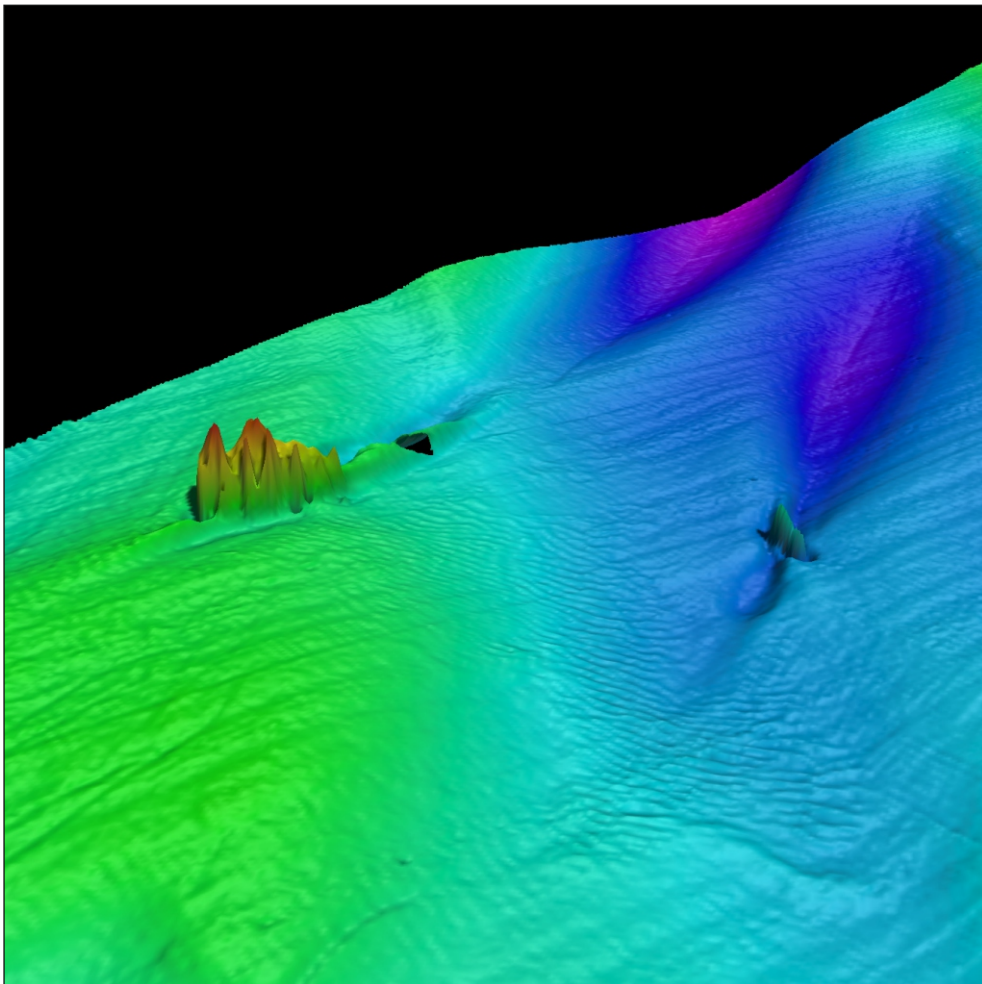




making sense of heritage

## Areas 508, 509, 510

Baseline Archaeological Assessment



Ref: 75931.02  
February 2015



## **Areas 508, 509, 510**

### **Baseline Archaeological Assessment**

**Prepared for:**

Lafarge Tarmac Marine  
TMD House  
Shopwhyke  
Chichester  
West Sussex  
PO20 2AD

Britannia Aggregates Limited

Lower Road  
Northfleet  
Gravesend  
Kent  
DA11 9BL

CEMEX UK Marine

Baltic Wharf  
Elm Street  
Marine Parade  
Southampton  
SO14 5JF

**Prepared by:**

Wessex Archaeology  
Portway House  
Old Sarum Park  
Salisbury  
SP4 6EB

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



**February 2015**

**Report Ref. 75931.02**



## Quality Assurance

<b>Project Code</b>	75931	<b>Accession Code</b>		<b>Client Ref.</b>	
<b>Planning Application Ref.</b>		<b>Ordnance Survey (OS) national grid reference (NGR)</b>			

Version	Status*	Prepared by	Checked and Approved By	Approver's Signature	Date
v01	E	R. Chester/ S. Arnott	L. Tizzard		21/01/2015
File:	75931_Area508-510_Geophysical_Report_20150120.pdf				
V02	F	R. Chester/ S. Arnott	L. Tizzard		05/02/2015
File:	75931_Area508-510_Geophysical_Report_20150205.pdf				
File:					
File:					
File:					

\* I = Internal Draft; E = External Draft; F = Final

### DATA LICENSES

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, 2014. 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.

## 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.



# Areas 508, 509, 510

## Baseline Archaeological Assessment

### Contents

Summary .....	ii
Acknowledgements.....	iii
<b>1 INTRODUCTION.....</b>	<b>1</b>
<b>2 METHODOLOGY.....</b>	<b>2</b>
2.1 Geophysical Survey .....	2
2.2 Data Processing Methodology.....	2
2.3 Approach.....	3
<b>3 RESULTS.....</b>	<b>4</b>
3.1 Area 509/1 and 509/2.....	4
3.2 Area 508, 509/3, 510/1 .....	6
3.3 Area 510/2 .....	7
<b>4 MITIGATION.....</b>	<b>8</b>
<b>5 REFERENCES.....</b>	<b>10</b>
<b>APPENDIX I: GAZETTEER OF ASSESSED ANOMALIES AREA 509/1 AND 509/2.....</b>	<b>11</b>
<b>APPENDIX II: GAZETTEER OF ASSESSED ANOMALIES AREA 508, 509/3, 510/1 .....</b>	<b>17</b>
<b>APPENDIX III: GAZETTEER OF ASSESSED ANOMALIES AREA 510/2.....</b>	<b>21</b>

### Figures

- Figure 1: Geophysical Anomalies and Archaeological Exclusion Zones in Aggregate Areas 509/1 and 509/2
- Figure 2: Geophysical Anomalies and Archaeological Exclusion Zones in Aggregate Areas 508, 509/3, 510/1 and 510/2
- Figure 3: S15 – Wreck of SS *Profit*
- Figure 4: S36 – Wreck of HMS *Leandros*
- Figure 5: S53 – Unidentified Wreck
- Figure 6: S54 – Wreck of SS *Salerno* (possibly)

### Tables

Table 1: Criteria discriminating relevance of feature to proposed scheme.....	3
Table 2: Pre-existing Archaeological Exclusion Zones .....	9
Table 3: Recommended modified Archaeological Exclusion Zones .....	9



## Areas 508, 509, 510

### Baseline Archaeological Assessment

#### Summary

Wessex Archaeology was commissioned by Lafarge Tarmac Marine Limited, Britannia Aggregates Limited and Cemex UK Marine Limited to conduct an archaeological assessment of 85 geophysical anomalies identified by Titan Environmental Surveys Limited for Licence Areas 509/1, 509/2, 510/2, and 508, 509/3, 510/1.

Sidescan sonar and multibeam bathymetry data were assessed at the 85 anomaly locations and an archaeological interpretation of each feature added to the list of features provided by Titan Environmental Surveys Limited. A total of 84 of the 85 anomalies were identified by Wessex Archaeology with one not clearly identified in the data. Of the 84 anomalies observed, these were grouped into 75 features (where two listed anomalies represented the same seabed feature). The majority of these features, 41, were interpreted as being natural or non-archaeological in origin. A total of 34 features were interpreted as being possibly of archaeological interest and are possible items of debris. Five anomalies, **S11**, **S15**, **S36**, **S53** and **S54** are of archaeological interest. Three, **S15**, **S36** and **S54** have been identified as known wrecks *SS Profit*, *HMS Leandros* and *SS Salerno*, respectively. **S53** is an unidentified wreck, whilst **S11** is the Sunk Head Tower, a naval sea fort.

In terms of mitigation, the positions of the previously recommended Archaeological Exclusion Zones for *HMS Leandros* (**S36**) and the unknown wreck (**S53**) should be updated to correspond with current findings. An additional Archaeological Exclusion Zones is recommended comprising a buffer of 50m around the extent of the wreck of the Sunk Head Tower (**S11**).

No Archaeological Exclusion Zones are recommended for the *SS Profit* (**S15**) and *SS Salerno* (**S54**) as these wrecks are situated outside of the licence areas and will not be impacted by dredging operations. Additionally there are two recorded locations of wrecks in Area 509/2 (*SS Monitoria*) and in Area 510/2 (*HMS Javelin*); however, there is no evidence of the remains of these wrecks in the geophysical data. As such, no Archaeological Exclusion Zones are recommended but their positions should be noted and if any finds are recovered then further investigation may be necessary.

Twenty-eight anomalies were discriminated as of uncertain origin of possible archaeological interest. No exclusion zones are recommended but their positions should be noted, particularly those within licence areas.

Finds of known or possible archaeological interest recovered through dredging operations should be reported through the Marine Aggregate Industry *Protocol for Reporting Finds of Archaeological Interest*.



## **Areas 508, 509, 510**

### **Baseline Archaeological Assessment**

#### **Acknowledgements**

Wessex Archaeology is grateful to Dr Andrew Bellamy of Lafarge Tarmac Marine Limited for assistance with various aspects of the project. Thanks are also due to Richard Fifield of Britannia Aggregates Limited and Joe Holcroft of Cemex UK Marine Limited. The geophysical data were provided by Titan Environmental Services Limited.

The geophysical data were assessed by Dr Stephanie Arnott and the report written by Stephanie Arnott and Rachel Chester. Illustrations were created by Karen Nichols and Kitty Foster. The project was managed for Wessex Archaeology by Dr Louise Tizzard.



## Areas 508, 509, 510

### Baseline Archaeological Assessment

#### 1 INTRODUCTION

- 1.1.1 Wessex Archaeology (WA) was commissioned by Lafarge Tarmac Marine Limited, Britannia Aggregates Limited and Cemex UK Marine Limited to conduct a baseline archaeological assessment of aggregate licence Areas 509/1 and 509/2, Area 508, 509/3, 510/1 and Area 510/2 (**Figure 1** and **2**). This assessment was to consist of an archaeological interpretation of 85 geophysical anomalies identified by Titan Environmental Surveys Limited (Titan) within the licence boundaries and a 500m buffer zone. The anomalies that are situated immediately outside the dredge area were assessed in order to recommend any exclusion zones that may impact the dredging area. This assessment is required to satisfy some of the conditions of the Marine Licence granted for aggregate extraction by the Marine Management Organisation (MMO).
- 1.1.2 The licence areas are situated approximately 21km to 35km southeast of the Felixstowe, Suffolk. The Areas are located in the outer approaches to the Thames Estuary, in an area known as 'Long Sand Head'. The Marine Management Organisation Marine Licence for the licence areas includes the following conditions (MMO 2013):
- *5.2.7 No dredging is permitted until the licence holder provides the details of any known features of archaeological interest within the licence area to the MMO and the Crown Estate, and acknowledged by the MMO in writing.*
  - *5.2.8 The licence holder must provide details of exclusion zones (EZ) relating to resource thickness, sensitive nature conservation features and features of archaeological interest to the MMO and the Crown Estate prior to the commencement of dredging, and be acknowledged by the MMO in writing.*
  - *5.2.9 The licence holder must ensure that appropriate mitigation measures are developed with archaeological curators, as defined in the guidance note 'Marine Aggregate Dredging and the Historic Environment' (British Marine Aggregate Producers Association (BMAPA) and English Heritage, 2003), to protect features of archaeological interest prior to the commencement of dredging. These measures must be agreed with the MMO. The Crown Estate must be informed of the agreed measure(s) prior to the commencement of dredging.*
- 1.1.3 Wessex Archaeology has undertaken a previous offshore desk-based archaeological assessment (DBA) and impact assessment for the Long Sand Head licence areas (WA 2011). The purpose of the DBA was to undertake an archaeological assessment to support an Environmental Impact Assessment in relation to the licensing of the Crown Estate dredging licence Areas 509/1 and 509/2, Area 508, 509/3, 510/1 and Area 510/2. The DBA resulted in four proposed exclusion zones: two around features identified on the geophysics data and another two around documented positions of wrecks within Area 510/2 with no geophysical data coverage at that time. An operational exclusion zone around a Sunk Head Tower was assumed already in place (WA 2011).





