on principally sandy seabed. Visible in the bathymetry data approximately 20m away as an elongate upstanding object measuring 4x2x0.2m. Seabed depth 18.9m.	6034	-	Licence area
7005	Dark reflector	638670	5610848	A2	6.1	0.2	0.3	Linear object with height. Lies on sandy seabed with several other smaller objects nearby. No feature seen at this location in the bathymetry data.	6035	-	Licence area
7006	Dark reflector	639015	5611351	A2	3.2	0.7	0.5	Isolated elongate feature with height lying on a sandy seabed. No feature seen at this location in the bathymetry data.	6048	-	100m buffer
7007	Dark reflector	638609	5610160	A2	3	0.6	0.9	Visible in the sidescan data as an isolated indistinct curved feature with height. Lies on sandy seabed marked by lots of scars. In the bathymetry data there is no feature which clearly corresponds. There is a projection of a slightly raised area of seabed here with a shallow scour on the NW side. It measures 7x4x0.2m. General seabed depth 18.2m.	6022	-	2011 survey area



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	Source	External References	Location
7008	Dark reflector	637679	5610152	A2	5.8	0.6	0.2	Indistinct feature with height. Possible debris. Lies on sandy seabed, featureless except for adjacent feature 7009. No feature visible in the bathymetry data at this location.	6023	-	2011 survey area
7009	Dark reflector	637665	5610156	A2	9.3	0.7	0.2	Indistinct intermittent linear feature lying on sandy seabed. Possible continuation of 7008. No feature visible in the bathymetry data at this location.	6024	-	2011 survey area
7010	Mound	640460	5610153	A2	4.4	1.2	0.6	Visible in the sidescan data as an irregularly shaped object with height. Possible debris. Lies several metres from rocky area. In the bathymetry data there is a small object (2x2x0.05m) surrounded by a shallow scour. It lies on the southern side of a large sandwave/outcrop.	6025	-	2011 survey area
7011	Mound	640219	5610069	A2	6.5	5.5	0.6	Possible debris. Appears in the sidescan data as an isolated indistinct feature, with bright reflector at the far side. It measures measuring 6.5x4.8x0m and is surrounded by sandy seabed. Visible in the bathymetry data as an isolated upstanding object with a slight scour on the eastern side. Seabed depth 21.9m.	6026	EMU_2011_002	2011 survey area



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	Source	External References	Location
7012	Dark reflector	638590	5609615	A2	3.7	1.1	1.1	Visible in the sidescan data as an angled linear feature with height lying on predominantly sandy seabed. Approximately 15m away in the bathymetry data is a depression measuring 11x8x-0.3m. There is no upstanding object here. Seabed depth 20.9m.	6029	-	2011 survey area
7013	Dark reflector	638620	5609654	A2	4	0.2	0.3	Linear feature with height lying on mainly sandy seabed. No feature seen at this location in the bathymetry data.	6030	-	2011 survey area
7014	Dark reflector	642285	5612565	A2	3.4	0.8	0.5	Visible in the sidescan data as a curved object with height lying on sandy seabed. Other less distinct small objects nearby. In the bathymetry data at this location is a depression with no upstanding object that measures 10x8x-0.2m. Seabed depth 17m.	6040	-	2011 survey area
7015	Bright reflector	640692	5612429	A2	3.3	3	0	Distinct feature. Possible shadow but no distinct object distinguishable on the near side. Sandy seabed marked by lots of scars. No feature seen in the bathymetry data at this location. There are several small objects and depressions nearby but it is not possible to tell which, if any, corresponds to the sidescan anomaly.	6045	-	2011 survey area



WA_ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	Source	External References	Location
7016	Seafloor disturbance	641392	5612782	A2	35.2	21.5	0.3	Appears in the sidescan data as an isolated area of seafloor disturbance, measuring 35.2x21.5x0, on sandy seabed. Possible debris field. Consists principally of bright reflectors with some linear dark reflectors with possible height. Indistinct feature. Possibly partially buried. In the bathymetry data it appears as an irregular area of seabed measuring 33x15x0.3m. It is surrounded by flat and featureless seabed of 16.0m depth.	6050	EMU_2011_001	2011 survey area
7017	Undefined	638610	5611384	A3	-	-	-	First reported as a wreck on 24/04/64 although it was stated that there was no trace on ordinary sounding lines. Not detected on subsequent surveys. Amended to dead following survey reported on 03/01/90.	6057	UKHO 19034	2011 survey area
7018	Foul ground	639625	5612367	A3	-	-	-	Reported as a wreck on 23/04/19. Subsequent searches did not find a wreck and it was amended to dead on 03/01/90.	6058	UKHO 19041	2011 survey area
7019	Foul ground	641855	5611285	A3	-	-	1.5	First located on 03/08/77. Not located on 27/11/03 and amended to dead. Also not seen on 27/04/09.	6065	UKHO 20002	2011 survey area