## 2 METHODOLOGY

### 2.1 Geophysical Survey

- 2.1.1 In June 2014 Titan Environmental Surveys Limited (Titan) were commissioned to conduct geophysical surveys across dredging licence Area 509/1, Area 509/2, Area 508, 509/3, 510/1 and Area 510/2. The geophysical survey covering all areas was undertaken between June and August 2014. The survey was conducted using sidescan sonar, boomer sub-bottom profiler and swathe bathymetry over the licence areas and a 500m surrounding zone. The field work was carried out using the survey vessel *Titan Discovery*. Data were acquired with a line spacing of 100m for the main lines and a 500m spacing for the cross lines.
- 2.1.2 Sidescan sonar data were acquired with an Edgetech 4200-FS towfish. Data were acquired at both high (400kHz) and low (100kHz) frequencies with a range of 100m. The towfish was towed astern of the vessel with a layback of 5-15m. Layback was determined manually. Digital data were recorded with fish positioning provided via HYDRpro's towline estimation utility (Titan 2014).
- 2.1.3 Multibeam bathymetry data were acquired with a Geoswath Plus system operating at 250kHz. It was deployed through the moon pool on the survey vessel (Titan 2014).
- 2.1.4 The sidescan sonar data were supplied to WA as xtf files with navigation information contained within the files. Multibeam bathymetry data were provided as gridded xyz files with a 1m cell size for Areas 509/1 and 509/2. The multibeam bathymetry data for Areas 508, 509/3, 510/1 and 510/2 were provided as gridded xyz files with a 2m cell size. The sub-bottom profile data were not required to be assessed by WA.

### 2.2 Data Processing Methodology

- 2.2.1 The high frequency 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.
- 2.2.2 When measuring targets in sidescan sonar data the maximum length, width and height of each anomaly are measured. If an object is seen on more than one line of data then the anomalies for this object are grouped together. The average position of the anomalies is given for the target. The maximum of each of the three measurement values are given, irrespective of which anomaly the measurement was made on.
- 2.2.3 A mosaic of the sidescan sonar data is produced during the data processing to assess the quality of the sonar towfish positioning. This allows the position of anomalies to be checked between different survey lines and for the layback values to be further refined if necessary. The navigation information was contained within the data files themselves with further smoothing applied.
- 2.2.4 The multibeam bathymetry data were made into a digital terrain map using IVS Fledermaus software. These data were examined for evidence of the anomalies.
- 2.2.5 The initial interpretation of the geophysical data sets is conducted independently of each other. 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 area.





- 2.2.6 To address this fact, the anomalies were grouped together. This allows one ID number to be assigned to a single object for which there may be, for example, a bathymetric anomaly and multiple sidescan sonar anomalies.
- 2.2.7 Once all the geophysical anomalies 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 listed in **Table 1**.

**Table 1: Criteria discriminating relevance of feature to proposed scheme**

Origin	Discrimination Class	Interpretation
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

- 2.2.8 Records of wrecks and obstructions within the assessment area and surroundings were obtained from the United Kingdom Hydrographic Office (UKHO).
- 2.2.9 The sidescan and bathymetry anomalies were grouped together where they correlate for each of Titan's 85 anomalies. Titan's original anomaly numbers were retained. UKHO records that fall within the assessment area were included and grouped where appropriate. A gazetteer of all 85 anomalies was produced with Titan's original information and WA's interpretation (**Appendix I**).

## 2.3 Approach

- 2.3.1 The anomalies identified by Titan for Areas 509/1 and 509/2 were listed in their report under the heading of Man Made Features and Obstructions (Titan 2014). The anomalies identified for Areas 508, 509/3, 510/1 and Area 510/2 were provided in an excel format. Positions and dimensions (in some cases just of the longest axis) are given with brief comments but the majority of anomalies have no detailed description.
- 2.3.2 Using the sidescan sonar trackplot provided by Titan, individual lines of sidescan sonar data were selected that covered each of the 85 anomalies to be assessed. The trackplots and data files both contain fix marks so it was possible to scroll through the data until the fix mark at which the anomaly was seen was reached. Only the data at the specified fixes have been assessed.
- 2.3.3 If there was no visible anomaly at the position given by Titan then the next line of data covering the anomaly position was examined. If the anomaly was clearly identified in the first line of data then it was not searched for in other lines. Most anomaly positions were covered by two lines of data. Some were covered by more if a line had been re-run.
- 2.3.4 The multibeam bathymetry data were assessed at the locations of the anomalies and any corresponding features were noted and grouped with the sidescan sonar interpretation as described above.
- 2.3.5 Additionally, the geophysical data at the location of two recorded locations of wrecks within Areas 509/2 and 510/2 were assessed in order to confirm that there was no evidence of these wrecks or associated debris.

### 3 RESULTS

#### 3.1 Area 509/1 and 509/2

- 3.1.1 A total of 31 anomalies were identified by Titan. Of these 30 were identified in the data by WA; **S3** was not clearly identified. An area of irregular seabed was observed at this location but no distinct disturbed area measuring 190m.
- 3.1.2 Of the remaining 30 anomalies in Areas 509/1 and 509/2 these were grouped into 29 features of which 16 were interpreted as being of archaeological potential; three with an A1 archaeological rating and 13 with a rating of A2. The remaining 13 anomalies were interpreted as being natural in origin, principally rocks (U1) or cable (U2). Full details of all anomalies with both Titan's original information and WA's archaeological interpretation are given in the gazetteer in **Appendix I** and **Figure 1**. Details of those anomalies classified as potential archaeology are discussed further below. Furthermore, a historic record of potential archaeological interest (A3) is situated in the centre of Area 509/2.
- 3.1.3 The remains of HMF Sunk Head Tower, **S11**, were observed towards the south of the Areas 509/1 and 509/2 and are situated within the licence area. A large area of debris measuring 90.5m x 40.8m x 6m includes an angular structure (measuring 45.6 x 30.0m) lying on a relatively flat seabed at a minimum depth of 7.7m LAT. An elongated cylindrical feature lies in a southeast/northwest orientation to the northeast of the structure measuring 29m x 6.5m x 5.5m is observed and is one of several significantly defined features within the debris field. Immediately to the southwest of this feature the structure thins before expanding into numerous large angular features that appear stacked on top of one another. It is this section where the maximum height of 6m exists. Evidence of scour is present orientated southwest to northeast. A minimum of seven small circular depressions can be seen surrounding the structure on the multibeam bathymetry data.
- 3.1.4 HMF Sunk Head Tower was a Naval Sea Fort launched on June 1<sup>st</sup> 1942. Its construction consisted of a reinforced concrete pontoon measuring 51m x 27m supporting twin cylindrical towers and topped with a gun deck, and upper deck and a central tower unit. It was filmed being demolished by explosives on 18<sup>th</sup> August 1967<sup>1</sup> on Government instructions to stop pirate radio activity.
- 3.1.5 The two further anomalies classed as A1 are situated outside of the licence areas and will not be impacted by dredging operations.
- 3.1.6 A wreck, **S15 (Figure 3)** was observed in both the sidescan sonar and the multibeam bathymetry data and is situated approximately 200m from the western edge of Area 509/2. The wreck lies in the UKHO recorded position of the SS *Profit* and appears very broken up and partially dispersed on the sidescan sonar data. However, it is evident from the multibeam bathymetry data that some structure still exists, with significant remaining height that undulates throughout. The wreck measures 75.3m x 33.4m x 3m and lies in an east/west orientation in a minimum depth of 17.3m LAT. A possible scour extends for approximately 80m to the northeast and some sediment build up has occurred along both lengths of the wreck, indicating partial burial. The eastern end of the wreck protrudes from the seabed greater than the western end which appears to be partially buried within the sediment. This suggests that the eastern end is at a greater risk of decay. Midway along the southern length of wreck is a cylindrical feature protruding from its surroundings

<sup>1</sup> <https://www.youtube.com/watch?v=qbaER7G3C4I>



measuring 6m x 5m x 1m suggesting that some of the structural features of the wreck remain intact.

- 3.1.7 The SS *Profit* was a general cargo vessel that was sunk on 17<sup>th</sup> April 1941. The vessel was on passage from London to Hull when it was mined and sunk.
- 3.1.8 The final anomaly in the area with an archaeological rating of an A1 is **S4**, a seafloor disturbance measuring 29.8m x 16.7m x 0.6m. It is located at the UKHO recorded position of live foul ground and is described in the surveying details as an uncharted wreck that is virtually buried, and principally located by magnetometer. The seafloor disturbance has been identified on both the sidescan sonar and the multibeam bathymetry data. An irregular area of dark and bright reflectors, two of which appear diffuse and elongated, can be seen on the sidescan sonar data. The multibeam bathymetry shows a circular depression with indistinct elongated features within. These observations support the suggestion that this is a buried debris, but of an unknown origin.
- 3.1.9 Two anomalies with archaeological potential are situated within Area 509/1 (**S27** and **S28**) and two within Area 509/1 (**S12** and **S17**). All are classed as dark reflectors which are less likely to be debris owing to their physical characteristics but they have been retained because they are isolated and anomalous in nature.
- 3.1.10 The remainder of the anomalies of archaeological interest are situated outside of the licence areas.
- 3.1.11 Four seafloor disturbances, **S1** and **S29** (interpreted as the same anomaly), **S2**, **S5** and **S14**, are all situated outside of Area 509/2. **S1** and **S29** were interpreted to be the same feature: a circular mound measuring 50m x 34m consisting of, and surrounded by diffuse dark reflectors in an area covering 134.9m x 45m. **S14** lies approximately 64m to the southeast of Sunk Head Tower and is an elongated area measuring 10.1m x 3.2m x 0.9m containing mostly dark reflectors. However; sections appear with height and may be debris.
- 3.1.12 **S2** is an area measuring 14.4m x 5.4m x 0.8m consisting principally of dark reflectors, including a thin elongated feature with a distinct tapered shadow that may be debris. Either adjacent to or surrounding is a depression identified on the multibeam bathymetry data measuring 8m x 7m x -3.5m. **S5** is an 'H' shaped dark reflector with no visible height measuring 3.9m x 2.1m located approximately 90m northeast of **S2**.
- 3.1.13 **S9** is an isolated seafloor disturbance measuring 17.1m x 2.2m to the south of the area with an archaeological rating of A2. It is an elongated area appearing to contain an 'X' shaped piece of debris with a corresponding shadow.
- 3.1.14 **S25** is a seafloor disturbance with an archaeological rating of A2 located approximately 220m to the north of the wreck **S11**. It was recorded by the UKHO as a live area of foul ground and the location of a sinking. Measuring 9m x 5m x 0.9m it contains an oval feature with a clear rectangular shadow, which could be debris.
- 3.1.15 **S20** is a depression measuring 15m x 10m x -0.1m containing a mound 0.04m high. This depression could contain partially buried debris.
- 3.1.16 The remaining A2 anomalies, **S8**, and **S31** are dark reflectors measuring 0.9m x 0.6m x 0.3m and 1.4m x 1.0m x 0.6m, respectively.

- 3.1.17 Previously, in the centre of Area 509/2, a faint possible anomaly was interpreted in the sidescan sonar data (WA 2011). Anomaly 7001 (**Figure 1**) was described as an amorphous feature with dimensions 104 x 9 x 6.1m and orientated northwest – southeast. No structure was observed, and the feature was situated in an area of sands and gravels with some evidence of sediment streaking approximately 130m from the UKHO recorded position. The UKHO record this as an area of foul ground, possibly the wreck of the SS *Monitoria*, a steamship with dimensions 85 x 12.8 x 5.5m. The vessel was mined on 21st October 1915 whilst on passage from the Humber to London.
- 3.1.18 Based on the 2014 data there is no evidence of any wreck in either the sidescan sonar or bathymetry data at the location of 7001 or the UKHO recorded position. There are small sand ripples in the area (up to 1m high) which are unlikely to conceal a large wreck or debris. A 4m-high sandwave is observed to the northeast, again unlikely to conceal a large wreck. Also, based on the bathymetry data there is evidence to suggest historic dredging at this location. As such this anomaly has been discriminated as A3, a historic record of potential archaeological interest.
- 3.2 Area 508, 509/3, 510/1**
- 3.2.1 All of the anomalies were identified in the data by WA. The 31 anomalies that were identified by Titan in Area 508, 509/3, 510/1 were grouped into 27 features. Of these 10 were interpreted as being of archaeological potential; one with an A1 rating and nine with an A2 rating. The remaining anomalies were interpreted as being natural in origin, principally rocks (U1). Full details of all anomalies with both Titan's original information and WA's archaeological interpretation are given in the gazetteer in **Appendix II** and **Figure 2**.
- 3.2.2 All 10 anomalies of archaeological potential all are situated within the licence area.
- 3.2.3 **S36 (Figure 4)** is situated within the licence area and is situated at the UKHO recorded position of the wreck of HMS *Leandros*. The wreck appears very broken up and partially buried in an area of sandwaves. A distinct elongated mound measuring 24m x 15m x 4m was identified on the multibeam bathymetry and lies immediately adjacent and anomalous to nearby areas of sandwaves. Orientated north/south the northern tip dips into a depression, probably caused by scouring around the wreck, with the southern end extending towards, and into, the sandwaves. The overall area of the wreck measures 40.9m x 15m x 4m and it lies in a minimum depth of 16.5m LAT.
- 3.2.4 The HMS *Leandros* was a British flagged trawler that was mined and sunk on 6<sup>th</sup> August 1915 whilst under the service of the admiralty. The UKHO record states that the wreck has frequently not been found during previous surveys, but states that the nature of the seafloor is prominently sandwaves with two previous reports of a strong magnetic anomaly identified at the location (in 2003 and 1990). The as-built dimensions are 30m length, 12m width and a draught of 3.5m. It can be presumed that the wreck has been partially buried beneath the sandwaves that it currently stands adjacent to (accounting for the observed length), with burial likely to have aided in the preservation of the wreck.
- 3.2.5 **S1** is an elongated feature, possible debris measuring 8.1m x 1.8m situated in the north of the area, approximately 280m north of **S7**, a seafloor disturbance. An area measuring 19.9m x 13.1m x -0.5m **S7** consists of both distinct and diffuse dark reflectors within a depression. This depression varies in depth from -0.2m to 0.5m.



3.2.6 **S18** and **S22** are seafloor disturbances situated approximately 400m apart in the southern central area and measure 7.6m x 3.3m and 11.2m x 5.4m x 0.2m, respectively. **S22** is an indistinct area surrounding a linear feature with height (5.6m x 0.3m x 0.2m).

3.2.7 **S2**, **S15**, **S21**, **S28** and **S39** are all classed as dark reflectors that may represent debris. These range in size from 2.6m x 0.5m x 0.2m (**S28**) to 6.2m x 0.5m x 0.4m (**S21**).

### 3.3 Area 510/2

3.3.1 All of the anomalies were identified in the data by WA. The 23 anomalies that were identified by Titan in Area 510/2 were grouped into 19 features. Of these eight were interpreted as being of archaeological potential; two with an A1 rating and six with an A2 rating. The remaining anomalies were interpreted as being natural in origin, principally rocks (U1). Full details of all anomalies with both Titan's original information and WA's archaeological interpretation are given in the gazetteer in **Appendix III** and **Figure 2**. Furthermore, a historic record of potential archaeological interest (A3) is situated in the centre of Area 510/2.

3.3.2 Wreck **S53 (Figure 5)** is situated outside of the licence area to the northeast and was observed in both the sidescan sonar and the multibeam bathymetry data. A mound of undulating structure was observed on the multibeam bathymetry data, with distinct elongated features and clear height visible on the sidescan sonar data. The wreck appears to be upright with some coherent structure remaining with a minimum depth of 32.4m LAT. Orientated north-northwest/south-southeast the wreck has the dimensions 36.7m x 13m x 5.2m and lies on a relatively flat seabed amongst small sandripples. The southern end of the wreck has the greatest height of 5.2m with a gradual decrease to 3.5m occurring towards the northern end. The northern tip itself increases to 4m height and is scoured. A north/south scour runs 30° degree to the orientation of the wreck towards the north.

3.3.3 **S53** is at the UKHO position of the bow section an unidentified wreck, upright and in good condition. Previous surveying details state that the wreck appears to be listing and deteriorating (in 1995), however a more recent diving survey (in 2002) has noted that the wreck remains in a good condition. The origin of this wreck is unknown, although it is possibly the *Volscian* based on a National Historic Environment Record (WA 2011).

3.3.4 The wreck, **S54 (Figure 6)**, is located approximately 25m east of the limit of Area 510/2. The wreck is at the UKHO position of SS *Salerno* and appears upright with a coherent amount of remaining structure. The wreck was identified on the multibeam bathymetry data to have a significant amount of varied height remaining with a definitive scour extending 200m to the southwest. Orientated northeast/southwest the wreck measures 94m x 34m x 12m with numerous features identified on the sidescan sonar data. Multiple elongated and angular features lie at various orientations suggesting the presence of remaining structure. Both the sidescan sonar and the multibeam bathymetry data indicate that a significant amount of undulating structure with height has survived.

3.3.5 The SS *Salerno* was a British flagged vessel sunk on 14<sup>th</sup> October 1915 whilst on passage from Hull to Marseilles by a mine set by UC-3. The general cargo vessel has as built dimensions of 99.1m length, 13.5m width and a draught of 6m. She was built in 1912 by Wood, Skinner and Co. of Newcastle-Upon-Tyne with two boilers, a triple expansion engine and single shaft. At the time of loss the vessel was owned by Wilson Line Ltd of Hull.



- 3.3.6 UKHO details of the last survey in 1996 states that the wreck is on its side with its superstructure having been removed by explosives but with much of its bow and part of the hull intact.
- 3.3.7 Six anomalies were discriminated as A2: of uncertain origin of possible archaeological interest. Of these, four are situated within the licence area.
- 3.3.8 **S35** and **S37** were interpreted to be the same feature and were categorised as debris. A distinctly oval structure measuring 7.7m x 4m x 0.3m it has a minimum of three internal parallel elongated features joining the external edges. These internal features run throughout the length of external structure.
- 3.3.9 **S46** and **S47** are both located in close proximity in Aggregate Area 510/2 and were interpreted to be the same feature: a seafloor disturbance observed as a patchy area measuring 11.3m x 8.2m x 0.4m consisting of dark reflectors and an indistinct feature with a hard edge measuring 1.9m x 1.4m x 0.4m.
- 3.3.10 The two remaining dark reflectors within the licence area, **S43** and **S44**, lie approximately 180m apart within the centre of Aggregate Area 510/2. **S43** is a rounded object with height measuring 3m x 0.9m x 0.5m, with a scour or depression surrounding it. Whereas, **S44** is an indistinct object measuring 5m x 0.8m x 0.5m.
- 3.3.11 **S30** and **S55** are situated outside of the licence area and consist of a small dark reflector, possible debris (2.9m x 0.3m x 0.1m) and a seafloor disturbance consisting of both bright and dark reflectors (7.5m x 3.7m x 0.0m), respectively.
- 3.3.12 In the centre of Area 510/2 (**Figure 2**) there is a recorded UKHO of the wreck of the HMS *Javelin* (7029), a British Trawler purchased as a minesweeper which was mined on 17th October 1915. Previous work (WA 2011) listed this position as an A3, a historic record of potential archaeological interest, as there was no geophysical data coverage during the 2011 assessment.
- 3.3.13 The UKHO has classified this wreck as dead and there is no evidence in the 2014 geophysical data of any wreck at or close to this position. Also, the bathymetry data indicates historic dredging over this location.

## 4 MITIGATION

- 4.1.1 With regards to mitigation of archaeology, the marine planning authority, working with the relevant regulator and advisors, takes account of the desirability of sustaining and enhancing the significance of heritage assets and adopts a general presumption in favour of the conservation of designated heritage assets within an appropriate setting (HM Government 2011; DCALG 2012).
- 4.1.2 Previously, four archaeological exclusion zones were recommended within the licence areas (**Table 2**). SS *Monitoria* was tentatively identified as an amorphous feature and HMS *Leandros* was identified on the geophysical data assessed for the DBA. However, HMS *Javelin* and the unknown vessel, possibly SS *Volscian*, were not covered by geophysical data reviewed in 2011 and archaeological exclusion zones were recommended based on the UKHO records alone (WA 2011).

**Table 2: Previously recommended Archaeological Exclusion Zones**

WA_ID (2011)	Name	Area	UTM31N Easting	UTM 31N Northing	Recommended Exclusion Zone radius (WA 2011)
7001	SS <i>Monitoria</i>	509/2	397983	5739132	50m
7017	HMS <i>Leandros</i>	508, 509/3, 510/1	405230	5729595	50m
7027	Unknown, possibly SS <i>Volscian</i>	510/2	411706	5733699	50m
7029	HMS <i>Javelin</i>	510/2	410121	5733167	100m

- 4.1.3 Based on the current assessment an additional Archaeological Exclusion Zone is recommended surrounding anomaly **S11**; Sunk Head Tower (**Table 3**). The Archaeological Exclusion Zone consists of a 50m buffer around the extents of the debris field as seen in the geophysical data.
- 4.1.4 Two of the pre-existing Archaeological Exclusion Zones surrounding anomalies **S36**; SS *Leandros* and **S53** (the unknown vessel, possibly SS *Volscian*) have had their positions updated to correspond with the current geophysical assessment. Although **S53** is situated outside the licence area the recommended Archaeological Exclusion Zone of 50m would impact the licence area.