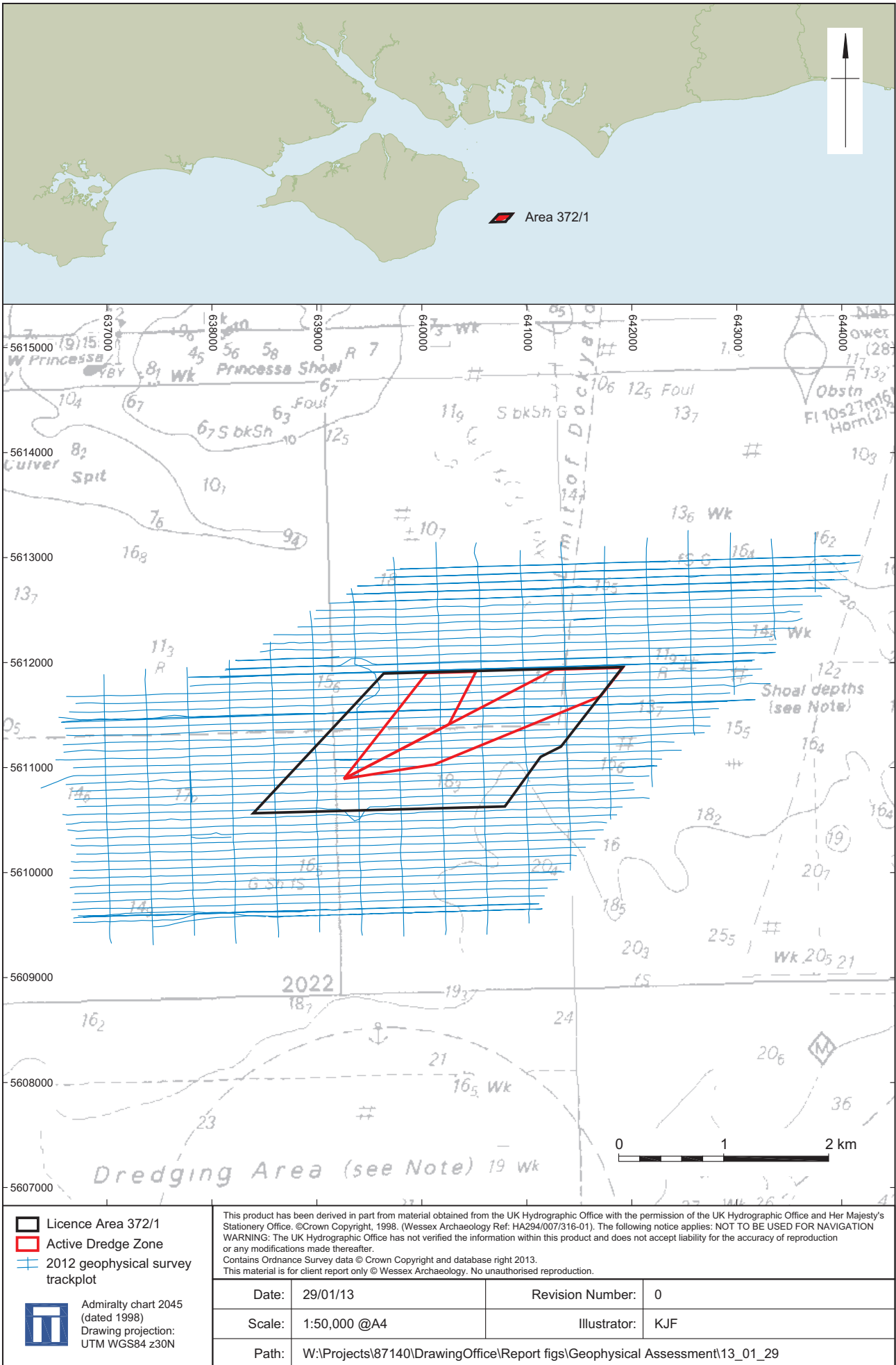


WA_ID	Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Description	Source	External References	Location
7020	Foul ground	643183	5612309	A3	15	-	-	Wreck first located on 14/03/74. Detected on further occasions and described as aligned 090/270. However in 2003 it was only located as a weak magnetic anomaly. Last surveyed on 27/04/09 when it was not located and reported as 'lies on linear rocky outcrop'. Amended to dead.	6069	UKHO 20015	2011 survey area
7021	Foul ground	642536	5612865	A3	2.9	2.4	0.5	Small object located on 19/10/08. Live.	6079	UKHO 73410	2011 survey area
7022	Dark reflector	643912	5612589	A2	4.7	0.9	0.6	Linear feature with height. Outside bathymetry data coverage.	6041	-	2012 survey area
7023	Bright reflector	643188	5613069	A2	34.6	17.6	0	Large indistinct feature. Possibly natural. On edge of sidescan data and not covered by another line. Outside bathymetry data coverage.	6049	-	2012 survey area

Notes

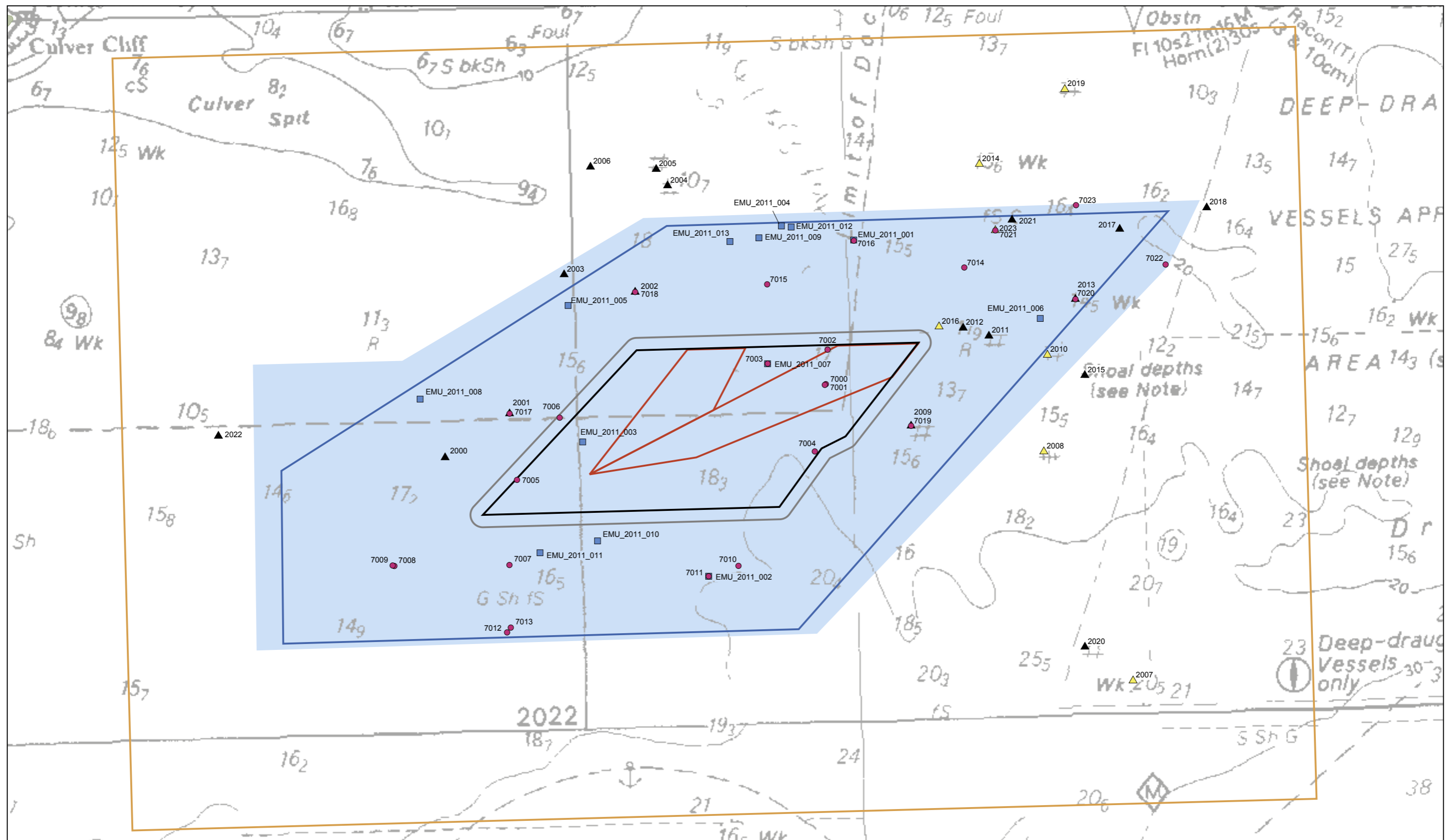
All coordinates are in WGS84 UTM Zone 30N