**Table 3: Recommended Archaeological Exclusion Zones based on current data assessment**

ID	Name	Area	UTM31N Easting	UTM 31N Northing	Recommended Exclusion Zone radius
<b>S11</b>	Sunk Head Tower	509/2	396807	5737038	50m around limits of the wreck
<b>S36 (7017)</b>	HMS <i>Leandros</i>	508, 509/3, 510/1	405215	5729623	50m around limits of the wreck
<b>S53 (7027)</b>	Unknown, possibly SS <i>Volscian</i>	510/2	411705	5733709	50m around limits of the wreck

- 4.1.5 The two other wrecks identified during the assessment, **S15** (SS *Profit*) and **S54** (SS *Salerno*) are situated outside of the licence area and are therefore not impacted. As such no Archaeological Exclusion Zones are recommended at this time.
- 4.1.6 Additionally there are two recorded locations of wrecks in Area 509/2 (SS *Monitoria*) (tentatively identified in 2011) and in Area 510/2 (HMS *Javelin*). However, there is no evidence of the remains of these wrecks or any associated debris in the 2014 geophysical data and in both cases there is some evidence of historic dredging. As such, no Archaeological Exclusion Zones are recommended but their positions should be noted and if any archaeological finds are recovered then further investigation may be necessary.
- 4.1.7 Twenty-eight anomalies were discriminated as A2: of uncertain origin of possible archaeological interest. No exclusion zones are recommended but their positions should be noted, particularly those within licence areas.





- 4.1.8 Should items of possible or known archaeological interest be recovered during dredging operations these should be reported through the Marine Aggregate Industry *Protocol for Reporting Finds of Archaeological Interest* (BMAPA and EH 2005).

## 5 REFERENCES

British Marine Aggregate Producers Association and English Heritage, 2005. Protocol for Reporting Finds of Archaeological Interest. Prepared by Wessex Archaeology.

Department for Communities and Local Government, 2012, National Planning Policy Framework, March 2012 Available online (accessed on 05/02/2014):  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf)

HM Government, 2011, Marine Policy Statement, March 2011, Available online (accessed on 13/01/2015):  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69322/pb3654-marine-policy-statement-110316.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf)

Marine Management Organisation, 2013. Marine Management Organisation Marine Licence. Licence number: L/2013/00317.

Titan Environmental Surveys Limited, 2014. Area 509/1 & 509/2 Monitoring Survey. Titan Report Ref. CS0441A/R1/V1.

Wessex Archaeology, 2011. Long Sand Head Licence Areas: Technical report and impact assessment, Unpublished client report ref.75930.02



## APPENDIX I: GAZETTEER OF ASSESSED ANOMALIES AREA 509/1 AND 509/2

Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S1	397089.5	5737305.6	94	Disturbed area outside Licence Area	Seafloor Disturbance	A2	Indistinct at the edges and difficult to discern extents (134.9m x 45m x 0.0m). Consists mostly of diffuse dark reflectors but appears to contain debris. S1 and S29 appear to be the same feature.	Outside
S29	397035.0	5737295.6	31	Disturbed Area				
S2	397114.5	5737203.7	17	Disturbed area outside Licence Area	Seafloor Disturbance	A2	Area (14.4m x 9m x -3.5m) consisting principally of dark reflectors, including one with height (0.8m) that may possibly be debris. Appears in the bathymetry data as a depression.	Outside
S3	396066.4	5736237.7	190	Disturbed area outside Licence Area	-	-	Not seen.	Outside
S4	396197.3	5736210.6	23	Outside Licence Area, Wessex contact -7010 UKHO 15007	Seafloor Disturbance	A1	Area of disturbed seabed containing dark and bright reflectors (29.8m x 16.7m x 0.6m). Appears in the bathymetry data to be a depression with 2 elongated features oriented N/S. Corresponds to 7010. Recorded by the UKHO as 15007, a live area of foul ground . Also described as an uncharted wreck that is virtually buried.	Outside
S5	397195.4	5737242.5	1.1 x 0.4 x 0.6	Contact outside Licence Area	Seafloor Disturbance	A2	Small feature (3.9m x 2.1m x 0.0m). Almost 'H' shaped dark reflector.	Outside
S6	398352.9	5738235.4	1.0 x 0.6 x 2.2	Contact outside Licence Area	Dark Reflector	U1	Small object with height (0.7m x 0.4m x 0.5m). Probable rock.	Outside



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S7	397576.9	5737206.4	0.6 x 0.3 x 0.8	Contact outside Licence Area	Dark Reflector	U1	Very small object with height (0.3m x 0.3m x 0.4m). Probable rock.	Outside
S8	400872.5	5740904.1	6.7	Linear contact outside Licence Area	Dark Reflector	A2	A linear feature (6.8m x 0.6m x 0.3m) with a small object with height (0.9m x 0.6m x 0.4m) lying partway along it.	Outside
S9	395856.6	5736912.1	14	Disturbed area outside Licence Area	Dark Reflector	A2	Patchy feature (17.1m x 2.2m x 0.0m). Although this is probably natural it does contain an 'X' shaped feature with height (5.0m x 1.9m x 0.5m) that may be of interest.	Outside
S10	396314.3	5737431.8	38	Disturbed area outside Licence Area	Seafloor Disturbance	U1	Probably natural. Area of sandwaves and possible rocks (36.0m x 7.8m x 0.0m).	Outside
S11	396810.0	5737038.7	42.0 x 26 x 17	Remains of Sunk Head Tower Wessex - contact 7009 UKHO 15022	Debris Field	A1	Corresponds to 7009 and UKHO 15022. Remains of HMF Sunk Head Tower. Launched on 01/06/1942 it consisted of a reinforced concrete pontoon supporting twin cylindrical towers and topped with a gun deck, upper deck and central tower unit. It was demolished by explosives on 18/08/1967). A large area of debris including the structure (90.5m x 40.8m x 6.0m) remains on the seabed and there is likely to be further debris scattered away from this main area.	Area 509/2
S12	396866.7	5737108.8	1.8 x 1.2 x 1.5	Contact	Dark Reflector	A2	Indistinct angular object (5.4m x 2.5m x 0.7m). May be debris. Lies within a depression or scour.	Area 509/2



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S13	396848.7	5737070.1	1.3 x 1.1 x 1.2	Contact outside Licence Area	Dark Reflector	U1	Indistinct elongated feature (2.4m x 1.4m x 0.7m). Probably natural.	Outside
S14	396859.7	5736998.8	13	Disturbed area outside Licence Area	Seafloor Disturbance	A2	Area (10.1m x 3.2m x 0.9m) containing mostly dark reflectors. Part of this feature has height and may be debris.	Outside
S15	397001.2	5738893.5	30.0 x 29 x 3.6	Debris field associated with SS Profit. Wessex - 7007/UKHO14 463	Wreck	A1	Corresponds to 7007 and UKHO 14463. Very broken up and partially dispersed wreck (75.3m x 33.4m x 3.0m) with some structure remaining. Orientated E/W with some surrounding sediment build up on both sides. A possible scour extends for approximately 80m to the NE. Wreck of SS <i>Profit</i> , a general cargo vessel sunk by a mine on 17/04/1941 during a passage from London to Hull.	Outside
S16	399566.4	5741518.6	62	Disturbed area outside Licence Area	Seafloor Disturbance	U1	Large area of irregular seabed (89.6m x 29.7m x 0.0m) similar to a much larger area observed nearby. Probably natural.	Outside
S17	398776.2	5740541.0	6.4 x 1.6 x 0.3	Contact	Dark Reflector	A2	Elongated feature (6.3m x 1.5m x 0.5m). Possibly two objects very close together. May be debris.	Area 509/2
S18	397111.5	5738725.7	3.0 x 0.5 x 0.3	Contact outside Licence Area	Dark Reflector	U1	Small feature with height (1.8m x 0.4m x 0.2m). Probable rock.	Outside
S19	398490.3	5741281.2	2.0 x 0.7 x 0.6	Contact outside Licence Area	Dark Reflector	U1	Very small and indistinct object with shadow (0.6m x 0.6m x 0.4m). Possible rock.	Outside



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S20	398810.9	5741519.3	13	Disturbed area outside Licence Area	Depression	A2	An oval depression (15m x 10m x - 0.1m) with a mound within, 0.04m high. In the sidescan data it appears as a bright reflector with a darker area in the centre.	Outside
S21	398900.5	5741388.0	20	Disturbed area outside Licence Area	Depression	U1	An oval shaped depression with undulating depth (15m x 8m x - 0.5m). Corresponds with UKHO 80101, a live area of foul ground.	Outside
S22	398917.9	5741271.5	41	Probable cable outside Licence Area	Debris	U2	Discontinuous linear feature (37.9m x 1.2m x 0.1m). Possibly partially buried cable or similar. May extend further SW - extremely indistinct trace here.	Outside
S23	397179.3	5739397.5	2.5 x 0.5 x 0.3	Contact outside Licence Area	Dark Reflector	U1	Small isolated object with height (2.0m x 0.4m x 0.2m). Possible rock.	Outside
S24	396945.8	5739170.4	1.4 x 0.5 x 0.6	Contact outside Licence Area	Dark Reflector	U1	Small isolated object with height (0.9m x 0.3m x 0.4m). Possible rock.	Outside



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S25	396847.0	5739049.4	4.7 x 1.2 x 1.2	Contact	Debris	A2	Area of dark reflectors (9.0m x 3.3m x 0.9m). In the bathymetry data this appears as a mound (5m x 5m x 0.9m) surrounded by a circular depression (26m x 17m x -0.8m). Recorded by UKHO as 70260, a live area of foul ground. The record indicates that it was originally recorded as the wreck of a lighter that sank in 1917. Currently the feature is thought to be possibly an item of debris from the wreck, which has not been found by multiple surveys since 1974.	Outside
S26	398400.2	5741255.2	5.9x0.8	Contact outside Licence Area	Seafloor Disturbance	U1	Elongated area of disturbed seabed (16.8m x 3.8m x 0.0m). Possible scar.	Outside
S27	400486.7	5742207.4	3.5 x 1.4 x 1.0	Contact	Dark Reflector	A2	Isolated oval shaped depression (12m x 7m x -0.5m). Appears in the sidescan data as two sections of dark reflector (3.7m x 0.8m x 0.2m) behind which lies a bright reflector .	Area 509/1
S28	400490.4	5742211.2	3.9 x 0.7 x 0.8	Contact	Dark Reflector	A2	Indistinct elongated feature (1.7m x 1.3m x 0.3m). There is a larger bright reflector adjacent to it. The feature is at the edge of the data and may extend beyond.	Area 509/1
S30	396897.1	5737210.6	10	Disturbed area	Seafloor Disturbance	U1	Area of dark reflectors (6.9m x 2.2m x 0.0m). Probably natural.	Area 509/2



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S31	401332.5	5741881.3	1.6 x 1.1 x 0.8	Contact outside Licence Area	Dark Reflector	A2	Small object with height (1.4m x 1.0m x 0.6m). Probable rock. Surrounded by a depression (8m x 7m x -0.3m). Corresponds to 7006. Recorded by the UKHO as 58542, foul ground but with status as dead. Thought possibly to be a piece of debris in a small hollow.	Outside

#### Notes

1. All coordinates are given in UTM31N
2. Rows highlighted in grey are the features of known or possible archaeological interest





## APPENDIX II: GAZETTEER OF ASSESSED ANOMALIES AREA 508, 509/3, 510/1

Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S1	406473.1	5734394.2	6.4 x 1.8 x 0.0	Contact	Dark Reflector	A2	Distinct irregularly shaped elongated feature (8.1m x 1.8m x 0.0m).	Area 508, 509/3, 510/1
S2	405360.2	5733118.7	4.2 x 0.0 x 0.0	Linear Contact	Dark Reflector	A2	Linear feature without height (4.4m x 0.6m x 0.0m). Possible debris.	Area 508, 509/3, 510/1
S3	405640.6	5733385.5	1.6 x 0.2 x 0.3	Contact	Dark Reflector	U1	Small object (1.9m x 0.4m x 0.2m). Possible rock. S3 and S6 appear to be the same feature.	Area 508, 509/3, 510/1
S6	405632.8	5733370.1	2.5 x 0.5 x 0.6	Contact				
S4	405381.9	5733180.8	1.8 x 0.3 x 0.2	Contact	Dark Reflector	U1	Small elongated object with height (4.3m x 0.5m x 0.5m). Possibly natural. S4 and S5 appear to be the same feature.	Area 508, 509/3, 510/1
S5	405386.9	5733183.8	1.0 x 0.3 x 0.1	Contact				
S7	406531.5	5734128.6	33	Disturbed Area	Depression	A2	Distinct depression (26m x 26m x -0.5m) that appears in the sidescan data as an area of seafloor disturbance (19.9m x 13.1m x 0.0m) containing both diffuse and distinct dark reflectors.	Area 508, 509/3, 510/1
S8	405429.4	5732633.5	3.4 x 0.7 x 0.5	Contact	Dark Reflector	U1	Very indistinct feature with height (2.6m x 1.2m x 0.3m). Possibly natural.	Area 508, 509/3, 510/1
S9	405487.1	5732528.1	1.5 x 1.0 x 1.7	Contact	Dark Reflector	U1	Very small feature with height (0.7m x 0.6m x 1.0m). Possible rock.	Area 508, 509/3, 510/1



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S10	399893.2	5728694.9	7	Disturbed Area	Dark Reflector	U1	Small object with height (1.4m x 0.6m x 0.5m) and possible depression/scour. Possible rock.	Outside
S11	400647.0	5729714.1	8	Disturbed Area	Seafloor Disturbance	U1	Indistinct area (13.3m x 5.8m x 0.0m) of bright and dark reflectors. Possibly natural, appears as an interruption in a dark streak of coarser sediment. S11 and S12 appear to be the same feature.	Outside
S12	400659.0	5729719.5	10	Disturbed Area				
S14	405360.8	5731475.9	0.9 x 1.1 x 1.2	Contact	Dark Reflector	U1	Very small object with height (1.0m x 0.8m x 0.7m). Possible rock.	Area 508, 509/3, 510/1
S15	405255.7	5731031.3	3.0 x 0.8 x 0.4	Contact	Dark Reflector	A2	Small elongate object with height (3.3m x 0.4m x 0.3m). Possibly caused by dredging but may be of interest.	Area 508, 509/3, 510/1
S16	405638.2	5731426.7	2.9 x 1.5 x 0.4	Contact	Dark Reflector	U1	Elongate object with height (3.0m x 1.0m x 0.5m). A second smaller object appears in the shadow. Possibly natural.	Area 508, 509/3, 510/1
S17	405977.1	5731509.7	1.1 x 0.5 x 0.4	Contact	Dark Reflector	U1	Small rounded object with height (1.1m x 0.4m x 0.3m). Possible rock.	Area 508, 509/3, 510/1
S18	404067.9	5729607.1	11	Disturbed Area	Seafloor Disturbance	A2	Small area of disturbed seabed (7.6m x 3.3m x 0.0m) consisting of dark and bright reflectors.	Area 508, 509/3, 510/1



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S19	403125.6	5728668.5	1.4 x 1.0 x 0.5	Contact	Dark Reflector	U1	Small object with height (1.0m x 0.4m x 0.4m). Possible rock. S19 and S20 appear to be the same feature.	Area 508, 509/3, 510/1
S20	403118.1	5728652.9	0.8 x 0.7 x 0.5	Contact				
S21	405768.1	5731173.0	4.8 x 0.6 x 0.5	Contact	Dark Reflector	A2	Linear feature with height (6.2m x 0.5m x 0.4m). Possible debris.	Area 508, 509/3, 510/1
S22	404480.1	5729751.2	11	Disturbed Area	Seafloor Disturbance	A2	Indistinct area (11.2m x 5.4m x 0.2m) surrounding a linear feature with height (5.6m x 0.3m x 0.2m) that may be a piece of debris.	Area 508, 509/3, 510/1
S23	403337.0	5728601.7	1.9 x 0.7 x 0.4	Contact	Dark Reflector	U1	Small indistinct object with height (0.9m x 0.2m x 0.2m). Possible rock.	Outside
S24	402923.0	5728224.4	0.5 x 0.9 x 1.5	Contact	Dark Reflector	U1	Very small object with height (0.9m x 0.6m x 0.7m) with very similar features nearby. Probable rock.	Outside
S25	403256.9	5728537.5	1.6 x 1.2 x 0.9	Contact	Dark Reflector	U1	Indistinct small object with height (1.4m x 1.2m x 0.6m). Possible rock.	Outside
S26	403284.7	5728531.3	50	Debris Field	Dark Reflector	U1	Group of small dark reflectors with height (50.5m x 6.6m x 0.3m). Possible rocks.	Outside
S27	406876.3	5728872.4	16	Disturbed area	Seafloor Disturbance	U1	An area (14.5m x 7.4m x 0.0m) principally consisting of dark reflectors. May be natural.	Area 508, 509/3, 510/1
S28	405179.6	5728723.5	1.9 x 0.2 x 0.4	Contact	Dark Reflector	A2	Linear feature with height (2.6m x 0.5m x 0.2m). Possible debris.	Area 508, 509/3, 510/1



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S29	407747.9	5730668.9	0.8 x 0.8 x 1.3	Contact	Dark Reflector	U1	Curved feature with height (1.6m x 1.1m x 0.6m), at the end of a long dark streak of possibly coarser sediment. Possibly natural.	Outside
S32	404521.4	5729791.7	2.1 x 1.3 x 0.3	Contact	Dark Reflector	U1	Elongate object with height (1.5m x 0.3m x 0.3m). Possibly natural.	Area 508, 509/3, 510/1
S36	405225.7	5729635.6	35.4 x 9.7 x 3.5	Wreck - HMS <i>Leandros</i>	Wreck	A1	Corresponds to 7017 and UKHO 15037. Somewhat indistinct wreck (40.9m x 15m x 4.0m) with far end hidden in shadow in the sidescan data. Appears possibly partially broken up and partially buried. Oriented N/S the wreck appears as a narrow elongated mound in the bathymetry data with an adjacent depression or scour to the north. The southern end of the wreck extends into an area of sandwaves. HMS <i>Leandros</i> was a trawler mined and sunk on 06/08/1915 whilst in the service of the Admiralty. Updated centre-point of wreck based upon bathymetry data: 405215E, 5729623N	Area 508, 509/3, 510/1
S39	404740.3	5728961.8	2.4 x 0.0 x 0.0	Linear Contact	Dark Reflector	A2	Small linear feature with height (2.8m x 0.1m x 0.2m). Possible debris.	Area 508, 509/3, 510/1

#### Notes

1. All coordinates are given in UTM31N
2. Rows highlighted in grey are the features of known or possible archaeological interest



**APPENDIX III: GAZETTEER OF ASSESSED ANOMALIES AREA 510/2**

Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
<b>S30</b>	408975.3	5734036.4	3.8 x 0.6 x 0.1	Contact	Dark Reflector	A2	Linear feature with height (2.9m x 0.3m x 0.1m). Possible debris.	Outside
<b>S31</b>	408319.7	5733402.7	0.9 x 0.4 x 0.3	Contact	Dark Reflector	U1	Small feature with height (0.9m x 0.4m x 0.2m). Possible rock. S31 and S33 appear to be the same feature.	Outside
<b>S33</b>	408313.6	5733390.9	0.5 x 0.5 x 0.2	Contact				
<b>S34</b>	409125.7	5733702.4	9	Disturbed Area	Dark Reflector	U1	Patchy feature with no clear height (5.7m x 3.8m x 0.0m). Possibly natural.	Outside
<b>S35</b>	408527.1	5732942.7	8	Disturbed Area	Debris	A2	Oval structure (7.7m x 4.0m x 0.3m) with parallel linear features within. S35 and S37 appear to be the same feature.	Area 510/2
<b>S37</b>	408522.6	5732931.4	7	Disturbed Area				
<b>S38</b>	409907.8	5734274.8	1.9 x 0.3 x 0.4	Contact	Dark Reflector	U1	Indistinct object with height (0.8m x 0.3m x 0.2m). Possible rock.	Outside
<b>S40</b>	408040.0	5732106.8	37.0 x 0.0 x 0.0	Cable/Chain	Rope/Chain	U2	Curving linear dark reflector with height (35.4m x 0.3m x 0.1m).	Outside
<b>S41</b>	408464.3	5732577.8	0.4 x 0.4 x 0.8	Contact	Dark Reflector	U1	Small object with height (0.9m x 0.8m x 0.5m). Possible rock. At the end of a long dark streak, possibly coarser sediment. S41 and S42 appear to be the same feature.	Area 510/2
<b>S42</b>	408478.9	5732581.1	0.4 x 0.5 x 0.7	Contact				
<b>S43</b>	409180.2	5733081.6	1.6 x 0.9 x 1.6	Contact	Dark Reflector	A2	Rounded object with height (3.0m x 0.9m x 0.5m). Surrounded by a scour or depression (10m x 8m x -0.2m).	Area 510/2
<b>S44</b>	409320.3	5732983.6	5	Disturbed area	Dark Reflector	A2	Indistinct elongate object with height (5.0m x 0.8m x 0.5m). May possibly be debris.	Area 510/2



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S45	409902.0	5733632.1	2.0 x 0.8 x 4.4	Contact	Dark Reflector	U1	Indistinct rounded object with height (2.0m x 0.9m x 0.9m). Possible rock.	Area 510/2
S46	408887.4	5732262.3	15	Disturbed Area	Seafloor Disturbance	A2	Patchy area of dark and bright reflectors (11.3m x 8.1m x 0.0m) containing an indistinct object with height (1.9m x 1.4m x 0.4m). S46 and S47 appear to be the same feature.	Area 510/2
S47	408907.2	5732270.5	9	Disturbed area				
S48	408525.1	5731654.6	1.6 x 0.5 x 0.4	Contact	Dark Reflector	U1	Indistinct small object with height (0.7m x 0.4m x 0.1m). Probable rock.	Outside
S49	408663.1	5731580.1	1.6 x 0.3 x 0.4	Contact	Dark Reflector	U1	Small object with height (1.8m x 0.4m x 0.2m). Probable rock.	Outside
S50	410085.2	5732455.3	0.8 x 0.3 x 0.3	Contact	Dark Reflector	U1	Very small object with height (0.5m x 0.3m x 0.2m). Probable rock.	Area 510/2
S52	410941.8	5733010.1	1.0 x 0.4 x 0.5	Contact	Dark Reflector	U1	Very small isolated object with height (0.3m x 0.2m x 0.3m). Probable rock.	Area 510/2



Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S53	411709.7	5733713.3	38.8 x 9.1 x 7.0	Wreck - <i>Volscian</i>	Wreck	A1	Corresponds to 7027 and UKHO 14418. The wreck (36.7m x 13m x 5.2m) appears very indistinct in the sidescan data with little structure visible. It appears mostly buried and has the appearance of a mound with a scour and build up of sediment extending to the south. In the bathymetry data the wreck is visible as an elongated mound oriented SSE/NNW with the height greater at the southern end. It is surrounded by a scour/depression with scours extending to the north and particularly the south of the wreck. Recorded by UKHO as an unidentified live wreck and believed to be the bow section only, as reported by divers. Centre point of wreck based on bathymetry data is: 411705E, 5733709N	Outside