Positions are only considered accurate to within approximately 30m owing to inaccuracies in the sidescan sonar navigation



Area 372/1 location and 2012 survey trackplot

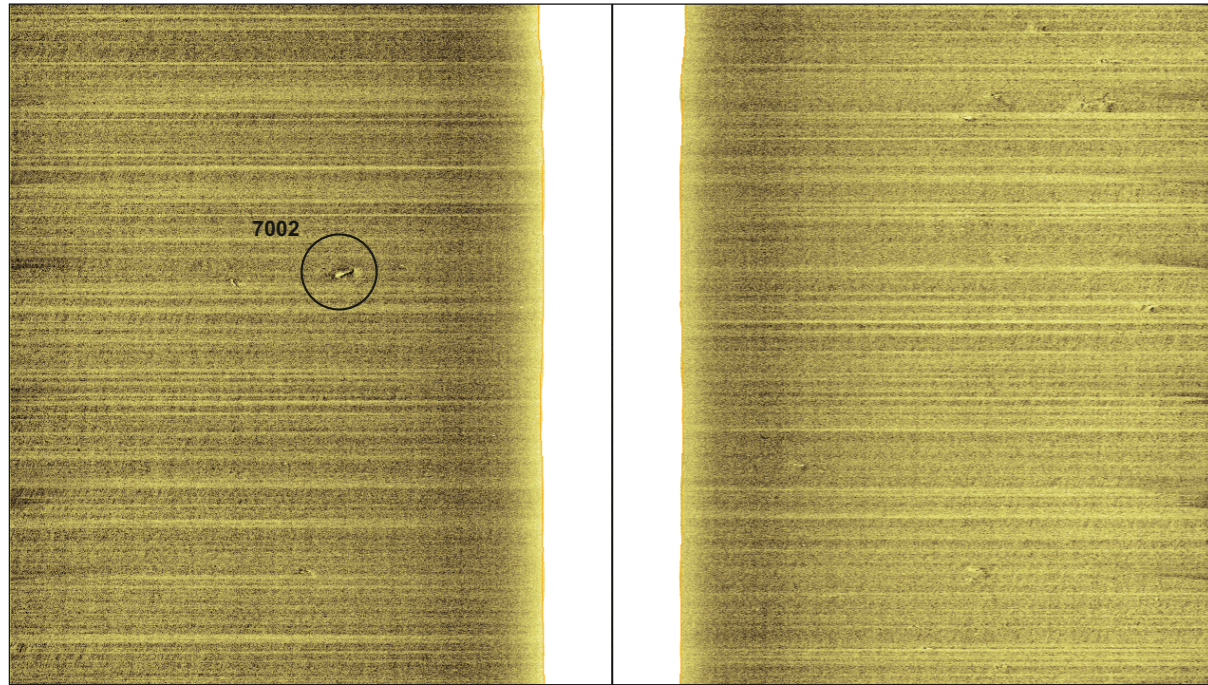
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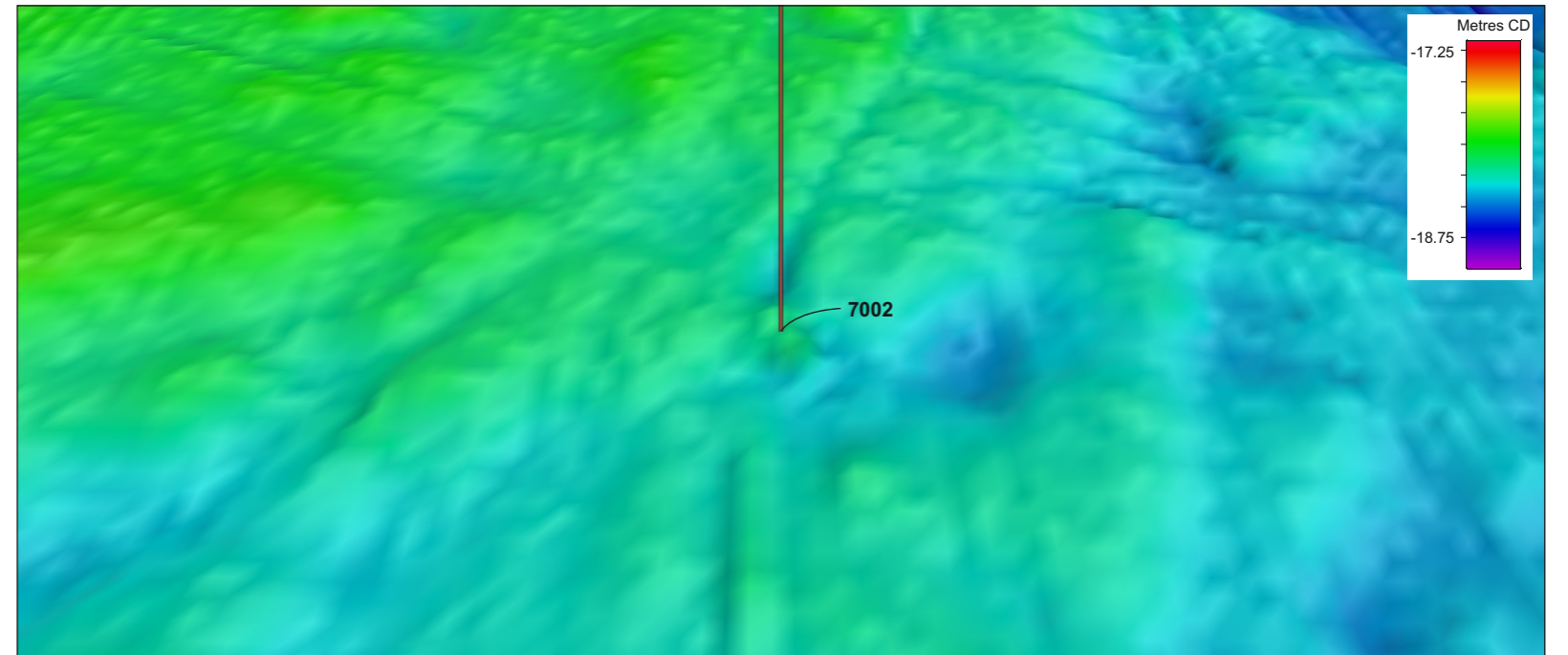
<ul style="list-style-type: none"> Licence Area 372/1 Active Dredge Zone Licence Area 100m buffer 2012 Survey Area 2011 Survey Area UKHO Search Area 	<ul style="list-style-type: none"> ● 2012 WA sites of potential archaeological interest ■ 2011 EMU sites of archaeological potential ▲ UKHO live wrecks and obstructions ▲ UKHO dead wrecks and obstructions 	<p>Admiralty chart 2045 (dated 1998) Drawing projection: UTM WGS84 z30N</p> <p>0 1 km</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 Stationery Office. © Crown Copyright, 1998. (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.</p> <p>This material is for client report only © Wessex Archaeology. No unauthorised reproduction.</p>											
		<table border="1"> <tr> <td>Date:</td> <td>29/01/13</td> <td>Revision Number:</td> <td>0</td> </tr> <tr> <td>Scale:</td> <td>1:30,000 @A3</td> <td>Illustrator:</td> <td>KJF</td> </tr> <tr> <td>Path:</td> <td colspan="3">W:\Projects\87140\DrawingOffice\Report figs\Geophysical Assessment\13_01_29</td> </tr> </table>	Date:	29/01/13	Revision Number:	0	Scale:	1:30,000 @A3	Illustrator:	KJF	Path:	W:\Projects\87140\DrawingOffice\Report figs\Geophysical Assessment\13_01_29		
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Sites of archaeological potential