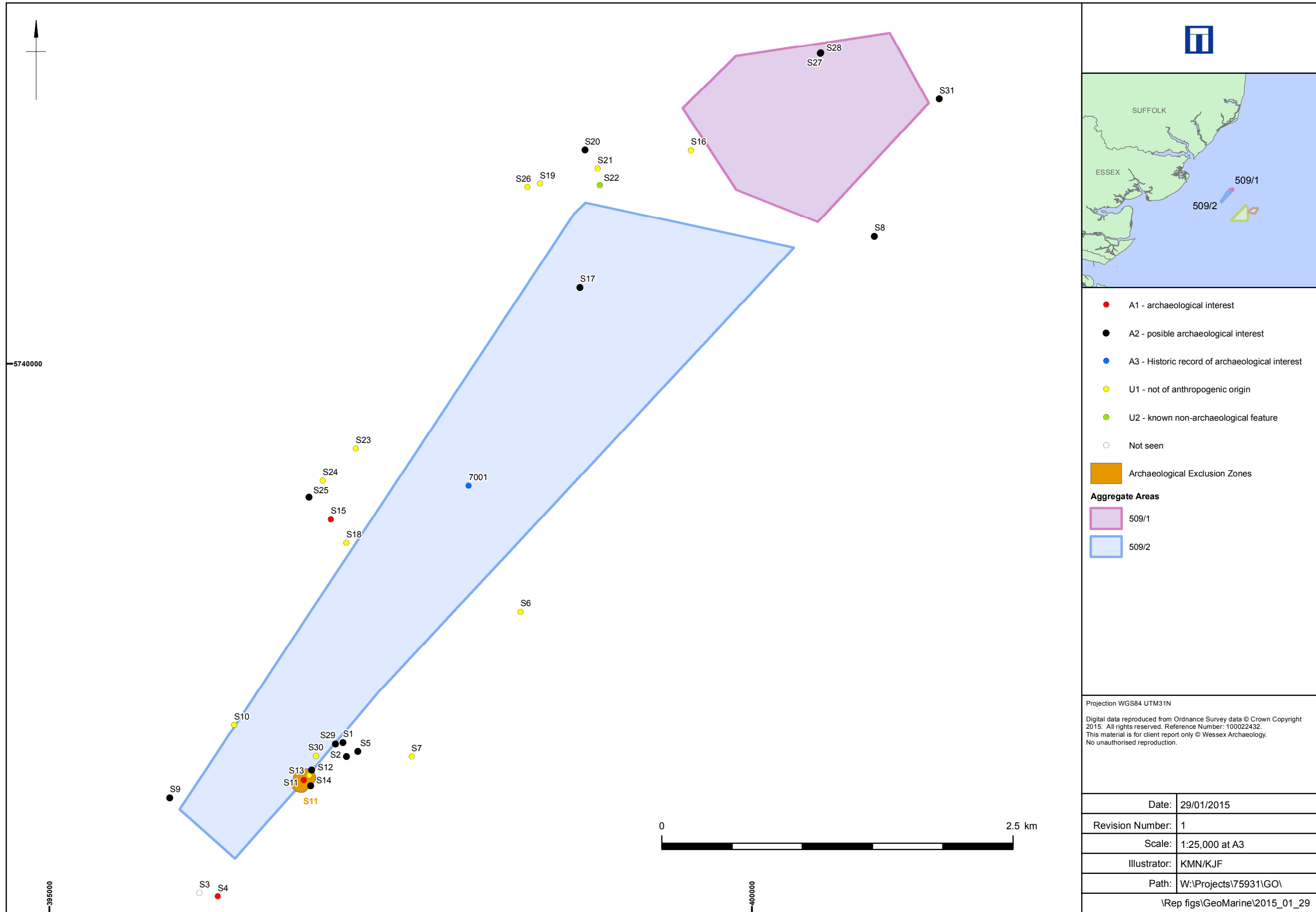




Titan Interpretation					Wessex Archaeology Interpretation			Area
ID	Easting	Northing	Dimensions	Comments	Classification	Archaeological Discrimination	Description	
S54	412011.3	5733778.6	89.9 x 13.0 x 18.6	Wreck - SS <i>Salerno</i>	Wreck	A1	Corresponds to 7026 and UKHO 14419. The wreck (94m x 35m x 12.0m) is oriented NE/SW and has a scour and build up of sediment extending to the SSW. There is some structure visible but it appears partially broken up and may be partly buried in places. The UKHO record states it is the wreck of the SS <i>Salerno</i> (possibly), which sank on 14/10/1915 after striking a mine. The steamship was a general cargo vessel on passage from Hull to Marseilles when the mine was encountered. Centre point of wreck based on bathymetry data is: 412017E, 5733757N	Outside
S55	411972.9	5733841.3	4.1 x 0.0 x 0.0	Linear Contact	Seafloor Disturbance	A2	Small area (7.5m x 3.7m x 0.0m) consisting of both bright and dark reflectors. It contains a linear feature (4.8m x 0.9m x 0.0m) that may be debris.	Outside
S56	409665.5	5731378.4	2.9 x 0.6 x 0.3	Contact	Dark Reflector	U1	Indistinct object with height (2.2m x 0.4m x 0.2m). Possible rock.	Outside

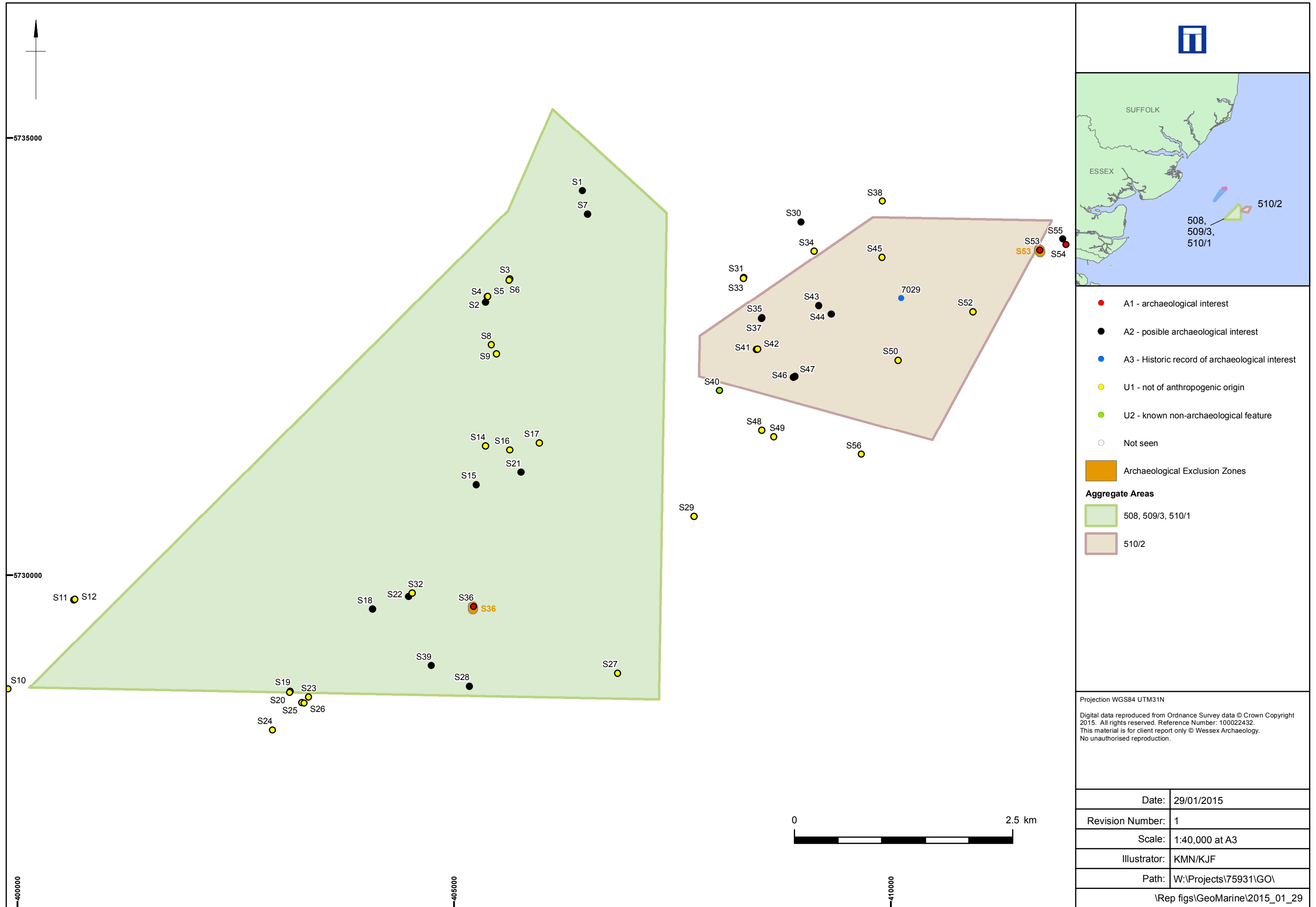
#### Notes

1. All coordinates are given in UTM31N
2. Rows highlighted in grey are the features of known or possible archaeological interest



Geophysical Anomalies and Archaeological Exclusion Zones in Aggregate Areas 509/1 and 509/2

Figure 1

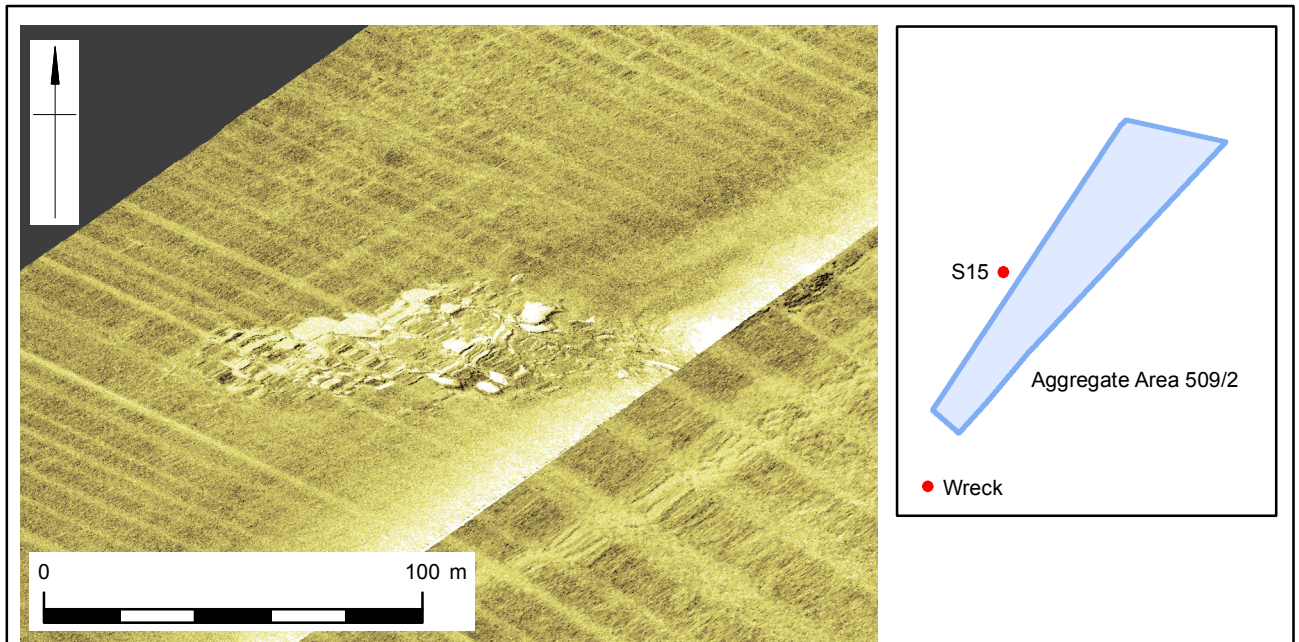


Geophysical Anomalies and Archaeological Exclusion Zones in Aggregate Areas 508, 509/3, 510/1 and 510/2

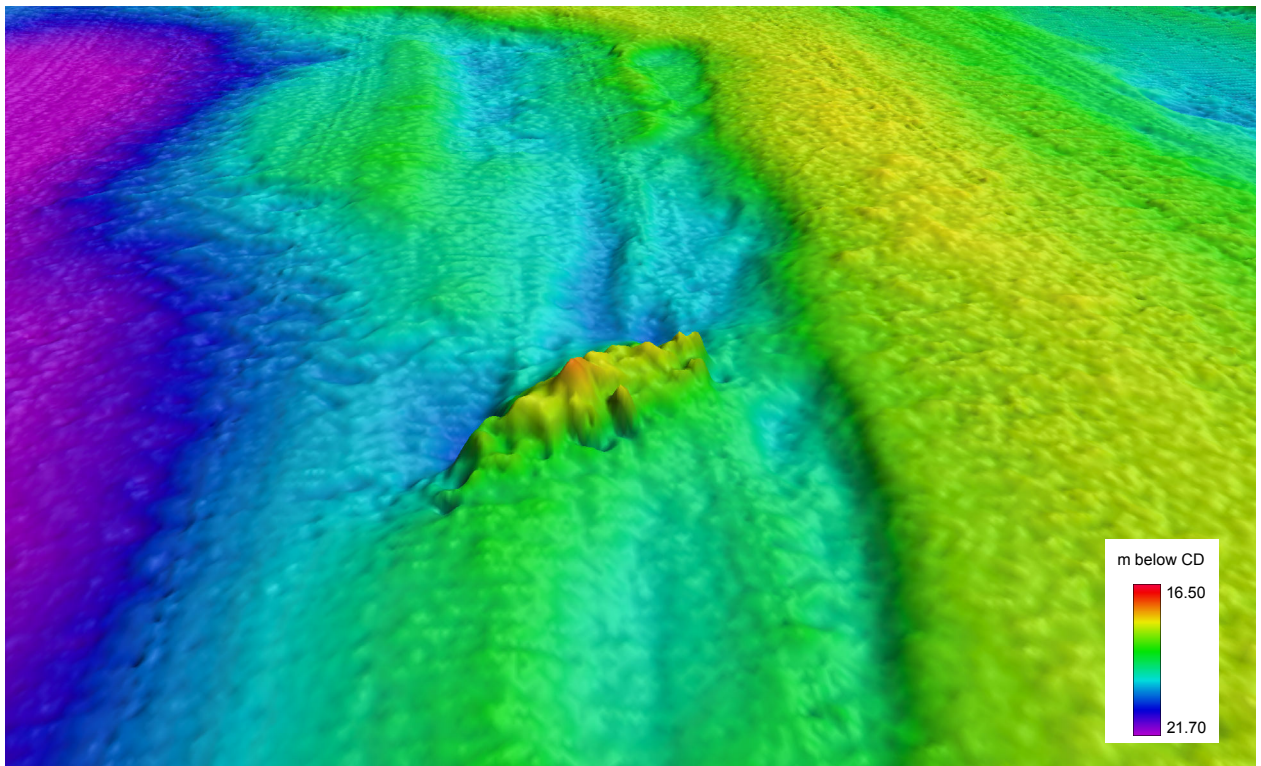
Figure 2

Projection WGS84 UTM31N  
 Digital data reproduced from Ordnance Survey data © Crown Copyright 2015. All rights reserved. Reference Number: 100022432.  
 This material is for client report only © Wessex Archaeology.  
 No unauthorised reproduction.


Date:	29/01/2015
Revision Number:	1
Scale:	1:40,000 at A3
Illustrator:	KMN/KJF
Path:	W:\Projects\75931\GO\
\Rep figs\GeoMarine\2015_01_29	



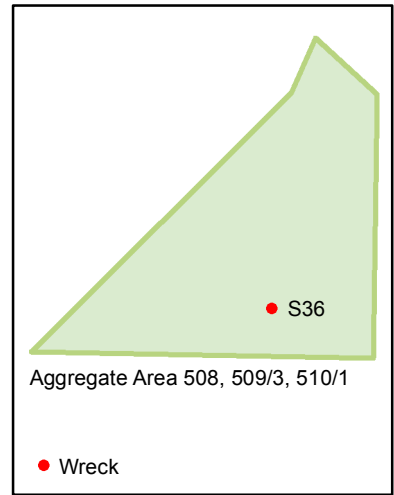
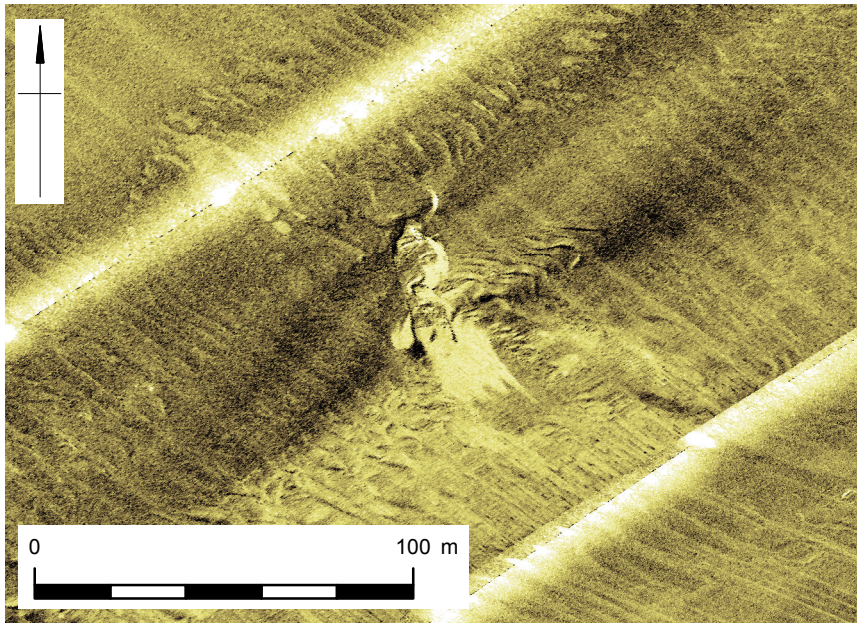
Sidescan sonar mosaic image of the wreck of SS *Profit* (75.3m x 33.4m x 3.0m)



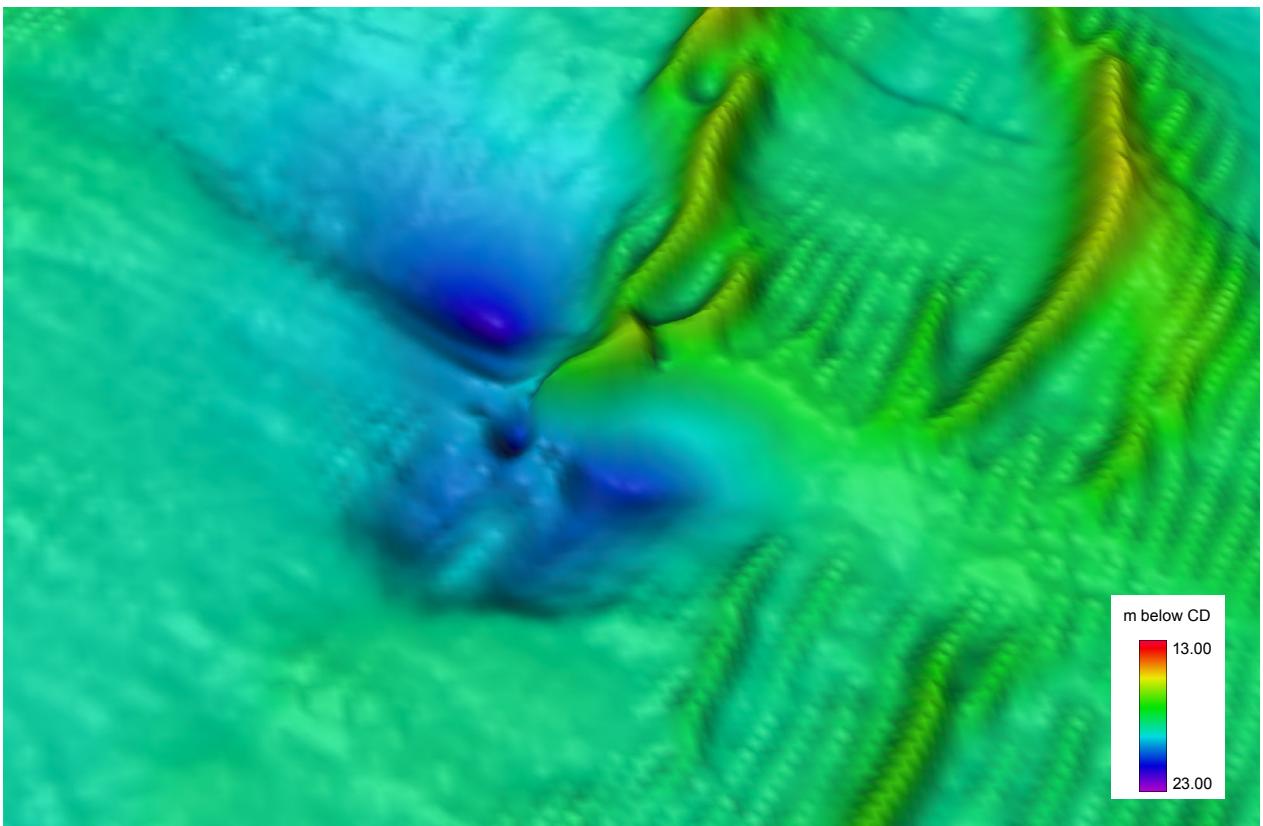
Oblique view of the wreck of SS *Profit* in the multibeam bathymetry data. View direction: northeast.  
Vertical exaggeration: x6

	Projection WGS84 UTM31N		
	This material is for client report only © Wessex Archaeology. No unauthorised reproduction.		
	Date:	106/01/2015	Revision Number: 0
	Scale:	See above	Illustrator: KMN
Path:		W:\Projects\75931\Graphics_Office\Rep figs\GeoMarine\2015_01_15	






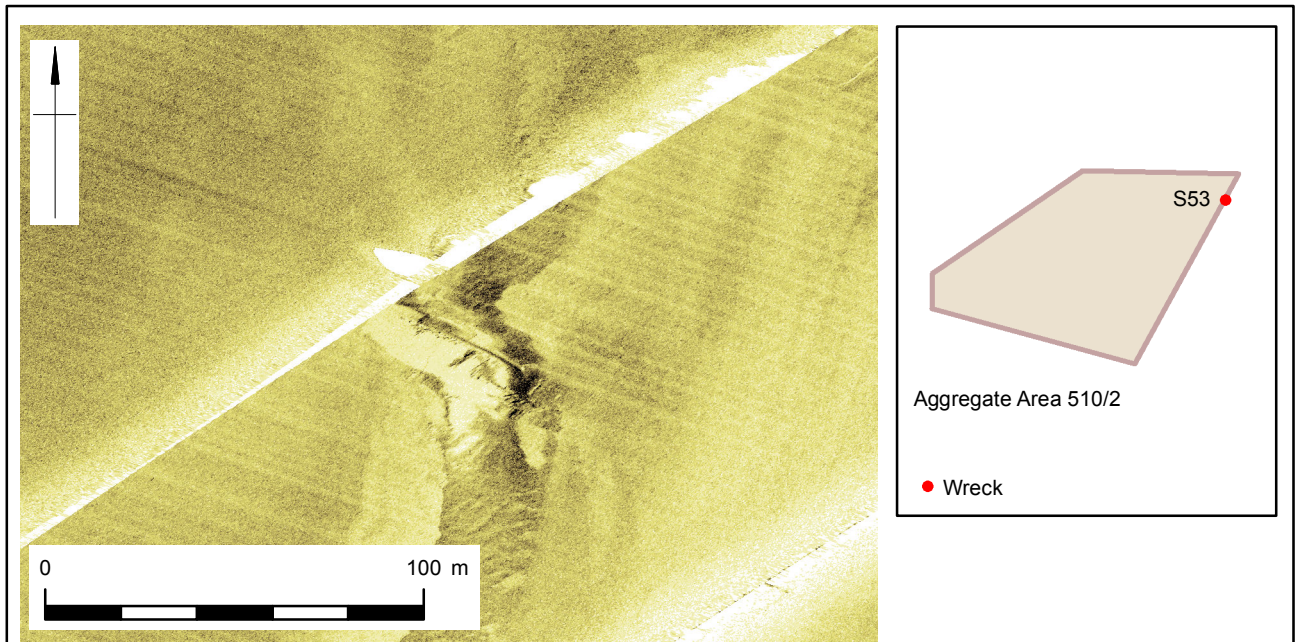
Sidescan sonar mosaic image of the wreck of HMS *Leandros* (40.9m x 15m x 4.0m)