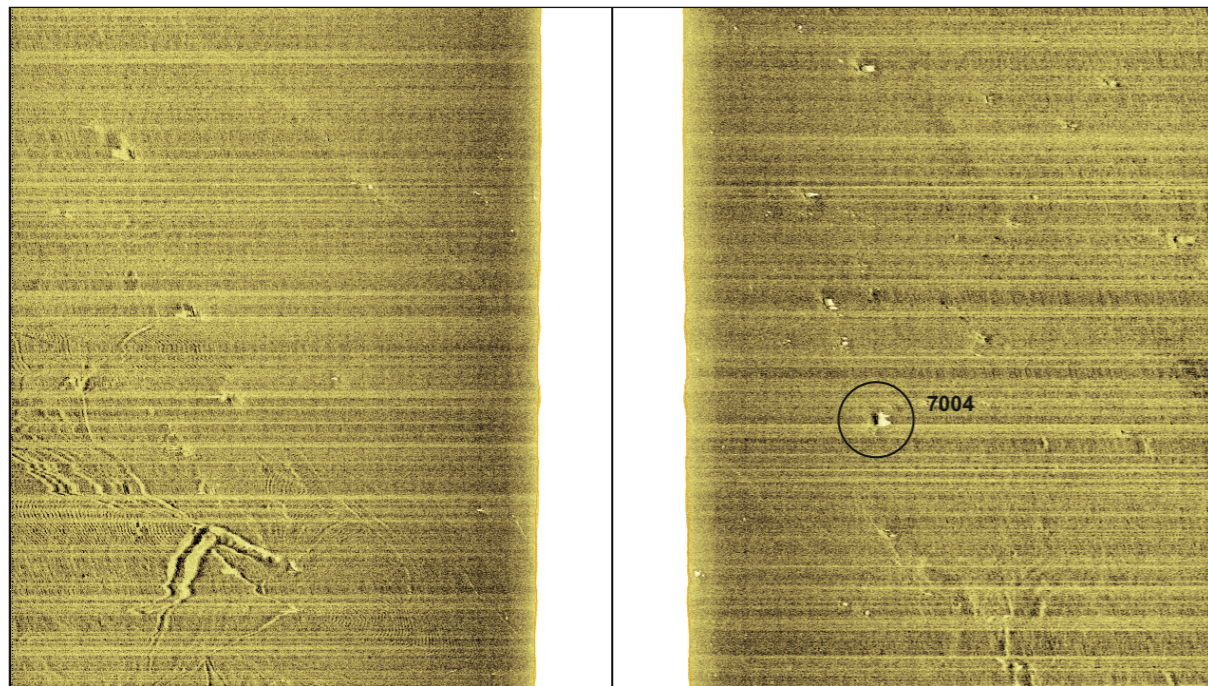
Figure 2



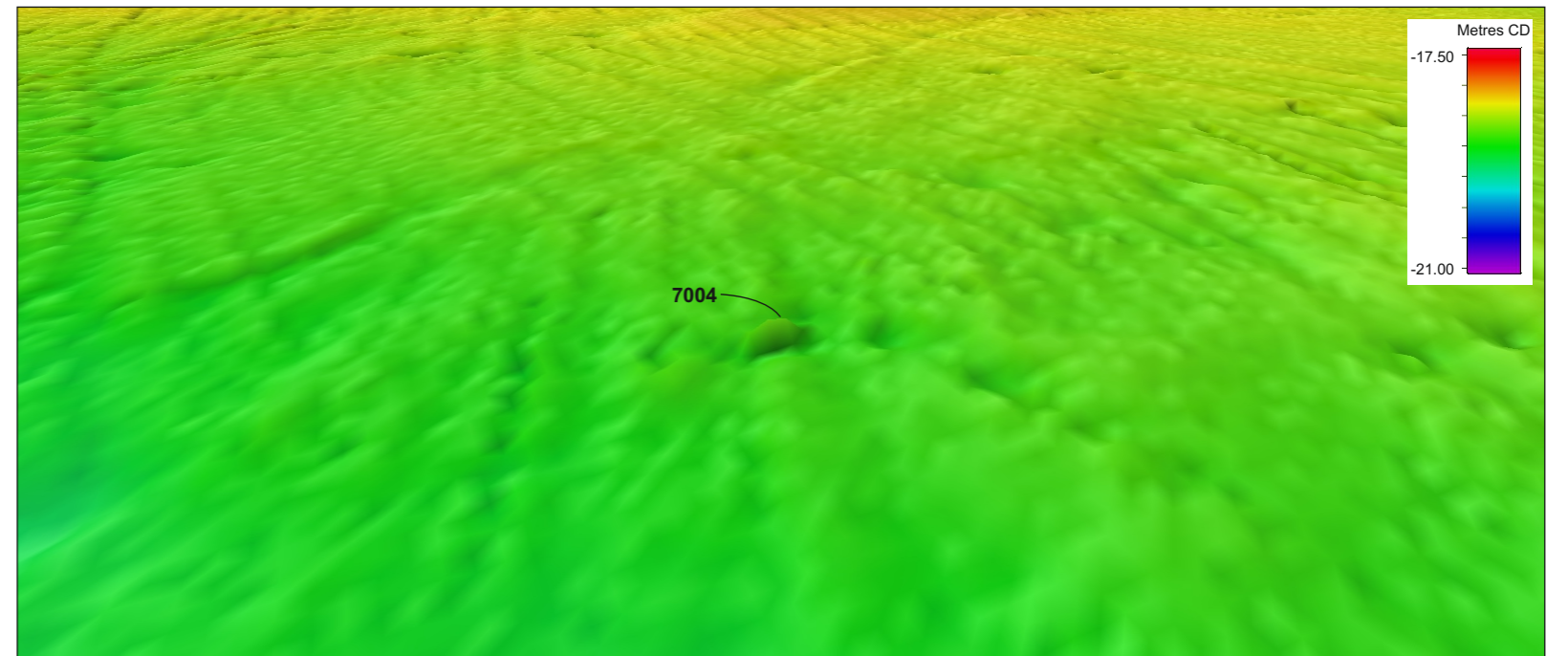
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B: 7002 multibeam image

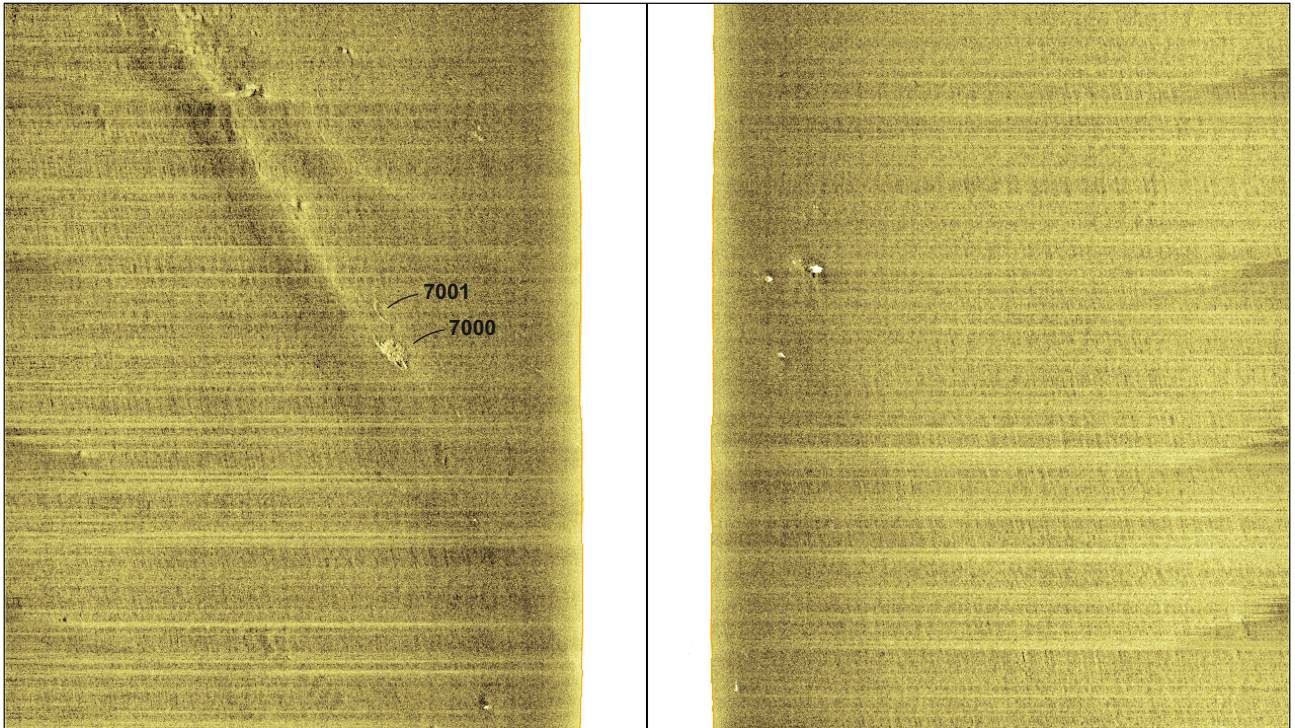


C: 7004 sidescan sonar image

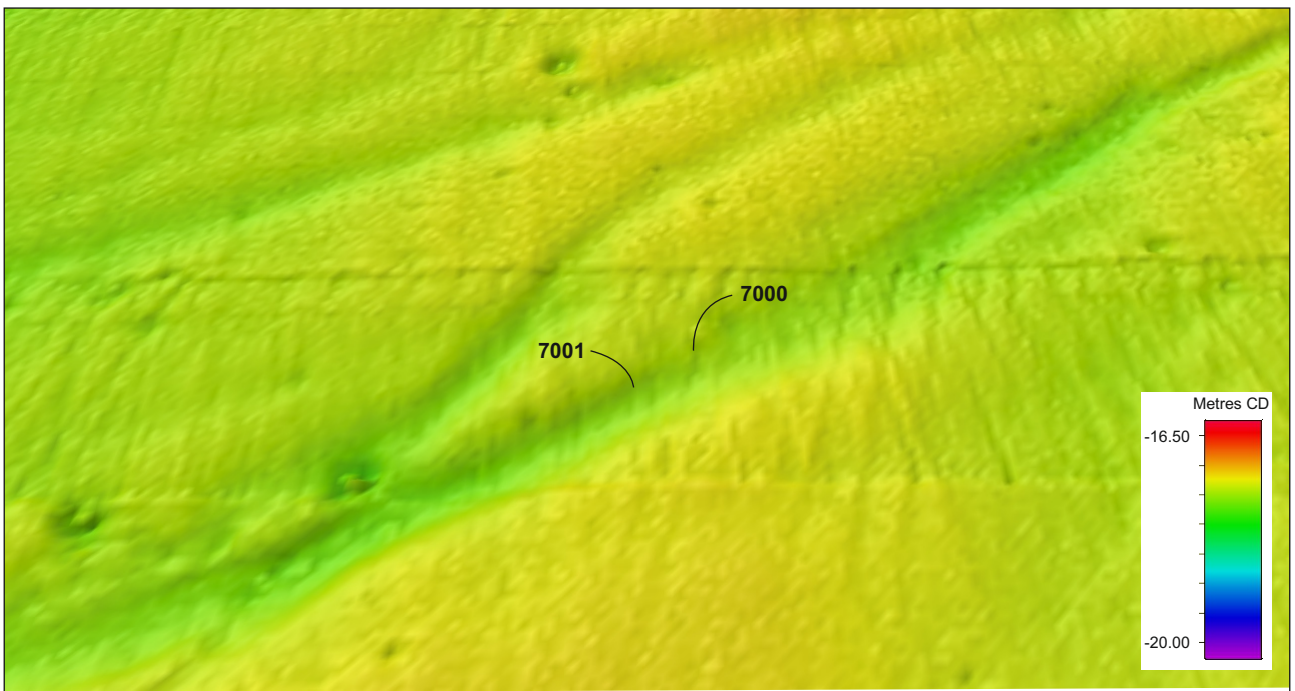


D: 7004 multibeam image


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A: 7000-1 sidescan sonar image



B: 7000-1 multibeam image

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