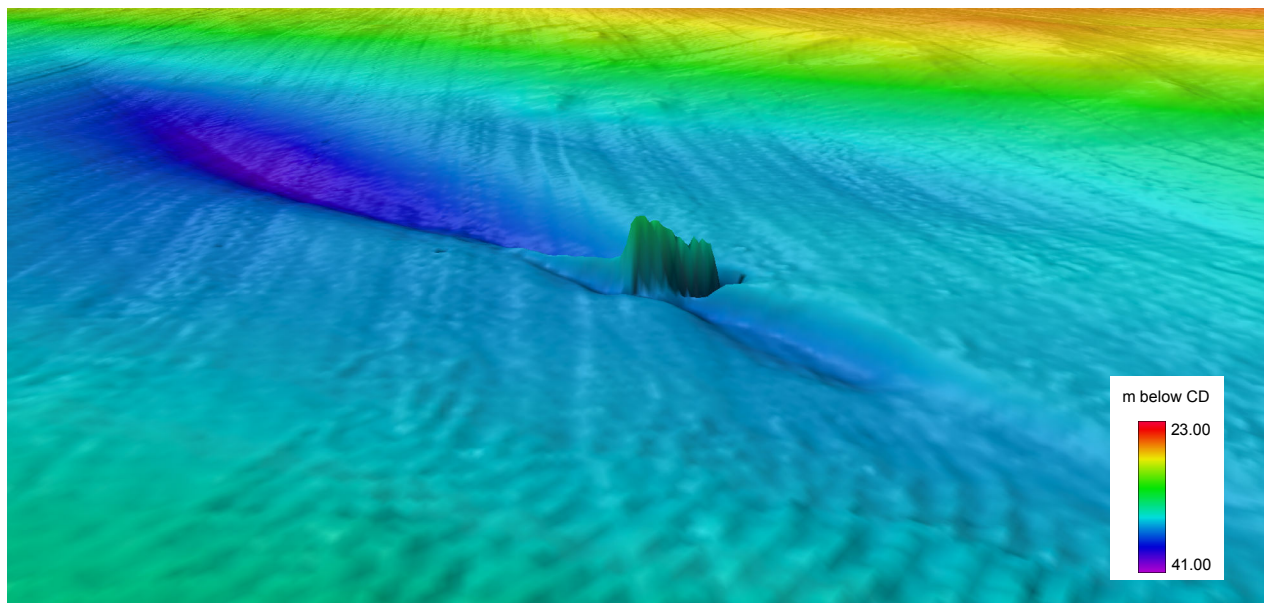
Oblique view of the wreck of HMS *Leandros* in the multibeam bathymetry data. View direction: east.  
Vertical exaggeration: x6

	Projection WGS84 UTM31N		
	This material is for client report only © Wessex Archaeology. No unauthorised reproduction.		
	Date:	106/01/2015	Revision Number: 0
	Scale:	See above	Illustrator: KMN
Path:		W:\Projects\75931\Graphics_Office\Rep figs\GeoMarine\2015_01_15	




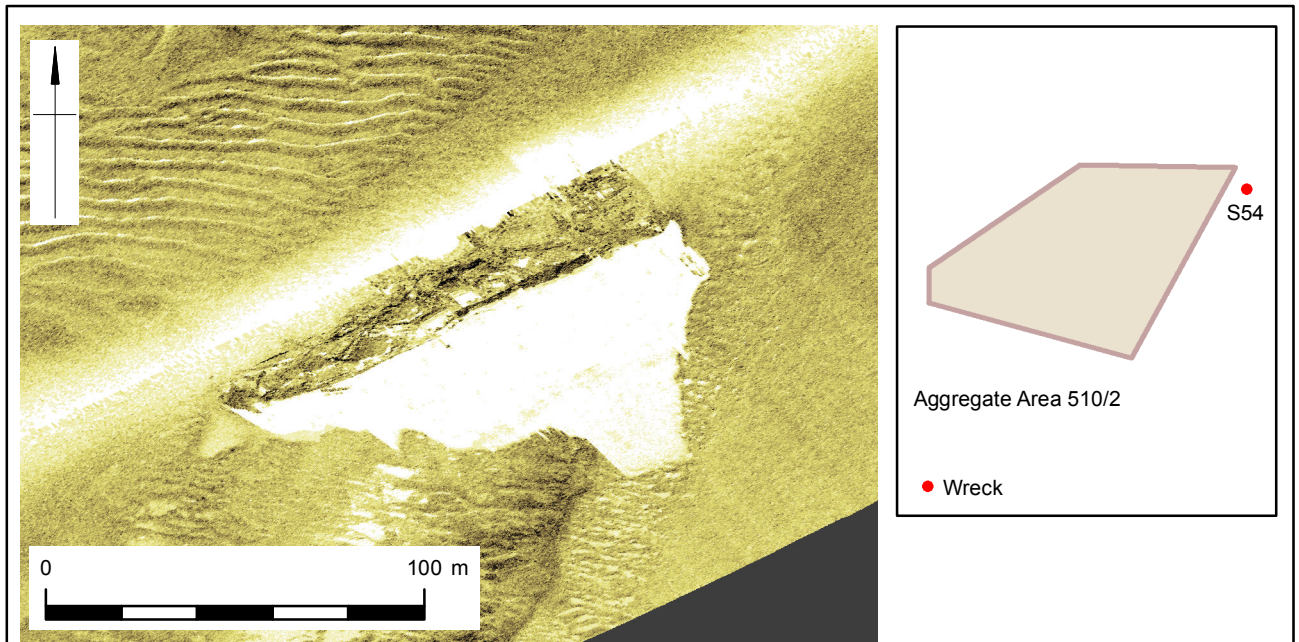


Sidescan sonar mosaic image of the wreck of an unidentified vessel (36.7m x 13m x 5.2m)

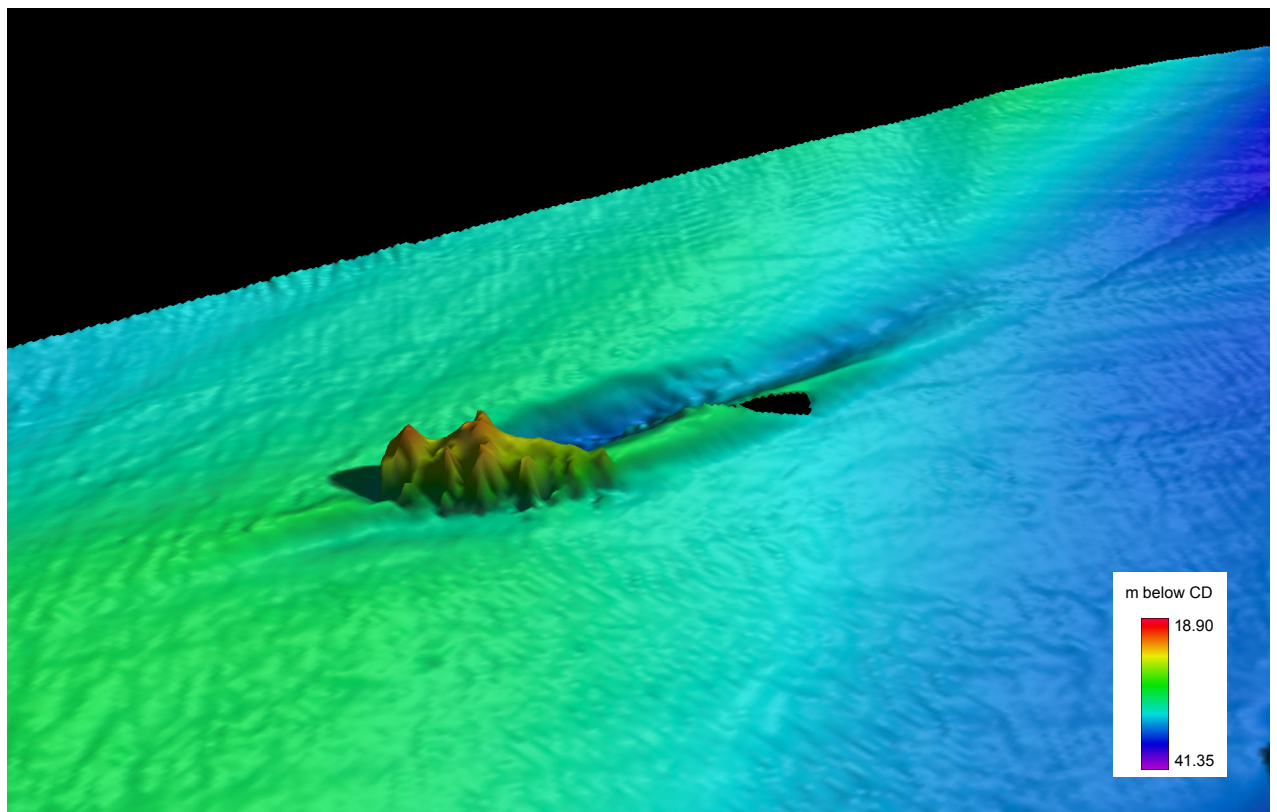


Oblique view of the wreck of an unidentified vessel in the multibeam bathymetry data. View direction: southwest. Vertical exaggeration: x6


	Projection WGS84 UTM31N		
	This material is for client report only © Wessex Archaeology. No unauthorised reproduction.		
	Date:	106/01/2015	Revision Number: 0
	Scale:	See above	Illustrator: KMN
Path:		W:\Projects\75931\Graphics_Office\Rep figs\GeoMarine\2015_01_15	



Sidescan sonar mosaic image of the wreck of (possibly) SS *Salerno* (94m x 35m x 12.0m)



Oblique view of the wreck of (possibly) SS *Salerno* in the multibeam bathymetry data. View direction: southeast. Vertical exaggeration: x3

	Projection WGS84 UTM31N		
	This material is for client report only © Wessex Archaeology. No unauthorised reproduction.		
	Date:	106/01/2015	Revision Number: 0
	Scale:	See above	Illustrator: KMN
Path:		W:\Projects\75931\Graphics_Office\Rep figs\GeoMarine\2015_01_15	





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



Wessex Archaeology Ltd is a company limited by guarantee registered in England, company number 1712772. It is also a Charity registered in England and Wales, number 287786; and in Scotland, Scottish Charity number SC042630. Our registered office is at Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB.