

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5005.02
December 2007**

Site ID: 5005

Site Name: *SS Letchworth*

PLA Wreck No.: WA has no PLA reports on the site

Mitigation Group: 2.2.3. Site of possible archaeological interest, seaward of SR1

No. of Casualties: 1 known

Vessel Type: Commercial cargo vessel

Cause of Loss: Bombed by German aircraft during World War II

Current Recording Status: Level 2

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the sites discovery and includes all forms of investigation to date:

1940	<i>SS Letchworth</i> lost due to bombing (1/11/1940);
1940	Vessel sunk at 51°28'58" N 00°56'58" E. Marked by light buoy (16/12/1940);
1940	Light Buoy positioned 160 Degrees and 91.5 metres from wreck (16/12/1940);
1942	Depth of wreck amended to 9.1m (3/4/1942);
1943	Depth of wreck amended to 11.9m (6/11/1943);
1944	Buoy deleted (22/4/1944);
1946	Depth of wreck amended to 14.3m (Captain <i>M/S Sheerness</i> 10/5/1946);
1958	Site swept clear at 15.54 metres, foul at 15.85 metres. Least E/S depth 15.54 metres in general depth of 15.54 to 18 metres. Scour depth 19.8 metres. Depth of wreck amended to 15.6m. (29/9/1958);
1961	Least depth 16.5 metres. Large scour to 19.5 metres. (7/7/1961);
1968	Examined 23/2/1968 at 51°28'58" N 00°57'01" E (positioned using hifix). Swept clear at 14 metres. Foul at 14.17 metres. Least E/S depth 14.6 metres in general depth of 17.99 metres. Scour depth 20.11 metres (19/3/1968).
1973	Site amended SW 14 metres (27/9/1973);
1979	Site examined 23/9/1978 at 51° 28'58" N, 00° 57'01" E (using hifix). Least E/S depth 14.3 metres in general depth 16 metres. Scour 19.2 metres. Wreck easy to find. Covers an area 75 x 45 metres and lies ENE/WSW (19/1/1979);
1982	Site amended to SW 14.1 metres at 51° 28'59" N, 00° 57'00.5" E (10/11/1982);
1992	Site examined at 51° 28'59.1" N 00° 57'00" E (using microfix). Least E/S depth 14.3 metres in general depth of 16 metres. Scour depth 18 metres. Retain as charted. (10/12/1992);
2001	Emu geophysical sidescan survey (29/3/2001);
2005	Site located at 51° 29.021 N 00° 56.919 E (14/6/2005);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (6/12/2005);
2006	WA and PWA diving investigation (18/08/2006).
2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2005	UKHO (12854);
2005	NMR (904766);
2006	Wessex Archaeology, Geophysical Analysis of 2005 multibeam (inclusive of: one geo tiff and six tiff images);
2006	http://www.bpears.org.uk/NE-Diary/Inc/ISeg_10.html ;
2006	http://www.elite-collections.com/Groups%20post%20WW1_1.htm
2006	Wessex Archaeology, London Gateway Project River Thames, Archaeological Diving Investigation, Technical Report;
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and four tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from 2005 multibeam data: 357549.736 E 5705589.935 N

Location: The site is located seaward of Sea Reach No. 1, 32 metres from the northern edge of the existing dredged channel (**Figure 1A**).

Bed Depth: 16 metres

Minimum Target Depth: 14.77 Metres CD

Extent: 44 metres x 30 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The coverage of the 2001 sidescan sonar survey included the position of site 5005, however the site was not identified in the data.

2002 WA sidescan sonar interpretation:

The coverage of the 2002 sidescan sonar survey did not extend to this section of the channel.

2006 WA interpretation of 2005 PLA multibeam data:

The site is 32 metres from the northern edge of the channel. It consists of a large area debris scatter with various upstanding features and scour pits. The site covers an area 45 metres long 30 metres wide and 2.5 metres upstanding (**Figure 1A**).

To the southwest of the site there is an area of built up sediment approximately 25 metres long, 30 metres wide and 1.5 metres upstanding, which may be burying other sections of the site (**Figure 1A**).

The maximum upstanding feature on the site is located at the northern edge of the debris scatter. It is 5.5 metres long, 5 metres wide and 1.5 metres upstanding. The largest scour pit on the site is located to the southwest of the area of debris. It is 40 metres long, 25 metres wide and 2.5 metres deep (20.35 metres actual depth - **Figure 1A-B**).

To the north of the scour there is a feature which protrudes into it. The feature is 9 metres long, 2.5 metres wide and 4 metres upstanding from the base of the scour, (**Figure 1A-B**). To the north-east of this feature is a smaller scour containing two upstanding features. The scour is 9 metres long, 6 metres wide and 1 metre deep. The first feature has a diameter of 1.5

metres and is 1.4 metres upstanding. The second feature is 3.5 metres long, 1.5 metres wide and 0.9 metres upstanding (**Figure 1A-B**).

To the northwest of the site there is an area of disturbed seabed containing one upstanding feature and a shallow area of scouring. The feature is 5 metres long, 4 metres wide and 1.2 metres upstanding. The area of scouring is 20 metres long by 16 metres wide, but a shallow 0.3 metres deep (**Figure 1A-C**).

2006 WA and PLA diving survey (WA, London Gateway Project River Thames, Archaeological Diving Investigation, Technical Report):

In August 2006 a diving survey on the site was undertaken by WA and PLA. Two WA divers were integrated into the PLA dive team. A Sonardyne SCOUT acoustic tracking system and the WA in house recording system were installed on the diving vessel.

The diver made bottom in the southern part of the site and proceeded along the western edge of the site towards a large upstanding object visible in the multibeam data. Travelling northwards, a metal structure, consisting of bent plates upstanding by 0.5 metre, was noted on the seabed. The structure became progressively less apparent, until it was almost flush with the seabed. The large object visible on the geophysical image was found to be a circular steel structure, approximately three metres in diameter, and was interpreted as a boiler. It was heavily damaged, probably by explosives.

Further steel plates were observed north of the boiler. The diver then proceeded to the south-western edge of the site and reached a relatively intact section of outer hull structure, standing up to 3 metres proud of the seabed in the south of the site.

Another circular steel section was found to the east of the outer hull structure. This section was about 2.5 metres long and stood about two metres proud of the seabed. It could not be interpreted.

Although a number of high sections remain on the seabed, the wreck of the *Letchworth* seemed to be very broken up. Sharp edges and bent or buckled steel plates and frames indicated explosion damage, caused either by the bomb that sank the vessel or by clearance attempts.

The site of the *Letchworth* comprised generally dispersed steel structure. There was evidence of the catastrophic destruction of the site either by the events of the sinking or by the subsequent clearance operations.

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data. The sidescan sonar data indicates a broken up wreck site with associated debris scatter. The main wreck area measures 60 metres by 30 metres (**Figure 2**). The multibeam data described the main wreck site measuring 45 metres long and a smaller site situated to the north-west measuring 5 metres. The sidescan sonar data indicates that the main and small sites are in fact connected by a series of small items of debris and as such should be treated as one site. This accounts for the discrepancy in the dimensions between the two datasets.

As identified on the multibeam data there are a series of upstanding features and scour pits associated with the wreck site. The most upstanding part of the wreck is in the centre at approximately 2.3 metres. To the north-west the site stands 0.9 metres proud of the seabed and to the south the site is upstanding by 1.3 metres.

A small feature (1.9 x 1.2 x 0.7 metres) is observed approximately 60 metres south-west of the main wreck site and is considered to be an item of debris. However, it is unknown whether this is associated with the main wreck site. An anchored buoy is observed approximately 100 metres north-east of the wreck site.

4. SITE HISTORY

Build

The steam collier *Letchworth* was built for the Watergate Steam Shipping Co. Ltd., a company managed by Dalgliesh, R.S., Ltd., in September 1924 by Wood Skinner and Co. Ltd., Newcastle.

James Skinner and William Wood (Wood Skinner and Co. Ltd) opened their first yard at Bill Quay, Newcastle in 1883. During the early 1920s the yard was expanded to have eight slipways that could accommodate tramps up to 500ft in length.

The yard built vessels on behalf of various Scandinavian yards, a number of which carried Norwegian emigrants to America in the 1920s. The company also had a number of important local customers, such as the Burnett Steamship Co., Newcastle. The company ceased trading in 1925 due to bankruptcy, having built a total of 330 vessels.

Letchworth is listed in the Lloyds Register of 1939-40 with the following specifications

Steamer's Name, Material, Rig, &c.	<i>Letchworth</i> Machinery aft, wireless, 1 deck (steel), cargo battens not fitted
Registered Tonnage	
Gross:	1317
Under deck:	985
Net:	717
Build Date	1924 (September)
By	Wood Skinner and Co. Ltd.
Where	Newcastle
Owners	Watergate Steam Shipping Co. Ltd. (R.S. Dalgliesh & R.I. James, managers)
Registered Dimensions, Deck Erections &c.	
Length	253.2 (77.17m)
Breadth	35.7 (10.88m)
Depth (in feet and tenths of a foot)	14.7 (4.48m)
Deck and keel details	Raised quarter deck, length 147ft (44.8m) Forecastle length 28ft (8.53m) Flat keel
Port of Registry	Newcastle
Engines	Triple expansion steam engine with 3 cylinders Cylinders have a diameter and length of stroke in inches: 18, 30 & 49 – 33
Boilers	Shell, stays, end plates, furnaces, and combustion chamber of boiler made of steel

	2 single ended boilers 4 corrugated furnaces Grate surface area: 80sqft Heating surface area: 3150sqft
Horsepower	179 Nominal Horse power
Engines built by	N.E. Marine Engine Co. Ltd., Newcastle
Ballast	Cellular construction of double bottom, under engines 18ft long, forward 152ft long, 380 tonnes 5 bulkheads cemented Midship deep tank 7ft, 141 tonnes Fore peak tank 100 tonnes After peak tank 45 tonnes
Anchors and chains	Proved at a machine recognised by the committee of Lloyd's registers

Further details of the *Letchworth* can be found in the book *The Steam Collier Fleets* (MacRae and Waine 1990) and in the *Lloyds Survey Report* (Lloyds Survey Reports 1924), which also contains the following plans (**Figure 3**):

Plan No	Scale	Content
LSR/235/W/410/1	1:96	Deck Construction
LSR/235/W/410/2	1:96	Longitudinal Elevation
LSR/235/W/410/3	1:24	Midship Section
LSR/235/W/410/4	1:12	Main Boiler

Distinguishing features of *Letchworth* and a similar vessel *Queenworth* are contained within *Merchant Ships 1940* (Talbot-Booth 1940). Features for both vessels are listed as being:

- Hulls: Black with white band.
- Boot-topping: Red
- Masts and derricks: White
- Services: General tramping and Port Churchill to United Kingdom.

The National Maritime Museum also holds a contemporary photograph of the *Letchworth*, details listed below:

Photograph reference number	Content
P2593	Letchworth in dock, side profile

An additional photograph of *Letchworth*, taken while she lay at the coal conveyor in Carron Dock, Grangemouth in 1933 can be found in the book *Steam Coasters and Short Sea Traders* (Waine and Fenton 1994) (**Figure 4**).

Use

Letchworth was given the collier No. 67 by the Watergate Steam Co. Ltd. in 1925 for the London trade. A near sister ship, the *Tamworth*, was delivered to the Robert Stanely Steam Shipping Co.Ltd. by S.P. Austin (Waine and Fenton 1994).

The vessel was employed on the East coast collier route for some time, and also made some journeys across the English Channel to Holland. Lloyds List for October 30th 1924 records an incident that occurred on one of these cross channel voyages (Lloyds of London 1734-):

‘Rotterdam – British Steamer *Letchworth*, Goole for Rotterdam grounded in the river near Maassluis last night. Got off at high water without assistance’.

Loss

Letchworth was on a routine voyage, delivering coal from fields in north east England when she was sunk on the 1st of November 1940. She had come from the port of Blythe, Northumberland, bound for London when she was attacked by German aircraft near the West Oaze Buoy in the Thames Estuary.

An eyewitness account of her sinking by the Admiralty Salvage Officer on Board *King Lear*, was found in the Admiralty damage report files (Admiralty: Department of the Director of Naval Construction: later Director General Ships: Damage Reports and Files: Shell and bomb 1939-1944):

‘At 2.30pm after clearing wreck (of *Houston City*) 10 to 12 enemy planes mad dive bombing attack on wreck and ships in vicinity. S.S *Letchworth* of Newcastle 1317 tons, astern of *King Lear* sustained direct hit in engine room sinking immediately one cable’s length E.S.E West Oaze Buoy. Bow portion bottom upwards still showing. Picked up 12 survivors including master, mate, and second mate. Five survivors picked up by S.S. *Hundvaag* of Stavanger. One member of crew, presumed to be chief engineer believed missing. All survivors transferred to Southend Lifeboat.’

The chief engineer George M. McColl Smith had indeed lost his life during the attack. He was posthumously awarded an early World War Two Coastal Waters Merchant Navy Casulty Pair, 1939-45 Star, War Medal, 1939-45. There were seventeen survivors rescued from the vessel. However it is not know whether there was any further loss of life.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of ‘possible’ archaeological interest. The key aspects of the site that have lead to the above rating are:

- Despite dispersal activity there are still scattered debris and upstanding features, indicating substantial remains on the seabed;
- The wreck may contain evidence of life on board the vessel at the time of loss;
- The wreck has an interesting history as a cargo vessel, delivering vital resources to the capital during a time of great hardship during wartime. It is likely to have documentary and other associations with Newcastle, the vessels home port.

6. CONSTRAINTS

There was one casualty at the time of the sinking and there is the possibility that there was further loss of life. Considering the poor state of the wreck, the survival of human remains on the seabed seems highly unlikely; however, the possibility that there may be an issue with human remains cannot be ruled out completely.

The vessel, although a cargo vessel, was a war time loss, and therefore the potential for ordnance on the site should not be ignored.

7. STAGE I MITIGATION

The aim of the Stage I Mitigation was a Level 2 record of the site. The Level 2 objective is the production of a record that provides sufficient data to establish the extent, character, date and

importance of the site. The following elements of the wreck were considered, at the different evaluation stages, to meet these objectives:

Build

- Construction (material, fastenings, methods)
- Propulsion (steam, diesel or and combination)
- Diagnostic features (machinery, fittings, armament)

Use

- Artefact / Cargo (dating objects)

Survival

- General survival of the site

Investigation

- Traces of any previous work on the site (salvage, excavation, dispersal etc).

Level 2 recording has been achieved for this site through geophysical surveys and documentary research. The extent of the site, as far as visible above the seabed, has been established through multibeam survey. Character, date and importance of the site are evident from the documentary research. The diving survey confirmed that the survival of human remains on the seabed is highly unlikely, considering the poor state of the wreck. The 2007 sidescan sonar data explained the difference in length measurement between the original vessel (71 metres) and the main multibeam anomaly on the seabed (45 metres); the sidescan sonar data indicated that the main site and a number of small sites are in fact connected by a series of small items of debris and as such should be treated as one site.

Further archaeological diving investigation of this wreck is unlikely to be cost effective in adding to the information available through documentary research.

8. OUTLINE OF STAGE II MITIGATION

The site will be avoided during dredging operations by changes to navigation, including the positioning of channel marker buoys adjacent to the site. No further archaeological mitigation is proposed.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will be avoided during dredging operations by changes to navigation, including the positioning of buoys.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2005 multibeam data	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

Material	Location
UKHO (12854)	WA
NMR (904766)	WA
One geo tiff and six tiff printed images of the 2005 multibeam data	WA
Wessex Archaeology, 2006, London Gateway Project River Thames, Archaeological Diving Investigation, Technical Report.	WA

REFERENCES

Lloyds of London (1734-). *Lloyds List*. London.

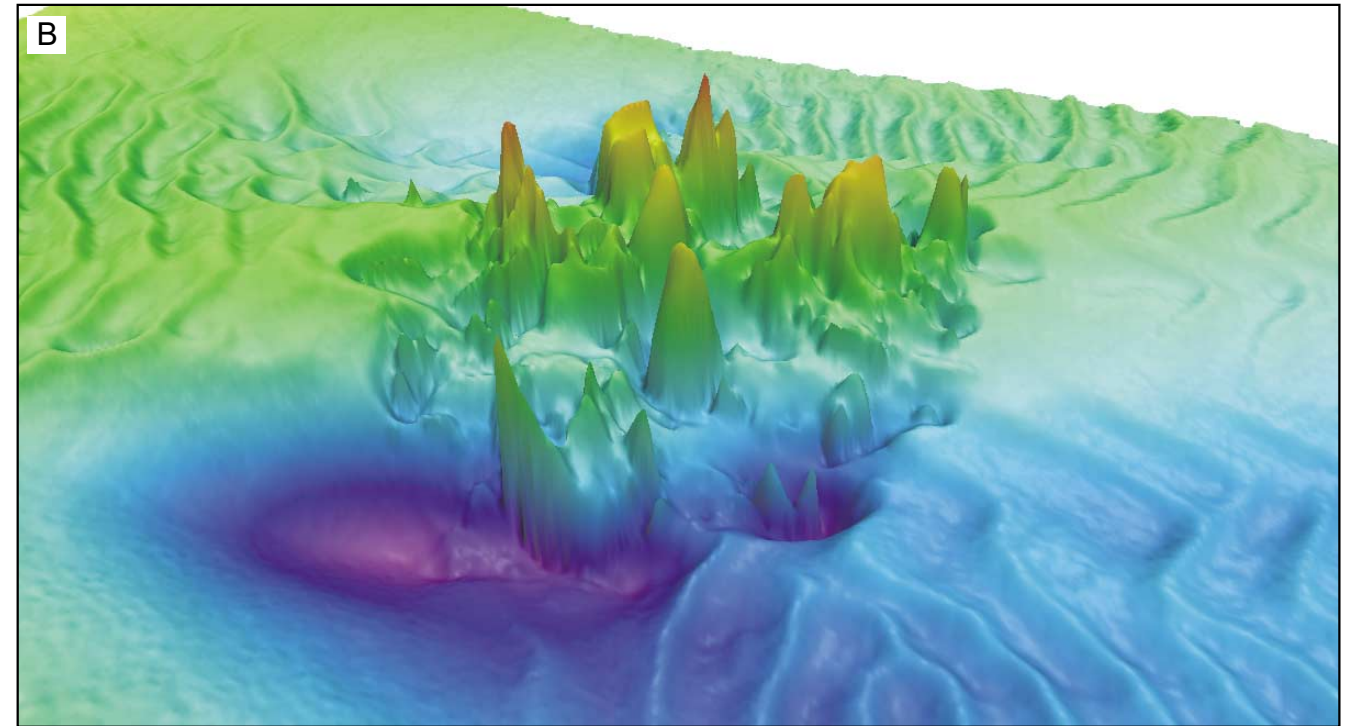
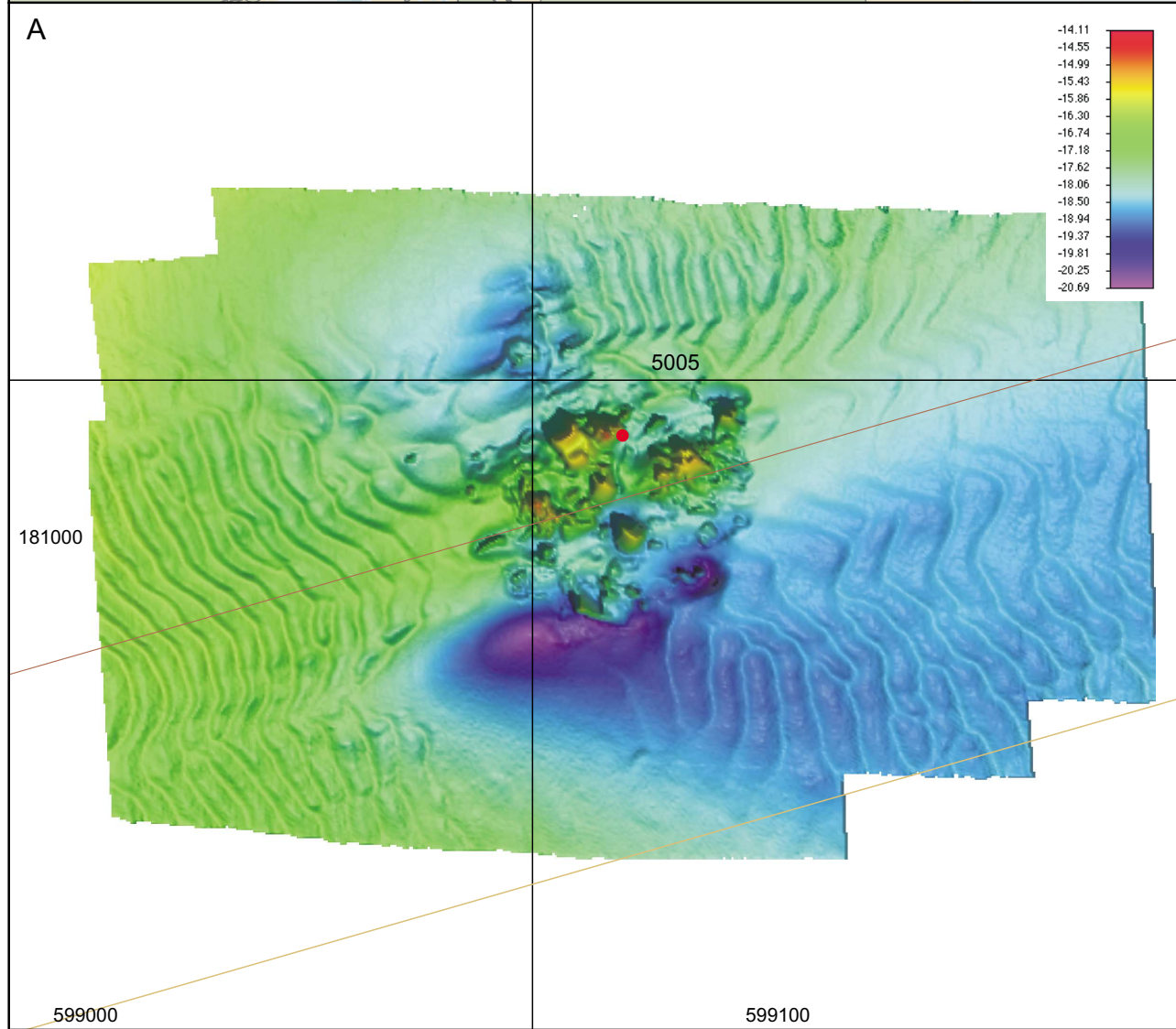
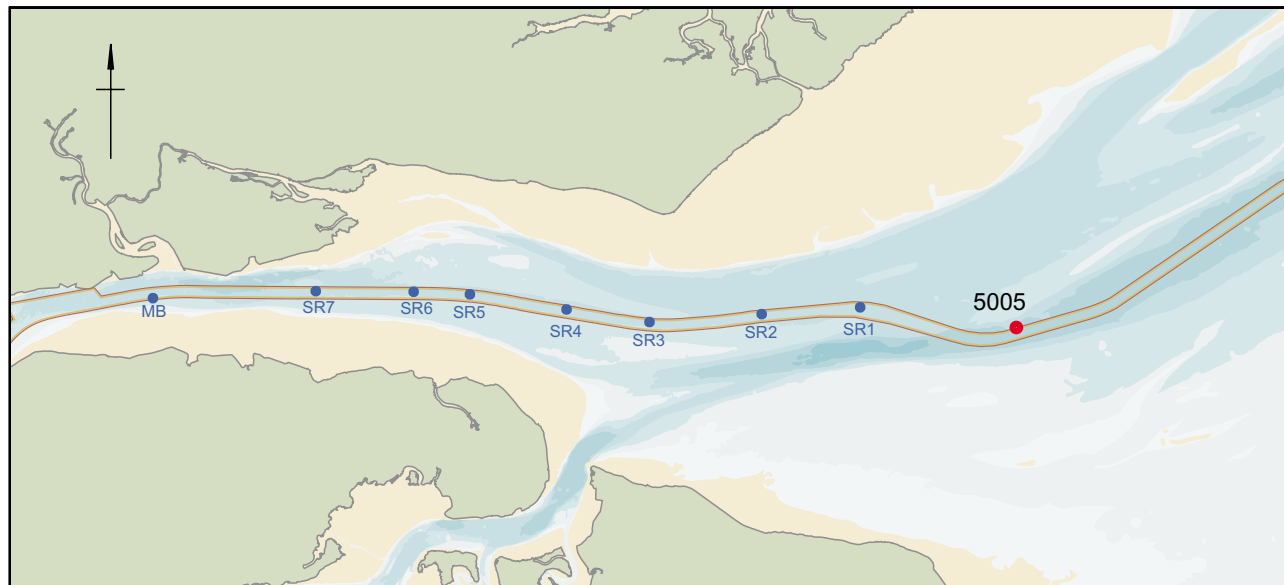
MacRae, J. A. & Waine, C. V. (1990). *The Steam Collier Fleets*. Wolverhampton: Waine Research Publications.

Talbot-Booth, E. C. (1940). *Merchant ships*. London: Marston & Co Ltd.

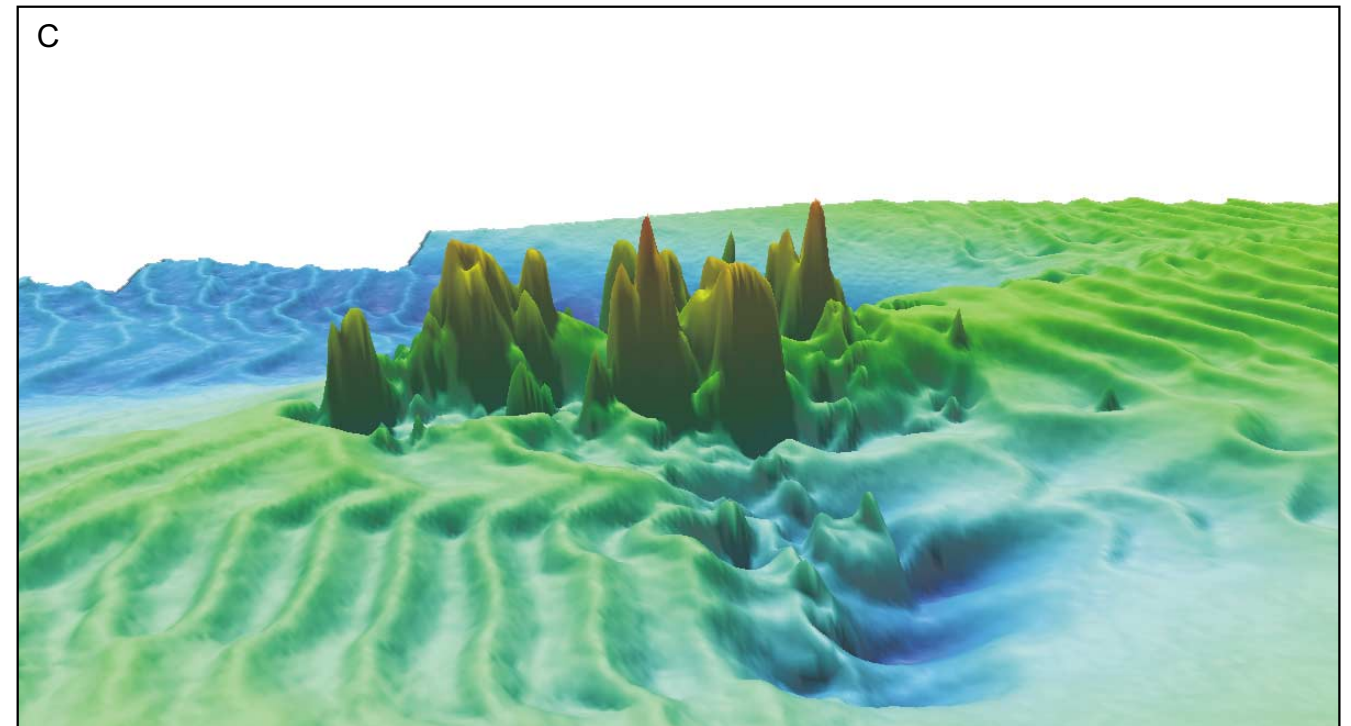
Waine, C. V. & Fenton, R. S. (1994). *Steam coasters and short sea traders*. Albrighton: Waine Research Publications.

NMR LSR 78282, Lloyds Survey Reports, *SS Letchworth*, 1924.

TNA ADM 267/113, Admiralty: Department of the Director of Naval Construction: later Director General Ships: Damage Reports and Files: Shell and bomb, *SS Letchworth*, 1939-1944.



Oblique view from south.



Oblique view from north.

Not to scale

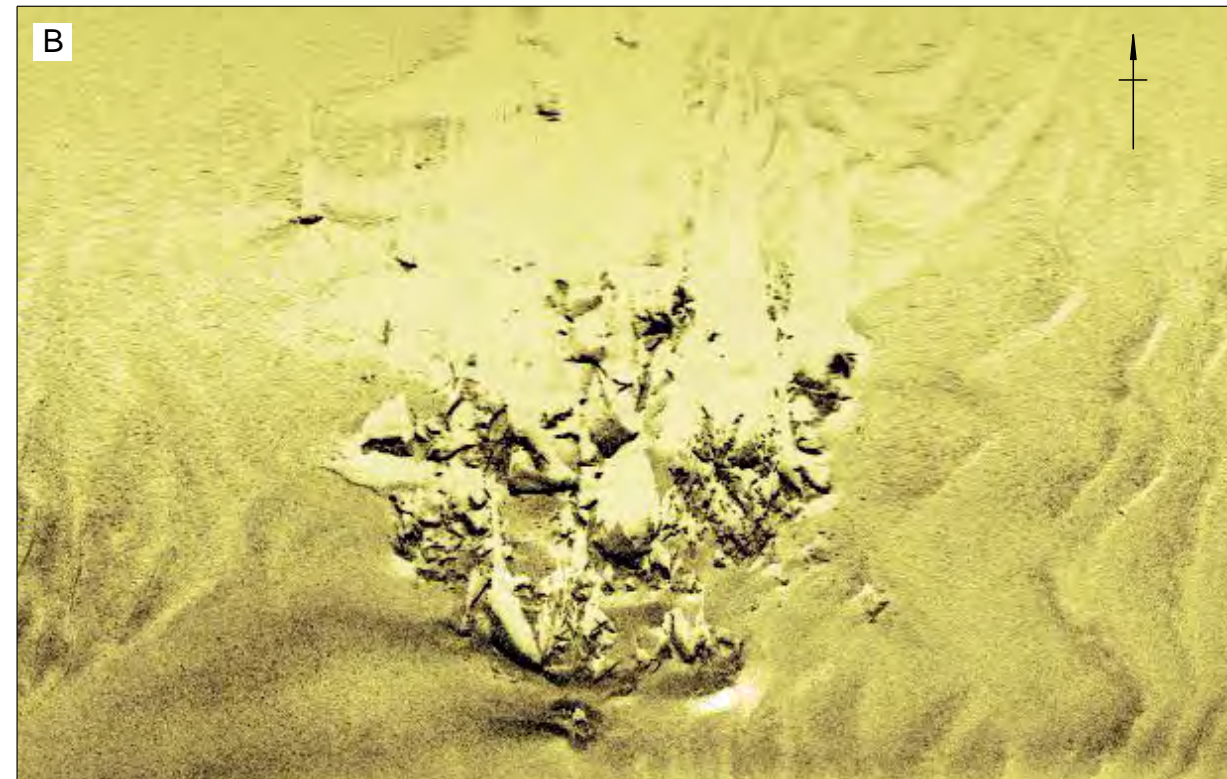
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- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



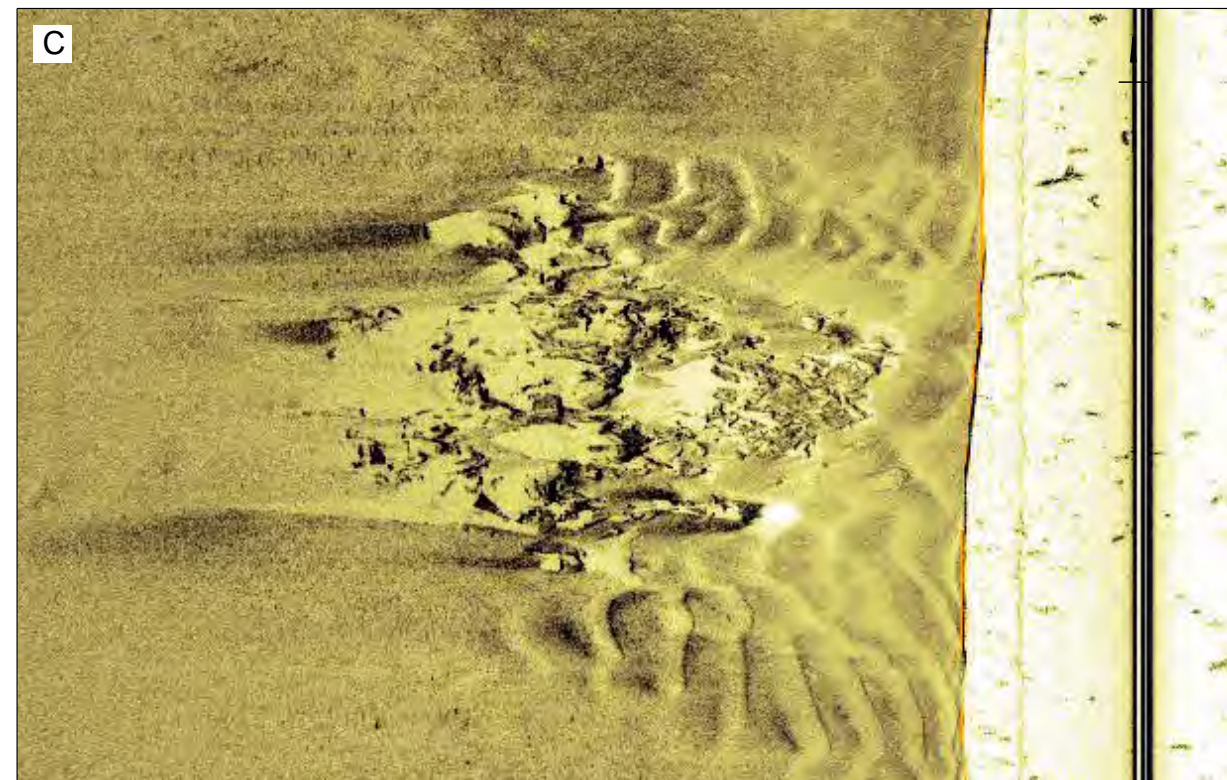
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Location and Multibeam data for Site 5005.

Figure 1



Not to scale



Not to scale

● Site location



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Sidescan Sonar image of Site 5005 showing wreck and buoy.

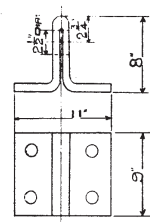
Figure 2

THE NORTH EASTERN MARINE ENGINEERING CO. LTD

WALLSEND-ON-TYNE.

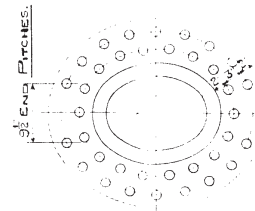
BOILER

SCALE-1 INCH = 1 FOOT



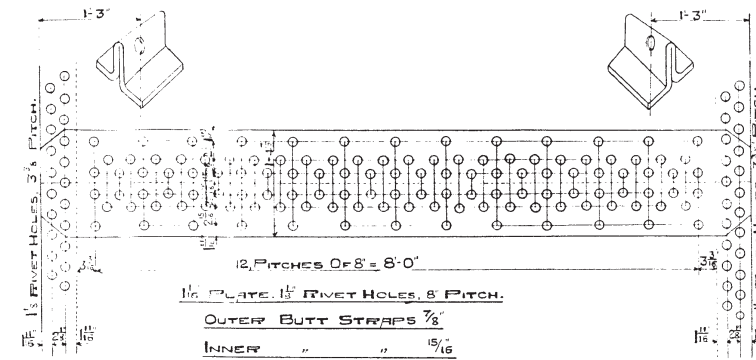
BOILER LIFTERS.

8, THUS.
1 1/2 RIVET HOLES.
1 5/16 PLATE.



15 RIVET HOLES
15 1/2" MANHOLE IN SHELL.
COMPENSATING RING 2 1/2" x 2 6 1/2" x 1 1/8"

PLATE STRENGTH = 85-93%
RIVET " = 80-91%
SHELL (34-2) 28 x 85 23. = 182 1/2"
2 7/8 x 153 3/8"



12 PITCHES OF 8" = 8'-0"
1 1/2" PLATE. 1 1/2" RIVET HOLES, 8" PITCH.
OUTER BUTT STRAPS 7/8"
INNER " " 15/16"

TO OWNERS & LLOYDS REQUIREMENTS.

HEATING SURFACE TUBES = 1286 sq
" " ELSEWHERE = 316 "
" " TOTAL = 1602 " PER BOILER.

WORKING PRESSURE 180 LBS.

TEST " 320 "

ALL PLATES, STAYS & RIVETS, STEEL. SMOKE TUBES, WROUGHT IRON.

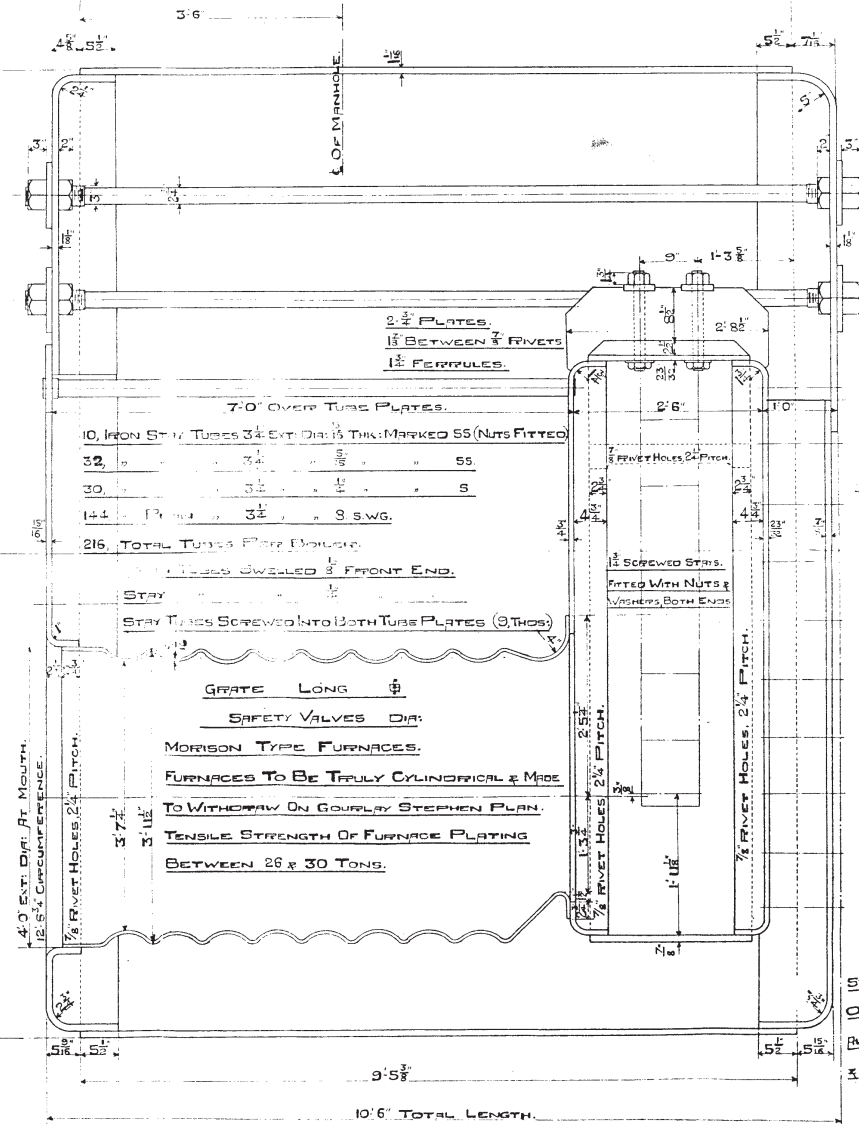
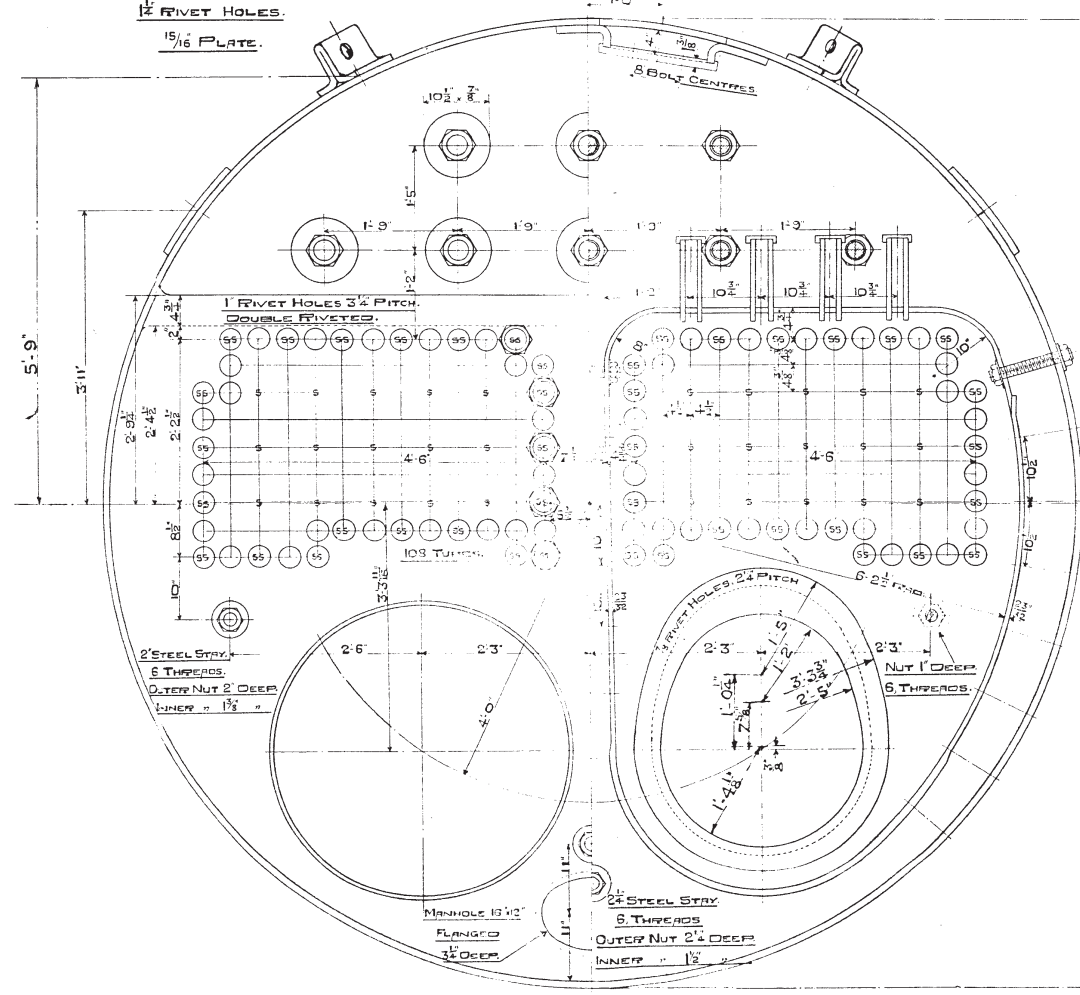
TENSILE STRENGTH OF SHELL PLATES, BUTT STRAPS, & GIRDERS 28-32 TONS/D

" " OTHER PLATES 26-30 TONS/D

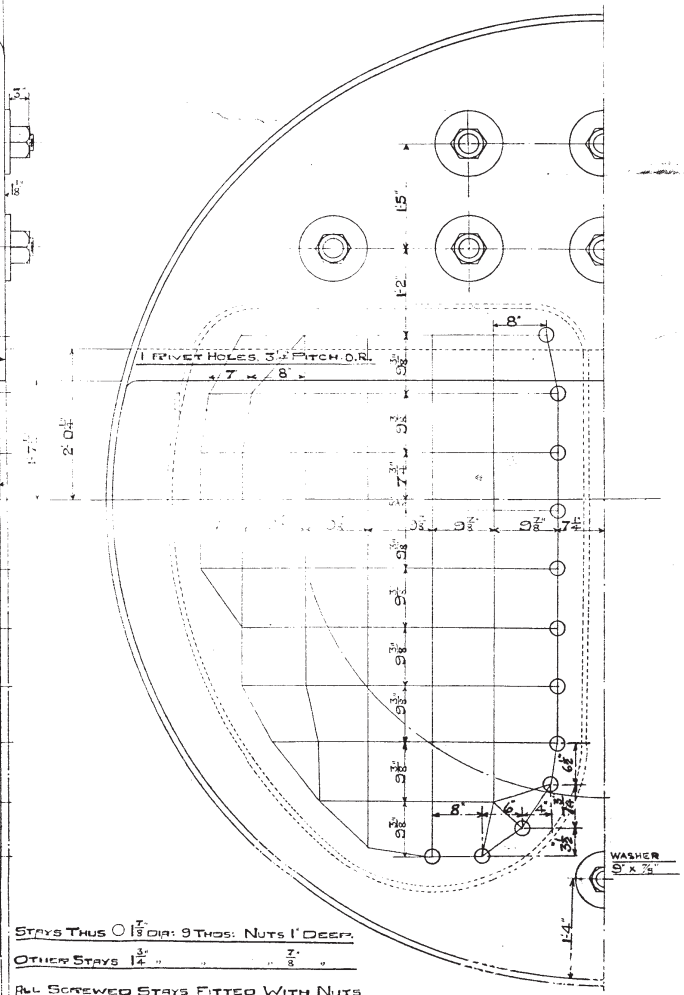
" " LONGITUDINAL STAYS 28-32 TONS/D

" " SCREWED " 26-30 "

ALL HOLES DRILLED IN PLACE AFTER PLATES ARE BENT.



1, THUS STAYS? BOILER.
1, OPPOSITE HAND, PORT BOILER.



TRACING N^o 678
CONTRACT: - 2576

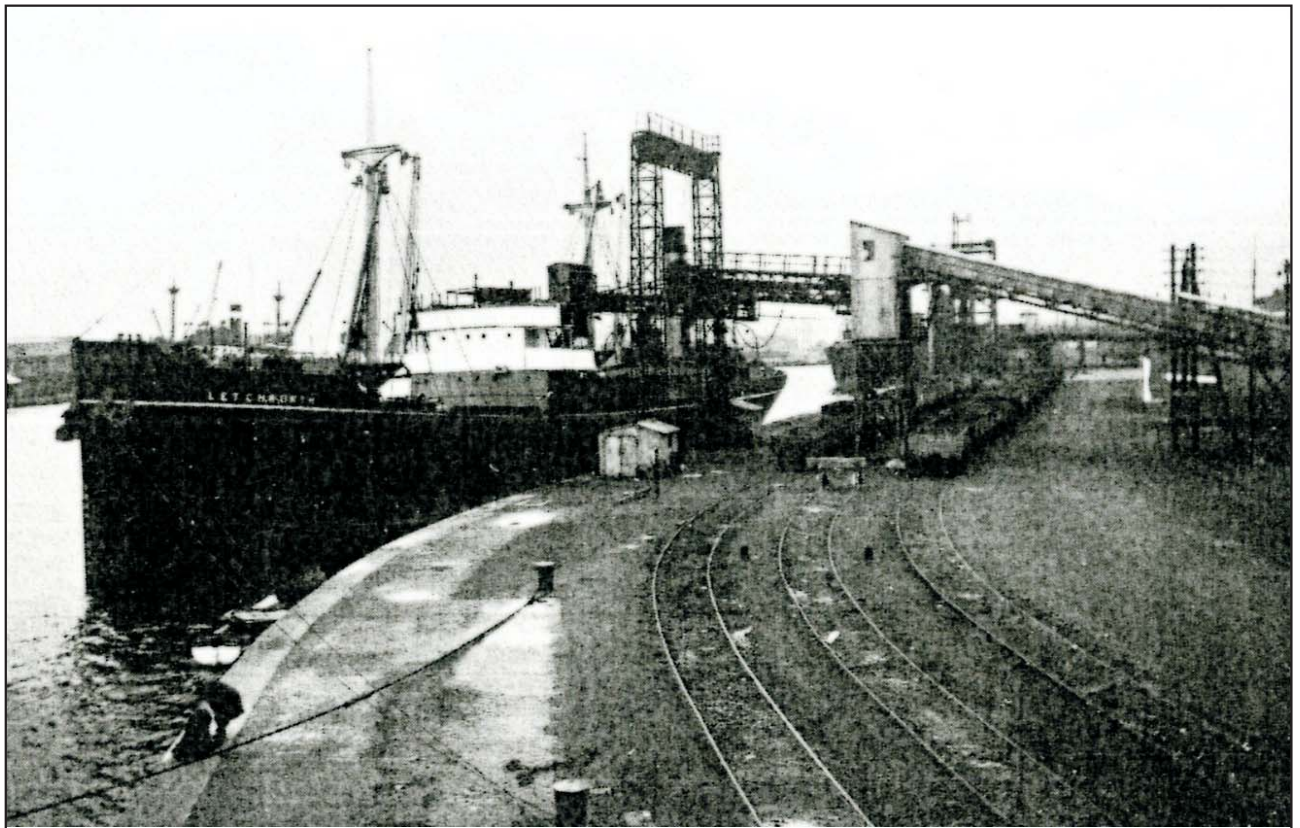



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Plan of boiler of SS Letchworth

Figure 3



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Letchworth of Newcastle at coal conveyor in Carron Dock, Grangemouth 1933.

Figure 4

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5008.02
December 2007**

Site ID: 5008

Site Name: *SS Argus*

PLA Wreck No.: 201/44

Mitigation Group: 2.2.3. Site of possible archaeological interest, seaward of SR1

No. of Casualties: 34 lives lost

Cause of Loss: Mined

Vessel Type: Trinity House Steamship

Current Recording Status: Level 2

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the sites discovery and includes all forms of investigation to date:

1940	Vessel sunk by mine (12/11/1940);
1940	A reported dangerous wreck at 51° 29' 20"N 00° 58' 55"E. At low water the top of foremast is just visible (12/11/1940);
1940	Wreck located at 51° 29' 14"N 00° 58' 44"E. 1.5 metres of mast visible above MHWS on 15/11/1940. Marked by buoy. Lying east, southeast (Capt <i>M/S Sheerness</i> , 16/11/1940) (UKHO entry 21/12/1940);
1940	Lt Buoy laid 245 degrees 137 metres from the wreck. (31/12/1940);
1942	Wreck drift swept clear at 9.75 metres foul at 10.21 metres. Least E/S depth 10.21 metres. Position 51° 29'13"N 00° 58'42"E. Buoy withdrawn. (24/9/1942);
1945	Wreck examined at 51° 29' 12"N 00° 58' 43"E. Drift swept clear at 13.7 metres, foul at 14.02 metres (27/7/1945);
1948	Wreck drift swept at 51° 29' 13"N 00° 58' 41"E. Clear at 14.63 metres, foul at 14.94 metres. (<i>HMS Seagull</i> 16/7/1948) (UKHO entry 31/7/1948);
1959	PLA report dispersal operations took place over the wreck;
1961	Wreck examined at 51° 29' 17"N 00° 58' 41"E. Swept clear at 14 metres, foul at 14.3 metres. Least E/S depth 15.2 metres in general depth of 17.4 – 18 metres. Scour depth 19.2 metres. (8/12/1961);
1971	Wreck examined at 51° 29' 17"N 00° 58' 40"E (OGB using HIFIX). Site swept clear at 13.7 metres, foul at 14.2 metres. Least E/S depth 14.6 metres in general depth of 17 metres. Scour depth 18 metres. Large wreck, easy to find. (26/11/1971);
1979	Wreck examined on the 23/9/1978. Site swept clear at 13.8 metres, foul at 14.2 metres. Least E/S depth 15 metres in general depth of 17 metres. Scour depth 18 metres. Large wreck lying NW/SE and easy to find. (19/1/1979);
1993	Wreck examined on the 18/1/1993 at 51° 29'16"N 00° 58'41"E (OGB using microfix). Least E/S depth 14.5 metres in general depth of 17 metres. Scour depth 18.4 metres. Substantial wreck 70 x 20 metres. Lying approximately E/W with scour to the south. Retain as charted. (1/3/1993);
1997	Wreck examined on the 13/1/1997 at 51° 29'15.5N 00° 58'41"E (OGB using Differential GPS). Least E/S depth 14.5 metres in general depth of 16.5 metres. Scour depth 18.4 metres. Fragments to west and south-west of main area. Wreck covers 115 x 40 metres. Retain as charted (PLA drawing 113-201-145) (28/4/1997);

2005	Wreck surveyed for P&O London Gateway. Wreck spread over a large area 50 x 18 metres centred position for this 606725 E 180795 N lying WNW/ ESE. Least depth 15.1 metres at position 609708 E 180804 N. The general depth is 17.5 metres and a scour depth of 19.5 metres extending 130 metres southwest (02/02/2005);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005).
2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2005	UKHO (12880);
2005	NMR (904776);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2006	Wessex Archaeology, Geophysical Analysis of 2005 multibeam (inclusive of one geo tiff and eight tiff images);
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and five tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from 2005 multibeam data: 359503.317 E 5706073.123 N

Location: The site is located seaward of Sea Reach No. 1, 89 metres from the northern edge of the dredged channel (**Figure 1**).

Bed Depth: 16.5metres - 19 metres

Minimum Target Depth: 15.1 metres

Extent: 60 metres x 23 metres, 1.9 metres upstanding.

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The coverage of the 2001 sidescan sonar survey did not extend to this section of the channel.

2002 WA sidescan sonar interpretation:

The coverage of the 2002 sidescan sonar survey did not extend to this section of the channel.

2005 WA interpretation of PLA multibeam data:

In 2005 a multibeam survey was undertaken over the site of the *Argus*. The site lies in a north-west by south-east orientation. It is oval in shape with a distinctive scour plume running from the southern part of the wreck in a westerly direction. The deepest part of this scour plume is around the wreck structure. The shape of the site is relatively coherent and there are five outlying anomalies that maybe associated wreckage (**Figure 1A**).

The wreck is 60 metres long, 23 metres wide and 1.9 metres upstanding. The south-eastern end of the wreck appears particularly intact and is 4.5 metres upstanding from the bottom of the scour plume in which it resides (**Figure 1A-B**). The seabed depth in the scour plume at this point is 20.2 metres. The scour plume extends for 33 metres to the west extending to a width of 15 metres and c. 2 metres deep (**Figure 1A-B**).

The five outlying features have been labelled features 1 to 5 on **Figure 1B-D** for explanation within this report.

- 1 This feature is 81.5 metres from the northern most point of wreck at 354507.5106 E 5634268.6076 N. the feature has the following dimensions: 1.9 metres long, 1.9 metres wide and 0.3 metres upstanding (**Figure 1B-C**).
- 2 This object consists of two features in a small scour (0.5 metres apart) and is located 40 metres from northern most point of wreck at 359437.2140 E 5706080.9016 N. The larger feature of the two (to the north) has dimensions: 2 metres long, 1.7 metres wide and 0.9 metres upstanding. The smaller feature has dimensions of 1 metre long, 0.7 metres wide and 0.2 metres upstanding. The scour in which they are located is 3 metres long, 1.3 metres wide and 0.45 metres deep (**Figure 1B-C**).
- 3 This object consists of two features (approximately 1 metre apart) in a small scour. They are located 23 metres from northern most point of the wreck at 359458.0898 E 5706092.3798 N. The western of the two features is 2.3 metres long, 1.9 metres wide and 0.4 metres upstanding. The eastern feature is 2.8 metres long, 2.6 metres wide and 0.6 metres upstanding. The scour is 5 metres long, 4 metres wide and 0.4m deep (**Figure 1B-C**).
- 4 This feature is located 3 metres west of the northern most point of the wreck at 359475.5022 E 5706079.5952 N. It is 2.4 metres long, 1.6 metres wide and 0.5 metres upstanding (**Figure 1B-C**).
- 5 This feature is linear shaped and located 20 metres northeast of the northern most point of the wreck at 359513.3219 E 5706105.2756 N. It is 5.6 metres long, 1.9 metres wide and 0.4 metres upstanding. The feature is orientated east, northeast by west, southwest. The scour is 6.9 metres long, 5.4 metres wide and 0.3 metres deep (**Figure 1B and D**).

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data and provided additional detail. The wreck measures 62 metres long and 20m wide (**Figure 2**). The south-eastern section of the wreck appears relatively intact with the structure clearly observed. The centre and north-western sections of the wreck appear broken up with isolated pieces of structure observed. The maximum observed height on the sidescan sonar data is 2.9 metres in the south-eastern section. The remainder of the wreck indicates heights of around 1 metre.

A distinct area of scour is observed to the east of the southernmost section of the wreck. The scour is then observed to the south-west of the vessel.

The five isolated anomalies observed on the multibeam data were also observed on the sidescan sonar data:

1. Observed 77 metres west of the wreck measuring 2.8 x 0.4 x 0.6 metres. A further scatter of small anomalies (less than 1 metre diameter) is observed within a 40 metres

radius from this feature. It is not sure if these represent small debris or are natural features;

2. Observed 38 metres west of the wreck and measures 3.6 x 0.7 metres with no measurable height;
3. Two adjacent features are observed 20 metres north-west of the wreck measuring 3.9 x 0.7 x 0.6 metres and 2.1 x 0.6 x 0.2 metres, respectively. 10 metres to the south of these is a further feature not observed clearly on the multibeam data measuring 2.5 x 0.5 x 0.3 metres;
4. This feature is observed 3 metres to the north of the wreck and measures 2.8 x 2.3 x 0.9 metres;
5. Two adjacent linear features (in total measuring 4.6 x 0.5 x 0.2 metres) are observed situated 26.2 metres north-east of the wreck. A small scour is also associated with this feature.

Further small (less than 1 metre diameter) items of possible debris are observed within a 15 metres buffer of the wreck. These were not all observed on the multibeam data.

4. SITE HISTORY

Build

The *Argus* was built in 1909 by Ramage & Ferguson in Leith for the Corporation of Trinity House (Lloyds of London 1774-).

The Ramage & Ferguson yard was set up in 1877. It specialised in building deep sea vessels, steam coasters and yachts. In 1917 the yard was extended and became capable of building ships up to 420ft in length. In 1934 Ramage & Ferguson were a victim of the depression. A total of 296 ships were built between 1877 and 1934 (Middlemiss 1995).

Argus is listed in Lloyds Register of 1909 with the following dimensions (Lloyds of London 1774-):

Steamer's Name, Material, Rig, &c.	<i>Argus</i> Twin screws, wireless and submarine signalling apparatus
Registered Tonnage	
Gross:	661
Under deck:	545
Net:	246
Build Date	1909
By	Ramage & Ferguson Ltd.
Where	Leith
Owners	Trinity House Corporation
Registered Dimensions, Deck Erections &c.	
Length	171ft (52.12m)
Breadth	30.1ft (9.17m)
Depth (in feet and tenths of feet)	12.9ft (3.93m)
Bridge deck (length)	56ft (17m)
Port of Registry	London – British
Engines	Triple expansion 6 cylinder engine Diameter of cylinders and length of stroke in inches: 11.5, 19 & 30 – 22
Horsepower	93 Registered horse power (as recorded in the official register of the vessel)
Engines built by	Ramage & Ferguson
Ballast	Carries water ballast (no particulars)

None of the Lloyds Survey Reports for *Argus* could be found in the National Maritime Museum and no plans are preserved.

Use

THV *Argus* was the fourth in a long row of vessels Trinity House vessels named *Argus*. The last *Argus* (5) was launched in 1948 and decommissioned in 1974.

Argus was used to service buoys and lightships. Typical tasks also included the recovery and exchange of light vessel crews. *Argus* was built with a fairly low bridge which caused problems when taking bearings on large arcs of the horizon which were obscured by the chart room. The crew also experienced difficulties in finding the correct position for lightvessels and buoys in the North Sea (Woodman 2005) (**Figure 3A**).

By the 1930's *Argus* bridge had been raised and the mainmast removed (**Figure 3B**). At the beginning of the Second World War, all Trinity House vessels were armed with 12pdr guns and or Lewis machine guns as they were constantly exposed to enemy aircraft attack (Woodman 2005).

Loss

On November 11, 1940, *Argus* was despatched from Blackwell to attempt to salvage gear from the wreck of the Trinity House vessel *Reculver* which had been mined off the mouth of the Humber. The ship, almost entirely manned by Harwich men and was under the command of Captain A.E. Smith, known as "Big Eddie".

Without an escort, *Argus* anchored at twilight near the Mouse lightvessel. *Argus* relieved the crew of the lightvessel, which had been bombed by aircraft several nights in a row.

The following morning *Argus* had to remain at anchor until 16:00, as an easterly gale made it impossible to remain the *Mouse* lightvessel. Once the lightvessel crew had left the ship, *Argus* set course for Harwich with the 18 year old quartermaster Archie Smith at the wheel. The crew went below to take their tea and Captain Smith went into the chartroom with the 2nd Officer to select another anchorage.

A detailed account of the sinking of *Argus* can be found in the book *Keepers of the Sea* (Woodman 2005):

"There was a sudden blinding flash. Quartermaster Smith was hurled into the corner of the wheelhouse where, dazed and semi-conscious, he reached instinctively for the wheel. It spun impotently in his hands. Eventually he stood up, a pain in his legs, staggered through what was left of the wheelhouse bulkhead and out on the bridge wing. He was dazed and totally at a loss what to do. He stared aft. *Argus* was down to her boat deck. Below him most of his 34 shipmates were already dead, immobilised by broken legs and pelvises and finally drowned. Suddenly he was joined by another man. The 2nd Officer, in pilot jacket and leather half boots, took one look aft and dived overboard. Smith followed his example, finding the water bitterly cold. He never saw the 2nd Officer again. Around him wreckage and dead fish filled his head with irrelevant regrets that he could not fry up some of the latter. Eventually he clambered, with great difficulty, on a carley float and lay half in the water, shivering with cold."

Smith was picked up by the anti-aircraft vessel *Royal Eagle* and taken care of by a naval surgeon on board. Being the only survivor of the *Argus*, he spent three months in hospital with splintered kneecaps.

After the accident, the officers and men of the THV *Patricia* found laying the wreck buoy a "...very disturbing experience...gushes of bubbles were emerging, usually bringing up items of personal belongings, but we removed no bodies..." (Woodman 2005).

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'possible' archaeological interest. The key aspects of the site that have lead to the above rating are:

- Despite dispersal activity there are still scattered debris and upstanding features, indicating substantial remains of the seabed;
- There are no surviving examples of such vessels;
- The wreck may contain evidence of life on board the vessel at the time of loss;
- The wreck has an interesting history as a Trinity House vessel. It is likely to have documentary and other associations with the vessels home port. This is further enhanced by the substantial number of casualties as a result of the sinking.

6. CONSTRAINTS

Although the name of the vessel is known, current information is insufficient to state whether there will be issues with ordnance on the site. It is known however, that 35 lives were lost at the time of sinking.

The site is upstanding by at least 3 metres (multibeam interpretation) and therefore entanglement may be an issue when investigating the site with divers.

7. SCOPE OF FURTHER STAGE MITIGATION

Stage 1 Mitigation is intended to achieve a Level 2 record of the site, which is a record that provides sufficient data to establish the extent, character, date and importance of the site.

Build

- Construction (material, fastenings, methods)
- Propulsion
- Diagnostic features(machinery, fittings, armament)

Use

- Artefact/Cargo (dating objects)

Survival

- General survival of the site

Investigation

Traces of any previous work on the site (salvage, dispersal, excavation etc).

Level 2 recording has been achieved for this site through geophysical surveys and documentary research. The extent of the site, as far as visible above the seabed, has been established through multibeam and sidescan sonar survey. Character, date and importance of the site are evident from the documentary research.

8. OUTLINE OF STAGE II MITIGATION

The site will be avoided during dredging operations by changes to navigation, including the positioning of channel marker buoys adjacent to the site. No further archaeological mitigation is proposed.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will be avoided during dredging operations by changes to navigation, including the positioning of buoys.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2005 multibeam data	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

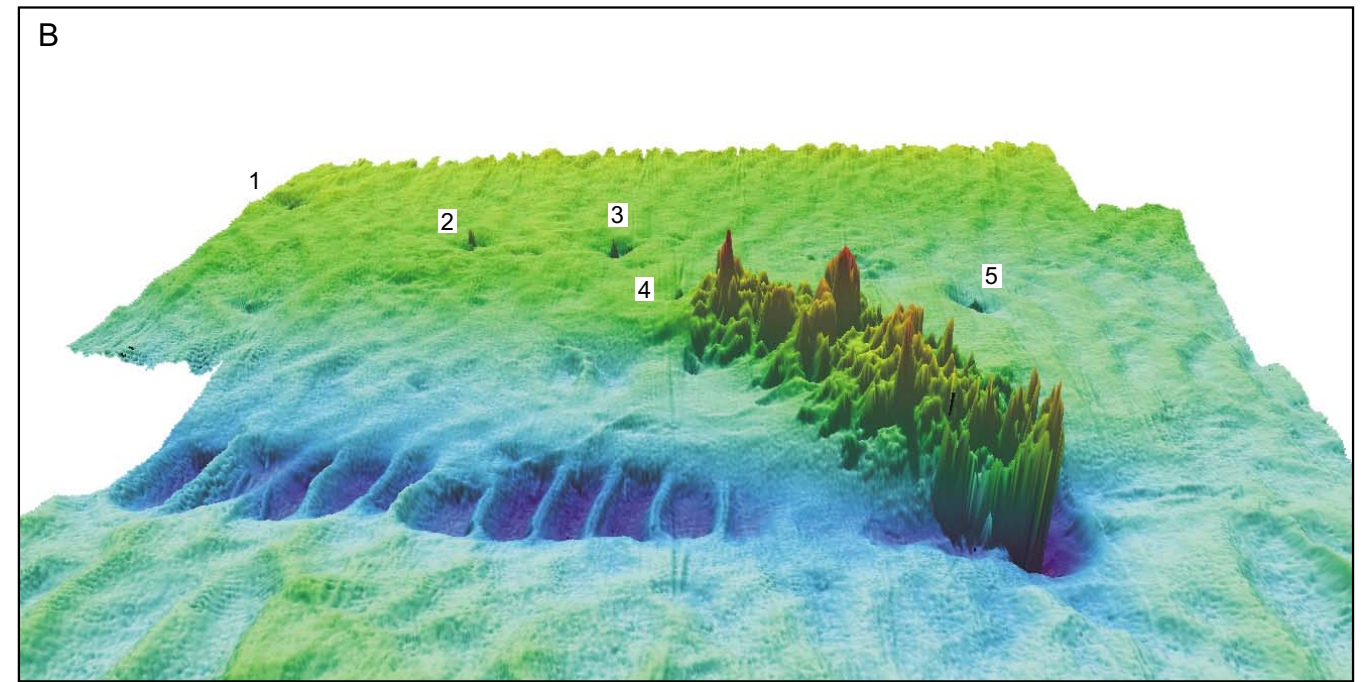
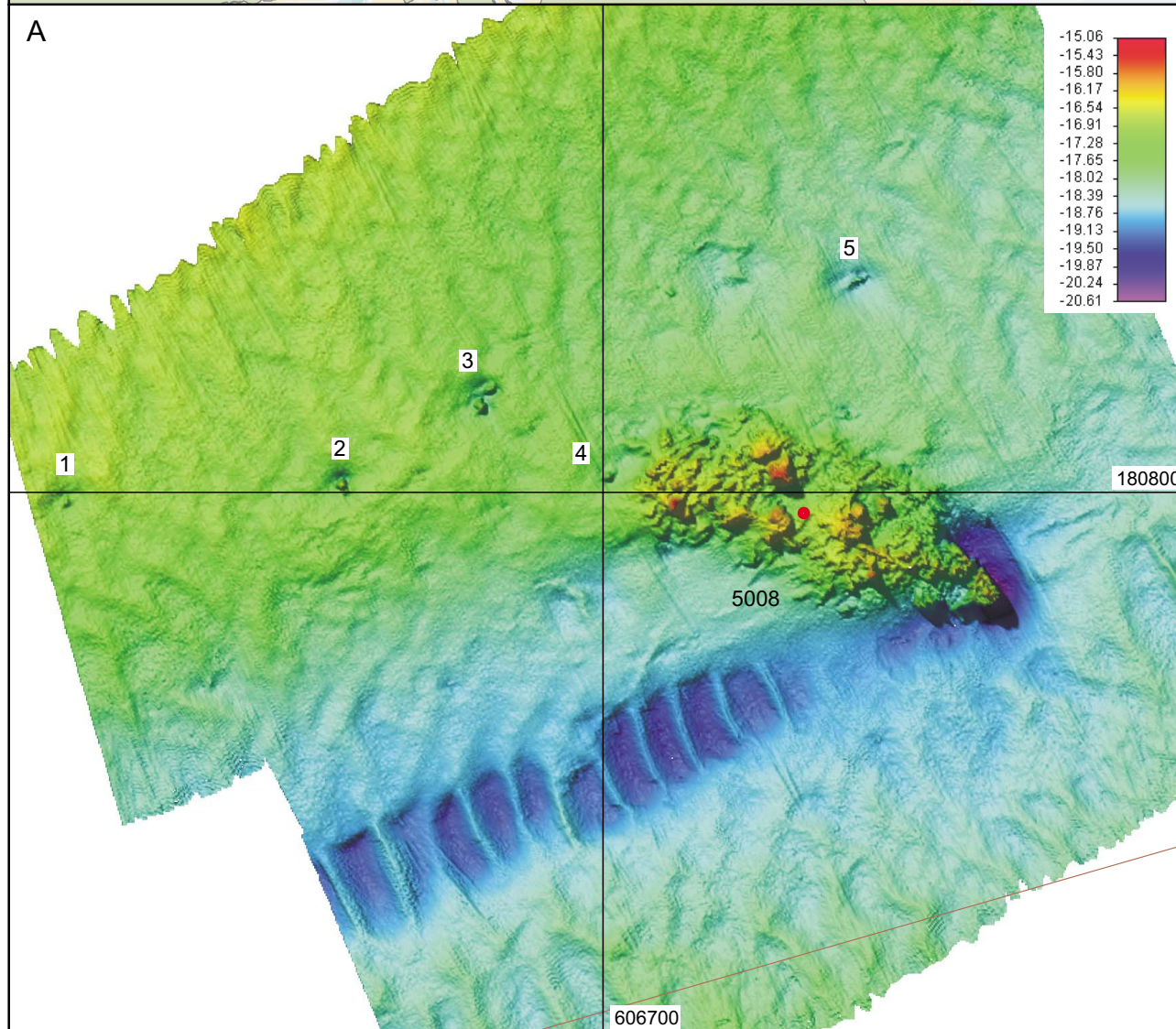
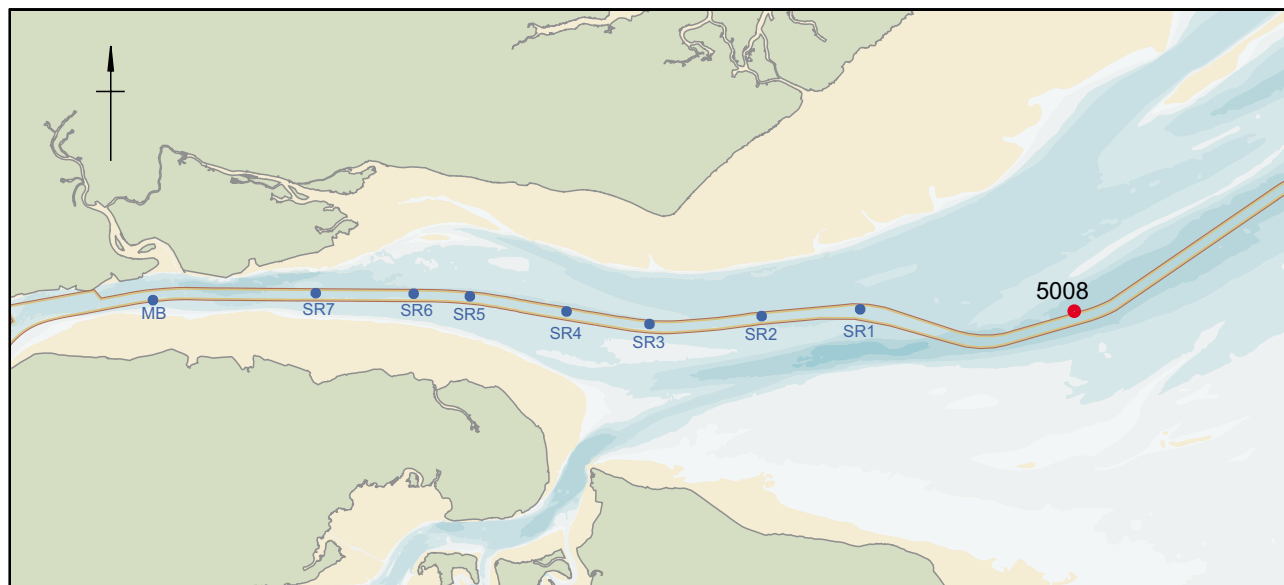
Material	Location
UKHO (12880)	WA
NMR (904776)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures	WA
Eight printed images of the 2005 multibeam data	WA

REFERENCES

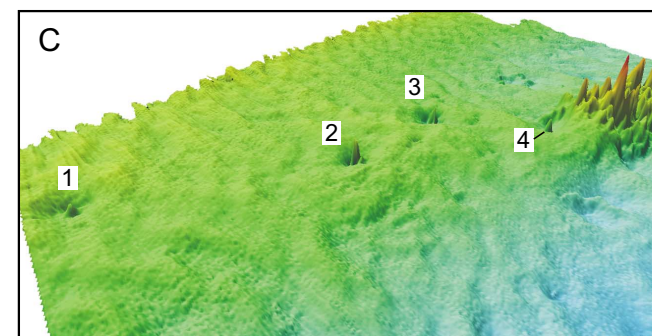
Lloyds of London (1774-). *Lloyds Register of British and Foreign Shipping*. London.

Middlemiss, N. L. (1995). *British shipbuilding yards 3: Belfast, Merseyside, Barrow and all other areas*. Newcastle-Upon-Tyne: Shield Publ.

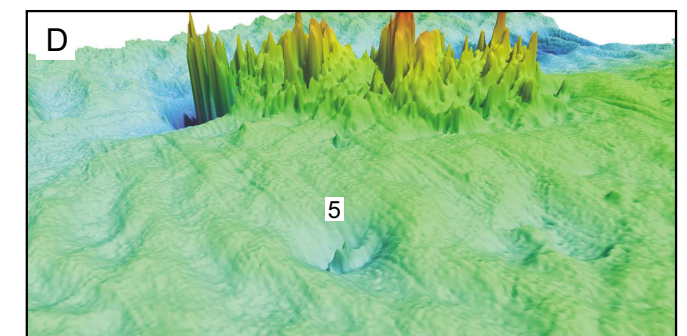
Woodman, R. (2005). *Keepers of the Sea: the story of the Trinity House Yachts and Tenders*. Ware: Chaffcutter Books.



Oblique view from south east.



Oblique view from south.



Oblique view from north east.

Not to scale

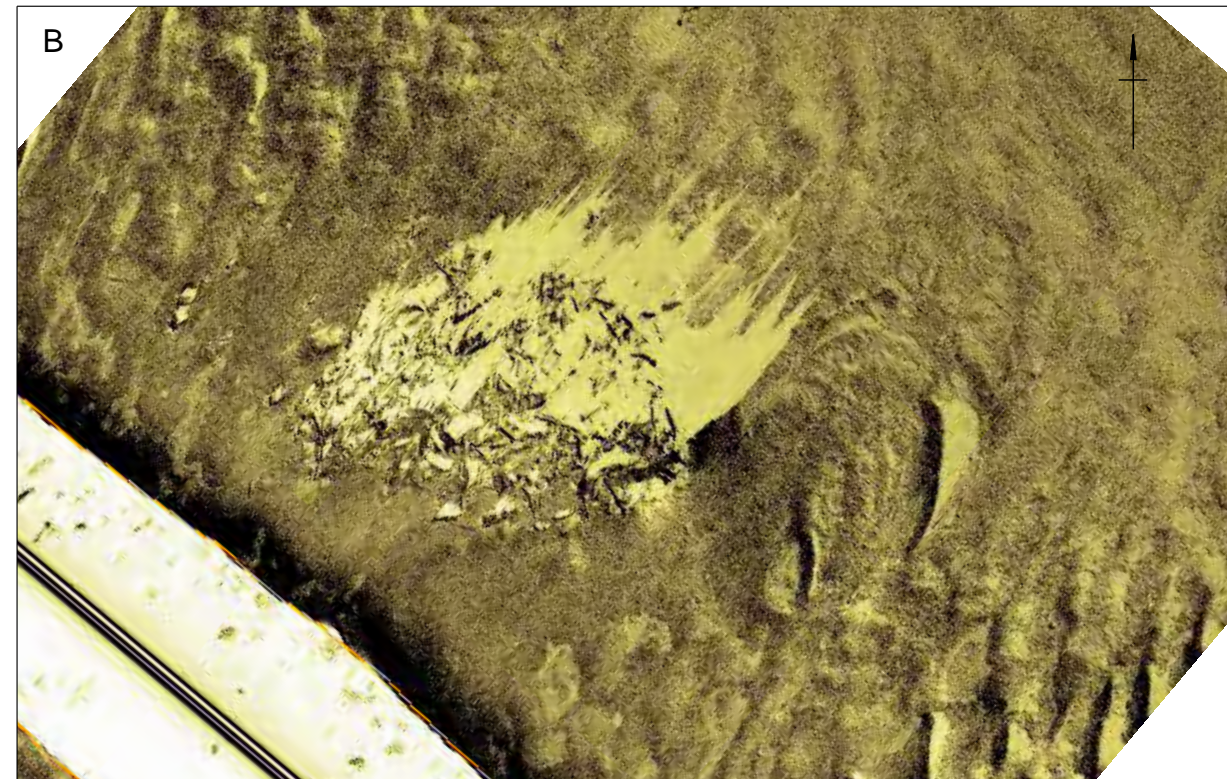
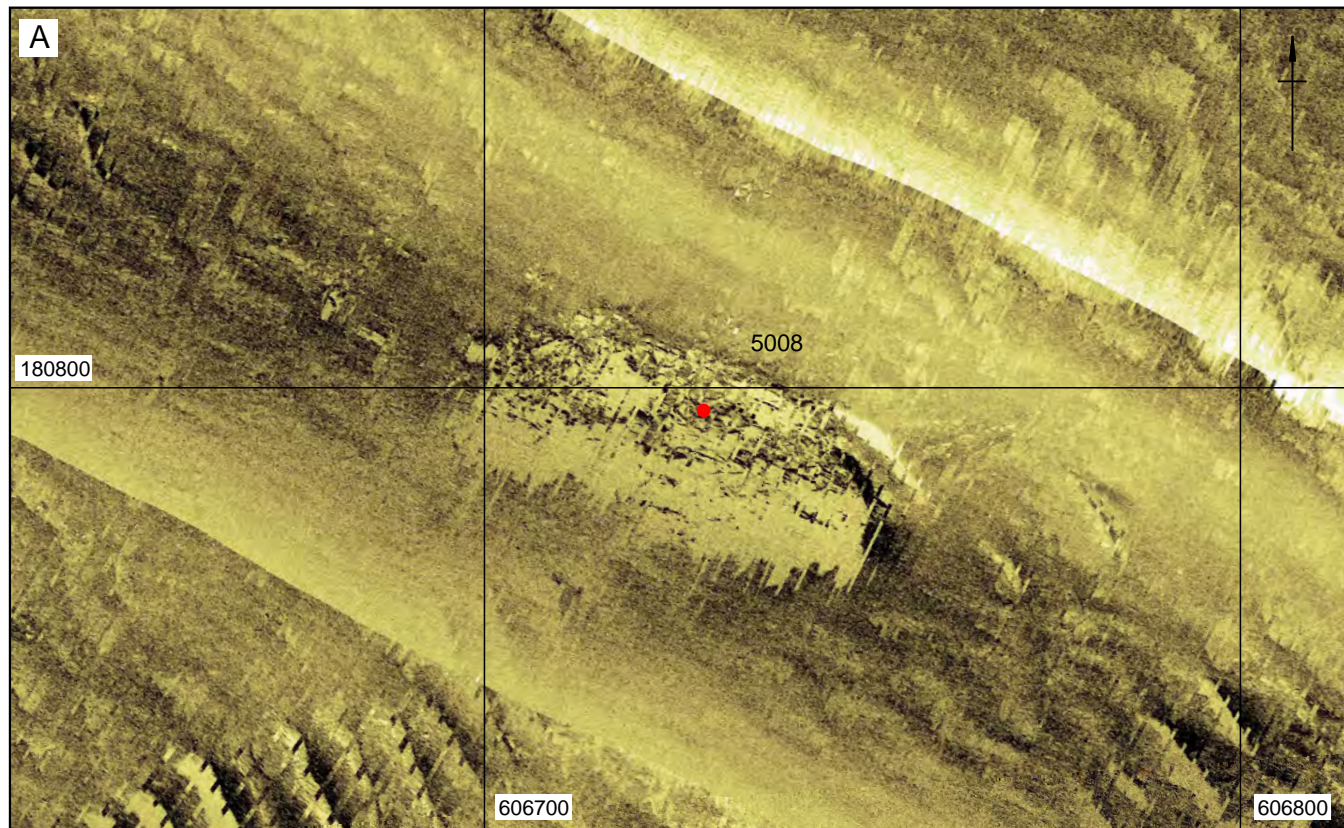
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



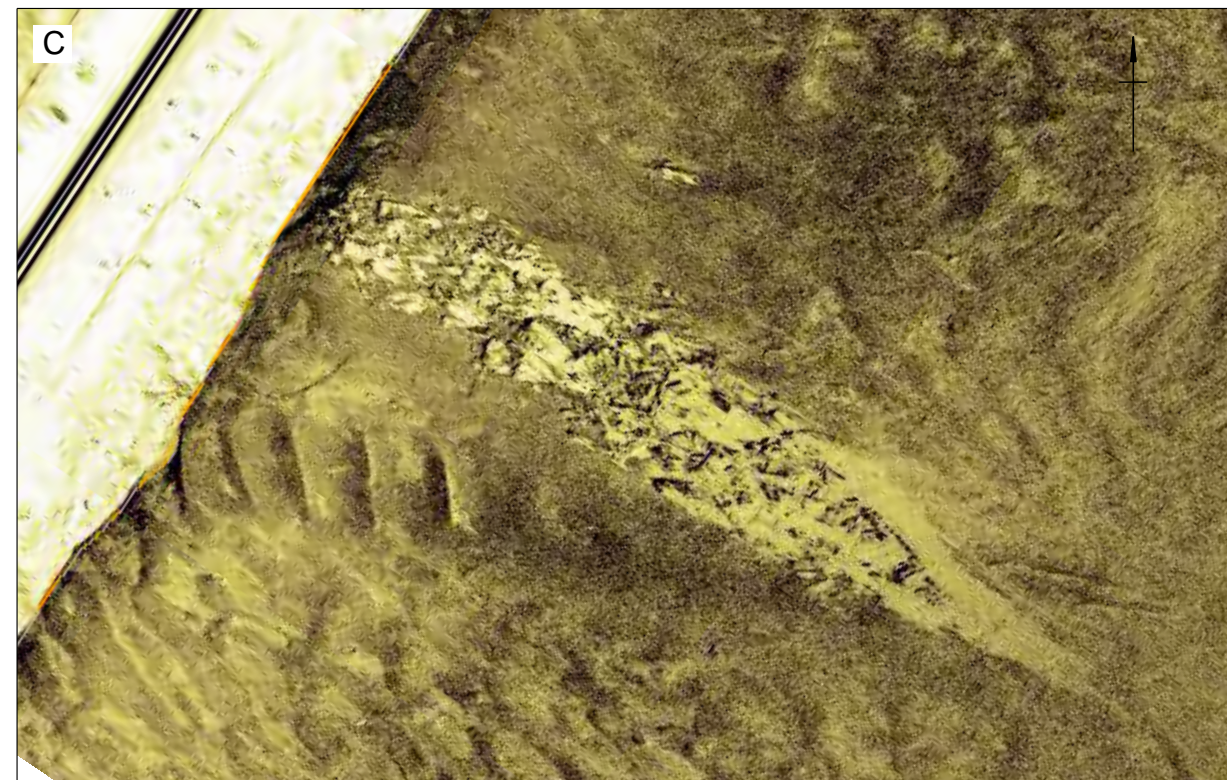
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Location and Multibeam data for Site 5008.

Figure 1



Not to scale



Not to scale

● Site location



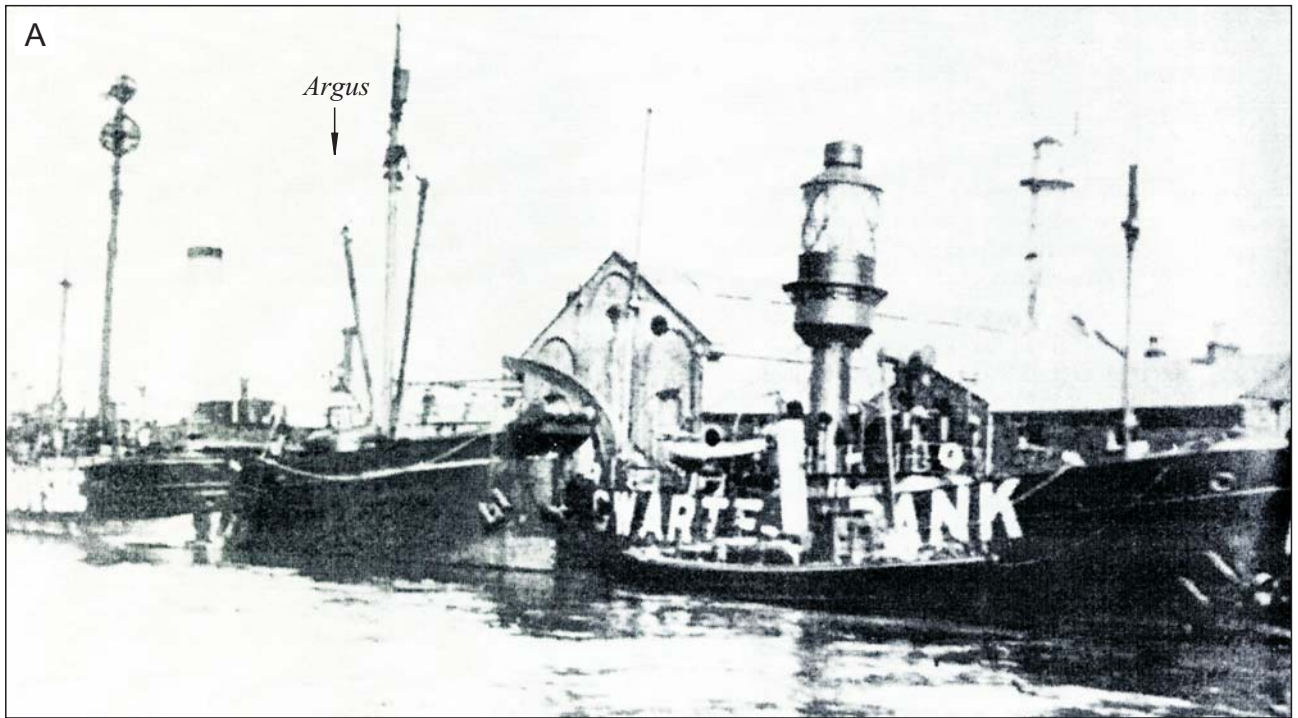
Projection OSGB

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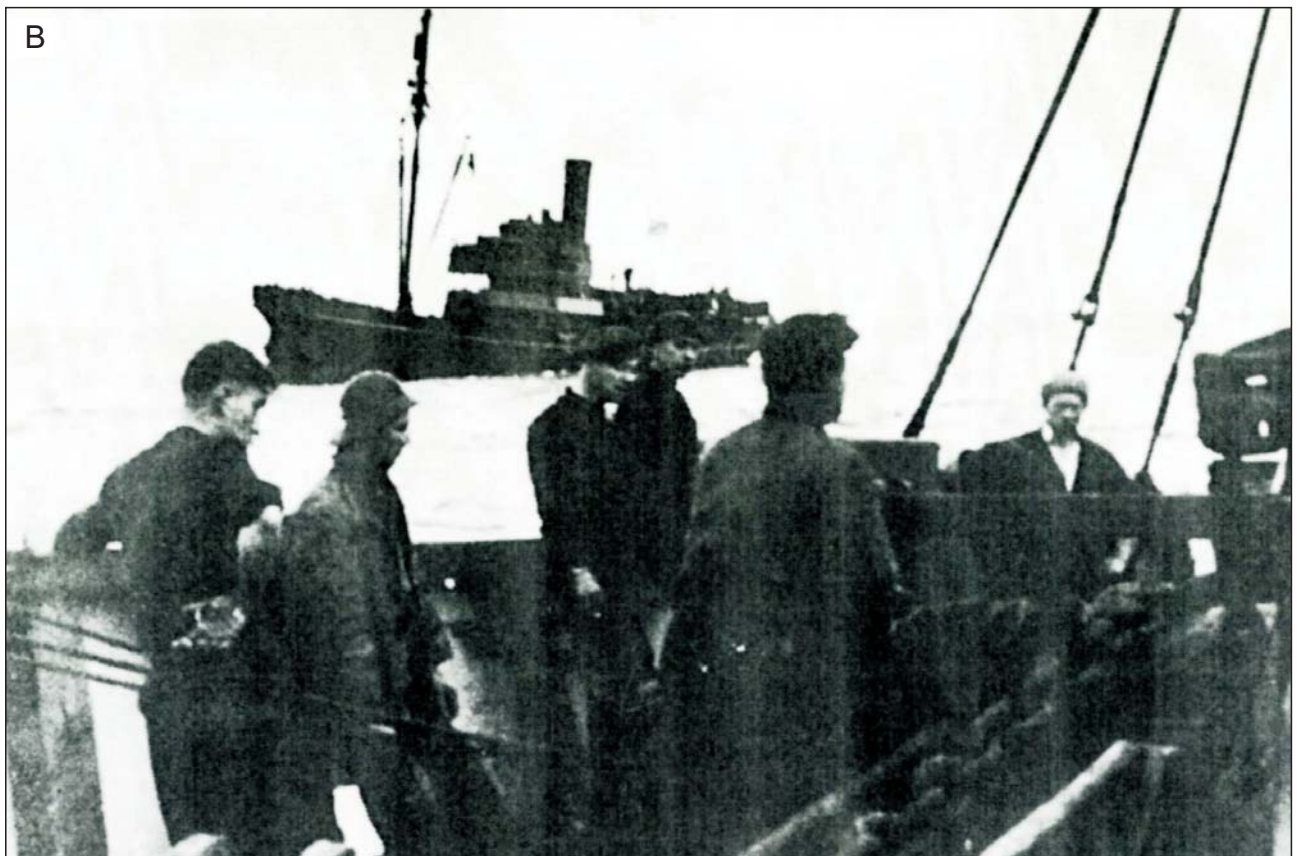
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Sidescan Sonar image of Site 5008.


Figure 2



Argus alongside Yarmouth depot.



Working party completing cable work on East Coast lightvessel. *Argus* coming up to recover them in the late 1930s.

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**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Third Draft**

**WA Ref: 61209.5010.02
January 2008**

Site ID: 5010; 5012; 7139; 7140; 7368; 7369; 7370; 7371; 7708; 7709

Site Name: *Dovenby*

PLA Wreck No.: 343/12; 343/11;

Mitigation Group: 2.1.2 Sites of probable archaeological interest, above SR1

No of Casualties: 1 crew member

Vessel Type: Civilian cargo vessel

Current Recording Status: Level 2a (**5010**)/Level 1b (**5012**)

The wreck of the *Dovenby* is charted in two sections on the seabed, the southern section **5010** and the northern section **5012**. Geophysical investigations in the area have identified eight anomalies within a 250 metre radius of the wreck, which could be related to the vessel. Documentary and geophysical investigations of the wreck have suggested that the two sites (**5010** and **5012**) are two vessels. The southern site **5010** corresponds to the dimensions of the *Dovenby*, and therefore it is possible that the northern site (**5012**) is the wreckage of another unknown vessel. For this Clearance Mitigation Statement all the associated anomalies (listed above) are included in this report (**Figure 1**).

1. INVESTIGATIONS TO DATE

The following tables are summaries of all investigations of the sites, including their first documented discovery.

Site 5010

1914	Vessel sank after collision with SS <i>Sindoro</i> (06/11/1914)
1915	Wreck dispersed with explosives [source unknown – PLA?]
1919	Wreck marked by light buoy (20/01/1919)
1924	Wreck located by PLA least depth 10.5 metres at location 51° 29'30" N 00° 50'54" E (11/01/1924)
1924	Wreck dispersed (unknown method) (10/12/1924)
1947	Wreck located, clear at 10.7 metres and fouled at 11.3 metres (28/07/1959)
1967	Wreck further dispersed by divers carrying out underwater cutting operations – oxy-acetylene (Notice to Mariners 57, 30/06/1967)
1969	Wreck located by PLA least depth now 12.2 metres in a surrounding depth of 15.2 metres (23/01/1969)
1969	Wreck located by PLA, it now lies in two parts and has a least depth of 12.2 metres over both sections (28/02/1969)
1969	Wreck drift swept by a single vessel, cleared at 12.6 metres fouled at 12.8 metres in a surrounding depth of 13.7 metres and a scour depth of 15.2 metres. The seabed in the area is sand and shell (14/03/1969)
1979	Wreck located by PLA and swept, clear at 12.2m fouled at 12.4m in a general depth of 14-15m with a scour depth of 18m (07/09/1979)

1990	Wreck located by PLA at co-ordinates 597741 E 180671 N (microfix) least depth 13.3m in general depth 13.1m with a scour depth of 18.2m. The wreck extends 170m north and 100 m west (02/05/1990)
1996	Wreck located by PLA at co-ordinates 51° 29'23.5"N 00° 50' 54.5"E (OSGB using DGPS), least depth 12.8m in a general depth of 13-15 metres and a scour depth of 18.4 metres. The wreck covers an area 75 x 65 metres in a north south direction (04/12/1996)
2001	Emu sidescan sonar survey (29/03/2001)
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2004	HMS Grimsby located the wreck at 51° 29.412 N 00° 50.824 E (using DGPS –WGD 30/11/2004)
2005	Wreck located at 51°29.418 N 00° 50.813 E (using DGPS – WGD) The least depth recorded was 13.22m in a surrounding depth of 15.2m. The scour was 3.4m deep and extends 120m north east and 170m south west. The length and width of the vessel are estimated to be 124.5m x 29.3m (19/08/2005)
2005	PLA multibeam and echosounder survey
2005	Site dived by the PLA (30/07/2005)
2005	Both sections of wreckage dived by Nigel Nayling, University of Wales Lampeter(UWL) (July 2005)
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)
2006	WA and PWA diving investigation (16/08/2006)

Site 5012

1914	Vessel sank after collision with SS <i>Sindoro</i> (06/11/1914)
1915	Wreck dispersed with explosives (source unknown – PLA?)
1919	Wreck marked by light buoy (20/01/1919)
1951	Wreck located by PLA at 51°29'27" N 00°50'50" E least depth 12.96 metres. (12/12/1951)
1979	Wreck located by PLA, least depth 12.2metres fouled at 12.3 metres in general depth of 15.6 metres and a scour depth of 18.6 metres. It is noted as a large wreck which is easy to find (07/09/1979)
1981	Wreck located by PLA and swept clear at 11.7 metres in a general depth of 14-16 metres and a scour of 18.2 metres (15/05/1981).
1981	Wreck dived by PLA, the diver reported a least depth by hand held leaded line of 12.1 metres (08/09/1981); dive report not supplied by PLA
1985	Wreck located by PLA in position 51°29'29" N 00°50'50" E (30/09/1985)
1991	Wreck located by PLA at 597637 E 180806 N (OSGB36 NGR Microfix). The least depth by echosounder recorded was 12 metres in a general depth of 13.9 metres and a scour depth of 17.6 metres. The wreckage covers a 100 metres x 270 metres area (02/05/1990)
2001	Emu sidescan sonar survey (29/03/2001)
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	PLA multibeam and echosounder survey
2005	Site dived by the PLA (30/07/2005)
2005	Both sections of wreckage dived by Nigel Nayling, University of Wales Lampeter(UWL) (July 2005)
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)
2006	WA and PWA diving investigation (15/08/2006)
2007	WA diving investigation (26-27/11/2007)

Site 7139

2001	Anomaly located during Emu sidescan sonar survey (29/03/2001)
2002	Anomaly not located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly not located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7140

2001	Anomaly located during Emu sidescan sonar survey (29/03/2001)
2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7368

2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7369

2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7370

2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7371

2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7708

2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

Site 7709

2002	Anomaly located during Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002)
2005	Anomaly located during PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005)

2. SUMMARY OF AVAILABLE DATA**Acquired Data Sources**

The following sources were acquired by WA to collate information on the *Dovenby*:

2001	EMU sidescan sonar survey data
2001	Wessex Archaeology, Assessment of Effects Archaeological Heritage: Inter-tidal and Marine in respect of the proposed development of London Gateway
2002	Wessex Archaeology, sidescan sonar and magnetometer data
2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i>
2003	Wessex Archaeology, London Gateway Enhanced Wreck Identification Further Work on Sites within the Survey Area
2005	PLA multibeam data
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> , includes PLA multibeam, pseudo sidescan screen captures and site plan for sites 5010 and 5012 .
2005	Port of London Authority, <i>Marine Diving Services Report</i> for sites 5010 and 5012
2005	Nayling, N, <i>London Gateway Project: Diving Inspection Report 2</i> University of Wales Lampeter for sites 5010 and 5012
2005	Wessex Archaeology, Geophysical Analysis of 2005 multibeam and 2001& 2002 sidescan sonar data
2005	Site 5010 - UKHO (12888)
2005	Site 5010 - NMR (908038)
2005	Site 5012 - UKHO (12890)
2005	Site 5012 - NMR (908039)
2006	Wessex Archaeology, <i>London Gateway Project River Thames, Archaeological Diving Investigation, Technical Report.</i>
2007	Wessex Archaeology, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i>

Reviewed Data Sources**UKHO**

The United Kingdom Hydrographic Office holds the following information of the *Dovenby*:

- UKHO archive holdings listing: Reports of surveys, geophysical data etc.

3. SITE DESCRIPTION**Introduction**

Since the 1960's it has been assumed that the wreck of the *Dovenby* lies in two main parts on the seabed, the southern section **5010** and the northern section **5012**. However, recent documentary and geophysical investigations of the wreck have suggested that the two sites (**5010** and **5012**) are two vessels. The southern site **5010** corresponds to the dimensions of the *Dovenby*, and therefore it is possible that the northern site (**5012**) is the wreckage of another

unknown vessel. Geophysical investigations in the area have identified eight more anomalies (listed below) within a 250 metre radius of the site which could be related to the vessel(s).

Anomalies **7368** and **7369** are located directly between **5010** and **5012**. Four of the anomalies (**7371**, **7370**, **7708** and **7140**) are located approximately 140 metres to the west of **5010** and **5012**. Anomaly **7139** is located approximately 230 metres to the west of **5010** and was only located during in a sidescan survey in 2001; it was believed to be modern material that has since been removed or buried. The table below summarises the site's locations and general details (**Figure 1**).

Site	Position (UTM)	Position derived from	Bed depth (metres)	Minimum target depth (metres)	Site extent (metres)	UKHO status
5010	350532.051 E 5706553.846 N	2005 multibeam	15m	12.37 m	93 x 30 m	Live
5012	350448.185 E 5706685.396 N	2005 multibeam	15.50m	13.41 m	53 x 18 m	Live
7139	350280.851 E 5706460.633 N	2001 sidescan data	13.10m	13.10m	30 x 30 m	Site not listed with UKHO
7140	350383.990 E 5706532.746 N	2002 sidescan data	13.80m	13.40m	75 x 50 x 0.5 m	Site not listed with UKHO
7368	350509.550 E 5706610.340 N	2002 sidescan data	15.10m	15.20m	35 x 15 x 0.2 m	Site not listed with UKHO
7369	350450.675 E 5706599.335 N	2002 sidescan data	15.10m	15m	150 x 3 x 0.20 m	Site not listed with UKHO
7370	350342.108 E 5706579.703 N	2002 sidescan data	14.70m	14.60m	150 x 3 x 0.20 m	Site not listed with UKHO
7371	350314.394 E 5706628.698 N	2002 sidescan data	14.50m	14.02m	25 x 15 x 0.3 m	Site not listed with UKHO
7708	350348.777 E 5706552.390 N	2005 multibeam	15.50m	13.56 m	5 x 3.5 x 2 m	Site not listed with UKHO
7709	350389.024 E 5706652.043 N	2005 multibeam	15.50m	14.87 m	3 m long 0.35 m upstanding	Site not listed with UKHO

SITE 5010

2001 Sidescan

The site was located during a sidescan sonar survey in 2001. At that time it consisted of a large rectangular target with associated scour plume with linear debris to the east. The NGR recorded was 597741 E 180655 N. The anomaly was 15 metres long and 60 metres wide and no length of shadow was recorded. The tiff file created was labelled target 40.

2002 Sidescan

In 2002 the site was identified during a sidescan sonar and magnetometer survey, it is noted as corresponding to the southern part of the *Dovenby* (**Figure 2**). The NGR recorded from this survey was 597657 E 180788 N. The anomaly is 20 metres long and 35 metres wide and no length of shadow was recorded. The tiff file created was labelled 288. The NGR recorded for the magnetometer survey was 597736 E 180652 N. The magnetic hit registered a max reading of 276nT. The tiff file created was labelled 415.

2005 Multibeam

In 2005 a multibeam bathymetric survey was undertaken over the site of the *Dovenby*. Site (5010) is ship shaped with a large scour pit on its western side. The wreck is 80 metres long by 35 metres wide orientated in a north-east by south-west direction (**Figure 3**).

The wreck stands a minimum of 6 metres above the base of the scour hole and 2 metres above the general seabed level at this point. There is an outlying piece of debris located 15 metres to the north-east of the main site, it is 1 metre wide at the base and 0.4 metres upstanding (**Figure 3**).

The point at the north-east end of the wreck is 1.5 metres upstanding, 6 metres long with a maximum width of 1.5 metres at the base. At the south-western end of the wreck on the northern side there is a long linear projection, 23 metres in length, 10 metres wide with a maximum height of 1.5 metres (**Figure 3**).

The large scour pit on the western side of the wreck is 200 metres long, 25 metres wide and a maximum of 4-5 metres deep. Near the end of this scour, 180 metres from the wreck, is feature 7708 (discussed below; **Figures 1 and 3**).

2005 PLA dive description

The PLA dived both sections of the *Dovenby* in 2005. The divers reported the wreck had been heavily reduced by explosives and cutting. The bow section appeared to be upright with a number of exposed ribs. The stern section was in an extensive and deep scour hole and was lying on its side. Large sections of the deck and side have been cut away. The diver located what was believed to be the vessels rudder and some chain.

2005 UWL dive description

Nigel Nayling, University of Wales, Lampeter (UWL), dived both sections of the *Dovenby* wreckage which are reported to be located approximately 100 metres apart. Mr Nayling confirmed the presence of substantial upstanding metal frames, which he believes to be consistent with that of the *Dovenby*. The structure was reported substantially degraded through both intentional clearance and subsequent erosion.

2006 WA dive description

The site was dived again on 16th August 2006. Two WA divers were integrated into the PLA dive team. A Sonardyne SCOUT acoustic tracking system and the WA in house recording system were installed on the diving vessel.

A ship's bollard was identified on the western edge of the wreck. Moving south from this point the diver noted steel plates, possibly the outer hull plating of the vessel, which stood approximately 1 metre proud of the seabed.

To the south the diver observed a substantial number of long, cylindrical iron or steel objects, c. 0.1 metres in diameter, some of which were bent into circular shapes. The diver described these objects as 'iron bars'. It could not be established whether they were structural remains of the vessel or part of the cargo or ship's ballast.

Further progress to the south was prevented by the length of the diver's umbilical. When the diver was returning to the shot a long cylindrical object c. 0.75 metres in diameter, possibly the remains of a steel mast, was identified.

SITE 5012

2001 Sidescan

The site was located during a sidescan sonar survey in 2001; at that time it consisted of a wreck shaped upstanding anomaly. A large plume of coarse material is apparent to the east of the northern end of the target. The NGR recorded was 597650 E 180790 N. The anomaly is 35 metres long and 15 metres wide, no length of shadow was recorded. The tiff file created was labelled target 91.

2002 Sidescan

In 2002 the site was identified during a sidescan sonar and magnetometer survey, as the northern part of the *Dovenby*. The NGR recorded from the sidescan was 597754 E 180693 N. The anomaly is 30 metres long and 50 metres wide and no length of shadow was recorded. The tiff file created was labelled 288 (**Figure 4**).

2005 Multibeam

In 2005 a multibeam bathymetric survey was undertaken over the site of the *Dovenby*. Site **5012** is slightly diamond shaped with a large scour pit at the northern end (**Figure 5**). It is orientated north-north-west by south-south-east. The site consists of a section of wreckage 55 metres long, 17 metres wide and 3 metres upstanding at the highest point.

The northern most end of the site is located in the scour pit, it stands 5 metres tall and is 7 metres long by 3.5 metres wide. The scour pit, located to the north of the site (**Figure 5A-C**) is 3.5 metres deep, 50 metres plus wide and extends beyond the multibeam coverage.

The southern most point of the site is 6 metres long, 5 metres wide and upstanding by 2 metres at its tallest point (**Figure 5B**). Approximately 17 metres from the southern end of the site there is a gap in the wreckage for approximately 10-14 metres. The western side of the vessel appears to be more continuous at this point.

2005 PLA dive description

The PLA dived both sections of the *Dovenby* in 2005. The divers reported the wreck had been heavily reduced by explosives and cutting. The bow section appeared to be upright with a number of exposed ribs. The stern section was in an extensive and deep scour hole and was lying on its side. Large sections of the deck and side have been cut away. The diver located what was believed to be the vessels rudder and some chain.

2005 UWL dive description

Nigel Nayling, University of Wales, Lampeter (UWL), dived both sections of the *Dovenby* wreckage. Mr Nayling confirmed the presence of substantial upstanding metal frames, which he believes to be consistent with that of the *Dovenby*. The structure was reported to be substantially degraded through both intentional clearance and subsequent erosion.

2006 WA dive description

The site was dived again on 15th August 2006. Two WA divers were integrated into the PLA dive team. A Sonardyne SCOUT acoustic tracking system and the WA in house recording system were installed on the diving vessel.

Debris including distorted metal plate was encountered in the south-east part of the site and followed in a north-westerly direction. The plate was upstanding by *c.* 2 metres. This is most likely to be the hull of the vessel.

It was noted that the wreckage was more upstanding in the north of the site. Steel plates in the centre of the wreck were standing 1.5 metres proud of the seabed, while the hull plating in the north-east was found to stand up to 3 metres proud of the seabed.

2007 WA dive description

During the first dive, the diver made bottom in the southern part of the site. In this area, some metal plate was encountered. It stood approximately 0.4 metres proud of the seabed, was approximately 2-3cm thick and between 1.5 and 2 metres in length. It had a curved shape along its length. The diver thought it might be a fragment of a cylindrical shaped object rather than part of the hull structure. He reported that there were some protrusions on the metal which may have been rivets though there was too much concretion to be certain.

Following this the diver was directed south-east towards the southern end of the site depicted on the multibeam. The diver encountered an area largely devoid of features until he came across an upstanding metal feature. It stood approximately 1 metre proud of the seabed. Further observations were impossible as the current had become unmanageable (spring tide) and the diver had to return to the shot.

The seabed consisted of medium-grained sand and slightly silty sand in places.

During the second dive, the diver examined the northern part of the vessel. The diver made bottom approximately 10 metres north-east of the northern end of the site and moved south-west into a deep scour. Moving further south, the diver came into contact with an isolated artefact. It was a small corroded iron/steel bar or tube, part buried, with an 'eye' at the exposed end attached to the side of the bar/tube. The diver then came across the metal structure of the vessel (**Figure 6**).

The northern end of the vessel consisted of a large section of corroded iron or steel plates (*c.* 2-3 metres upstanding) with possible rivets very deeply undercut by scour. No obvious stem or sternpost or form other than ship's plate was exposed. The structure appeared deformed and highly unstable (it moved to light touch), and was therefore not closely examined.

Directly south-east of this the diver encountered thin corroded iron or steel plate with deformed edges. It appeared to be slightly curved, with one part near vertical and one part leaning to the east. It was deeply undercut by scour. At an approximate right angle to this and 'wedged' up under it was a round or rounded iron or steel bar or tube estimated *c.* 0.15 metres in section and *c.* 1 metre long exposed (the lower end was buried). Attached to the upper end of the bar was another slightly smaller section bar at right angles to it (forming a cross shape). It was not clear whether this was attached or passed through the plate (the other side was obscured by debris). The buried end stuck in very firm gravel which was not excavated due to the limited bottom time. It is possible that this feature is a small anchor or rudder post.

South of this the diver came across a large section of thin iron/steel plates leaning slightly west, *c.* 6 metres long and 3.5 metres upstanding. The lower edge was buried. A joint was noted between two overlapping plates running along the long axis (with a slight angle down towards north). One rivet was observed along this joint.

South-east of this the diver reported another large section of corroded iron/steel plate leaning east and highly unstable (and therefore not closely examined). Confused debris was found to

the south-east and west of this feature; between and around all these large plates the diver noted a large quantity of metal debris.

The seabed consisted of fine silty sand. It was scoured deeply at the northern end of the site down to a firm gravelly layer on/in which the wreck sits.

SITE 7139

2001 Sidescan

The site was located during a sidescan sonar survey in 2001. At that time it consisted of an area encompassing several features in close proximity to each other, the position (above in the table) is centred on the strongest reflector (**Figure 7**). The NGR recorded was 597499 E 180555 N. The anomaly is 30 metres long and 30 metres wide, no length of shadow was recorded. The tiff file created was labelled target 38-39.

2002 Sidescan

The site was not identified in the 2002 sidescan sonar survey, even though it was covered.

2005 Multibeam

The site was not located by the 2005 multibeam survey; the seabed illustrated in **Figure 7** is an area of sandwaves which are approximately 10cm high.

SITE 7140

2001 Sidescan

The site was located during the sidescan sonar survey in 2001. At that time it consisted of an anomaly with thin ridges or spurs emanating from the epicentre, it could possibly be a cable. The NGR recorded was 597606 E 180619 N. The anomaly is 10 metres long and 10 metres wide and no length of shadow was recorded. The tiff file created was labelled as target 38-39.

2002 Sidescan

In 2002 the site was identified in the sidescan sonar and magnetometer survey. The site comprises of a large debris scatter probably associated with the wreck of the *Dovenby*. The NGR recorded was 597597 E 180634 N. The anomaly is 40 metres long and 50 metres wide, no length of shadow was recorded. The tiff file created was labelled as target 414 (**Figure 8**).

2005 Multibeam

In 2005 the site was identified during the multibeam survey. The site consists of linear ridges running along the top edge of a large scour hole (**Figure 8**). The scour hole is associated with the wreck of the *Dovenby* (**5010, 5012**). The ridges are 75 metres long, 50 metres wide with a maximum height of 0.5 metres.

SITE 7368

2001 Sidescan

The site was not located by the 2001 sidescan sonar survey, even though it was covered.

2002 Sidescan

In 2002 the site was located during a sidescan sonar and magnetometer survey. It comprises of various small anomalies one of which was a block shaped object located between the two

main sections of the *Dovenby* (**Figure 9**). The NGR recorded was 597717 E 180720 N. The anomaly is 15 metres long and 20 metres wide and no length of shadow was recorded. The tiff file created was labelled target 288.

2005 Multibeam

In 2005 the site was identified during a multibeam survey. It appears to be a ridge on a sloping seabed which runs parallel to the scour of **5010** on its northern side. The ridge is 0.05 metres upstanding on its northern side and 0.2 metres upstanding on its southern side. It is 35 metres long and 1.5 metres wide. Two other small anomalies noted on the 2002 side scan sonar data were also observed both are upstanding by no more than 0.10 meters. The first is located 8 metres to the northwest from the position given for **7368** by the 2002 data, whilst the other is located 18 metres to the northeast of the ridge (**Figure 9**).

SITE 7369

2001 Sidescan

The site was not located during the 2001 sidescan sonar survey, even though it was covered.

2002 Sidescan

In 2002 the site was located during a sidescan sonar and magnetometer survey. The site consists of the eastern extent of a long discontinuous linear feature, although no length of shadow was recorded in 2002, the feature does have a small amount of shadow, indicating the feature is upstanding by a small amount. The other end of this feature is **7370**. The NGR recorded was 597659 E 180705 N. The anomaly is 3 metres long and 3 metres wide and no length of shadow was recorded. A magnetometer hit of Max4.7nT was recorded. The tiff file created was labelled target 289 (**Figure 10**).

2005 Multibeam

In 2005 the site was identified from the multibeam data. The site consists of a long discontinuous linear feature, it has been located in two parts the eastern end (**7369**) and the western end (**7370**). The feature is approximately 150 metres long, 2 to 3 metres wide and 0.20 metres upstanding. The feature is located on the northern side of a large scour hole which is associated with the wreck of the *Dovenby* (**5010, 5012**). Due to the features location at the edge of the scour hole it is possible that the anomaly is a natural disturbance of the seabed due to the scour. The site is located 112 metres from a previously unrecorded feature (**7708** discussed below) which only appears in the 2005 multibeam (**Figure 10**).

SITE 7370

2001 Sidescan

The site was not located during the 2001 sidescan sonar survey, even though it was covered.

2002 Sidescan

In 2002 this site was identified during the sidescan sonar and magnetometer survey. The site consists of the western extent of a long discontinuous linear feature, although no length of shadow was recorded in 2002, the feature does have a small amount of shadow, indicating the feature is upstanding by a small amount. The other end of this feature is **7369**. The NGR recorded was 597552 E 180678 N. The anomaly is 3 metres long and 3 metres wide, no length of shadow was recorded. The tiff file created was labelled target 289 (**Figure 10**).

2005 Multibeam

In 2005 the site was relocated during a multibeam survey. The site consists of a long discontinuous linear feature, it has been located in two parts the western end (**7370**) and the eastern end (**7369**). The feature is approximately 150 metres long, 2 to 3 metres wide and 0.20 metres upstanding. The feature is located on the northern side of a large scour hole which is associated with the wreck of the *Dovenby*. Due to the features location at the edge of the scour hole it is possible the anomaly is a natural disturbance of the seabed due to the scour (**Figure 10**).

SITE 7371

2001 Sidescan

The site was not located during the 2001 sidescan sonar survey, even though it was covered.

2002 Sidescan

In 2002 this site was identified during the sidescan sonar and magnetometer survey. The site consists of an elliptical anomaly (**Figure 11**). The NGR recorded was 597521 E 180725 N. The anomaly is 5 metres long and 8 metres wide and no length of shadow was recorded. The tiff file created was labelled target 289.

2005 Multibeam

In 2005 the site was identified during the multibeam survey. It consisted of a low mound 25 metres long, 15 metres wide and 0.3 metres upstanding (**Figure 12**).

SITE 7708

2001 Sidescan

The site was not located during the 2001 sidescan sonar survey, even though it was covered.

2002 Sidescan

The site was not initially located during the 2002 sidescan sonar and magnetometer survey. Further analysis of the data in 2006 identified the feature which corresponded to the anomaly located in the multibeam survey (discussed below). The site consists of an oval shaped feature with a linear projection to the south west. The feature is 3.5 metres long and 1.5 metres wide but projects no shadow so therefore is not upstanding (**Figure 13**).

2005 Multibeam

In 2005 the site was identified during a multibeam survey. It consisted of a pyramid shaped object 5 metres long, 3.5 metres wide and 2 metres upstanding. It is located 180 metres to the west of site **5010** at the edge of a scour for that site (**Figure 14**).

SITE 7709

2001 Sidescan

The site was not located during the 2001 sidescan sonar survey, even though it was covered.

2002 Sidescan

The site was not initially located during the 2002 sidescan sonar and magnetometer survey. Further analysis of the data in 2006 identified the feature which corresponded to the anomaly located in the multibeam survey (discussed below). The site consists of an oval shaped area of

coarse / darker seabed approximately 12 metres by 6 metres wide which is not upstanding. On the south-eastern edge of this feature there are two linear dark reflectors (**Figure 15**). The outer southern most one is 8 metres long, 0.7 metres wide and not clearly upstanding. The inner linear projection is 2.1 metres long, 0.3 metres wide and 0.35 metres upstanding. Site **7709** is located approximately 70 metres west of site **5012**.

2005 Multibeam

In 2005 the site was identified during a multibeam survey. It consisted of a cone shaped feature 3 metres wide at the base and 0.35 metres upstanding. The feature is located in a depression 8 metres by 10 metres and the top of the feature is level with that of the surrounding seabed. It is located 60 metres to the west-south-west of site **5012** (**Figure 16**).

4. SITE HISTORY

Build

The steel barque *Dovenby* was built for P. Iredale and Porter Ltd. by W. Pickersgill and Sons, Sunderland in 1891 (Lloyds of London 1774-).

William Pickersgill and Sons Ltd. began shipbuilding in 1838 in the North Dock area of Sunderland and transferred to Southwick in 1851. They were a family business and built mainly barques, brigs and snows. They constructed wooden ships for the coal trade up until the 1880’s. The yard solely produced merchant ships until the 20th century.

The vessel build capacity of the yard increased to 30,000 tonnes during the Second World War when the company merged with neighbouring yards. They traded up until 1958 when they became Austin and Pickersgill. The company was subjected to a number of takeovers and mergers in the 1970s and 1980s, and was bought for the last time by North East Shipbuilders in 1986. The yard was finally closed in 1988 and demolished in 1990 (Middlemiss 1995).

Construction details and other information contained with the Lloyd’s Register of Sailing vessels entry for the *Dovenby* in 1914/1915 is summarised in the following table (Lloyds of London 1774-):

Steamer’s Name, Material, Rig, &c.	<i>Dovenby</i> Steel barque, 1 bulk head cemented, 1 deck with 2 tiers of beams
Registered Tonnage	
Gross:	1653
Under deck:	1547
Net:	1547
Build Date	1891 (August)
By	W. Pickersgill & Sons
Where	Sunderland
Owners	P. Iredale & Porter Ltd.
Registered Dimensions, Deck Erections &c.	
Length	256ft (70m)
Breadth	38.1ft (11.61)
Depth (feet and tenths of feet)	22ft (6.7m)
Moulded depth	23ft 5in (7.1m)
Freeboard midships	4ft 6in (summer freeboard) (1.3m)
Quarter deck (length)	41ft (raised quarter deck) (12.5m)

Forecastle (length)	29ft (8.83m)
Bar keel (depth in inches)	9½ in (0.24m)
Port of Registry	Liverpool; British
Anchors and chains	Proved at a machine recognised by the committee of Lloyd's registers

Further detail is given in the Lloyd's Survey Report of 1891, which also contains a number of plans (Lloyds Survey Reports 1891):

Plan No	Scale	Content
LSR/94/sld16212/1	1:96	Profile & deck (constructional)
LSR/94/sld16212/2	1:24	midship section
LSR/94/sld16212/3	1:96	Full rigging plan (with mast and yard)

The National Maritime Museum also holds three contemporary photographs of the *Dovenby*, two of which have been requested:

Photograph reference number	Content
P2593	Dovenby in full sail, shot of bow
P2594	Side view of Dovenby in dock

Use

The *Dovenby* sailed from Middlesbrough to begin her first major voyage on the 12th October 1891, bound for Sydney, under the command of Captain Barclay. By the 13th October the *Dovenby* had sailed to Deal, and was taken in tow by the tug *Victory*. *Dovenby* stayed in Deal harbour until the 24th October when she was again taken in tow by the tug *Victory* and proceeded east up the English Channel. The pair were sighted still under tow passing Dover on the 26th October. *Dovenby* finished the voyage to Sydney on the 29th January 1892, staying there until the 19th April when she set sail for San Francisco, arriving there on the 13th May (Lloyds of London 1734-).

The *Dovenby* represents the remains of a fairly typical example of a mid to late nineteenth century commercial sailing barque, of a type commonly used to transport large amounts of goods over long distances. During the nineteenth century the term barque was used to describe a vessel with a certain type of rigging. The typical barque at this time would therefore have three (or more) masts, fore and aft sails on the aftermost mast and square sails on all other masts.

Loss

The loss of the *Dovenby* is recorded in the Lloyd's List, and the circumstances of the loss led to legal action, which was reported in the Times on February 18th 1915 (The Times 1785-1985) under the title

‘Collision Action: Effect on a False Story’:
The Sindoro

(Before Mr Justice Bargaive Deane, sitting with two of the Elder Brethren of the Trinity House.)

“In this action the owners of the steel barque *Dovenby* sought to recover from the owners of the Dutch steamship *Sindoro* the amount of the damage suffered in a collision between the two vessels below the Nore on November 6 last.

The *Dovenby* sank and one crew drowned. Mr Bateson, K.C.; and Mr. Laing, K.C., and Mr D. Stephens for the defendants and counter claimants.

The case is reported on the effect on compulsory pilotage of the ship's officers having put forward a false story.

The Judgment

Mr. Justice Bargrave Deane said that the *Dovenby*, a steel barque of nearly 2,000 tons gross, loaded with guano, was on a voyage from Peru to London. She was in tow of a tug, and the evidence was that when fog was encountered the tug eased down, and at the time of the collision her speed was about 3 knots. She was run into by the Dutch steamship *Sindoro*, a twin screw vessel of 5,472 tons, bound from London to Batavia with general cargo. The *Sindoro* was in charge of a compulsory pilot. She had anchored in fog and had started full speed ahead again when the weather cleared, and she was making about 10 knots. Then when a thick patch of fog was observed ahead the engines were reversed, but she ran on into the fog, and ran into this barque.

According to the log at 9.22 a thick fog bank was observed, and at 9.24 the engines were out in full speed astern, at 9.26 the collision took place. Manifestly that was bad navigation. At 9.22 the engines should have been reversed. The pilot had no right to enter the fog at all, and if the case stopped there the pilot would be alone to blame.

His Lordship had, however, in this case circumstances which did not often occur. The ship's company had tried to get the pilot out of his difficulties by false evidence. They had put their heads together, and in spite of what was entered in their logs, the pilot, master, and third officer all said the logs were untrue, and that the order to reverse the engines was at 9.22 and not two minutes later. If that were a true story the way might have been off the ship at the time of the collision and it might have exonerated the pilot had the court accepted it. But it was a false story put forward to get the ship and pilot out of condemnation. His Lordship believed that he was laying down what his predecessors had laid down—namely, that where witnesses were found combining to tell a false story the ship was held to blame as well as the pilot. He so held in this case.

The defence of compulsory pilotage failed, and as there was no fault to be found with the navigation of the *Dovenby*, the *Sindoro* must be held alone to blame.”

A number of steel barques similar to the *Dovenby* survive to date, e.g. the barque *Glenlee*, built in Port Glasgow in 1896, which is now used as a museum in Glasgow or the three mast barque *Rickmer Rickmers*, also built in 1896, which is now in display in Hamburg.

Salvage and Clearance

The *Dovenby* was lost in 1914, since this time there have been various reports of clearance works carried out on the two main sites.

During an examination eight days after the sinking of the *Dovenby* it was stated that it appeared from the alignment of the fore and main masts that either the bottom of the ship was being squeezed up or the vessel had started to break amidships. Therefore, the prospects of successfully salvaging the vessel were considered ‘very doubtful’, and it was recommended to blow the vessel up (PLA files).

On the 26th November 1914 the dispersal of the wreck by means of explosives was authorised. ‘The work was accordingly put in hand and a large portion of the wreck’ had been removed by March 1915. However, it was not possible to remove the ‘vertical frames and ribs’. ‘Further dispersion’ had taken place by July 1916 to a depth of 11.28 metres (PLA files).

In 1924 the southern section of the *Dovenby* (**5010**) was further dispersed (method unspecified) and cleared to 10.6 metres (UKHO record).

In 1965, it was reported that the wreck would lie in two parts close to each other, on part at 10.67 metres and the other at 12.5 metres below low water (PLA files).

In 1967 a 5.8 metres section of the steel mast standing almost upright in the south-west corner of site **5010** was recovered. It was stated that ‘approximately 160’ of plating with frames and a number of individual high spots’ would require removal (PLA files). Later that year, site **5010** was dispersed by divers carrying out underwater cutting operations using oxy-acetylene to a depth of 12.2 metres (UKHO record).

In 1969 site **5010** was drift swept by a single vessel and was clear to 12.6 metres. In 1979 it was swept and clear to 12.2 metres, in 1990 the channel was clear to 13.3 metres, but in 1996 the channel was only clear to 12.8 metres. Site **5010** was located again in 2004 and 2005 were the channel was clear to a depth of 13.22 metres in a general depth of 15.2 metres (UKHO record).

The northern section of the *Dovenby* (**5012**) has undergone a slightly different clearance history to the southern half of the wreck. In 1981 site **5012** was swept and cleared to 11.7 metres, it was also dived by the PLA who reported a hand held leaded line least depth of 12.1 metres. In 1991 the channel was clear to 12 metres in a general depth of 13.9 metres and a scour of 17.6 metres (UKHO record).

Both sites and the surrounding anomalies (listed above) have since been surveyed with geophysics (sidescan sonar, magnetometer and multibeam) in 2001, 2002 and 2005. Sites **5010** and **5012** have been dived by the PLA, Nigel Nayling of UWL and WA in 2005, 2006 and 2007.

As a result of the 2006 diving survey, site **5010** was confirmed to be of steel construction. A bollard was found indicating the remains of deck structure. Site **5012** was also of steel construction but no specific diagnostic features were identified.

The 2007 diving survey confirmed that site **5012** consists of the corroded and deformed metal wreckage of an iron or steel plated, riveted or partly-riveted vessel.

During the first dive, the diver explored the southern part of site **5012**. Apart from two upstanding metal features the area appears to be largely devoid of features. This is partly consistent with the multibeam evidence, where this area is depicted as being far less exposed than the northern part of the vessel. It is also possible that features have been covered by sediment since 2005. Major sediment movement on the site is demonstrated by large scour formations to the west, north and south of the vessel. It is not possible to establish whether the diver reached the southernmost tip of the site.

During the second dive, the diver examined the northern part of site **5012**. The exposed structure is clearly the remains of a small to medium riveted or part riveted iron or steel vessel. The structure examined during the dive appears to be one of the ends of the vessel but which end cannot be determined. It is not clear whether the vessel sits upright or is on its side or capsized. The wreckage is deformed and incoherent in places suggesting either a very violent wrecking event or subsequent salvage or clearance.

5. ARCHAEOLOGICAL INTEREST

The *Dovenby* has been rated as ‘probable’ archaeological interest. The key aspects of the wreck which have lead to the above rating are:

- The vessel was built in a period of great technological change from sail to steam and iron to steel construction;
- The vessel's use in international contexts indicates an international dimension of interest;
- It is one of a small number of surviving examples of a metal sailing barque from this date;
- The diver reports on the site suggest a large amount of surviving remains, which have not been fully investigated.

The list above clearly highlights why the *Dovenby* is important with regard to the archaeological record and the insight it may provide to late 19th century ship building.

6. CONSTRAINTS

The *Dovenby* was lost due to a collision with another vessel, little is documented about the actual sinking or if any salvage was undertaken at the time. Since its loss the vessel has been dispersed numerous times using a combination of explosives, underwater cutting and wire sweeps. The present remains on the seabed now only partially reflect the damaged caused during the wrecking event.

The dispersal of the wreckage will mostly likely have resulted in sharp, jagged, partially upstanding (6 metres from multibeam) wreckage. It is therefore highly likely entanglement maybe an issue when investigating the site with divers.

It is reported that one crew member was lost during the sinking, so there is a possibility of human remains on the site.

7. SCOPE OF FURTHER STAGE MITIGATION

Stage 1 Mitigation was intended to achieve a Level 2 record of the site, which is a record that provides sufficient data to establish the extent, character, date and importance of the site.

Build

- Construction (material, fastenings, methods)
- Propulsion
- Diagnostic features(machinery, fittings, armament)

Use

- Artefact/Cargo (dating objects)

Survival

- General survival of the site

Investigation

Traces of any previous work on the site (salvage, dispersal, excavation etc).

The results of the geophysical survey brought up a number of questions. The multibeam data show two anomalies (**5010** and **5012**), lying about 100 metres apart. Each anomaly is ship-shaped. **5010** measures 75 metres by 16 metres, dimensions which - considering outlying

debris - are consistent with the known dimensions of the *Dovenby*. Anomaly **5012** measures 55 metres by 14.5 metres. Even though the wreck of the *Dovenby* is known to have been broken up, it seems unlikely for the two large anomalies to be part of the same wreck.

Archaeological dives were conducted on both anomalies in order to clarify the site's extents and survival. The results can be summarised as follows:

Level 1b recording has been achieved for site **5012** through geophysical and diving surveys. Level 2a recording has been achieved for site **5010** through geophysical and diving surveys and documentary research, as character, date and importance of the site are evident.

So far, it was not possible to determine whether sites **5010** and **5012** are part of the same wreck or constitute two different wrecks. No diagnostic elements that would differentiate the two sites were encountered during the dives. However, it became clear that both anomalies are composed of similar structural steel elements. Although the diving raised no doubts as to the identification of **5010** as being the *Dovenby*, the case for **5012** to also be a part of the *Dovenby* remained unproven. However, the identification of rivets during the 2007 diving survey indicates a pre-World War II date of the remains.

8. OUTLINE OF STAGE II MITIGATION

Stage II, Mitigation III

The *Dovenby* is located in the centre of the dredging channel and covers a large area of seabed, 200 x 200 metres if all the anomalies assumed associated with the site are included.

The dives established that considerably more time would be required on site **5012** to confirm the identity of the vessel. It was noted that the lack of underwater visibility, the size of the anomaly and the dispersed/broken up and instable nature of the wreckage would make archaeological recording of this site a very time consuming and hazardous task. On the advice of English Heritage no further archaeological work will be undertaken on this site.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

It is anticipated that the site will be cleared by grabbing at the conclusion of clearance activities.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

A '19 feet section of the steel mast standing almost upright on the S.W'ly corner' was recovered by the SV *Yantlet* in 1967 and landed at East India Dock (PLA files).

DIGITAL ARCHIVE

The digital archive consists of the following:

Material	Location
2001 sidescan sonar data	EMU
2001 sidescan sonar images (5 tiff files for targets 40, 91, 38-39)	WA
2002 sidescan sonar and magnetometer data	WA
2002 sidescan sonar image 1 tiff file (288)	WA
2002 magnetometer data 5 tiff files (415, 288, 414, 288, 289)	WA
2005 multibeam data	WA
46 tiff images and 1 geotiff 2005 multibeam data	WA
2007 dive recordings	WA

PAPER ARCHIVE

The paper archive consists of the following:

Material	Location
UKHO Report (12888)	WA
NMR Report (908038)	WA
UKHO Report (12890)	WA
NMR Report (908039)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo sidescan screen captures	WA
Port of London Authority, 2005, <i>Marine Diving Services Report</i>	WA
Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 2</i> University of Wales Lampeter	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Intertidal and Marine in respect of the proposed development of London Gateway	WA
Wessex Archaeology, 2003, <i>London Gateway Appendix Q: Enhanced Wreck Site Identification Report</i>	WA

Material	Location
Wessex Archaeology, 2003, <i>London Gateway Enhanced Wreck Identification Further Work on Sites within the Survey Area</i>	WA
Forty-seven printed images of the 2005 multibeam data	WA
Twenty-one printed images of the 2001 and 2002 sidescan data	WA
PLA files with regard to the <i>Dovenby</i>	WA (copies)
Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i>	WA

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Middlemiss, N. L. (1995). *British shipbuilding yards 3: Belfast, Merseyside, Barrow and all other areas*. Newcastle-Upon-Tyne: Shield Publications.

The Times (1785-1985). *The Times Digital Archive*. London.

NMR LSR 16212, Lloyds Survey Reports, *Dovenby*, 1891.

London Gateway Project: Diving Inspection Report 2

Nigel Nayling

Summary

Three seabed targets, identified as of varying archaeological potential within the possible area of impact of proposed dredging for the London Gateway Project, were inspected by a diving archaeologist in line with the agreed Archaeological Mitigation Framework. One site comprises two large sections of a steel built vessel identified as the *Dovenby*, a barque which sank in 1914. Closely stacked bricks located at a second site may relate to the documented sinking of a brick-carrying barge in 1922. A third site, comprising the partially exposed remains of a wooden wreck, is unidentified.

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1 Background

1.1 INTRODUCTION

This document is a factual technical report on results of diving operations carried out to assess the archaeological nature of previously identified underwater anomalies in areas of proposed dredging for the London Gateway Project (LGP). Three locations, identified as probable wrecks of possible archaeological significance in previous work (see below) were selected for inspection. Sites in this report are referred to primarily through use of codes assigned by Wessex Archaeology to facilitate cross-referencing with previous reports.

1.2 PREVIOUS WORK

Previous assessment of the underwater cultural heritage in the area potentially affected by the London Gateway Port Development has included:

A desk-based assessment distributed as Appendix B of *The (London Gateway Port) Harbour Empowerment Order 2002: Assessment of Effects on Cultural Heritage in Respect of the Proposed Development of London Gateway Port Development* based on investigations undertaken by Wessex Archaeology.

An updated wreck site identification exercise carried out by Wessex Archaeology between October 2002 and February 2003 to enhance the Environmental Assessment of London Gateway, including *Enhanced Wreck Site Identification*.

This task comprised two elements, a review of existing sidescan survey and wreck data held by the Port of London Authority, and additional sidescan and magnetometer survey. The survey area comprised the Limit of Deviation (LOD) and an area of proposed dredging extending 2.77km eastwards along the channel from the Sea Reach No.1 navigation buoy.

1.3 AIMS AND OBJECTIVES

The aim of this study was to assess the character of three sites on the seabed within the area of proposed dredging in the Yantlet Channel to inform future decisions on appropriate mitigation. In line with the Archaeological Mitigation

Framework for LGP, direct observation by a competent and suitably experienced archaeologist (the author), by means of diving, was employed. The aim of diving operations was to investigate each of the sites, sufficient to determine whether they are, or are not, of archaeological significance. This report does not attempt to assess the extent, or detailed nature of the archaeological resource at each location, or to provide guidance on their future management.

1.4 METHODOLOGY

In accordance with the Archaeological Mitigation Framework, each of the sites had been surveyed by the Port of London Authority using multibeam bathymetry, prior to inspection. The results of these surveys were used to assist in determining the diving programme, and to assist location of the sites. Some of the survey results are integrated within this report. Each site had previously been visited by a dive team from the PLA under the supervision of Kevin Leadbetter and relevant observations are also included here. Using procedures broadly in line with those employed previously (Nayling 2005), each of the sites was visited by the PLA dive team with the author in attendance.

1.5 RESULTS

1.5.1 WA 5230, 343/99, OSGB 36 591581 180324

The site is located on the south side of the main channel between Sea Reach No 3 and Sea Reach No 4 buoys. The wreck may be that of barge that sank in 1922 (Admiralty Reference No 12886) which was shown on charts prior to 1926 located some 110m from the surveyed anomaly. The site was located by PLA survey and inspected by divers in 2002. Although not subjected to additional magnetometer and sonar survey by Wessex Archaeology in 2001/2, the site was listed in its updated wreck site listing (Leather 2003, table 1). More recent survey (2005) indicated two areas of debris: an area extending 8 x 4 m and 1m above the general bed level and a smaller area of debris 14m south in the original charted position (591581 180310) extending from the shoal to the south-west. PLA Marine Services diver inspection reported that the obstruction is composed of piles of bricks (some of which are neatly stacked), wood and concreted metal indicating that the

obstruction could be the wreck of a wooden dumb barge or sailing barge. Diving on 28/7/05 confirmed this description. Samples of stamped brick were recovered for possible identification. Features observed are consistent with presence of a relatively modern, brick carrying barge as indicated in Admiralty records.

1.5.2 WA5204, 343/93, OSGB 36 593858 180121

The site is located east of Sea Reach No. 3, 20m from the southern edge of the existing, dredged channel. The wreck was apparently first surveyed by the PLA during channel extension survey in 1999. Although not subjected to additional magnetometer and sonar survey by Wessex Archaeology in 2001/2, the site was listed in its updated wreck site listing (Leather 2003, table 1). PLA survey in 2005 revealed a smooth mound measuring some 7m (NS) by 3m (EW) with signs of debris up to 10m to the north. Initial inspection by PLA divers indicated that the obstruction is the remains of a wooden vessel with framing timbers protruding from the sand in a debris field roughly 7m x 3m.

The site was dived twice by the author on 29/7/05. The presence of apparently articulated framing timbers protruding from a marked mound was confirmed. Additionally, a section of keel some 7m in length was found to extend out from this mound, sloping upwards such that, at its exposed uppermost end, it was some 2m clear of the seabed. A small number of pottery sherds from the debris mound were recovered for possible identification. Small pieces of loose timber which had previously been recovered from the site were examined but, although oak, found to be unsuitable for dendrochronological dating.

1.5.3 WA5010 and WA 5012, *Dovenby*, 343/11 and 12, OSGB 36 597736 180646 and 597665 180831

This site is extensively recorded in the records of the PLA. Built in the Sunderland yard of Pickersgill in 1891, this steel barque sank in collision with the Dutch steamer *Sindoro* carrying a cargo of *guano* from Lobos d'Afuera to London in 1914. Records indicate that the wreck was dispersed with explosives soon after wrecking and had also been reduced by cutting with oxy-acetylene in 1967. The site was surveyed in 2001 and 2002 using sidescan and magnetometer survey (Leather

2003), and more recently using multibeam bathymetry. Surveys show clear wreckage in two distinct locations some 100m apart. Both main locations associated with this site were dived. The presence of substantial, upstanding metal frames was confirmed. Seabed inspection was consistent with the remains representing those of the *Dovenby*.

1.6 DISCUSSION

The identification of the *Dovenby* seems secure. Wreck structure has been substantially degraded through intentional clearance and subsequent erosion. The dating of the two other sites examined might best be resolved by examination of ceramics (brick from one, pottery from the other) recovered during diving inspections. The extent of any surviving wooden wreck structure at these latter two sites remains unclear.

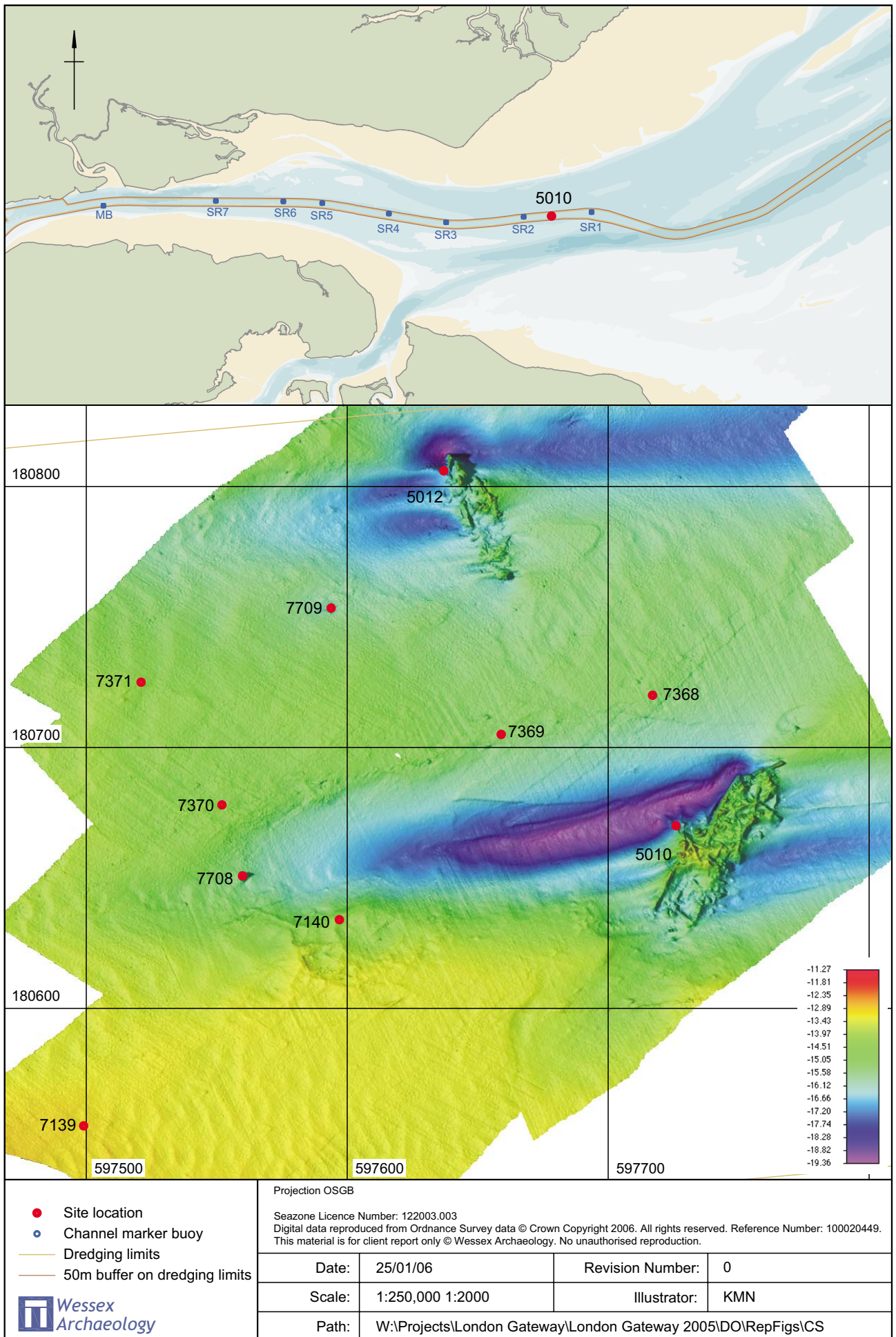
1.7 ACKNOWLEDGEMENTS

Hydrographic data and bathymetric survey results were supplied by John Pinder, PLA. The advice of Peter Steen and the support of the dive team at the Port of London Authority are gratefully acknowledged.

1.8 REFERENCES

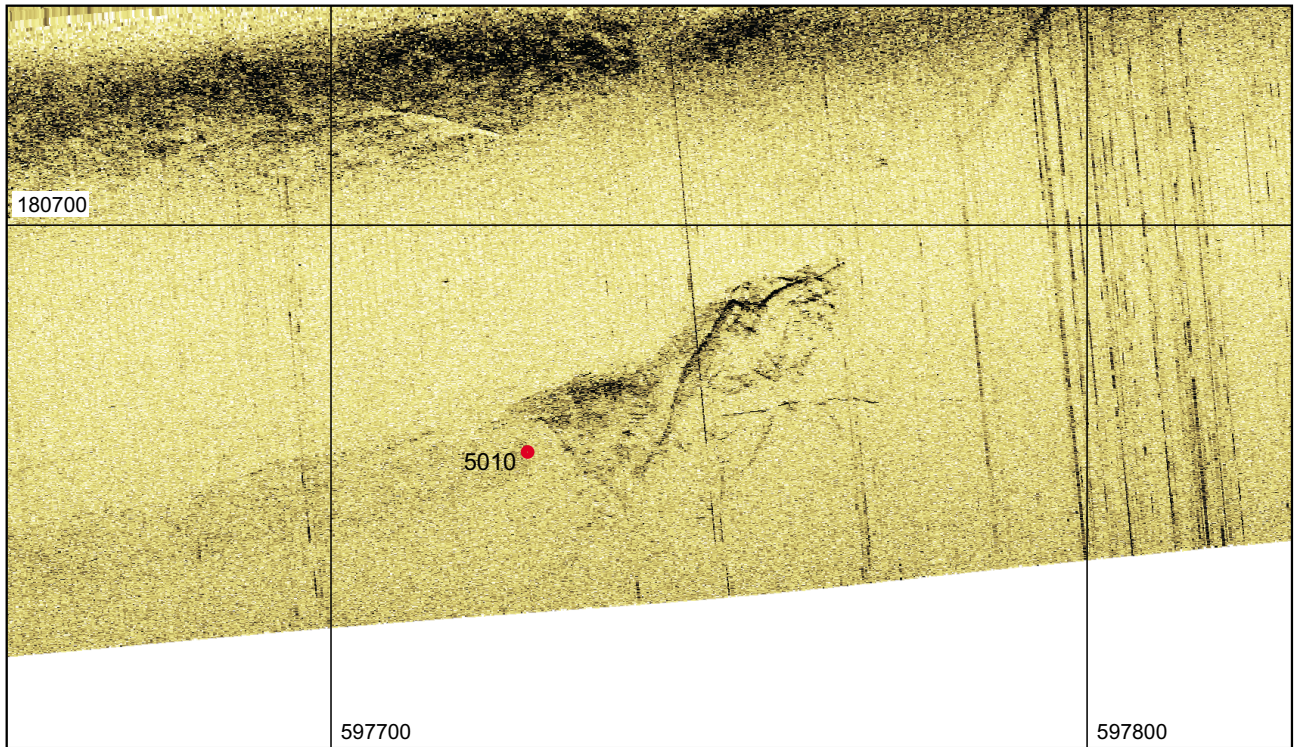
Leather, S, 2003 *Updated Wreck Site Identification: Sidescan Sonar and Marine Magnetometer Survey*, Wessex Archaeology, **London Gateway Development Technical Report Appendix Q**

Nayling, N, 2005 *London Gateway Project: Diving Inspection Report 1*, **University of Wales Lampeter London Gateway Archaeology Report 01/2005**





Location and Multibeam data for Sites 5010, 5012, 7139, 7140, 7368, 7369, 7370, 7371 and 7708.

Figure 1

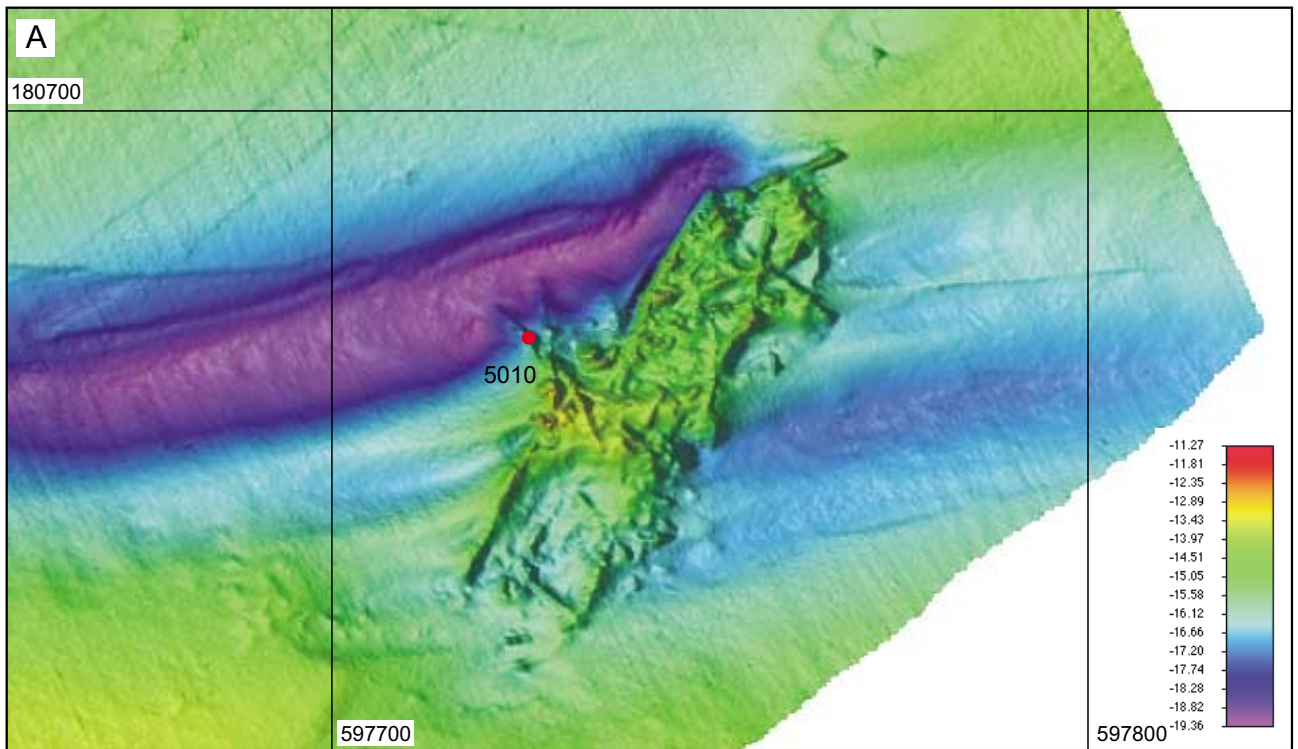


Plan view.

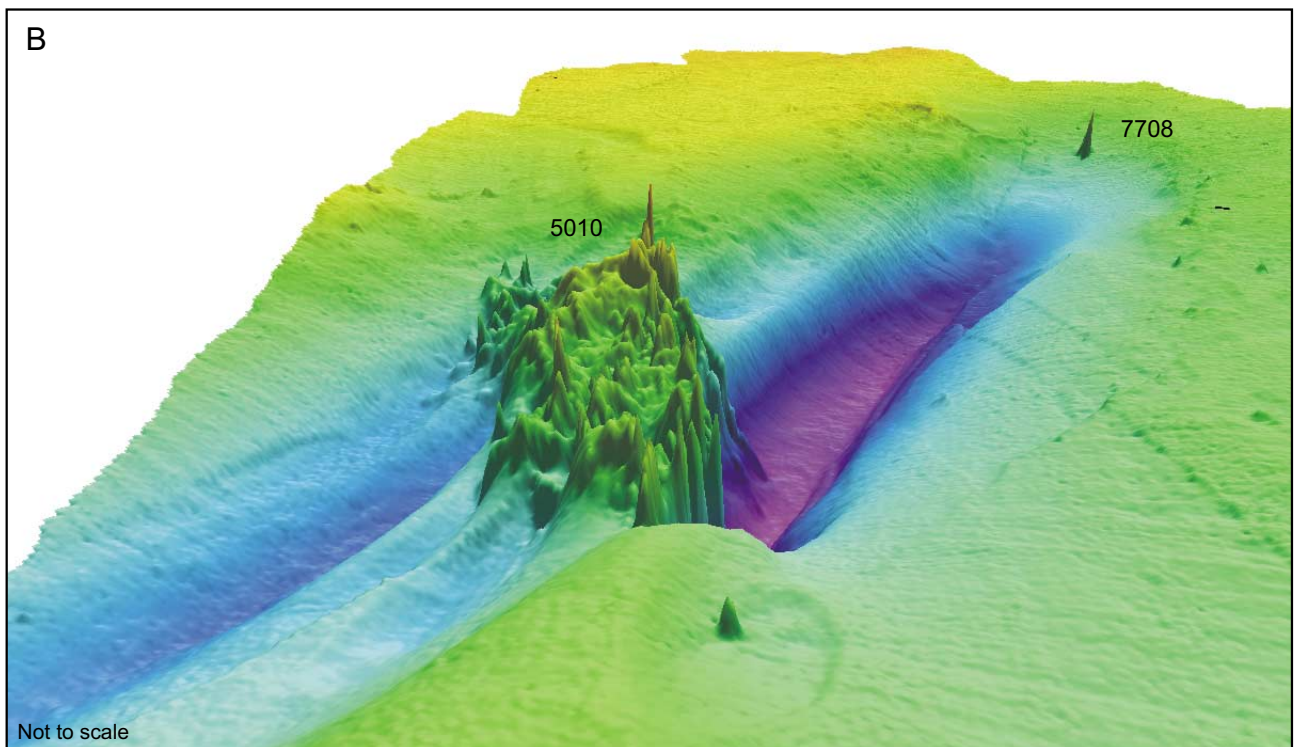
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Site 5010 - Sidescan Sonar 2002 survey data.

Figure 2



Plan view.

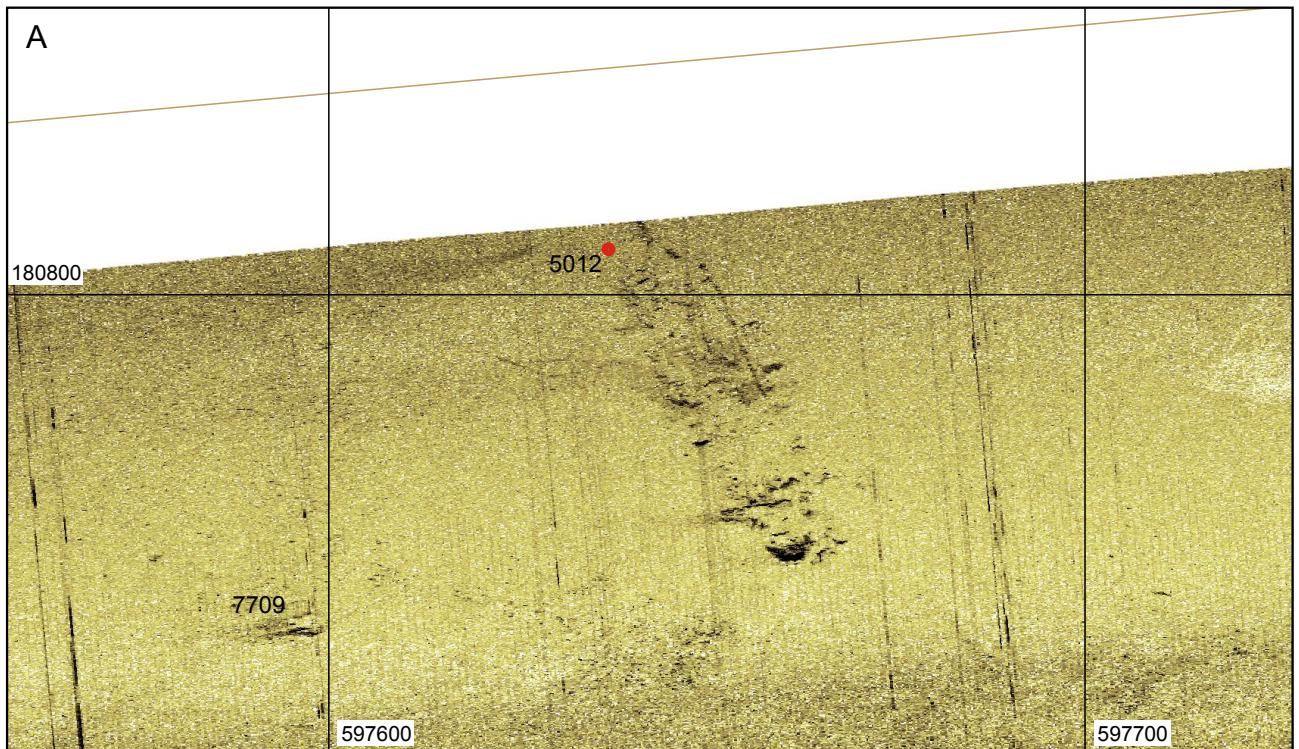


Oblique view from north.

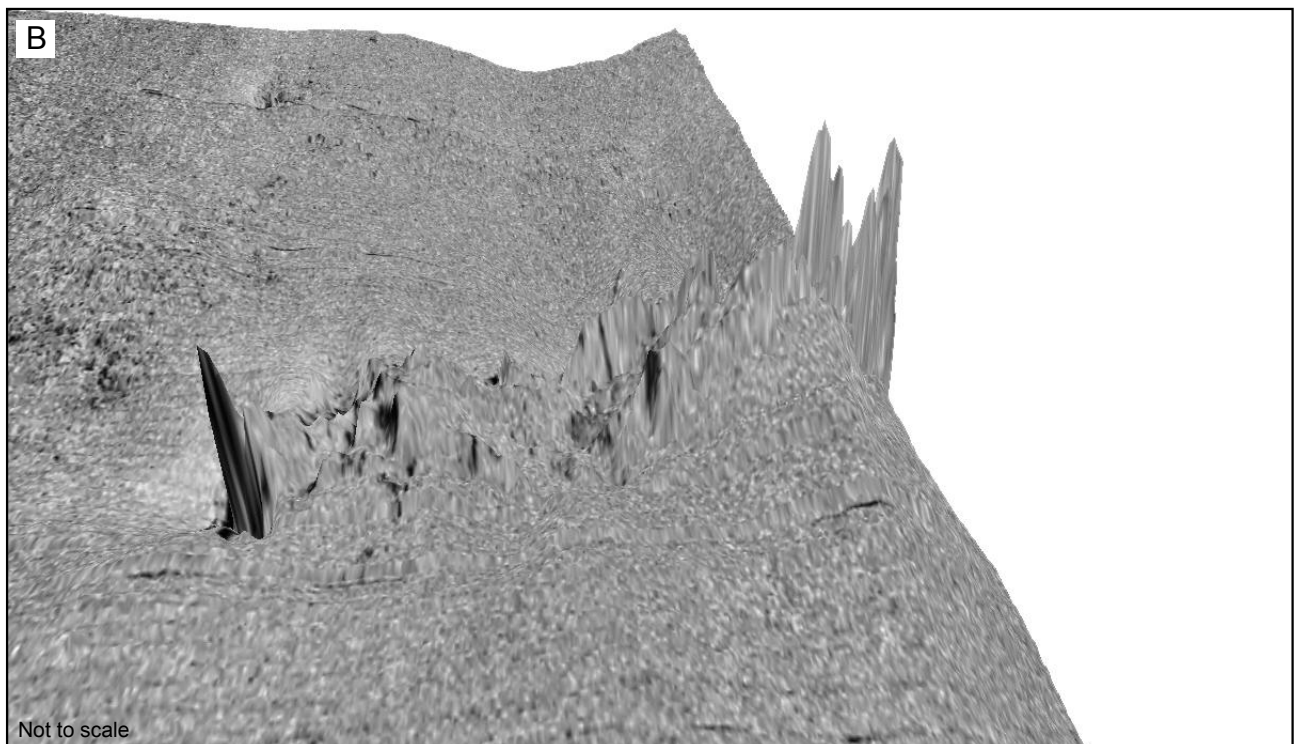
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Multibeam data for Site 5010.



Figure 3



Plan view (2002 survey data).

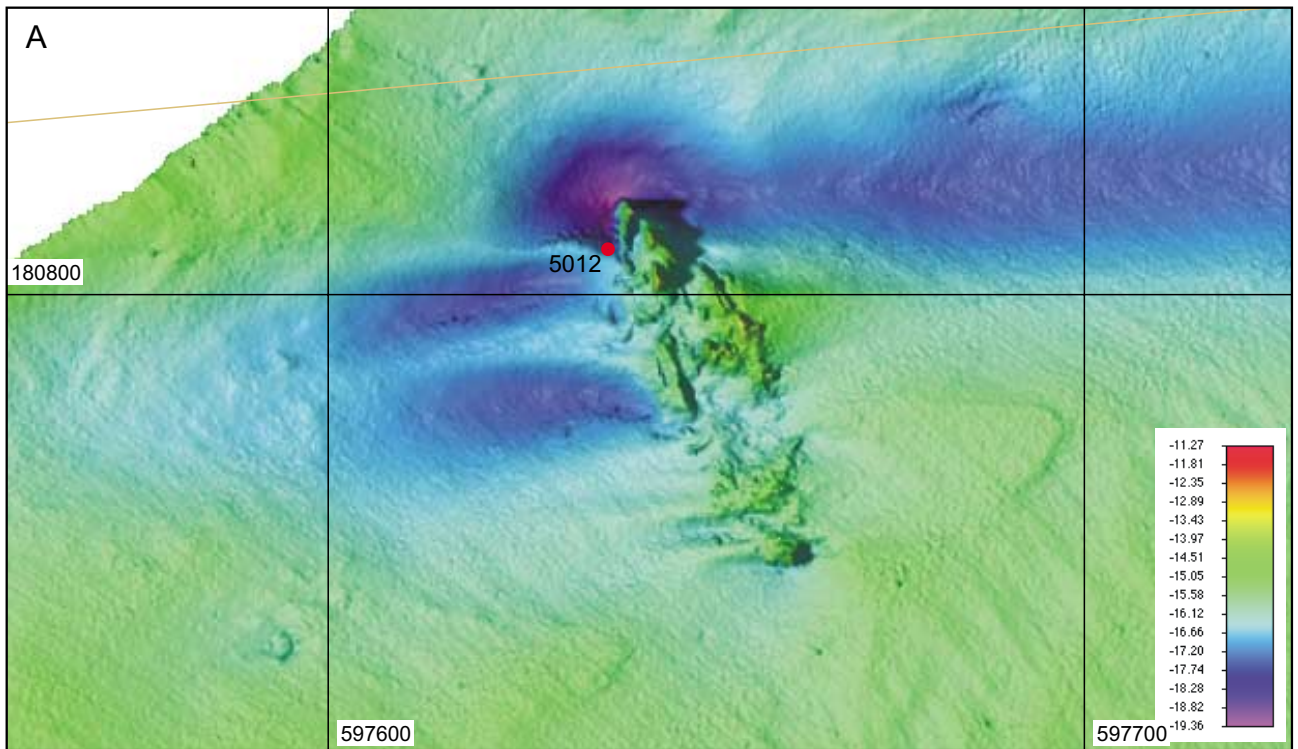


Oblique view from east.

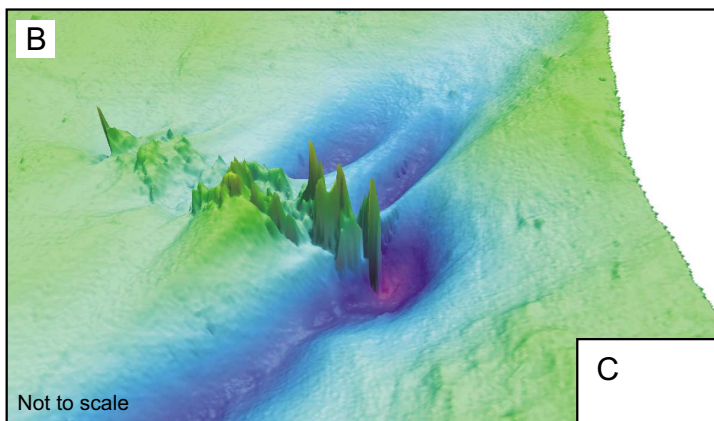
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Sidescan Sonar image of Site 5012.

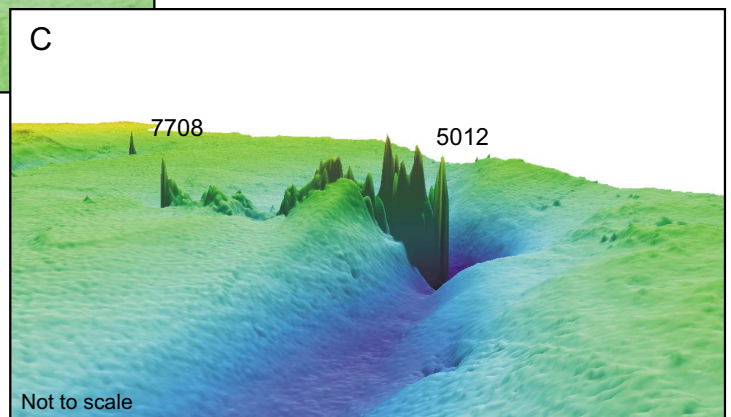
Figure 4




Plan view.

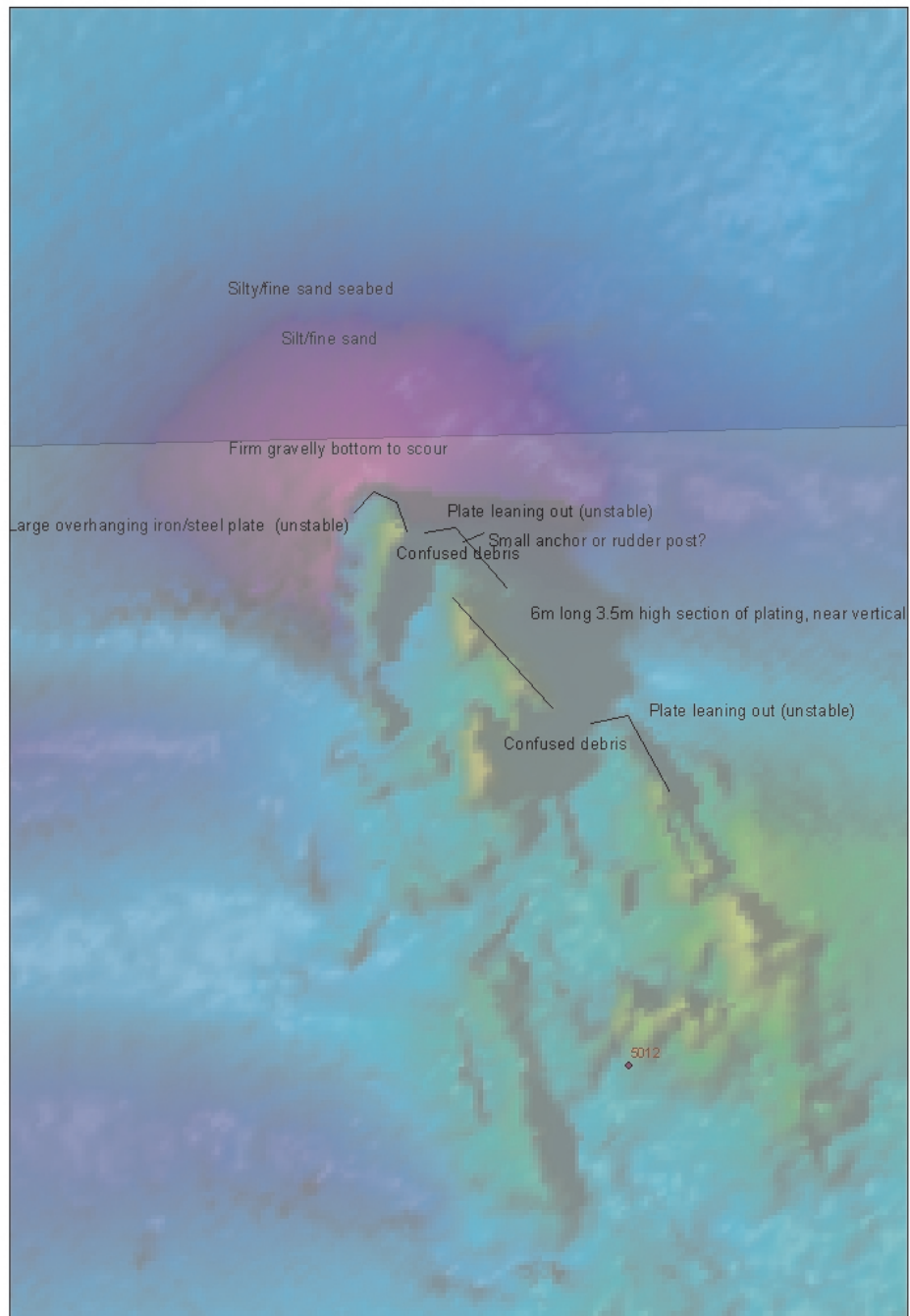


Oblique view from north-east.



Oblique view from east.

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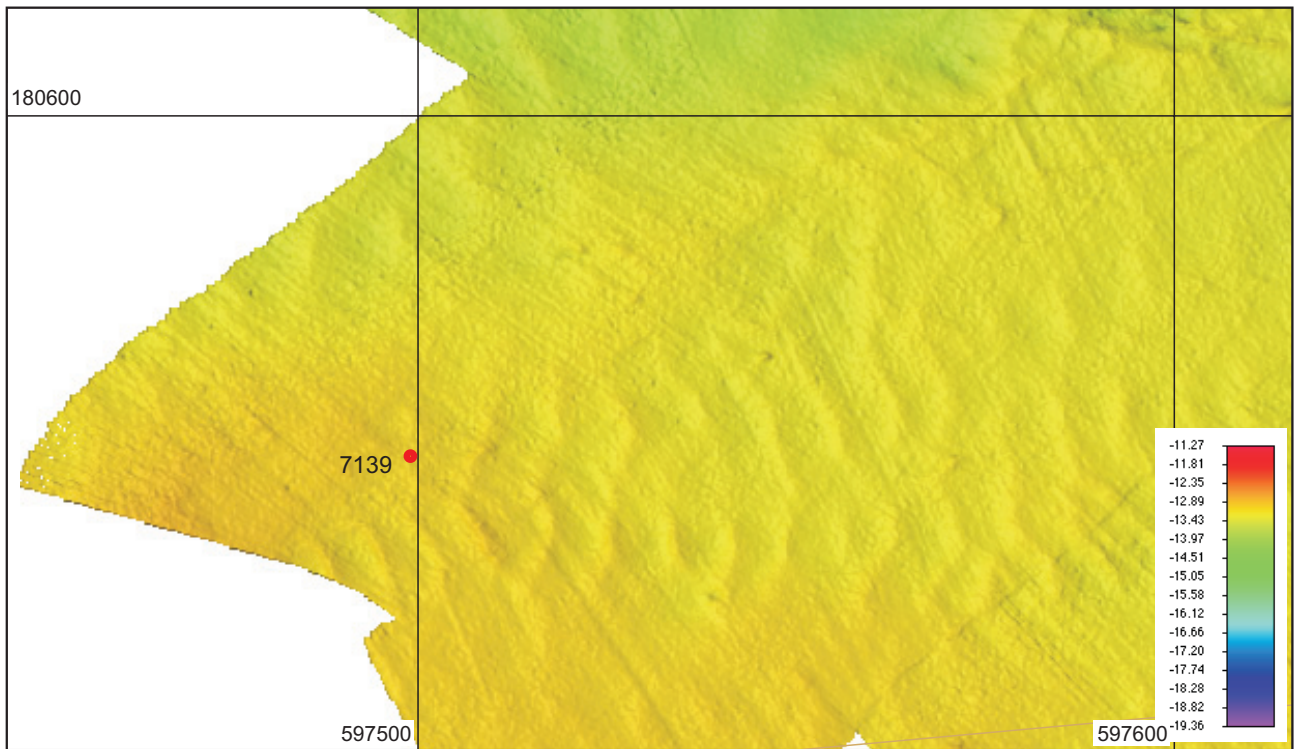
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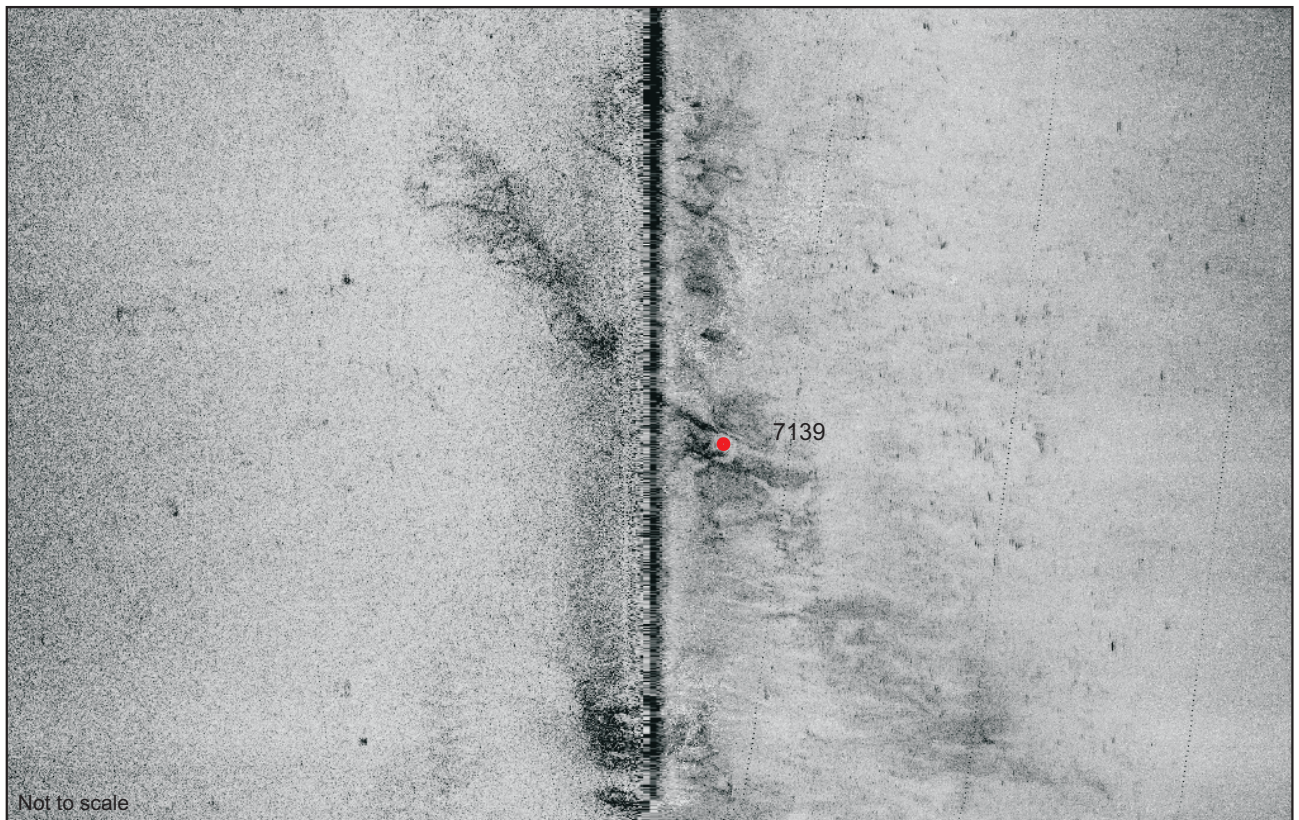
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2007 Diving investigation of the northern part of site 5012.


Figure 6



Multibeam data - plan view.

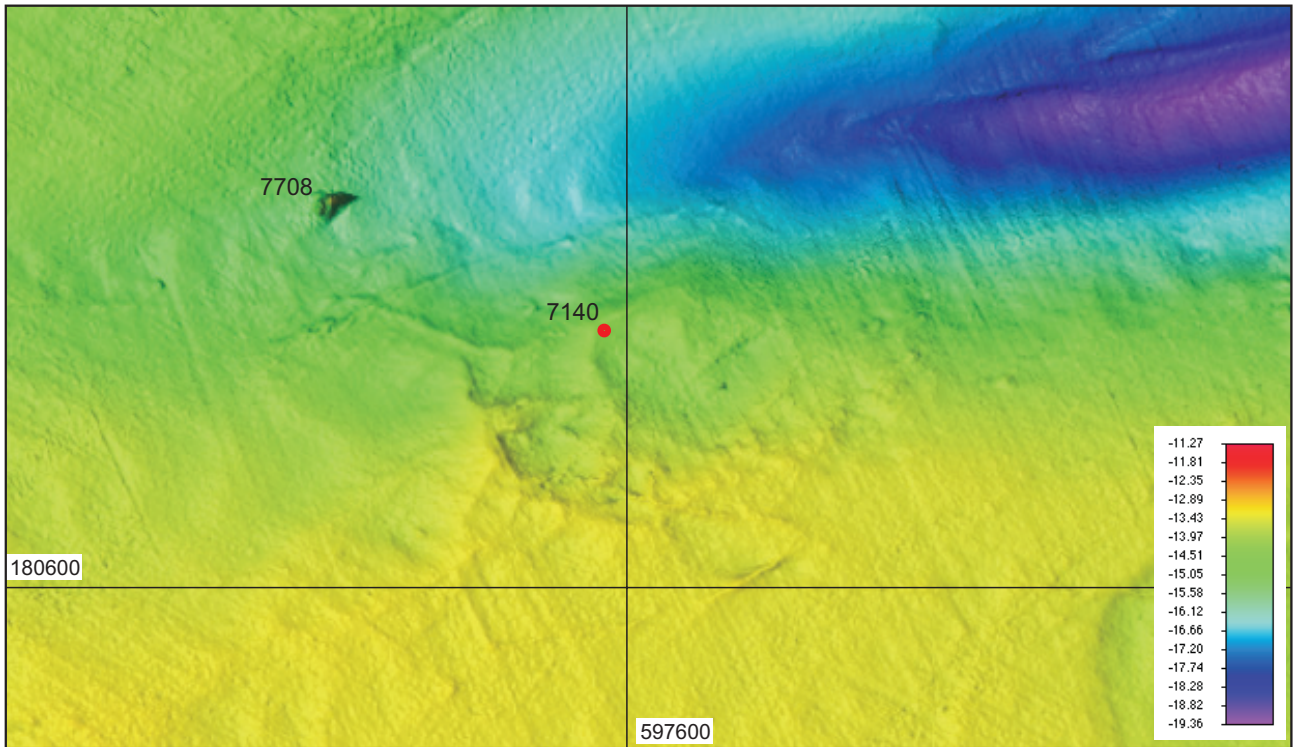


Sidescan Sonar data - plan view.

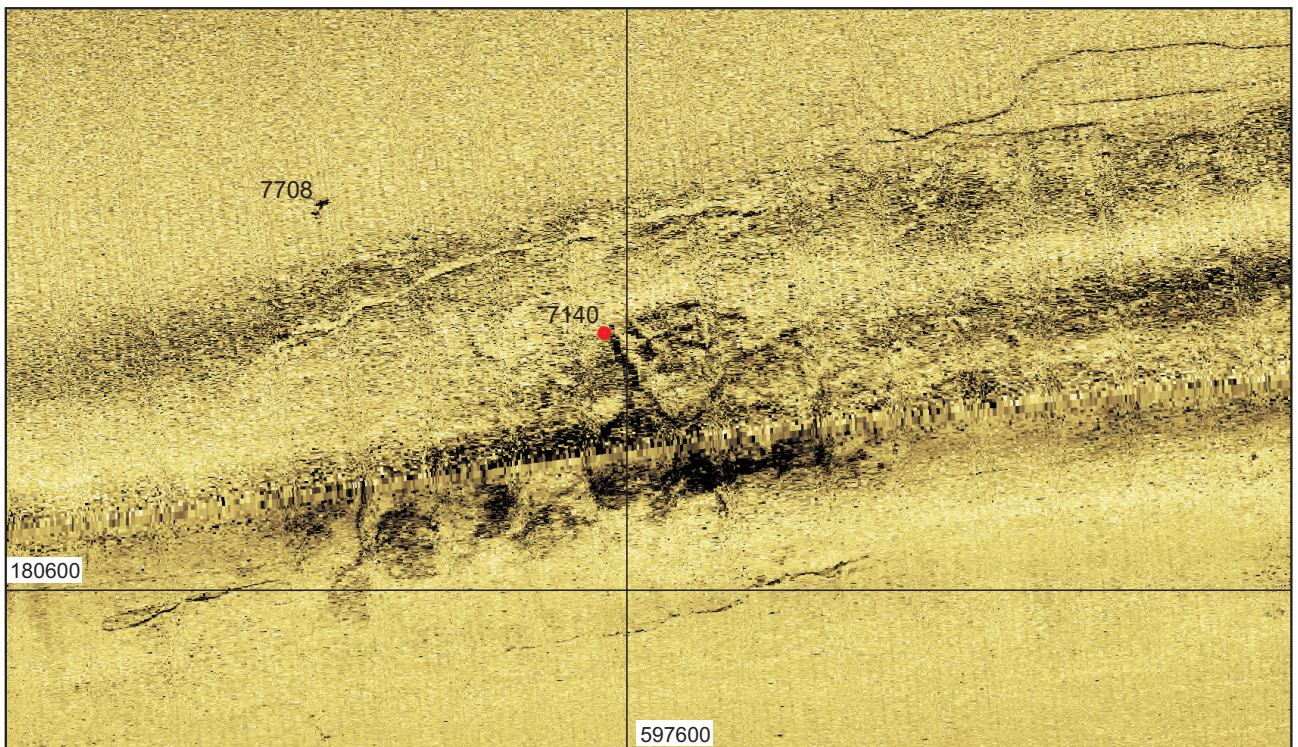
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Multibeam and Sidescan Sonar data for Site 7139.


Figure 7



Multibeam data - plan view.

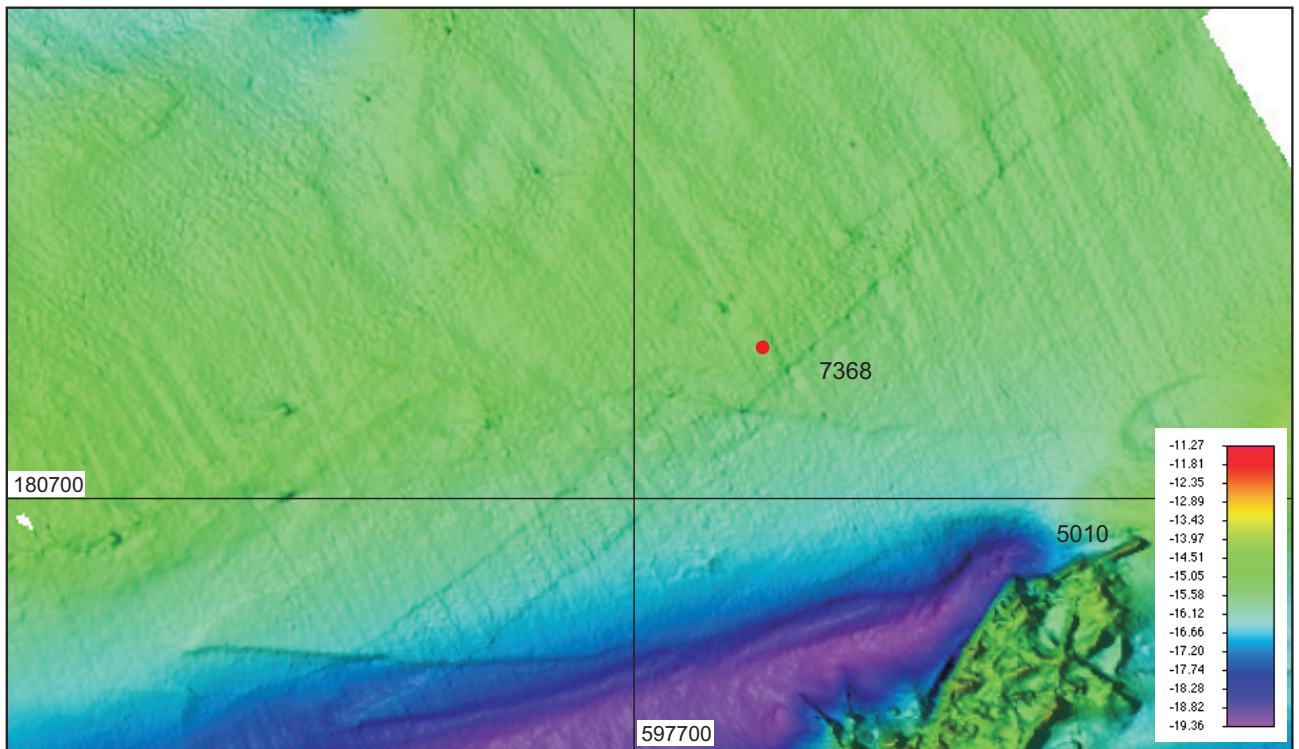


Sidescan Sonar 2002 survey data - plan view.

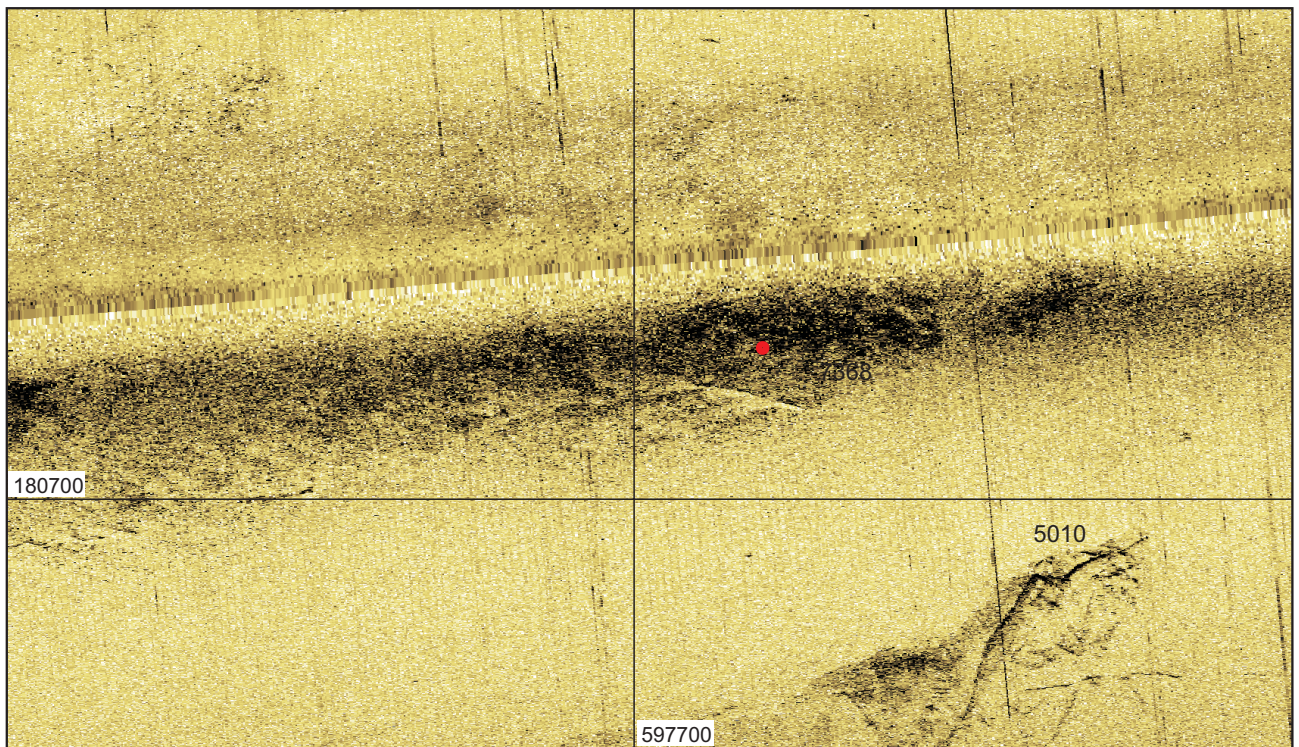
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Multibeam and Sidescan Sonar data for Site 7140.


Figure 8



Multibeam data - plan view.

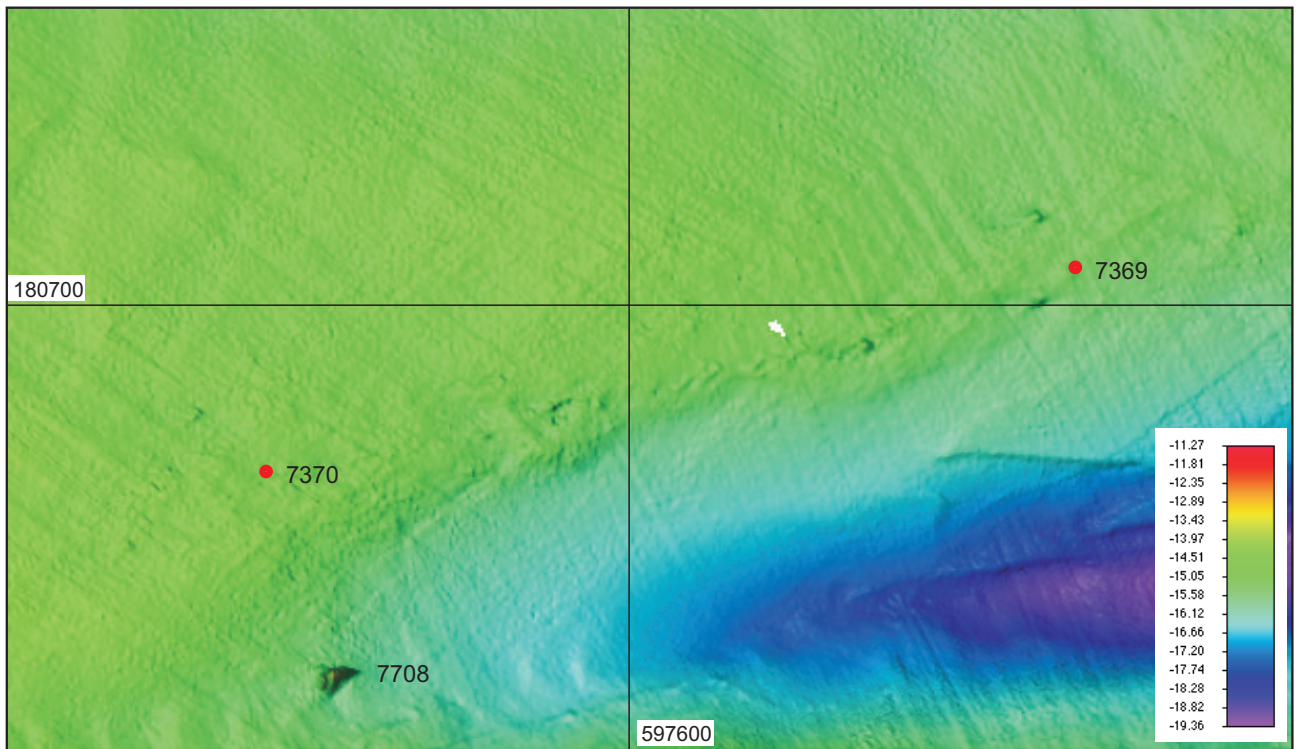


Sidescan Sonar 2002 survey data - plan view.

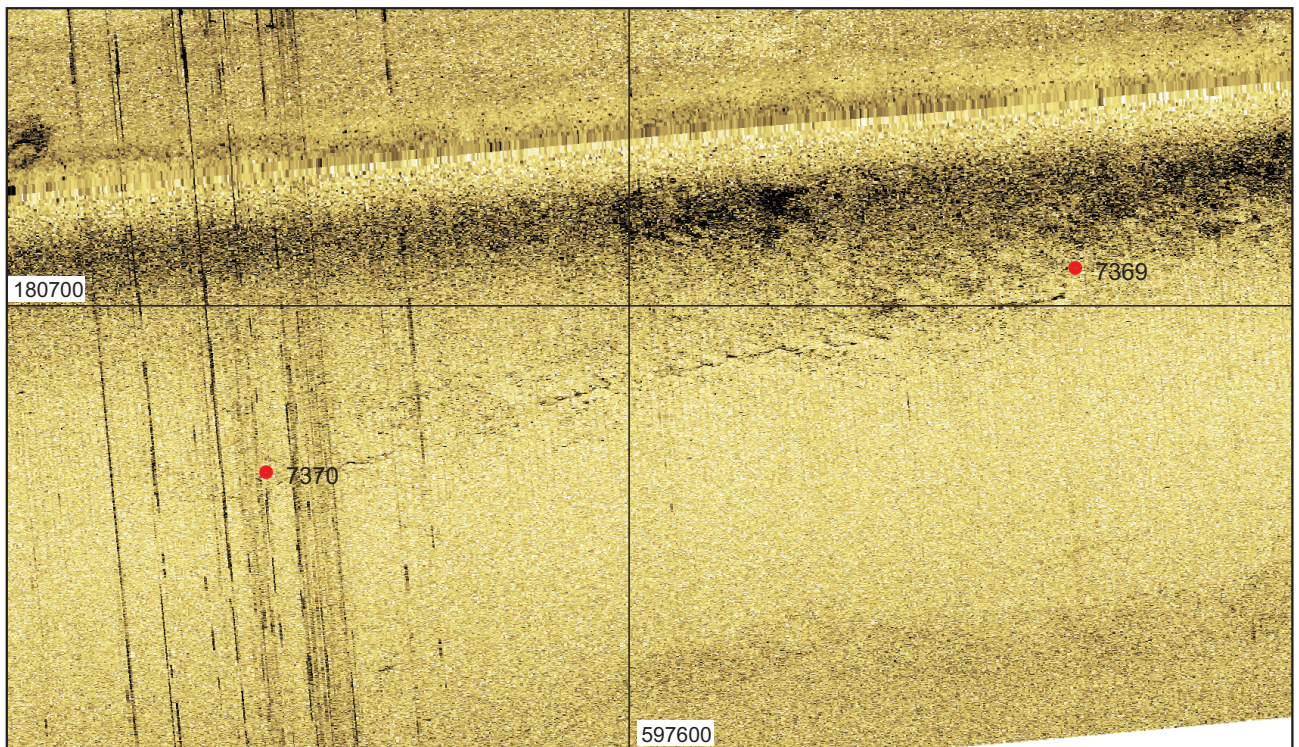
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Multibeam and Sidescan Sonar data for Site 7368.


Figure 9



Multibeam data - plan view.

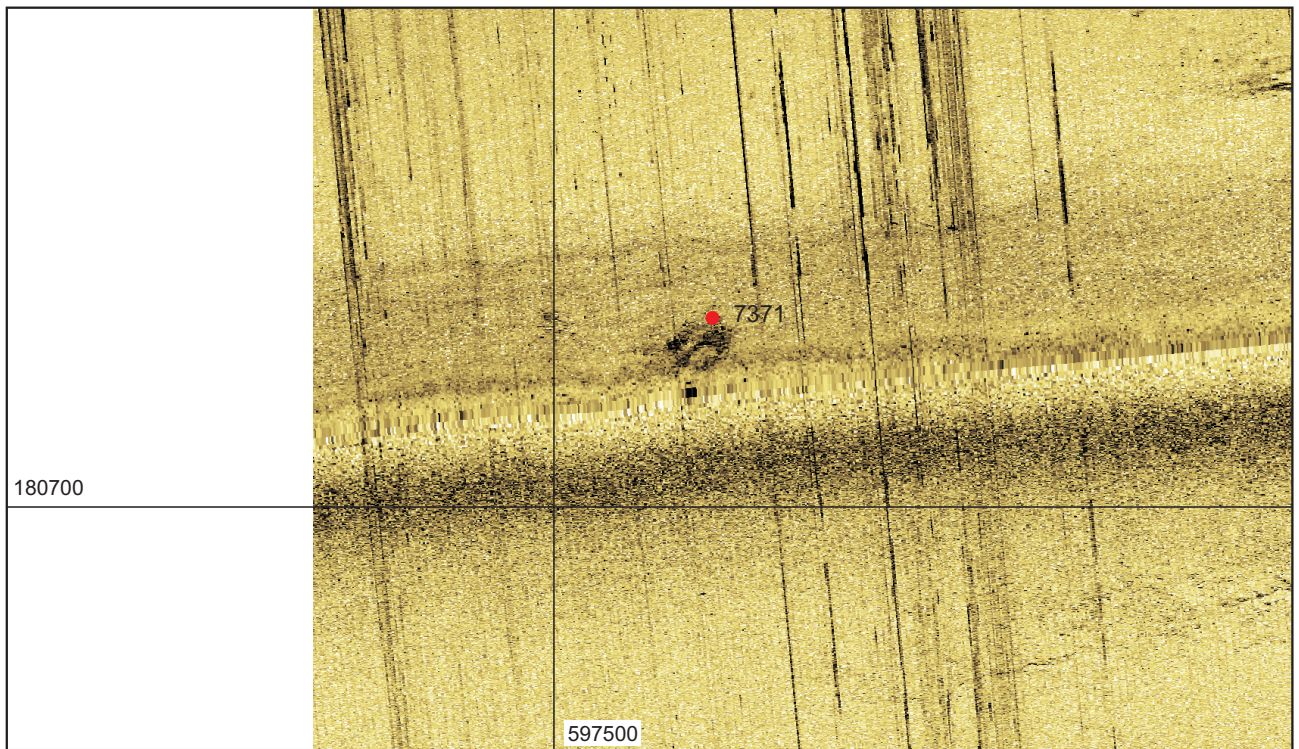


Sidescan Sonar 2002 survey data - plan view.


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Multibeam and Sidescan Sonar data for Sites 7369 and 7370.

Figure 10

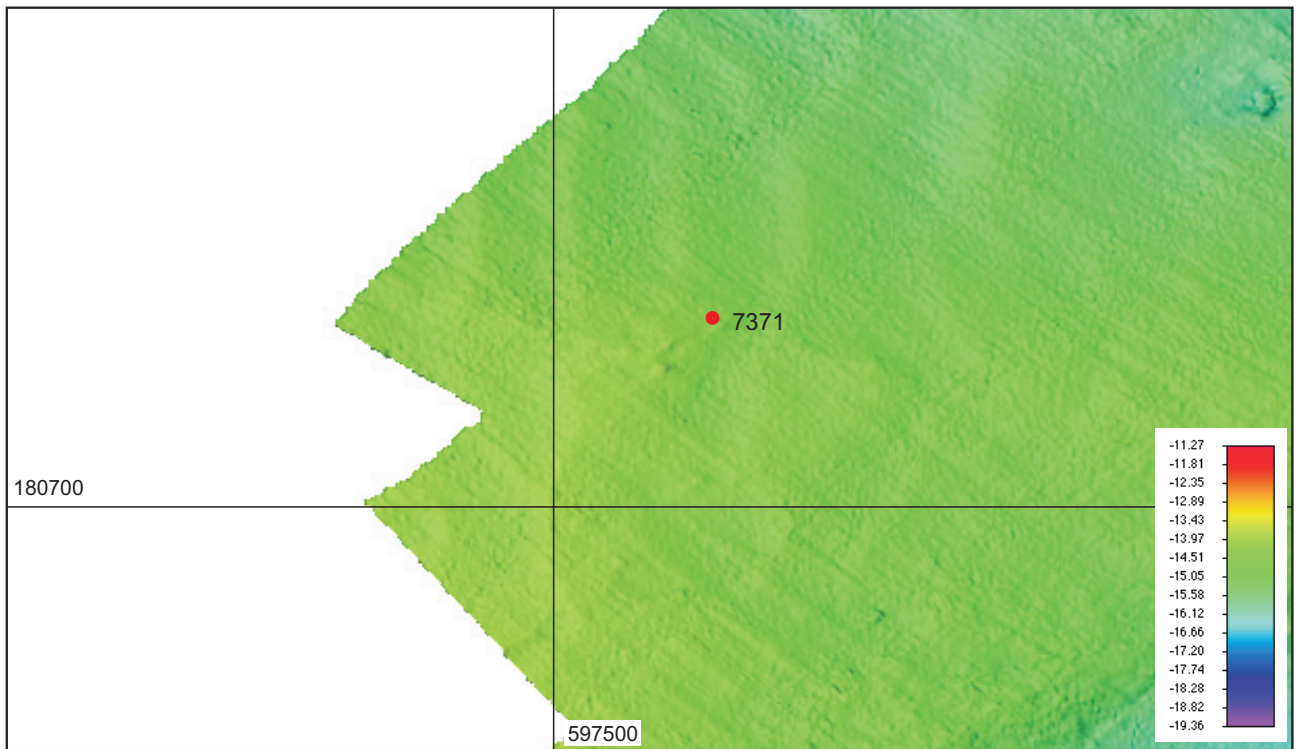


Plan view (2002 survey data).

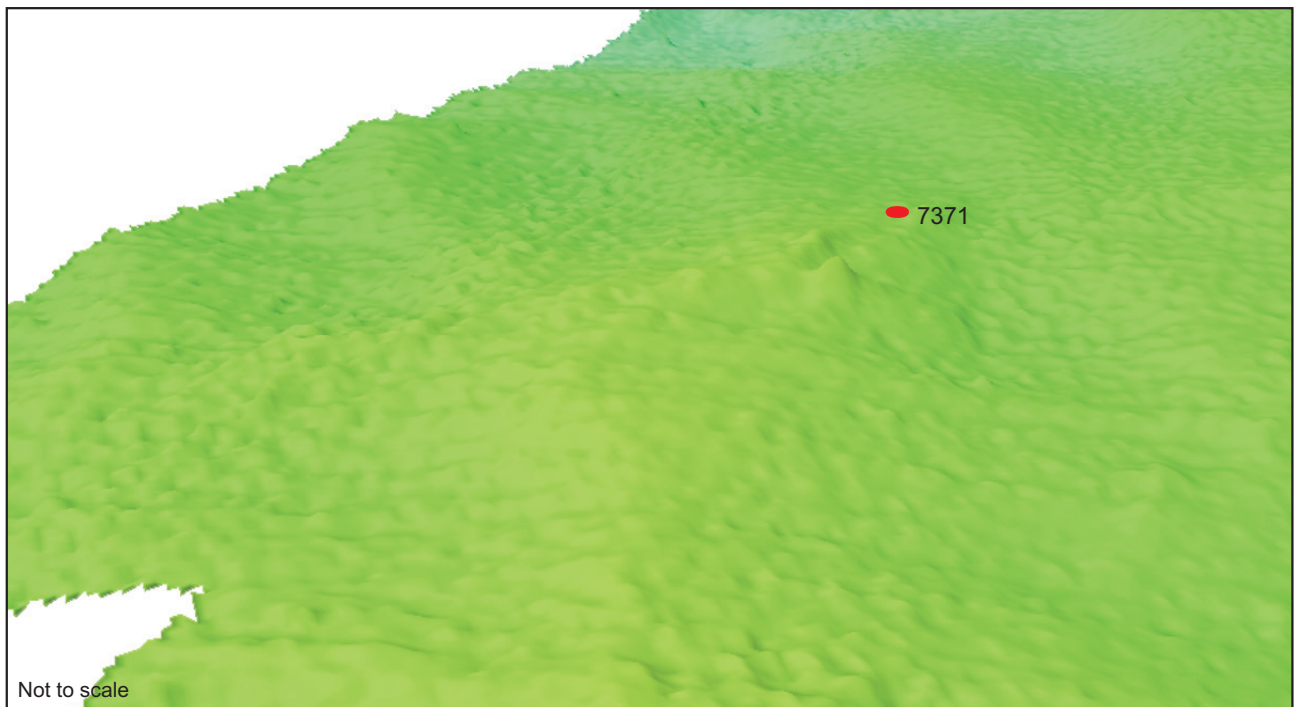
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Sidesacn Sonar image for Site 7371.


Figure 11



Plan view.

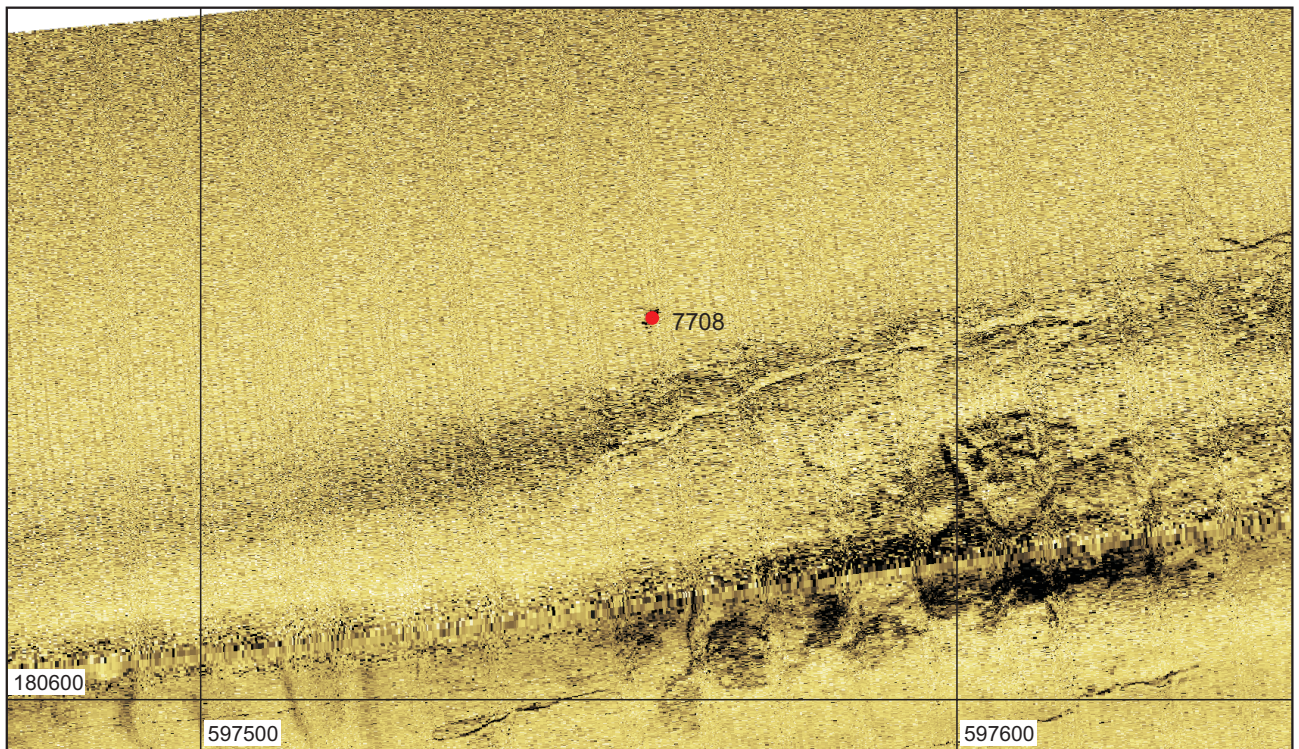


Oblique view from the south west.


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Multibeam data for Site 7371.

Figure 12

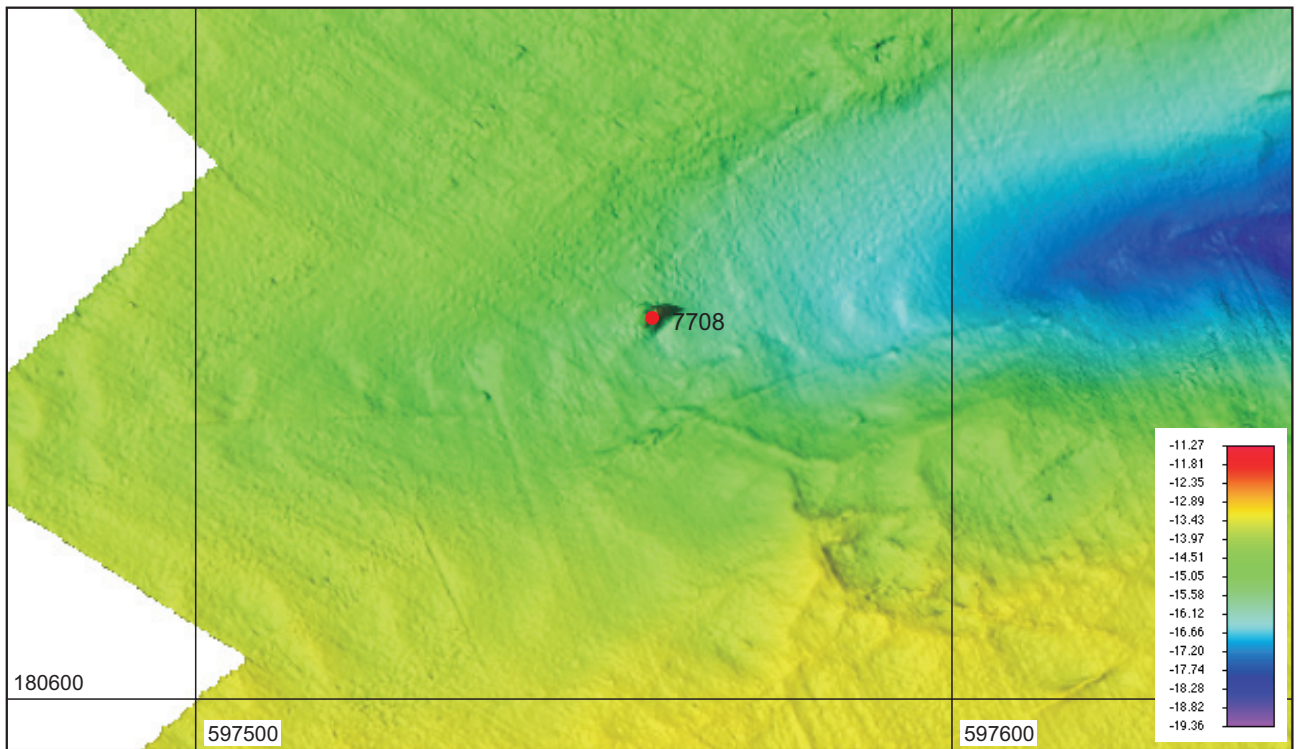


Plan view (2002 survey data).

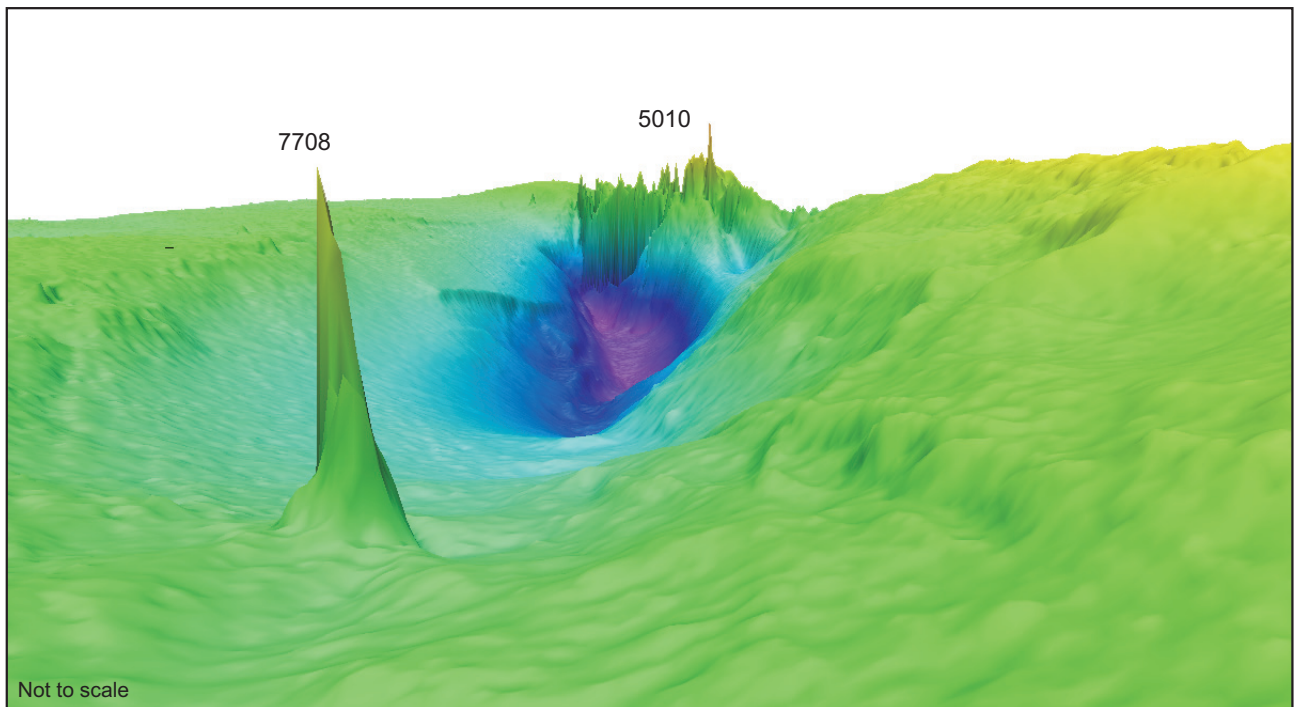
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Sidesacn Sonar image for Site 7708.


Figure 13



Plan view.

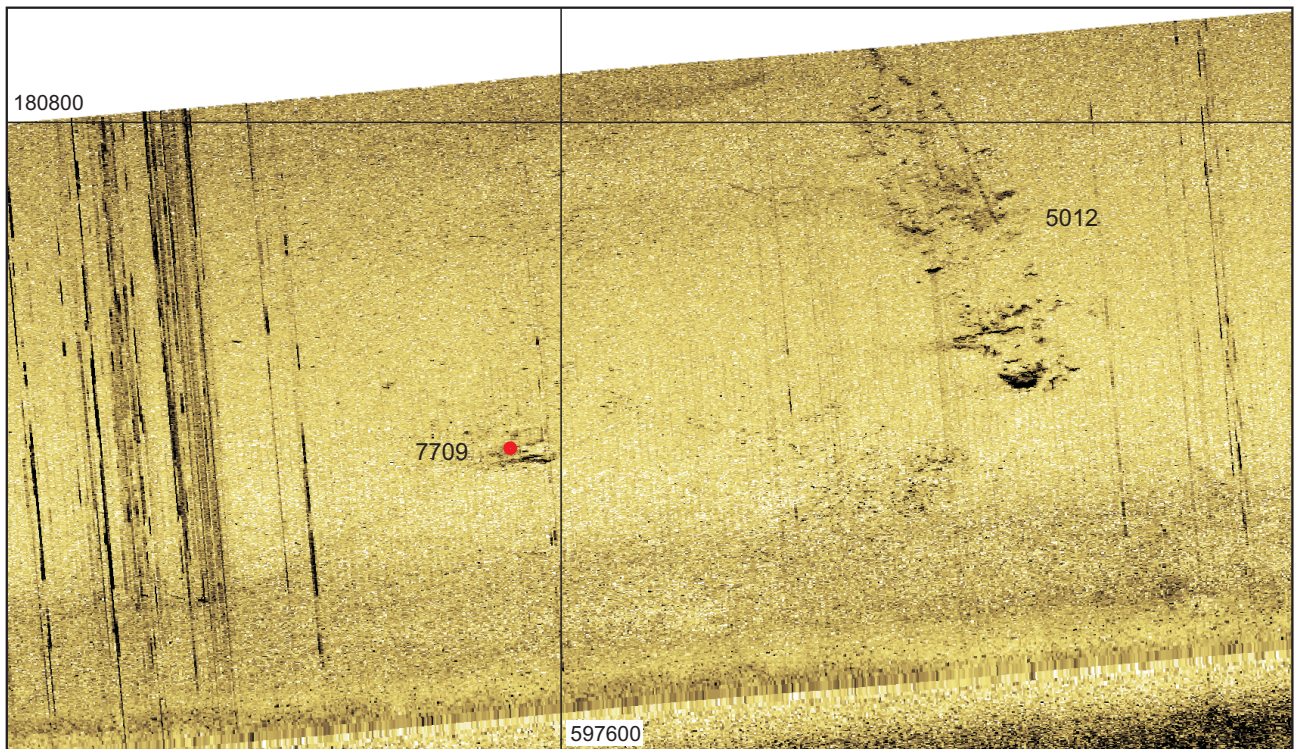


Oblique view from the west.


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Multibeam data for Site 7708.

Figure 14

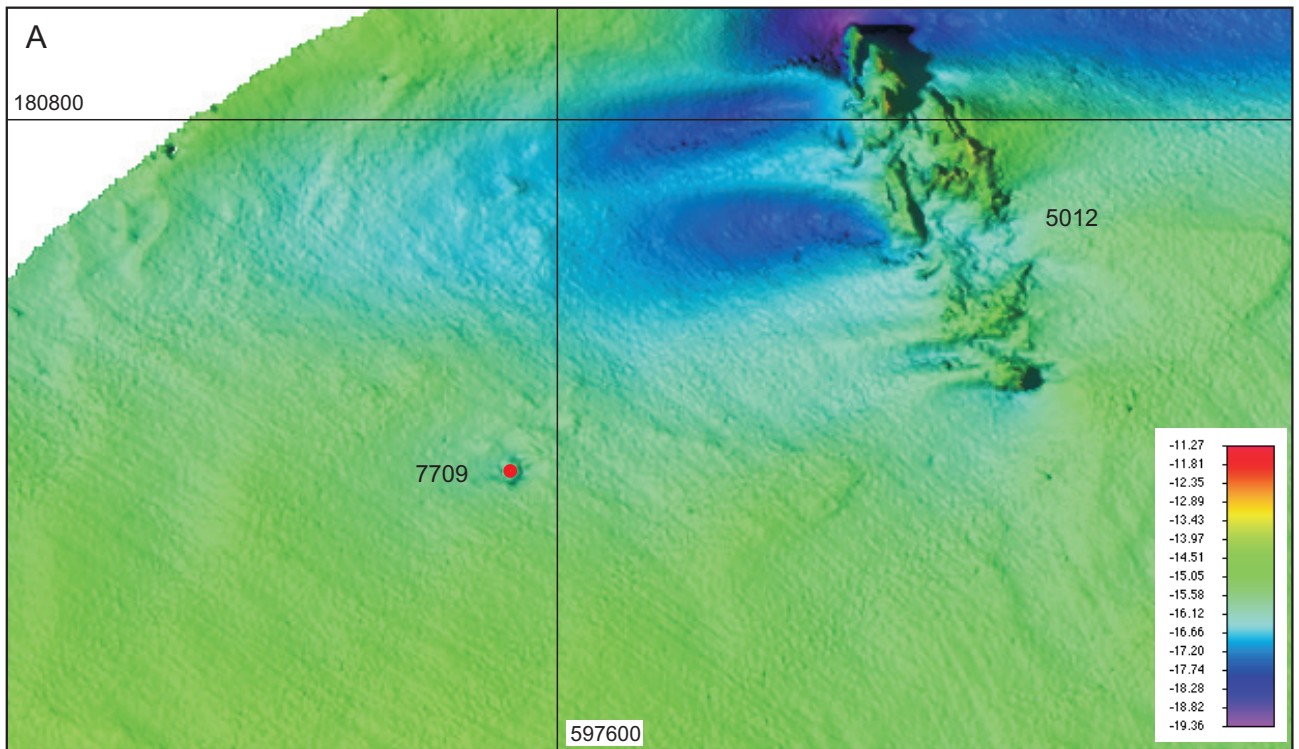


Plan view.

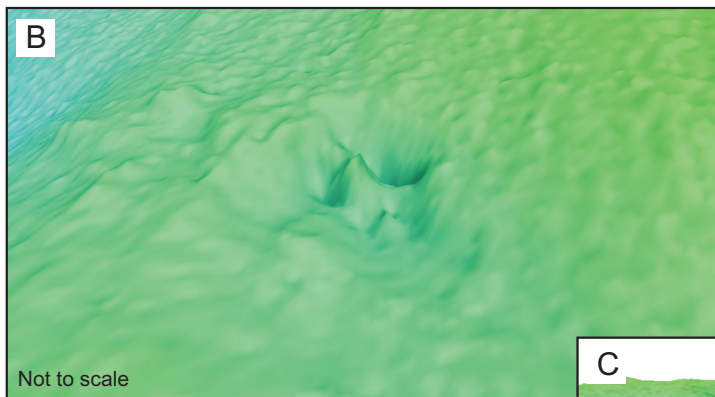
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Site 7709 - Sidescan Sonar 2002 survey data.

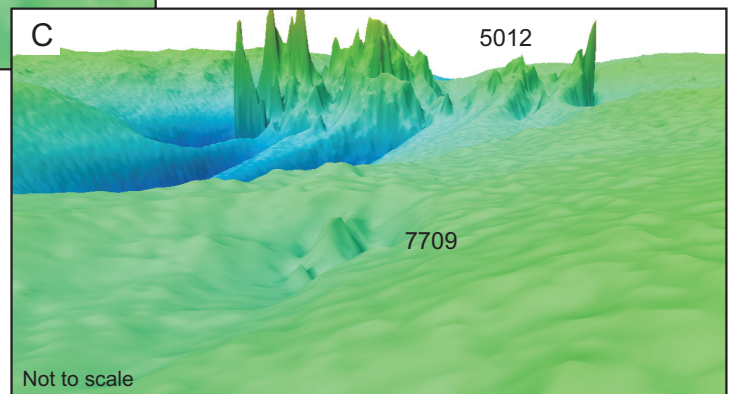
Figure 15




Plan view.



Oblique view from north-west.



Oblique view from west.


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Date unknown.



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**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5011.02
December 2007**

Site ID: 5011

Site Name: *Atherton*

PLA Wreck No.: 201/45

Mitigation Group: 2.2.3. Site of possible archaeological interest, seaward of SR1

No. of Casualties: Unknown

Vessel Type: Civilian cargo vessel

Cause of Loss: Cargo Shift

Current Recording Status: Level 2

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the site's discovery and includes all forms of investigation to date:

1921	Vessel sank circumstances unknown (12/1921);
1921	Wreck located at 51°29'20" N 00°58'24" E wreck is marked by G CONL LT Buoy (28/12/1921);
1923	Wreck dispersed to 14.63 metres buoy removed (12/02/1923);
1948	Wreck is drift swept at 51°29'19" N 00°58'56" E, clear at 31.71 metres and foul at 14.02 metres (31/07/1948);
1954	Wreck located at 51°29'19" N 00°58'52" E;
1959	Dispersal operations on the wreck by Royal Navy?;
1961	Wreck located and swept clear to 14.33 metres but foul at 14.63 metres. The least depth is 15.84 metres in a general depth of 16-18 metres. The scour depth is 20.73 metres. The wreck appears to be in two parts, approx. 76 metres apart or two superstructures with the centre covered by sand (05/09/1961);
1971	Wreck was located at 51°29'21" N 00°58'51" E (high fix) and swept clear at 14.02 metres, foul at 14.33 metres. Least depth of 14.17 metres in a general depth 16.76 metres. The scour depth is 19.51 metres. The wreck lies sw/ne and is 45.72 metres long with a scour to the north (26/11/1971);
1978	Wreck swept, sweep parted when fouled. Seabed consists of clay mud sand and shell. Wreck 45.72 metres long with a scour to the n.n.w. no change since in depth since 1971 (12/10/1978);
1993	Wreck located at 51°29'0" N 00°58'52" E (microfix). The least depth was 14.9 metres in a general depth of 16-18 metres. It is a large wreck, easy to find, upstanding by 4 metres, fragmented parts lie over an area 50 x 50 metres in a s.s.w. direction with a twin scour in the north to west sector (21/06/1993);
2005	Wreck surveyed for P&O London Gateway. The wreck is 40 x 14 metres centred on 606930 180925, least depth 14.3 metres at 606934 E 180936 N. The general depth is 17.5m and the scour depth is 19m off the north west corner but is not extensive (02/02/2005);
2005	Wreck located by PLA at 51° 29.364 N 00° 58.762 E (13/06/2005);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005).

2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).
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2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2005	UKHO (12889);
2005	NMR (904777);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	Wessex Archaeology, Geophysical Analysis of 2005 multibeam (inclusive of: one geo tiff and four tiff images);
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and four tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from 2005 multibeam data: 359719.618E 5706188.752 N

Location (derived from 2005 multibeam data): The site is located at Oaze Deep 163 metres outside the north edge of the dredged channel (**Figure 1**).

Bed Depth: 17.8 metres

Minimum Target Depth: 14.63 metres

Extent: 40 x 20 x 3 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site is located outside the 2001 survey area.

2002 WA sidescan sonar interpretation:

The site is located outside the 2002 survey area.

2005 WA interpretation of PLA multibeam data:

In 2005 a multibeam survey was undertaken over the site of the *Atherton*. The site lies in a northeast, south west orientation, is rectangular in shape with a scour hole at the northwest corner (**Figure 1A**).

The wreck is 45 metres long, 20 metres wide and 3 metres upstanding at its tallest point. The scour hole at the north western corner of the wreck is 40 metres long, 25 metres wide and 1.5 metres deep which gives the seabed at this point a total depth of 19.4 metres (**Figure 1A**).

The wreck appears to have a gap just off its centre which is 9 metres long and 5 metres wide. The south eastern corner of the wreck stands slightly by itself and is 12 metres wide, 10 metres long and 1.8 metres upstanding (**Figure 1A-B**).

In the scour hole at the north western corner of the wreck there are three small anomalies all of which are 2 metres wide. The most northern one is 0.15 metres upstanding; the south eastern one is 0.25 metres upstanding whilst the south western one is 0.15 metres upstanding (**Figure 1B**).

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data and provided additional detail (**Figure 2**). The wreck site measures 40 metres by 20 metres confirming the multibeam interpretation. At its maximum the wreck sites is upstanding by 2.5 metres. The wreck is broken up but appears intact at the western end of the wreck with some structure showing. Also a series of parallel linear reflectors across the width of the wreck are observed indicating intact structure in the western portion of the wreck. Four distinct linear reflectors, also indicating structure, are observed running along the length of the wreck and measure up to 13 metres long and 1.2 metres high.

Small features measuring up to 1 metre diameter are observed within a 10 metre buffer of the wreck. These features show heights of up to 0.5 metres above the surrounding seabed and are interpreted as likely debris associated with the wreck.

Scour is observed to the west of the northern section of the wreck in agreement with the multibeam data.

4. SITE HISTORY

Build

The steamer *Atherton* was originally built as the *Arnhem* by I.S, Figuee, Vlaardingen, Netherlands in 1918. When the *Arnhem* was acquired by the Gower shipping Co. Ltd of Swansea she was renamed *Atherton*.

Atherton is listed in Lloyds Register of 1920-21 with the following specifications (Lloyds of London 1774-):

Steamer's Name, Material, Rig, &c.	<i>Atherton (ex Arnhem)</i> Steel, screw, schooner, 1 deck
Registered Tonnage	
Gross:	318
Under deck:	251
Net:	166
Build Date	1918
By	I.S. Figuee
Where	Vlaardingen, Netherlands
Owners	Gower shipping Co. Ltd (C.A.R. Gibbs, manager).
Registered Dimensions, Deck Erections &c.	
Length	133ft (40.5m)
Breadth	23ft (7m)
Depth (in feet and tenths of a feet)	10.7ft (3.26m)
Port of Registry	Swansea – British
Engines	Triple expansion steam engine with 3 cylinders. Diameter of cylinders and length of stroke in inches: 11,18 & 30 - 22
Horsepower	43 NHP (Nominal Horse Power)
Engines built by	L.S. Mulders of Utrecht
Ballast	Carries water ballast (no particulars)

A copy of the profile plan with ships lines was provided by the Stadsarchief in Vlaardingen, with details listed below (**Figure 3**):

Plan No	Scale	Content
S-41	N/A, annotated	Profile of vessel annotated with dimensions (in meters). Also contained within the plan is a schematic depicting the ships lines

Use

The *Atherton* worked on coastal routes around Britain and across the English Channel, usually carrying general cargo. An entry within the Lloyd's List for the 21st of January describes an incident that occurred on one of these typical journeys (Lloyds of London 1734-):

'Grampian. London 20th January 1921 – Steamer Grampian of Glasgow, St. John (N.B.) for London with general cargo, was in collision with steamer Atherton on January 15th in the River Thames and had stem holed.'

Loss

The *Atherton* was lost on the 25th December 1921 in the Thames Estuary, near the Middle Oaze Buoy. The sinking was recorded in both the Lloyd's Weekly Casualty Reports (January 2nd 1922) (Lloyds of London 1920-1994) and in the Times (27th December 1921) (The Times 1785-1985). The Times report reads as follows:

"The master of the steamer Atherton, bound from London to Antwerp with general cargo, reported to Lloyd's yesterday that early on Christmas Day, when in the vicinity of the Girdlers Lightship, in the Thames Estuary, the deck cargo shifted, and the vessel took a heavy list, and was abandoned on her beam ends at anchor near Middle Ouse buoy, the crew being rescued by the steamer Falcon. The Atherton sank a few hours later."

The master and crew of the steamer *Antinoe* actually saw the *Atherton* sinking and were able to give an exact time, their account being recorded in the Lloyd's Weekly Casualty Reports (Lloyds of London 1920-1994):

"North Foreland Wireless Station, Dec. 25 – Following from steamer Antoinette: Steamer Atherton sank at 1:30pm today, Middle-Oaze Buoy bearing N.E. half mile, cause unknown (the Atherton by this time was unmanned, the crew having been picked up earlier by the Falcon). Saw ship sink at anchor. No boats or crew visible. Passed empty boat 10 minutes later."

The time of sinking was verified by a second report from a vessel passing close by, also recorded in the Lloyd's Weekly Casualty Reports (Lloyds of London 1920-1994) for 2nd January 1922.

"North Foreland Wireless Station, Dec. 25 – Following from tug Lady Brassy: We saw ship sink and passed two boats, one submerged, other capsized, bearing name port "Swansea", at 1:50pm to-day, position half-mile north (mag.) from Girdler light-vessel."

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'possible' archaeological interest. The key aspects of the site that have lead to the above rating are:

- Despite dispersal activity there are still scattered debris and upstanding features, indicating substantial remains of the seabed;
- It is not known whether there are any surviving examples of this vessel type;
- The wreck may contain evidence of life on board the vessel at the time of loss.

6. CONSTRAINTS

The site is upstanding by at least 3 metres (multibeam interpretation) and therefore entanglement maybe an issue when investigating the site with divers.

7. STAGE I MITIGATION

Stage I Mitigation is intended to achieve a Level 2 record of the site, which is a record that provides sufficient data to establish the extent, character, date and importance of the site.

Level 2 recording has been achieved for this site through geophysical surveys and documentary research. The extent of the site, as far as visible above the seabed, has been established through multibeam and sidescan sonar survey. Character, date and importance of the site are evident from the documentary research. No human remains are present on the site. Further archaeological diving is not necessary.

8. OUTLINE OF STAGE II MITIGATION

The wreck lies 163 metres outside the dredged channel. The wreck will be cleared by grabbing. No further mitigation is required.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will have been cleared by grabbing.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2005 multibeam data	WA
2005 multibeam data consisting of one geo-tiff and four tiff images	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

Material	Location
UKHO (12889)	WA
NMR (904777)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Intertidal and Marine in respect of the proposed development of London Gateway	WA
Five printed images of the 2005 multibeam data	WA

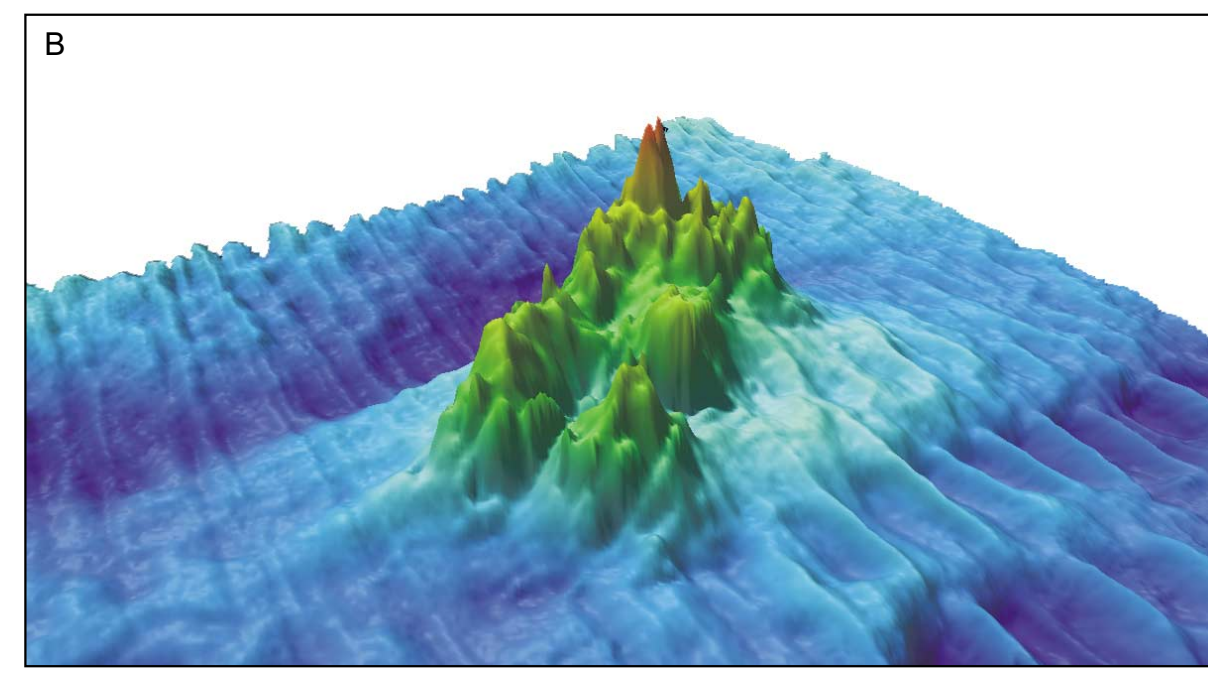
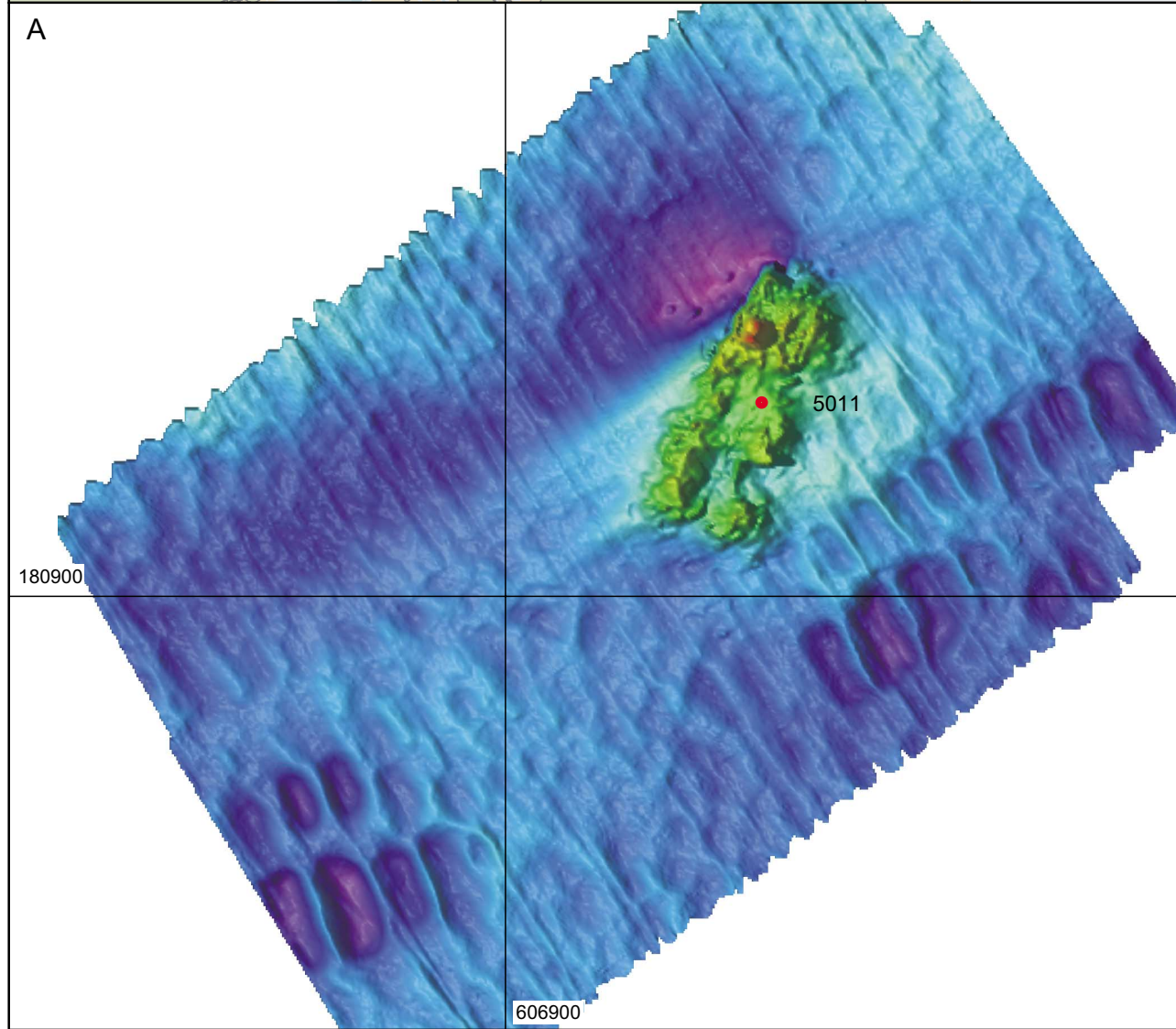
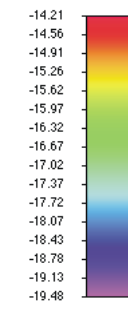
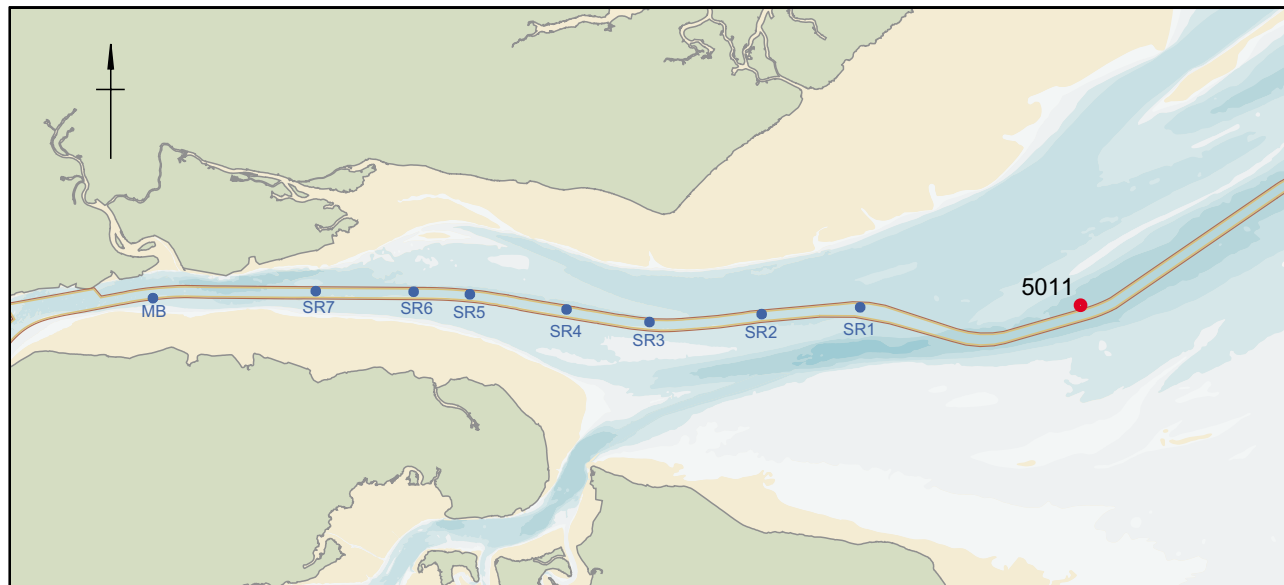
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Lloyds of London (1734-). *Lloyds List*. London.

Lloyds of London (1774-). *Lloyds Register of British and Foreign Shipping*. London.

Lloyds of London (1920-1994). *Lloyds Weekly Casualty Reports*. London.

The Times (1785-1985). *The Times Digital Archive*. London.



Oblique view from south.

Not to scale

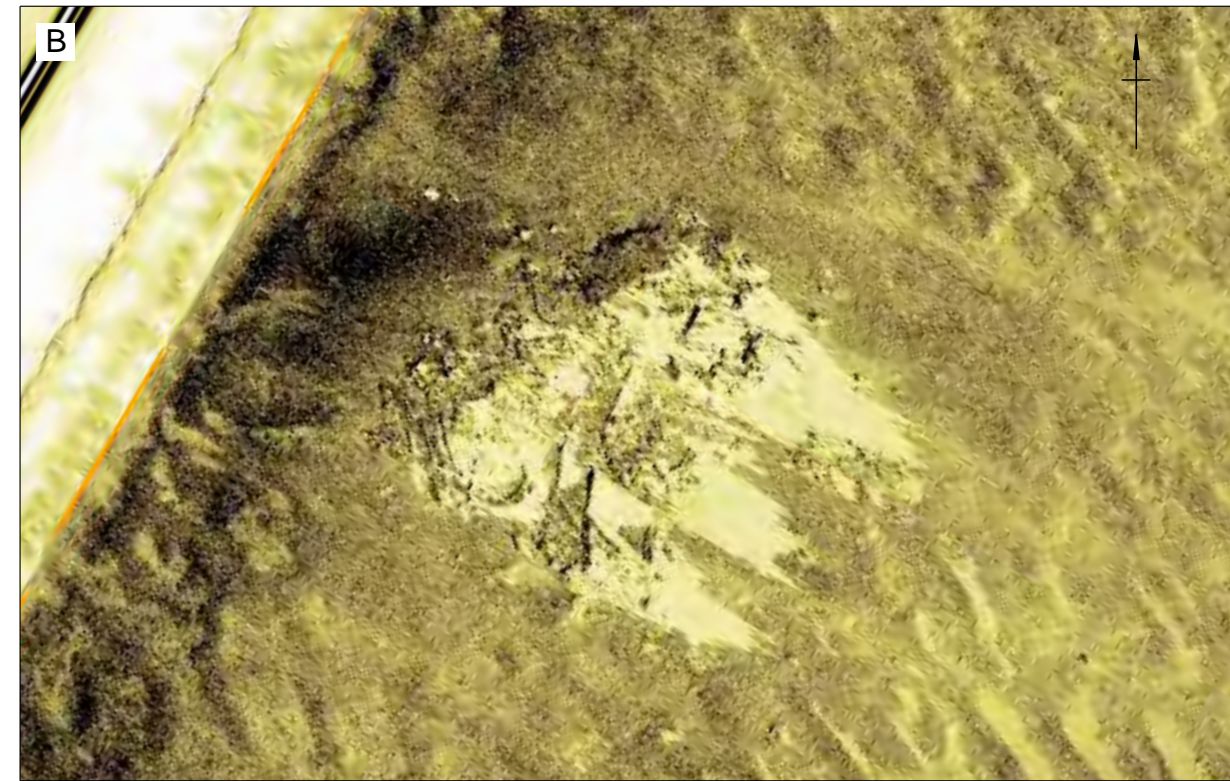
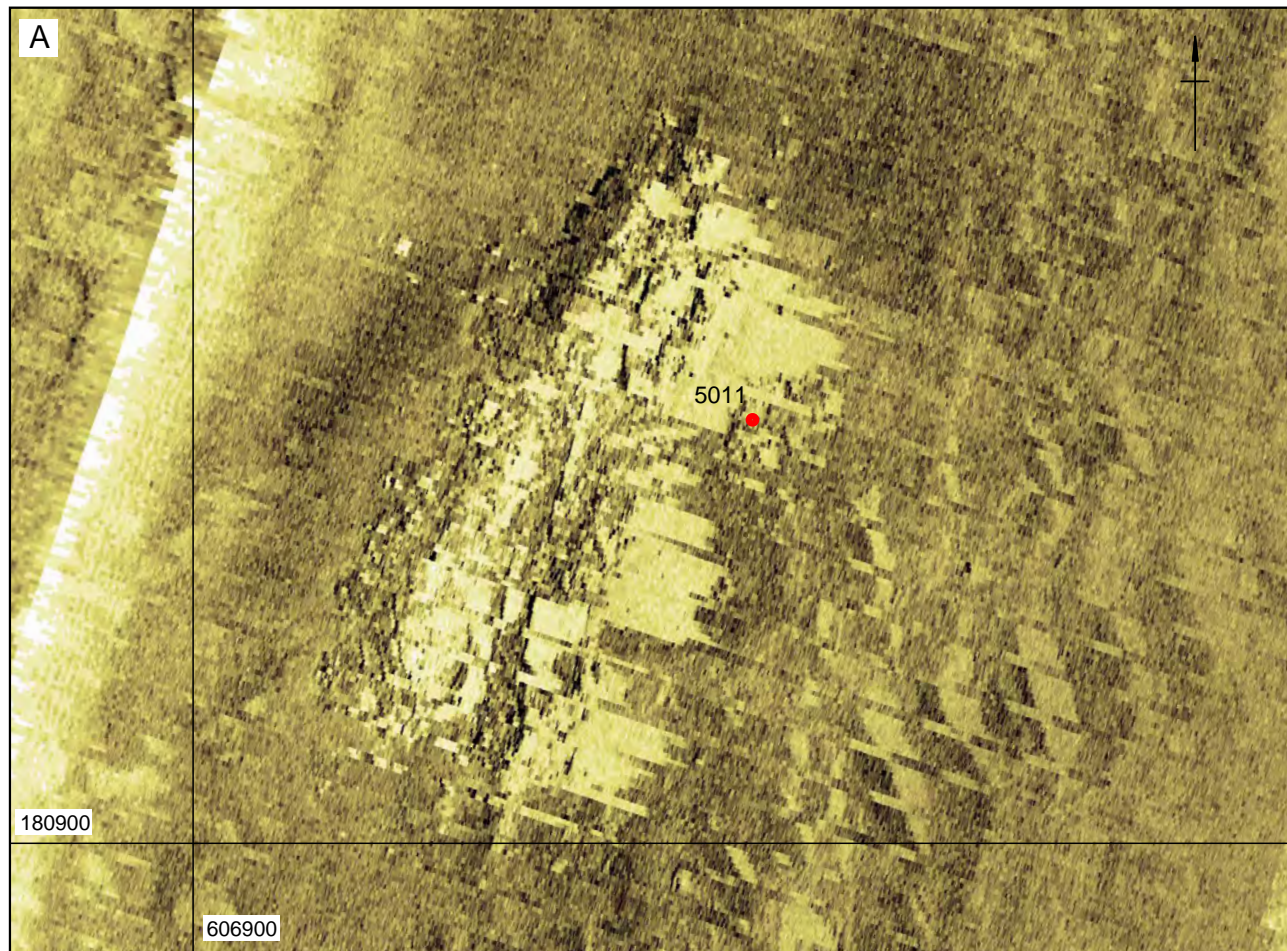
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



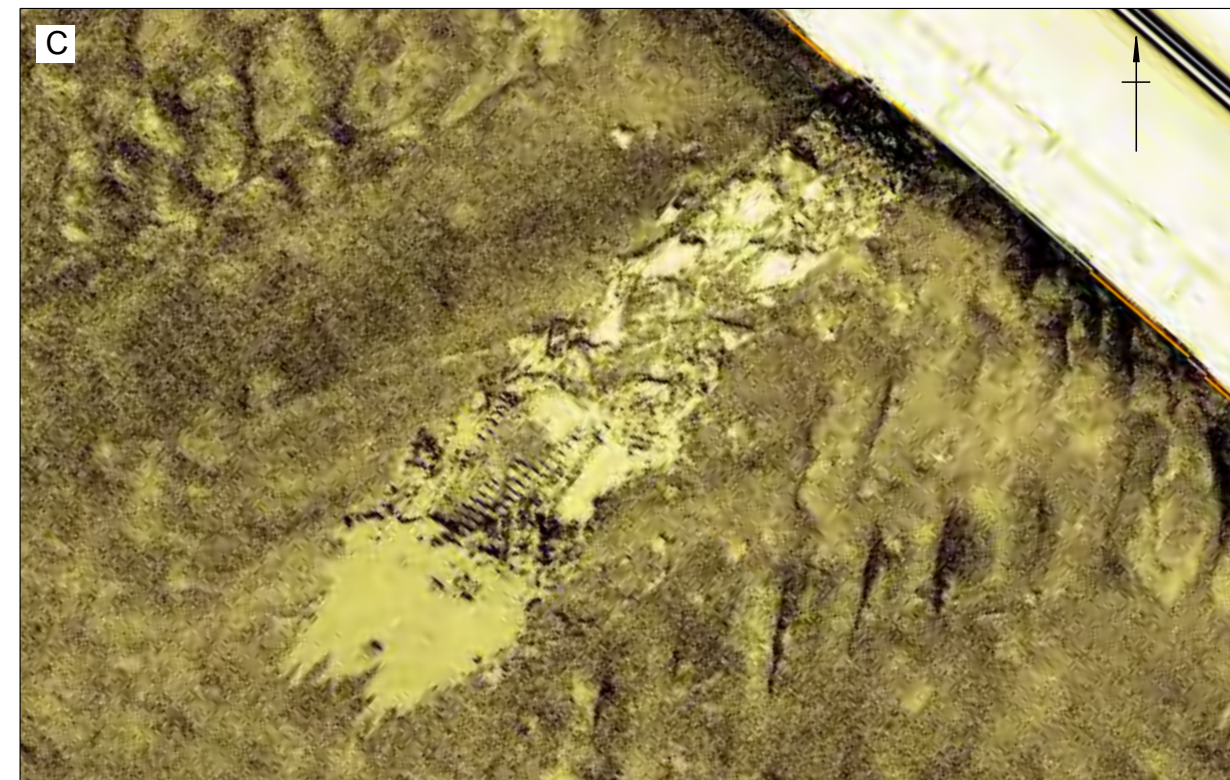
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Location and Multibeam data for Site 5011.

Figure 1



Not to scale



Not to scale

● Site location



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Sidescan Sonar image of Site 5011.

Figure 2

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5013.02
December 2007**

Site ID: 5013

Site Name: *HMS Ash*

PLA Wreck No.: 201/52

Mitigation Group: 2.2.3. Site of possible archaeological interest, seaward of SR1

No. of Casualties: Unknown

Vessel Type: Military – Admiralty Minesweeper

Cause of Loss: Mined

Current Recording Status: Level 2

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the sites discovery and includes all forms of investigation to date:

1941	<i>HMS Ash</i> Trawler mined (05/06/1941);
1941	Wreck located, position by HSA (11/07/1941);
1942	Drift swept after dispersal. Clear at 10 metres in 51° 29'28" N 00° 59'54" E (12/08/1942);
1945	Swept clear at 13.72 metres, foul at 14.02 metres in 51° 29'31"N 00° 59'55"E (30/04/1945);
1948	Position 51° 29'19"N 00°58'56"E, drift wept clear at 14.02 metres, foul at 14.33 metres (21/07/1948);
1961	Lucas wire sweep clear at 14.02 metres, foul at 14.33 metres. Least E/S depth 15.54 metres, general depth 16.77 metres. Scour depth 18 metres (8/12/1961);
1968	Located in chart position, poor sonar contact (25/06/1968);
1971	Located in 51° 29'32" N 00° 59'20" E (OSGB) using HIFIX. Swept clear at 13.7 metres, foul at 14.02 metres. Small wreck, difficult to find. (26/11/1971);
1979	Swept 12/10/1978, no reported change to above statement;
1992	Now shown in 51° 29'31" N 00° 59'49" E on PLA 201 (10/08/1992);
1993	Examined using microfix. Established a least depth 14 metres in general seabed depth of 16.5 metres. The deepest scour pit has a depth of 17 metres. The wreck lies dispersed over area 40 x 10 metres, orientated 260/080 degrees. There is also evidence of wreckage within 14.5 metres scour (21/6/1993);
2005	Shown in 51° 29.548 N 00° 59.797 E on PLA 201/23 (13/06/2005);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005);
2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2005	UKHO (12894);
2005	NMR (904779);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2006	Wessex Archaeology, Geophysical Analysis of 2005 multibeam (inclusive of one geo tiff and five tiff images);
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and five tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from 2005 multibeam data: 360909 E 5706501 N

Location: The site is located Seaward of SR1, 57 metres north of the northern edge of the dredged channel (**Figure 1**).

Bed Depth: 16.5 metres

Minimum Target Depth: 14 metres

Extent: 50 metres x 30 metres, 2.5 metres upstanding

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site was not within the 2001 survey area.

2002 WA sidescan sonar interpretation:

The site was not within the 2002 survey area.

2005 WA interpretation of PLA multibeam data:

The main body of the site encompasses three upstanding features in an area of debris; the extent of this area is 30 metres long by 50 metres wide (**Figure 1A**). The area of debris is surrounded by an overall scour which is 45 metres long, 40 metres wide and 0.5 metre deep.

The first upstanding feature is to the north east of the NGR position. It is 5 metres long, 7 metres wide and 1.8 metres upstanding. The second feature is in the middle of the site. It is 4 metres long, 3.5 metres wide and 2 metres upstanding (**Figure 1B**). The last and tallest upstanding feature on the site is located to the south west and is 3 metres long, 3 metres wide and 2.5 metres upstanding.

Twenty metres to the south west of the main site is a cone shaped anomaly 2 metres long, 3 metres wide with a maximum upstanding height of 0.7 metres (**Figure 1B**).

The deepest scour hole on the site is around an object to the western extremity of the wreck (**Figure 1C**). The scour is 15 metres long, 10 metres wide and 0.8 metres deep. Within this scour pit is a feature 3 metres long, 2 metres wide and 0.6 metres upstanding.

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data and provided additional detail. The sidescan sonar data indicates a broken up shipwreck with

numerous upstanding features (**Figure 2**). The wreck site is 54 metres by 28 metres orientated south-west by north-east and exhibits a maximum height of 2.5 metres. The scour and associated feature observed on the multibeam data are both apparent on the sidescan sonar data. The scour is observed extending in a north-eastern by south-western orientation indicating the general current direction.

The wreck is situated in an area of generally featureless seabed with evidence of cobbles/boulders scattered around the site.

4. SITE HISTORY

Build

HMS *Ash* was a Tree Class naval trawler. The Tree class consisted of 20 Admiralty built trawlers fitted out for minesweeping duties. They were launched at a number of different yards throughout Britain. Two vessels, HMS *Ash* and HMS *Bay* were built by Cochrane & Sons in Selby in 1939 and engined by Amos & Smith (Toghill 2003).

The Cochrane Yard was founded by Andrew Cochrane in 1884 in Beverley and moved inland to Selby in 1898. All through the First World War Cochrane & Sons built trawlers and coasters, a lot of them for the Admiralty. They developed a production line system for the construction of trawlers which allowed them to increase the output by building up to ten trawlers at the same time. Due to the narrowness of the river Ouse at Selby, all vessels had to be launched broadside during spring tides. The construction of trawlers and other small specialised vessels continued through the Second World. The Cochrane Yard was finally closed down in 1992 (Middlemiss 1993).

HMS *Ash* was launched on December 13 1939 with the Pennant number T39.

The vessel had a displacement of 530 tons and measured 164ft (49.9m) in length over all and 27ft 6in (8.37m) in breadth. She had a depth in hold of 10ft 6in (3.1m). Equipped with a single shaft reciprocating steam engine which delivered 850 HP, the vessel was capable of a top speed of 11.5 knots.

The armament consisted of a single 12pdr gun at the bow, two single 0.5 inch AA guns and two twin Lewis machineguns. Tree class vessels had a complement of 35 men (Toghill 2003 and Jane's Information Group 1940 and Cocker 1993).

The collection of Admiralty plans in the National Maritime Museum contains plans for the Tree Class trawlers Almond built by Ardrossan Dry Dock & Shipbuilding Co Ltd in 1940 and Chestnut/ Deodar built by Goole Shipbuilding and Repair Co Ltd. Although slightly different in layout and general arrangement, these vessels were built to the same specifications as HMS *Ash* and *Bay*.

Plan No	Scale	Content
ADF//178/1	1:48	Almond 1940: NPO1314: Profile, Boat, Bridge & Fo'c'sle
ADF//178/2	1:48	Almond 1940: NPO1315: Upper & Lower Decks
GOO/348/23/1	1:48	Chestnut 1940: Profile & bridge, Fo'c'sle, Gun Platform, etc.
GOO/348/23/2	1:48	Chestnut 1940: Decks

Photographs of HMS *Bay* and HMS *Birch* show the general appearance of Tree class trawlers (Toghill 2003) (**Figure 3**).

Use

None of the logbooks for HMS *Ash* are preserved in the National Archives, but the ship's history can partly be reconstructed from other available documentary sources.

According to a document on the recommendation for awards, Second Hand K.R. Lazenby, RNPS, X.7590C of HMS *Ash* was awarded the Distinguished Service Medal and Lieutenant A.G. Newell, NZRNVR, commanding officer of HMS *Ash* and Engineman L.Elton, KX.98260 were mentioned in despatches for courage and continuous good service with the Channel Convoys. By 1941 HMS *Ash* had swept 18 channel convoys (Admiralty and Ministry of Defence Navy Department: Correspondence and Papers: SERIES I: 1938-1945 (plus strays 1892-1937): HONOURS AND AWARDS (Code 85) 1941).

Loss

The loss of HMS *Ash* on June 5 1941 is well documented in the enquiry report dating to 1941 (Admiralty and Ministry of Defence Navy Department: Correspondence and Papers: SERIES I: 1938-1945 (plus strays 1892-1937): BOARDS OF INQUIRY AND DISCIPLINARY COURTS (Code 29) 1941). According to a letter written by Lieutenant Newell RNVR (NZ) on June 6, 1941, the two trawlers *Birch* and *Ash* were proceeding ahead of convoy C.W.3Y in the Thames Estuary to carry out minesweeping with Oropesa sweeps from Shingles to Dumpton. At 18:25 both trawlers were steaming with 150 revolutions on a course N 60 deg E about 23/4 cables apart, when an explosion occurred just abaft midships on the starboard side of HMS *Ash*. On board the trawler everybody was taken by surprise: people were swept off their feet and the ship's first lieutenant reported that the bridge was in "...a state of chaos...". The second engine man, William Lawson Brown, managed to enter the engine room shortly after the explosion and found water 6in above the engine room plates. The engines were rendered useless and the steering gear was found heavily damaged. The trawler *Birch* was called for assistance and came alongside HMS *Ash*. All publications and charts, the Lewis and Hotchkiss guns, small arms and all ammunition were then transferred to HMS *Birch*. Ship's fittings such as compasses, signal lamps, etc. and personal effects were also transferred.

Ash was then taken into tow and both trawlers set course for Sheerness. At 19:30, the rescue ship HMS *Mammouth* arrived on the scene and secured *Ash* on the portside. Two salvage pumps were rigged to keep water levels down. All survivors and equipment were then transferred from *Birch* to *Mammouth* and *Birch* rejoined the convoy at 20:10. By then the water level in the engine room had reached 12 feet above the plates. The pumps could not bring the water level down, but succeeded in keeping *Ash* afloat. Shortly after eight o'clock a pipe burst and then the starboard fire pump on HMS *Mammouth* failed. By 20:30, the stern of HMS *Ash* was awash. The depth charges aboard had been set to safe and the trawler was slipped. HMS *Ash* sank around 20:35 in 10fathoms of water. The wreck was marked by a balloon flying from the main mast. Nine ratings were injured in the incident but no fatalities occurred.

As a result of the inquiry, it was suggested to improve communications among convoy vessels and to overhaul the salvage equipment on board HMS *Mammouth* at the first opportunity (Admiralty and Ministry of Defence Navy Department: Correspondence and Papers: SERIES I: 1938-1945 (plus strays 1892-1937): BOARDS OF INQUIRY AND DISCIPLINARY COURTS (Code 29) 1941).

Out of 20 tree class trawlers built, six sank during the war. The remaining 14 survivors were all sold to mercantile post war (Toghill 2003).

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'possible' archaeological interest. The key aspect of the site that have lead to the above rating are:

- Its scattered debris and upstanding features;
- It is not known if there any other surviving examples of such a vessel.

There are significant remains on the seabed. This is a known wartime loss and as such has intrinsic archaeological interest and the remains have potential for further information.

6. CONSTRAINTS

Due to the location of the site within the Thames and because it is a World War II vessel the potential for ordnance in the area should not be ignored. Most ammunition and arms were removed from the ship before it sank, but the depth charges were left on board and set to safe. There is a possibility of these charges remaining on the seabed.

As the site is upstanding by 2.5 metres it is possible that entanglement may be an issue when investigating the site with divers.

7. SCOPE OF FURTHER STAGE MITIGATION

The aim of the Stage 1 Mitigation is to achieve a Level 2 record of the site. The Level 2 objective is the production of a record that provides sufficient data to establish the extent, character, date and importance of the site. The following aspects of the wreck will be considered at the different evaluation stages, in addressing these objectives:

Build

- Construction (material, fastenings, methods)
- Propulsion (sail, steam, diesel or and combination)
- Diagnostic features(machinery, fittings, armament)

Use

- Artefact/Cargo (dating objects)

Survival

- General survival of the site

Investigation

Traces of any previous work on the site (salvage, excavation etc).

Level 2 recording has been achieved for this site through geophysical surveys and documentary research. The extent of the site, as far as visible above the seabed, has been established through multibeam and sidescan sonar survey. Character, date and importance of the site are evident from the documentary research. No human remains are present on the site. Further archaeological diving is not necessary.

8. OUTLINE OF STAGE II MITIGATION

The wreck lies 57 metres outside the dredged channel. The site will be cleared by grabbing. No further mitigation is required.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will have been cleared by grabbing.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2005 multibeam data	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

Material	Location
UKHO Report (12894)	WA
NMR REF (904779)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures;	WA
Five printed images of the 2005 multibeam data	PLA

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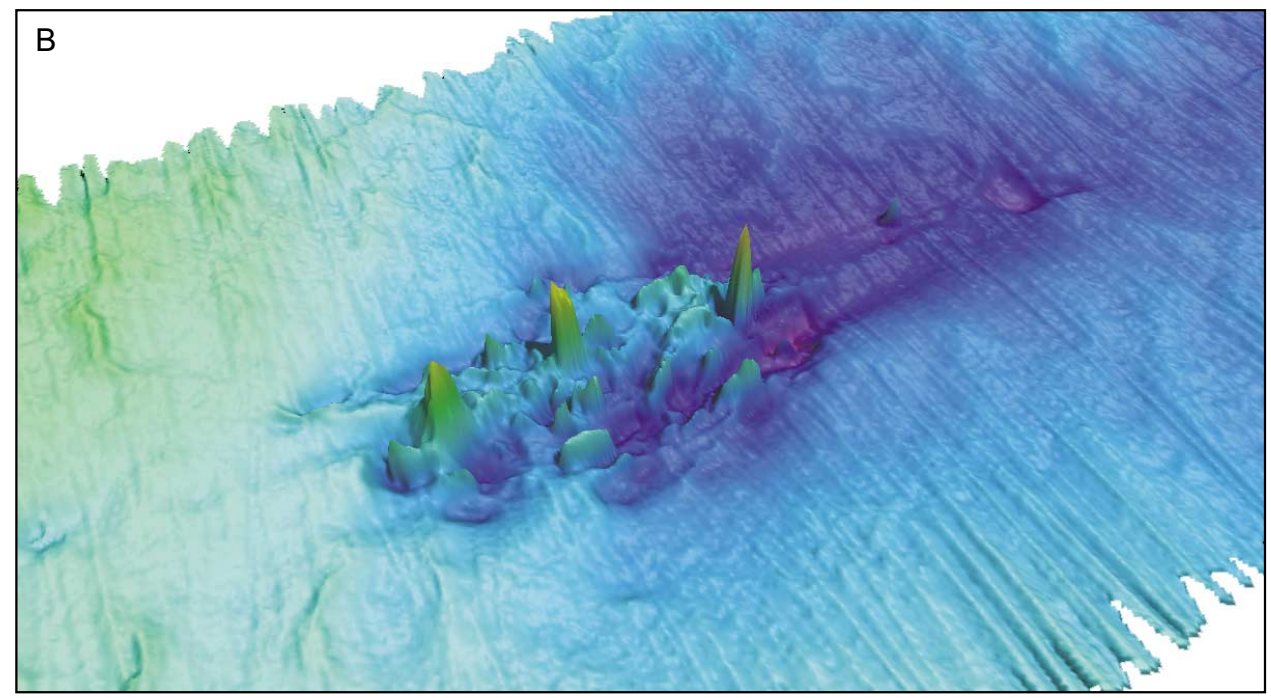
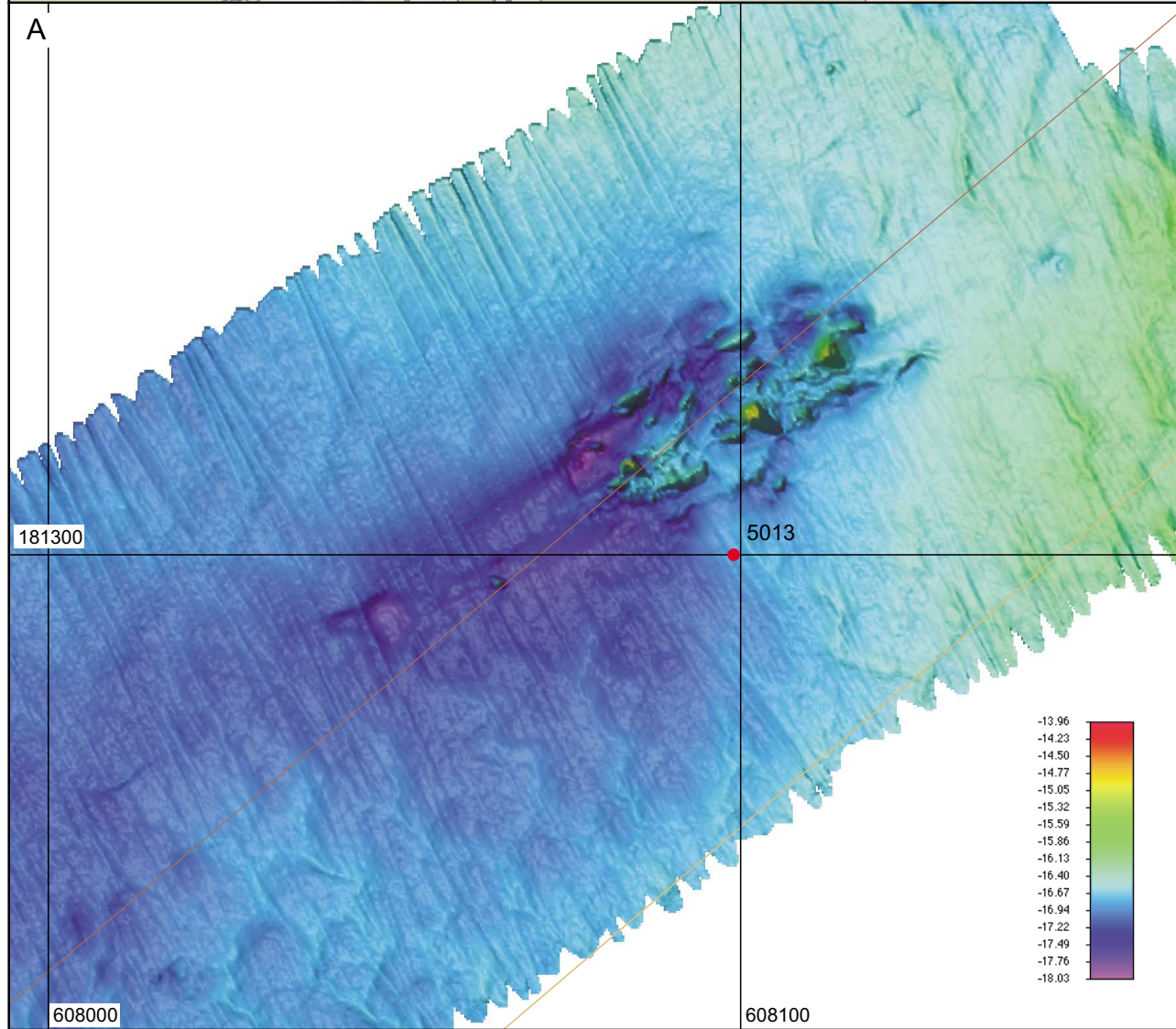
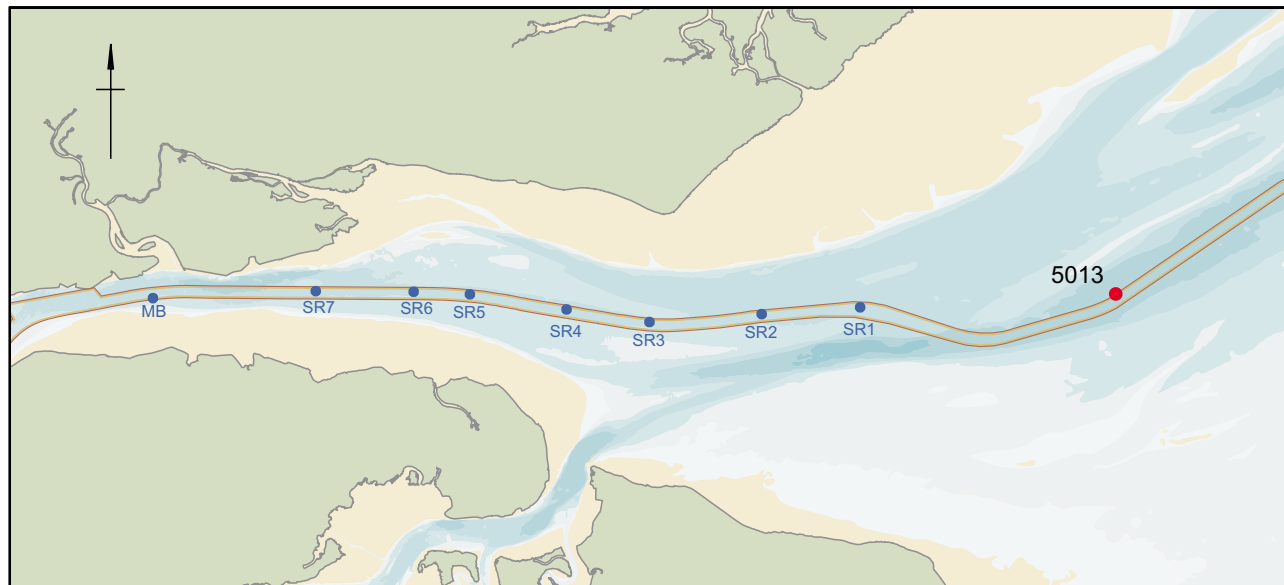
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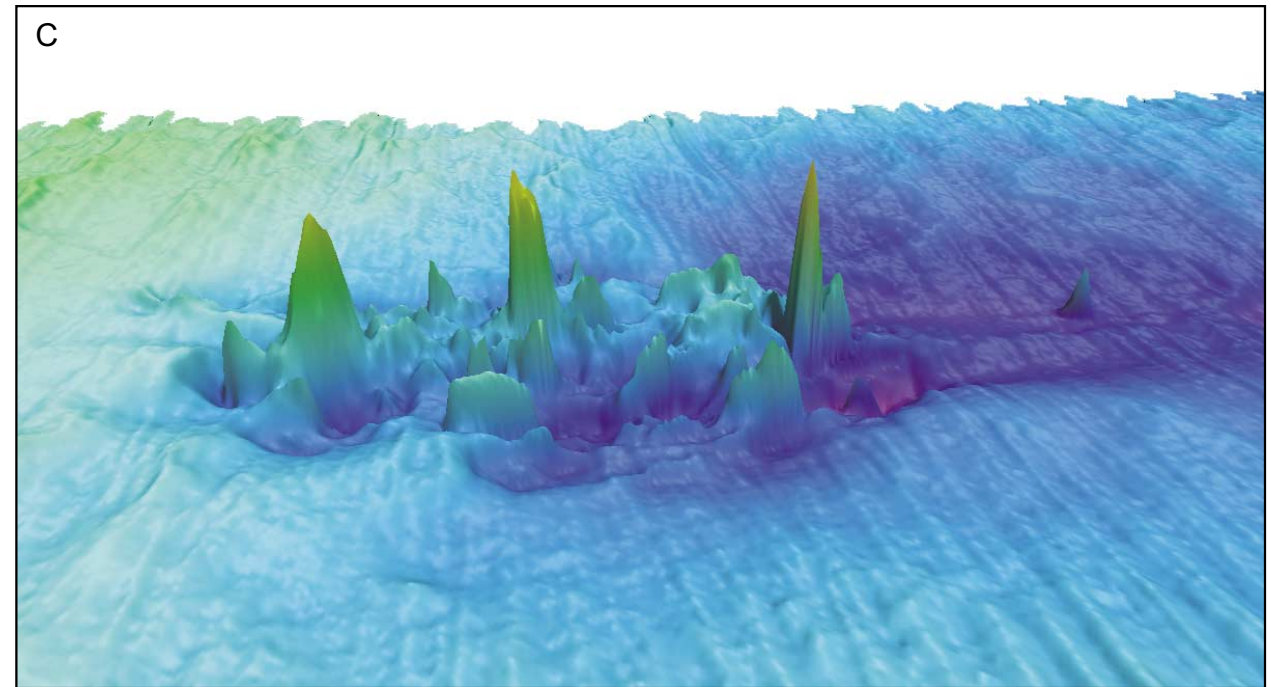
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ADM 1/11295, Admiralty and Ministry of Defence Navy Department: Correspondence and Papers: SERIES I: 1938-1945 (plus strays 1892-1937): BOARDS OF INQUIRY AND DISCIPLINARY COURTS (Code 29), *Loss of HM trawler ASH by mining: board of enquiry*, 1941.

ADM 1/11651, Admiralty and Ministry of Defence Navy Department: Correspondence and Papers: SERIES I: 1938-1945 (plus strays 1892-1937): HONOURS AND AWARDS (Code 85), *Awards to personnel of H.M. Ships ASH, ACACIA, BAY, DEODOR and WALNUT for good services in Channel convoys*, 1941.



Oblique view from east.



Oblique view from east.

Not to scale

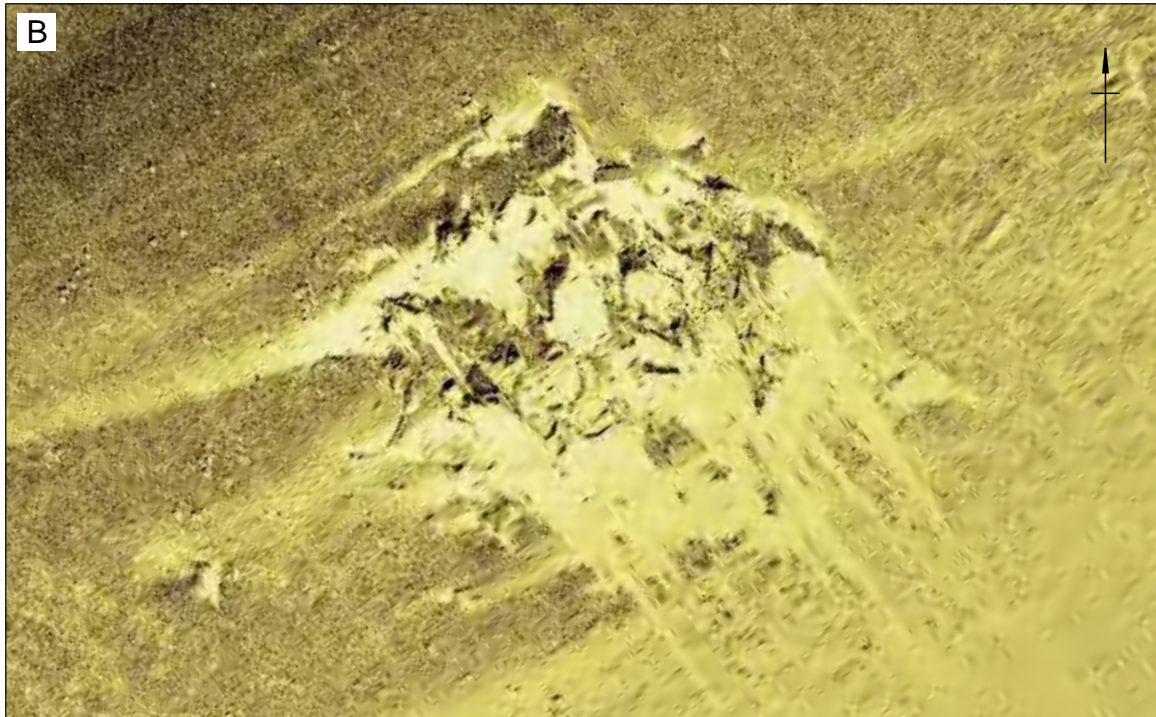
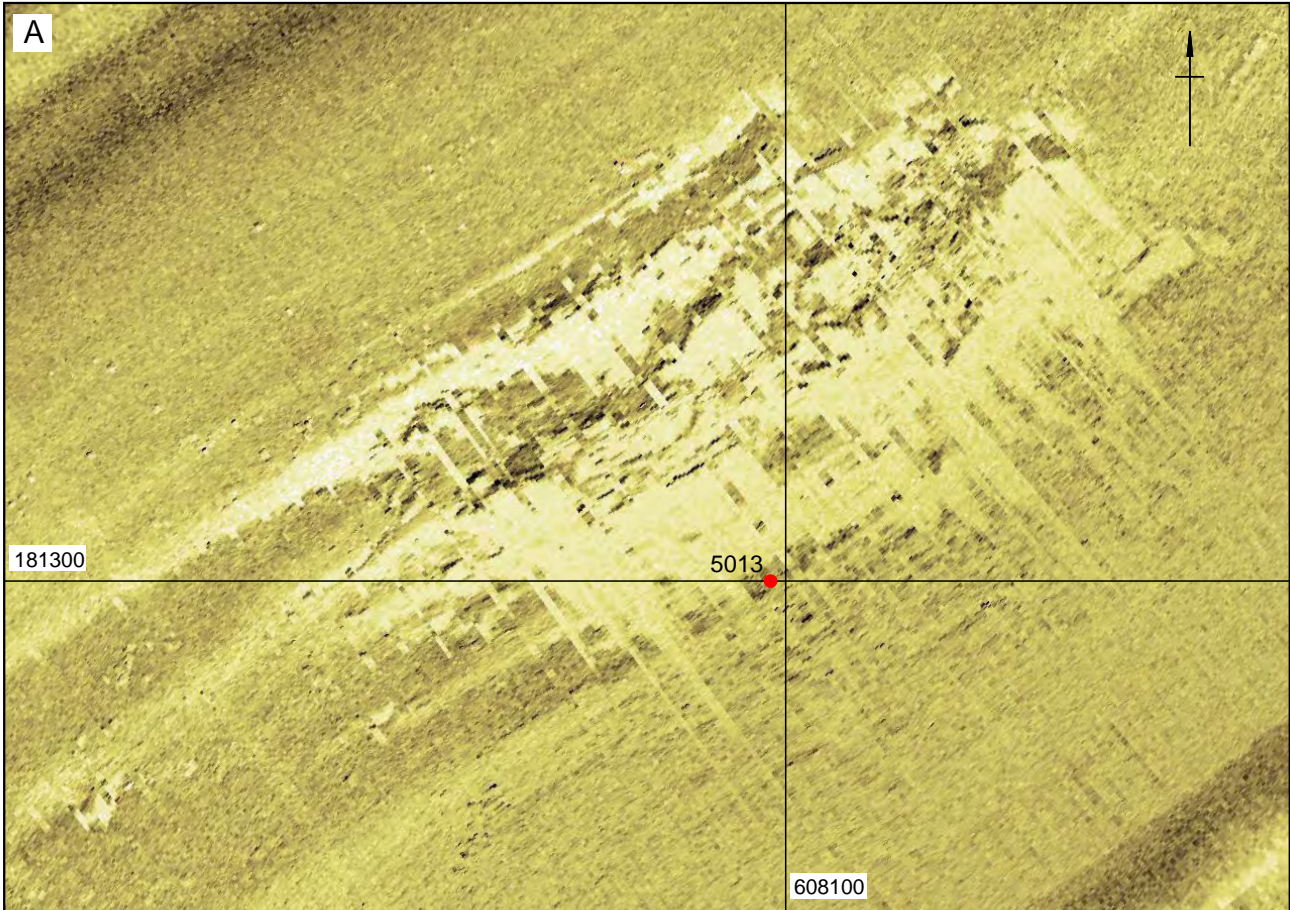
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits





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Location and Multibeam data for Site 5013.

Figure 1

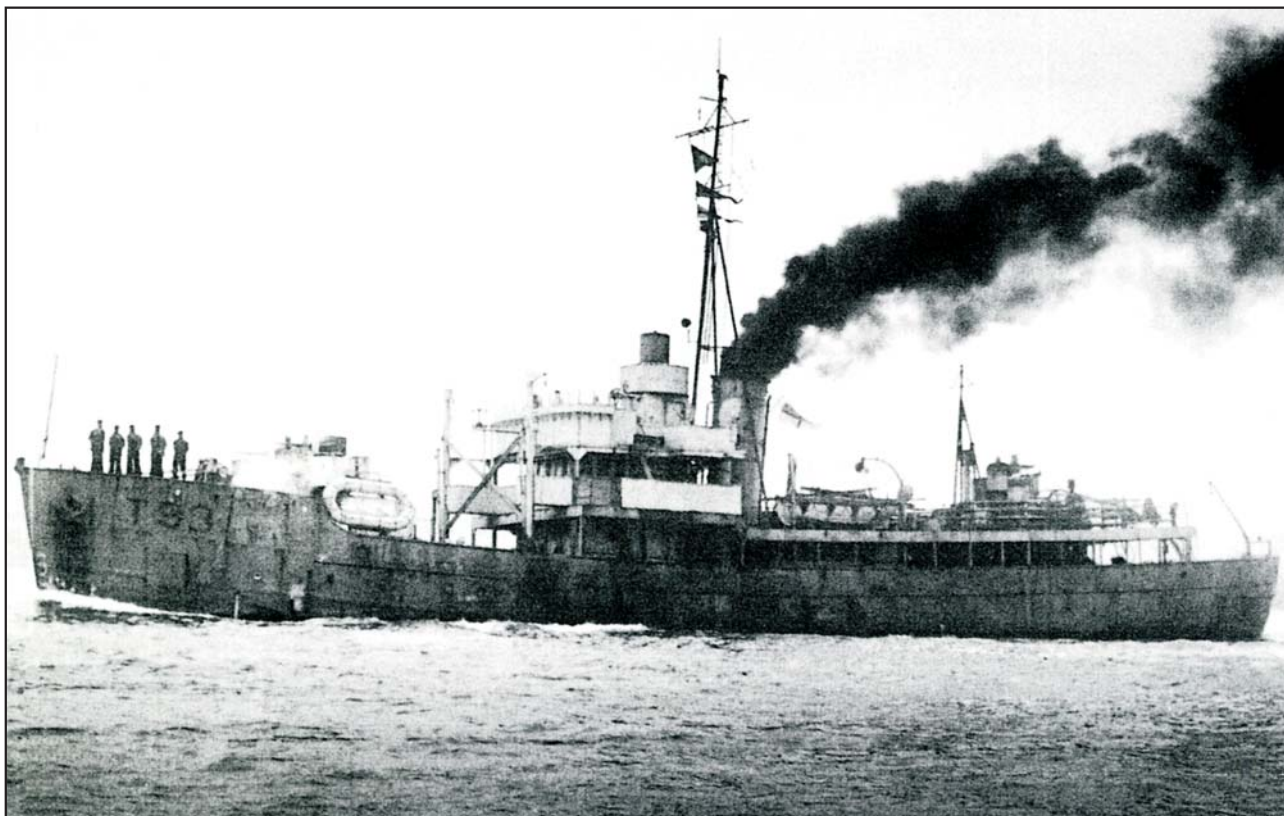



Not to scale

 Site location	Projection OSGB			
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	Date:	30/10/07	Revision Number:	0
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Sidescan Sonar image of Site 5013.

Figure 2



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Tree class trawler *HMS Birch* (Toghill 2003).

Figure 3

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5019.02
January 2008**

Site ID: 5019

Site Name: Unknown (King)

PLA Wreck No.: 343/01

Mitigation Group: 2.1.1. Site of certain archaeological interest, above SR1

No. of Casualties: Unknown

Vessel Type: Unknown

Cause of Loss: Unknown

Current Recording Status: Level 1b

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the site's discovery and includes all forms of investigation to date:

1962	Site reported as foul (8.8 metres) at 51°29'42" N 00°44'06" E. A cannon was also recovered from the site dated 1636 (27/02/1962);
1968	Site amended to 8.52 metres (28/05/1968);
1973	Site amended to 8.5 metres (26/09/1973);
1979	Site shown as wreck at 8.5 metres (31/07/1979);
1979	Site examined at 51°29'43" N 00°44'06.5" E (OGB using Hifix/6). Site swept clear at 10 metres foul at 10.2 metres. The least depth is 10.5 metres in a general depth of 11.5 metres. It has a scour depth of 12.8 metres. The wreck appears to have disintegrated since last survey (good fouls reported only obtained on the flood tide). Wreck is referred to as the <i>King</i> (28/09/1979);
1990	Site examined using Microfix. In a least depth of 10.8 metres in a general depth of 12 metres, with a scour depth of 13.5 metres (09/04/1990);
1999	Site examined at 51°29.707' N 00°44.126' E (OGB using DGPS). Site swept clear at 10.4 metres, foul at 10.7 metres (16/06/1999);
2001	Emu sidescan sonar survey (29/03/2001);
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002);
2004	Site examined at 51° 29.757' N 00° 44.035' E (WGD using DGPS);
2005	Site dived by the PLA and Nigel Nayling of UWL (30-31/01/2005);
2005	Site examined at 51°29.740' N 00°44.027' E (WGD using DGPS) Site has a least depth of 7.55 metres in a general depth of 9 metres. The scour is 4.8 metres deep and extends 60 metres southwest. The length of the site is 37.5 metres by 27.4 metres (22/08/2005);
2006	PLA site investigation using Reson 8125 multibeam system (09/03/2006);
2007	PLA and WA diving investigation (30/10/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2001	Wessex Archaeology, Assessment of Effects on the Archaeological Heritage: Inter-tidal and Marine, in respect of the proposed development of London Gateway;
2002	Wessex Archaeology, side scan data and magnetometer data;
2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i> , inclusive of: 'target 98' and target '314', '369', '524' tiff images;
2003	Wessex Archaeology, Enhanced Wreck Site Identification Further work on Sites within the Survey Area;
2005	UKHO (12905);
2005	NMR (908041);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	Port of London Authority, <i>Marine Diving Services Report</i> ;
2005	Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 1</i> University of Wales Lampeter;
2006	Wessex Archaeology, Geophysical Analysis of 2006 of multibeam and 2001& 2002 sidescan sonar data, inclusive of: one geo tiff and eight tiff images.

3. SITE DESCRIPTION

Position (UTM) obtained from 2006 multibeam data: 342686.9005 E 5707379.7231 N

Location: The site is located adjacent to Sea Reach No. 4, 40 metres outside the northern edge of the main dredged channel (**Figure 1**).

Bed Depth: 12 -12.5 metres

Minimum Target Depth: 11.18 metres

Extent: Total area 60 x 40 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site consists of a large thin rectangular shaped anomaly. The NGR recorded was 589853 E 180946 N. The anomaly is 10 metres long and 20 metres wide, no length of shadow was recorded. The tiff file created was labelled as 'target 98'.

2002 WA sidescan sonar interpretation:

The site was identified on three separate lines during the survey (**Figure 2**). The NGR recorded was 589852 E 180959 N. The tiff files created were labelled 'targets 314, 369 and 524'. The site consists of three features:

- The first feature is to the east and is the largest of the three, covering an area of 41 x 12 metres. The northern part of this feature is triangular in shape, and is 28 metres long and 12 metres wide. The eastern edge of the triangle is defined by a strong linear reflector. The southern part of this feature is oval in shape with three lines running across its width; it is 19 metres long and 6 metres wide. On the eastern side of this feature there is a scour, the northern edge of which is visible by a defused hard reflector; it is 22 metres in long;
- The second feature is to the west and lies 13 metres to the northwest from the northern point of the eastern section of wreckage. It consists of dark general linear reflectors covering an area of 23 metres long and 5 metres wide;

- The third feature lies 6 metres to the south of the western feature. It consists of an area of dark reflectors covering an area 13 metres long and 12 metres wide.

2005 PLA dive description:

The PLA in conjunction with Nigel Nayling of UWL dived the site on the 30th and 31st January 2005. The PLA’s report on the investigation undertaken was as follows:

The diver identified a large section of timber on the site with a pile of associated debris consisting of round wooden poles. These were located on the northern side with the scour to the south. Along the northern section of timber and approximately 15 metres from one end, the diver identified a bronze cannon which was clear of growth and concretion. It was located resting on the pile of wooden poles and had no visible marking but appeared complete. The cannon had the following measurements:

Area	Dimensions
Length	2.7m
Bore	0.1m
Muzzle breech	0.15m
Breech circumference	1.5m
Trunnion diameter	0.11m
Cascabel button length	0.2m

A second obstruction was located 48 metres west of the first (discussed above). This was identified as a pile of chain. The pile was estimated to be 4 metres in length, 2 metres wide and 1 metre upstanding with a trail running off to the south (possibly an anchor). The link length was approximately 4 inches suggesting a chain from a fairly small vessel. The report notes that the chain should be recovered to help simplify any future works on the site.

The PLA dived on the previously identified modern chain on the 7th March 2005. The chain was partially recovered but parted regularly during recovery.

2005 UWL dive description:

Nigel Nayling of UWL in conjunction with PLA dived the site on the 30th and 31st January 2005. The UWL’s report on the investigation undertaken was as follows:

A total of four dives were undertaken on the site by Nigel Nayling, two dives on each large section of wreckage. The eastern section of wreckage was dived first, it consisted of disturbed fragments of wood over a wide area. Concreted timber was located around a bronze cannon which was located on top of various other frames.

The second dive confirmed the presence of the cannon and provisional measurements were taken suggesting it was either a saker or demi-culverin.

The cannon overlies a concretion of apparent roundwood of 100-150mm diameter. Nearby, a plain chamfered beam (approximately 250-300mm sided) protruded from the seabed. The beam is interpreted as a possible carling (deck beam). A wooden wheel was discovered lying embedded in sediment which could be from a truck, gun carriage or part of a pulley block. A circular search was conducted around the cannon which revealed further timber but also steel cable and other debris probably of modern origin. The hull structure of the vessel was not as

clear as the 8101 multibeam data indicated but this could be due to the quantity of smaller loose material scattered over the area.

Circular searches were conducted over the western section of wreckage. This identified two clear areas of material with what appeared to be no debris in between the two sections. A large concentration of chain was also identified. The second dive on this section confirmed the presence of the chain which consisted of links of approximately 100mm. The chain is probably relatively recent as the links were easily moved. No historic items were identified in the vicinity.

2006 WA interpretation of PLA multibeam data:

The site consists of three main sections of wreckage and a large scour hole; two sections of debris are located on the edge of the channel. It should be noted the seabed channel edge does not correspond to the charted channel edge (**Figure 1A and Figure 3**).

The site appears to be scattered with outlying debris, the identification of which is difficult to interpret due to the uneven nature of the seabed in the area. To assist with the interpretation of the data the sidescan sonar and multibeam data have been overlaid and key features labelled on **Figure 1-3**.

The eastern section of wreckage (Feature 1) is the largest of the three; it is orientated northeast southwest. This section is 25 metres long, 15 metres wide and 1 metre upstanding.

The south-western corner of this feature has two linear features extending out of it. The linear features are 3.5 metres apart peak to peak, and initially run parallel before converging. The western linear feature is 15 metres long, 3 metres wide and 0.4 metres upstanding. The eastern linear feature is 12 metres long, 4 metres wide and 0.4 metres upstanding. On the eastern edge of this feature is a large scour pit, the scour is 55 metres long, 20 metres wide and 1 metre deep orientated in an east west direction (**Figure 1A-C**). At the eastern end of the scour pit there is a small anomaly located within a scour. The scour is 3 metres across and 0.15 metres deep, the feature is 1.2 metres across and 0.15 metres upstanding.

A small anomaly (Feature 2) lies 9 metres north of the eastern section of wreckage, it has a diameter of 1.7 metres and is 0.15 metres upstanding. To the west of the eastern section of wreckage there is a small ridge (Feature 3), it is 6 metres long, 3.5 metres wide and 0.2 metres upstanding.

The western section of wreckage (Feature 4) is roughly square 18 metres long by 18 metres wide and 1 metre upstanding at the southern end. Within this lies a rectangle 10 metres long and 7 metres wide which is flat and featureless. The northern edge of the rectangle is 0.25 metres upstanding with a steep sided edge. The eastern edge of this feature consists of a linear feature which is 10 metres long, 2 metres wide and 0.08 metres upstanding (**Figure 1A-C**).

The third section of wreckage (Feature 5) is located further into the channel. It lies in a scoured area which is 30 metres long, 20 metres wide and 0.6 metres deep. Within the scour the seabed is disturbed indicating the remains of scattered debris which covers an area 14 metres long, 7 metres wide and 0.3 metres upstanding (**Figure 1A-C**).

2007 WA dive description:

In autumn 2007, sports divers reported the recovery of two bronze cannons from this site to the Receiver of Wreck. Allegedly, they recovered three more cannons from another site further out the estuary; however, there seems to be a chance that all five cannons came from the site of the *King*. One of the cannons is shown in **Figure 4B**.

A WA archaeologist was integrated into the PLA dive team and dived the site together with a PLA diver on 30th October 2007. The objective of the dives was to clarify if any other cannons are on the site and to identify other archaeological features, especially those at immediate risk, either risk of recovery by sports divers or risk of destruction because of the destabilisation of the site caused by the salvage activities.

During the first dive, the divers made bottom presumably just south-south-east of the site. The WA diver made his way along the site towards the east. There was no coherent hull structure, but a very dense scatter of broken up timber, metal, bricks and organic material such as concreted rope (still coiled), leather and tissue which felt like coarse sandbags. The latter was encountered predominantly towards the eastern end of the site. The metal included, amongst others, pipe-and pole-like objects, as well as considerable amounts of lead plates, possibly sheathing. Two bricks were found (parts of the galley?) somewhere towards the middle of the site, as well as a seemingly very well preserved cleat, probably made of non-ferrous metal as it was not concreted at all. In this area an upstanding metal ring was recorded which had a diameter of *c.* 0.9 metres, and close to it a *c.* 3 metres long beam. Towards the western end of the site, and seemingly a bit apart from it, a *c.* 5 metres long timber (possibly a plank) was found upstanding in the sediment. Another, parallel plank was attached on top of it, but with a gap in between big enough to stick the diver's hand through. This structure might be identifiable as one of the features (Feature 3?) on the multibeam image (**Figure 1**).

The PLA diver made his way across the site and found a wooden wheel (possibly of a gun carrier) and the wooden part of a gun close together on the southern side of the wreck. In a distance of approximately 10 metres from these artefacts, the diver reported a 'dugout' wooden structure, like a semicircular hull, *c.* 8-9 metres long, smooth inside and with open ends protruding from the ground. This structure had poles (metal or wood?) protruding from its sides. These poles were *c.* 1 metre high and 0.2 x 0.2 metres in diameter. He counted at least three in a row. This structure might be identifiable as the feature visible on the multibeam image protruding from the south-west end of the site (**Figure 1**).

During the second dive, the divers made bottom presumably just west-north-west of the site. The WA diver made his way in a south-westerly direction and came across similar evidence as during his first dive: a dense scatter of broken up wreck material, consisting of timber, metal, bricks and organic material. Noticeable was a round wooden beam with a diameter of *c.* 0.25 metres which protruded *c.* 6 metres in an angle from the sediment (a shaft, or part of the rigging?).

Both the PLA and the WA diver noticed the presence of modern rope at several places on the site. The PLA dive team confirmed that they did not leave any rope on the site during previous dives. Presumably, these were remains of the recent salvage operations. It was also noticeable that a lot of the material on the seabed was very loose and could easily be moved and/or lifted. This was not reported during previous dives by the PLA dive team and Nigel Nayling and has presumably also been caused by the salvage operations. The site lies on the

edge of the shipping channel and is affected by strong currents. Therefore, it can be assumed that the material might not survive on the site for very much longer.

A wooden part (handle) of a gun, a wooden wheel (gun carriage?), a piece of concreted rope, a piece of perforated leather string (probably part of a shoe/boot), a flat brass ring (diameter c. 0.12 metres; part of a navigational device?); a circular piece of lead plate, a lead pipe (scupper?) and a wooden block were recovered during the dives (**Figure 5**).

The broken up nature of the wreckage on the seabed is probably due to earlier site clearance operations. According to the PLA, there have been attempts to remove the wreck with a big grab during the 1960's. However, the preservation of the material on the seabed, although broken up, still seems to be excellent (as confirmed by some of the items recovered, see above), and there are clearly more vessel remains buried in the sediment which might prove to be of a more coherent structure.

As a result, no more cannons could be identified. However, there was no underwater visibility and no tracking during the dives. Therefore, it cannot be ruled out that more cannons exist on the site itself or in its immediate vicinity. This is confirmed by the fact that only one cannon was reported during previous dives, even though at least two cannons have recently been recovered. The remaining wreck material is still abundant and so far seems to be in a very good condition, as indicated by the preservation of delicate organic remains.

4. SITE HISTORY

The identity of the wreck is not currently known. The site was first documented in 1962 when a cannon was recovered. The gun was identified as a bronze demi-culverin measuring 2.92 metres in length. This type of gun is a rare example of the first French regulation series of naval cannon, the sizes and decoration were decreed by Cardinal Richelieu. However, this gun has the weight incised on it in the English manner, suggesting the gun was a captured piece and later remounted on an English vessel (Blackmore 1976: 115). The cannon currently resides in the Royal Armouries at Fort Nelson in Portsmouth (**Figure 4A**).

The site was first swept in 1979 to a depth of 10 metres and then again in 1999 to a depth of 10.4 metres. At least since 1979, the site is referred to as the *King*, although this is not the reported name of the wreck. The charts from PLA report (343/1) identify the wreckage with the letter K. Current admiralty charts do not record the site with this symbol.

The wreck of the warship *London* is located approximately 414 metres to the south-east of the *King*. WA has previously documented that earlier investigations on the two sites may have been confused in the past (WA ref: 61209.5029.01).

Salvage and Clearance

According to the PLA, there have been attempts to remove the wreck with a grab during the 1960's. A cannon was recovered in 1962. Further cannons were recovered during a commercial salvage operation in 2007.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'certain' archaeological interest. The key aspect of the site that have lead to the above rating are:

- The 1636 date of a cannon recovered from the site and delivered to a museum during the 1960's;
- The large sections of wreckage identified during the 2006 multibeam survey and confirmed during subsequent dives;
- The (commercial) recovery of further bronze cannons from the site in 2007;
- Diver reports of substantial timbers and many small finds remaining on the site before and after the 2007 salvage operation, including a number of delicate organic finds;
- The reported confusion between this site and the *London* indicating the possibility that there may be a connection between the two sites as they appear to be very similar in date.

6. CONSTRAINTS

The identity of the wreck is not currently known, it is therefore not possible to state whether there will be issues with ordnance or human remains.

7. SCOPE OF FURTHER STAGE MITIGATION

The site is located 48 metres outside the northern edge of the channel. The site will be avoided during dredging operations by changes to the design of the channel on account of its archaeological sensitivity. Mitigation will be achieved by establishing an Archaeological Exclusion Zone and monitoring it through a programme of multibeam surveys.

8. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site is located outside the dredged channel and will remain *in situ*. Dredging operations will not affect the site. An Archaeological Exclusion Zone will have been established, which will be monitored by multibeam survey.

ARCHIVE**RECOVERED MATERIAL**

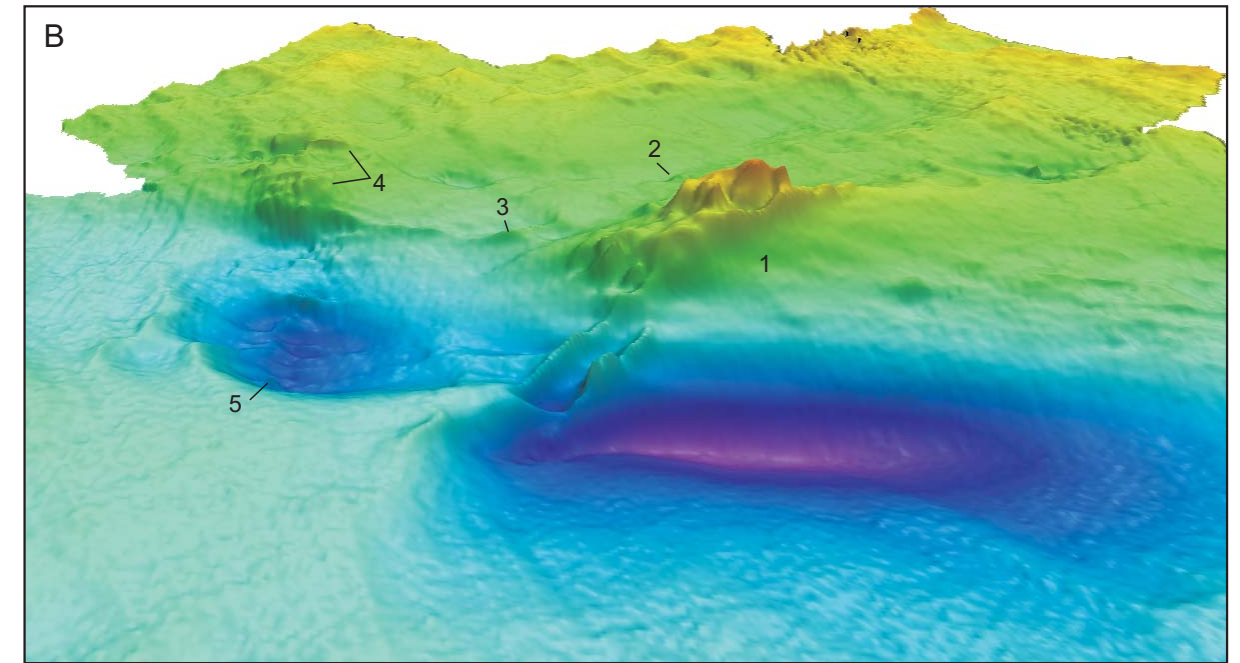
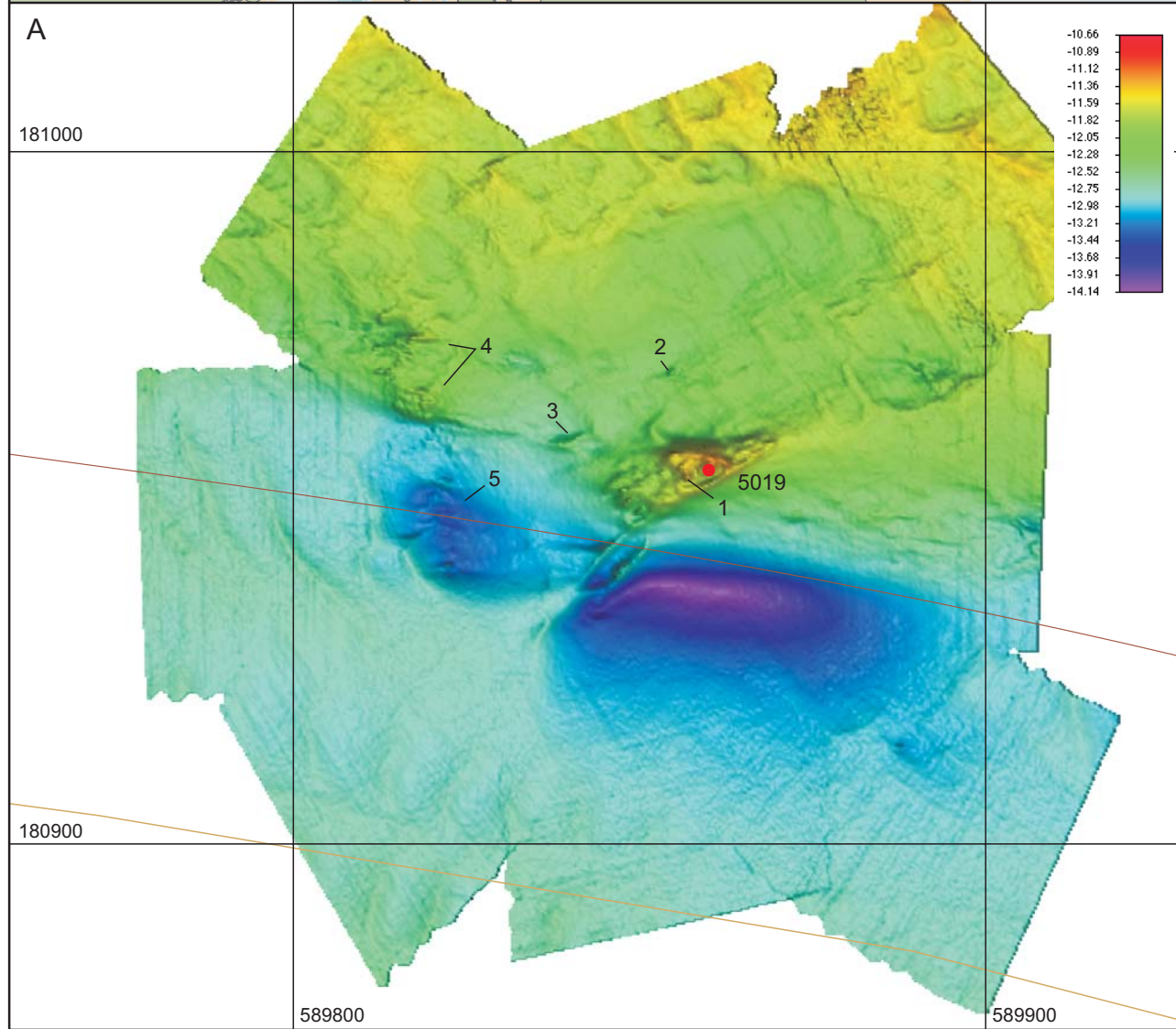
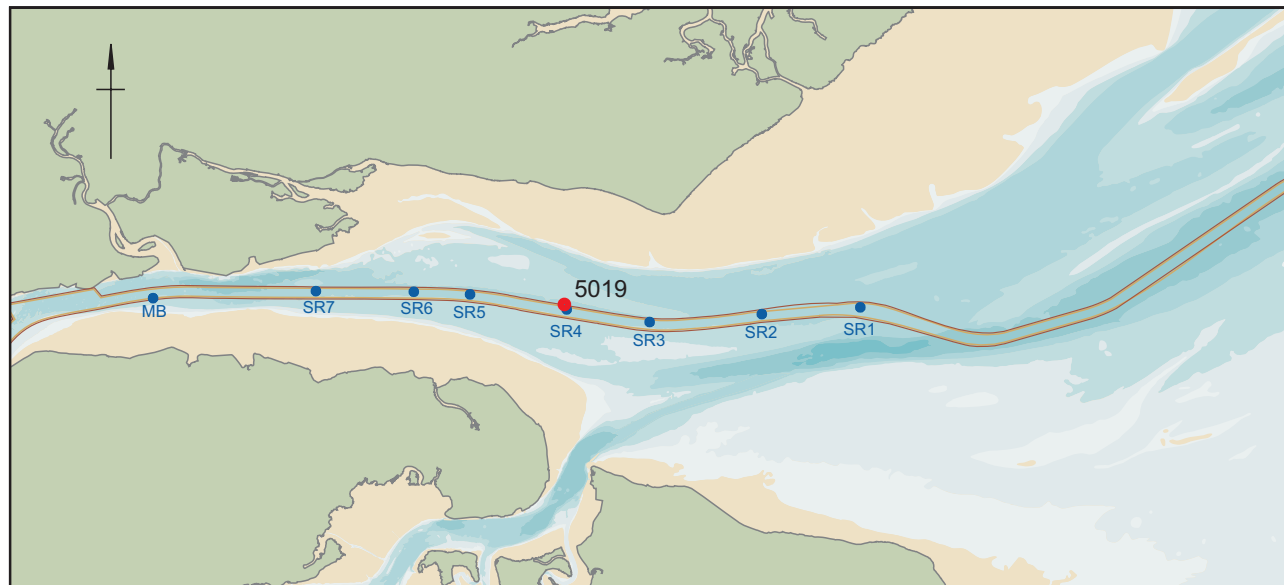
Finds	Dated recovered and by who	Location
Cannon	Unknown	Royal Armouries
Five cannons	Unknown	Unknown
Wooden part (handle) of a gun, wooden wheel (gun carriage?), piece of concreted rope, piece of perforated leather string (probably part of a shoe/boot), flat brass ring (diameter c. 0.12m; part of a navigational device?); circular piece of lead plate, lead pipe (scupper?), wooden block	2007, WA/PLA	PLA (Denton Wharf)

DIGITAL ARCHIVE

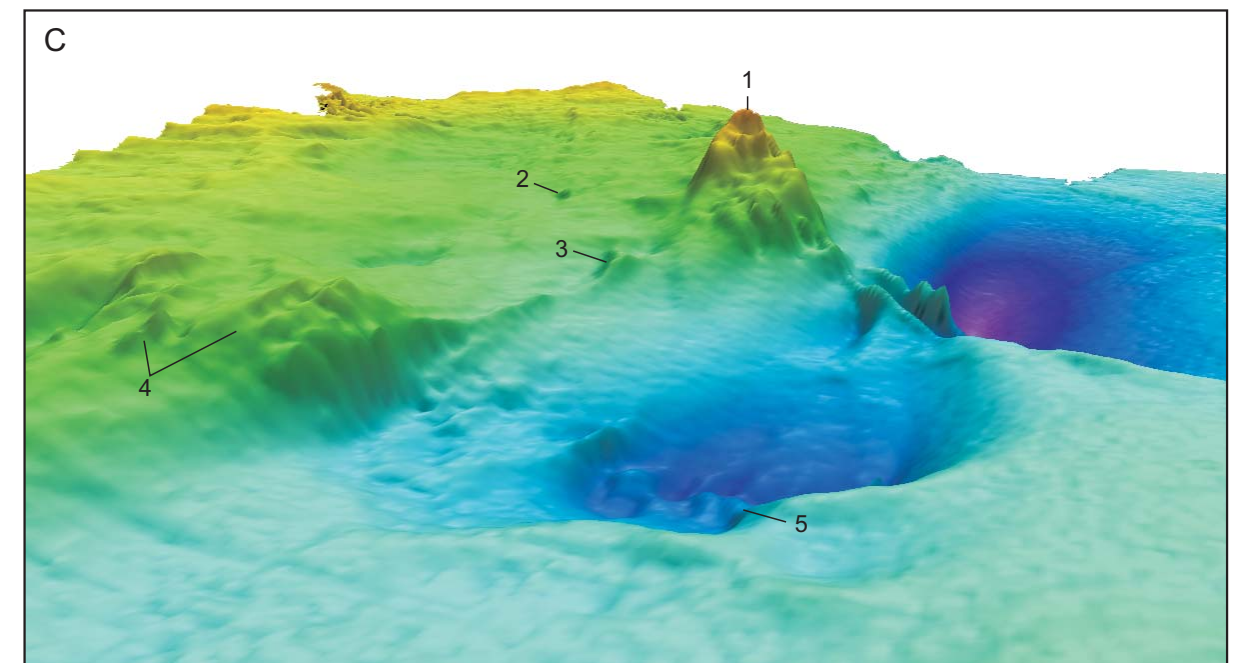
Material	Location
2001 sidescan sonar and magnetometer data	WA
2002 sidescan sonar and magnetometer data	WA
2005 multibeam data	WA

PAPER ARCHIVE

Material	Location
UKHO (12905);	WA
NMR (908041);	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures;	WA
Port of London Authority, 2005, <i>Marine Diving Services Report</i> ;	WA
Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 1</i> University of Wales Lampeter;	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Inter-tidal and Marine in respect of the proposed development of London Gateway;	WA
Wessex Archaeology, 2003, Enhanced Wreck Site Identification Further work on Sites within the Survey Area;	WA
Wessex Archaeology, 2003, <i>London Gateway Appendix Q: Enhanced Wreck Site Identification Report</i> ;	WA
Ten printed images of the 2006 multibeam data.	WA



Oblique view from south.



Oblique view from west.

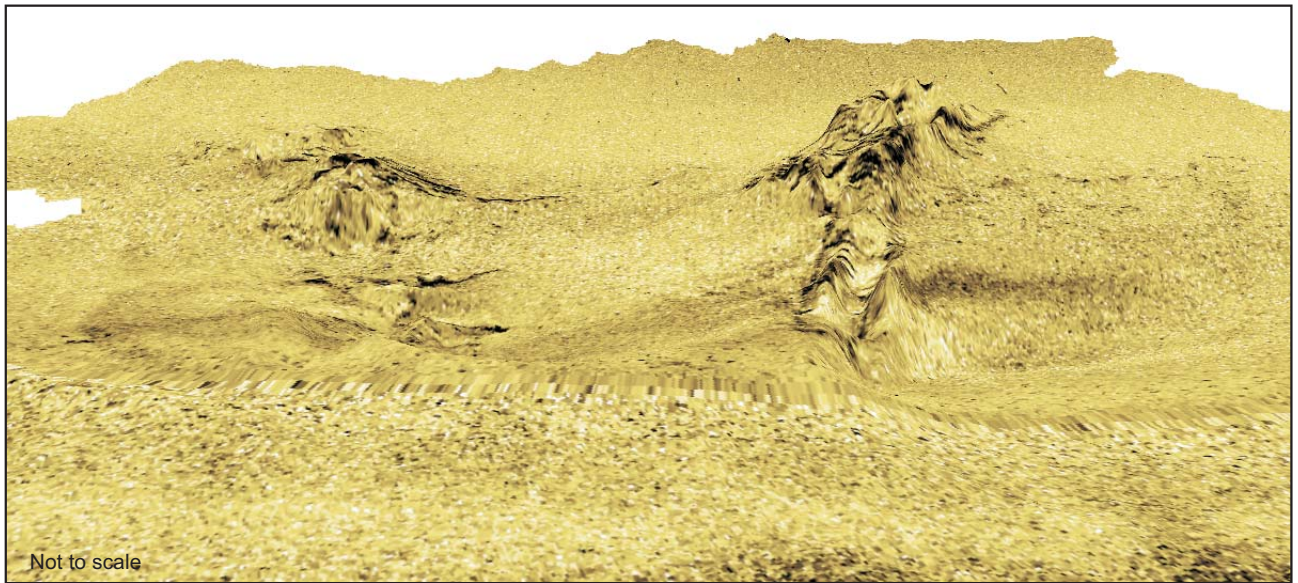
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- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



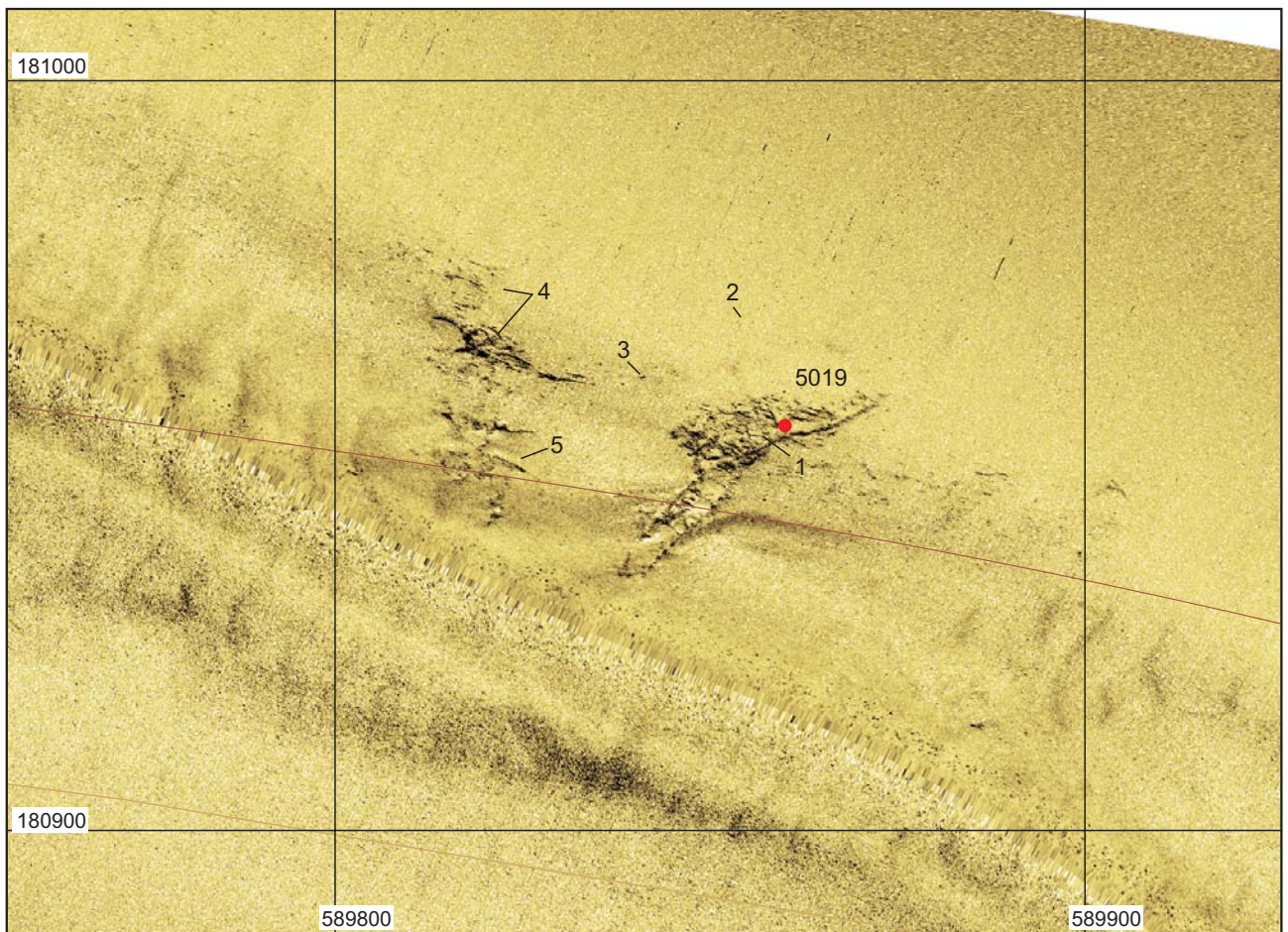
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Location and Multibeam data for Site 5019.


Figure 1



Oblique view of 2002 Sidescan Sonar image overlain on Multibeam data, from the south-west.

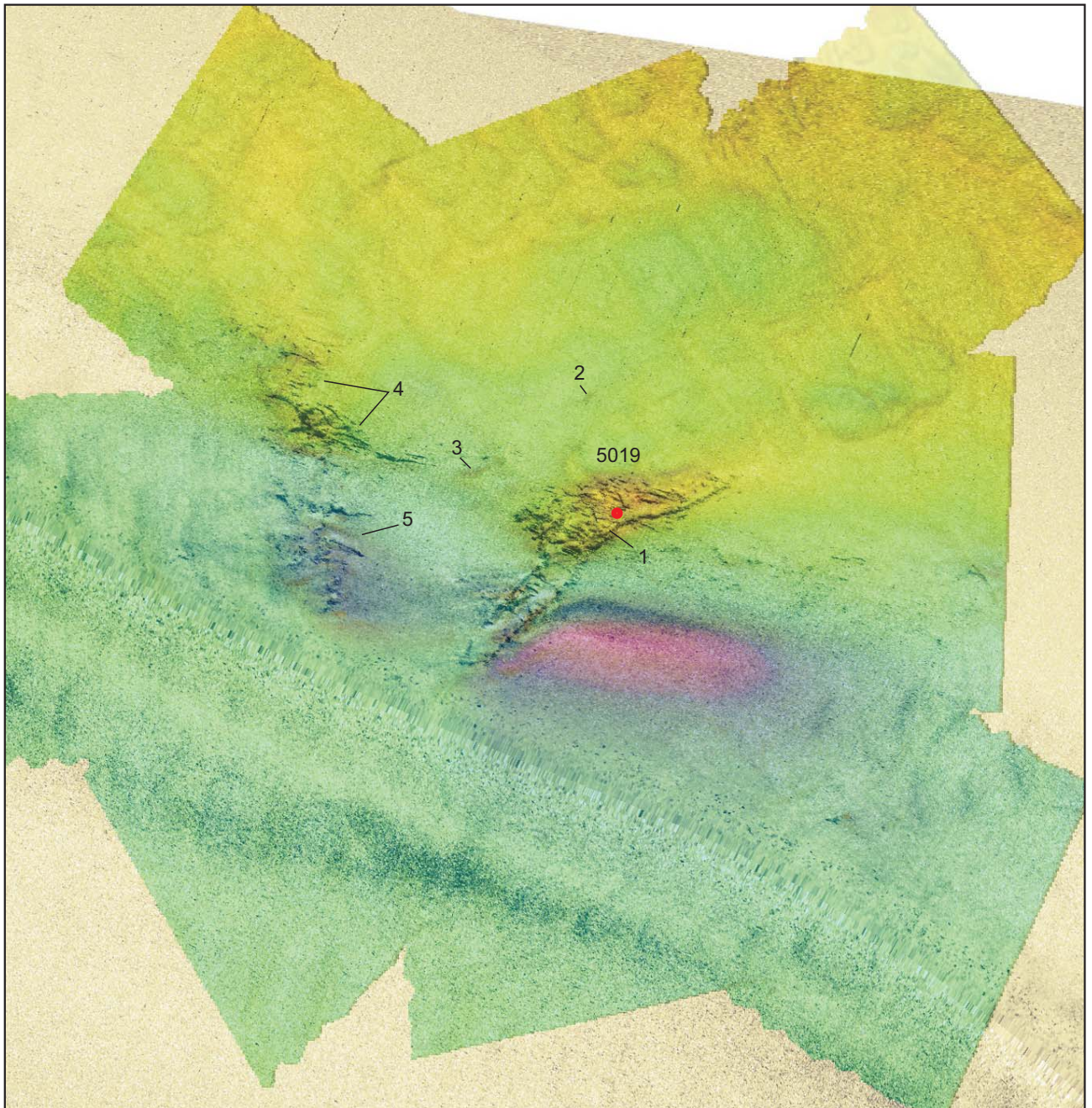


Plan view of 2002 Sidescan Sonar image.

<p>● Site location</p> 	Projection OSGB			
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Sidescan Sonar images of Site 5019.

Figure 2



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2002 Sidescan Sonar combined with Multibeam data.

Figure 3



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Canon recovered from site 5019 in 1962

Figure 4a



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Cannon salvaged from site 5019 in 2007.

Figure 4b



**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5020.02
January 2008**

Site ID: 5020

Site Name: Unknown (Iron Bar Wreck)

PLA Wreck No.: 342/79

Mitigation Group: 2.1.2. Site of probable archaeological interest, above SR1

No. of Casualties: Unknown

Vessel Type: Unknown (possible cargo vessel)

Cause of Loss: Unknown

Current Recording Status: Below Level 1b

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the site's discovery and includes all forms of investigation to date:

1978	Wreck located during periodic survey (01/1978);
1978	Wreck swept and partially salvaged. Clear at 11.2 metres, in a general seabed depth of 12 metres and a scour of 12.4 metres (10/05/1978);
1979	Wreck located at 51° 29' 48" N 00° 43' 26.5" E (31/07/1979);
1985	Site examined at 589068 E 181085 N by close sounding in a radius of 50 metres from above position. No remains of wreckage were located. However, previous surveys immediately after the salvage operation on the site showed signs of debris (10/09/1978);
2001	Emu sidescan sonar survey (29/03/2001);
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002);
2004	Site surveyed by the PLA using multibeam Reson 8101 Pos-MV. Two lines were run north and south over the site, the first line located a scour hole while the second line appeared to locate wreckage (07/10/2004);
2005	Site dived by the PLA and Nigel Nayling (UWL). Wreck was located and a sample of concreted rope and timber were lifted for further analysis;
2005	Site searched for at 51° 29.818 N 00° 43.352 E (WGD DGPS). Least depth of nearest obstruction 12.1 metres in a general depth of 12.2 metres. Site not located by echo sounder or DCS3 (22/08/2005);
2006	PLA site investigation using Reson 8125 multibeam system (09/03/2006).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2001	Wessex Archaeology, Assessment of Effects on the Archaeological Heritage: Inter-tidal and Marine, in respect of the proposed development of London Gateway;
2002	Wessex Archaeology, side scan data and magnetometer data;
2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i> , inclusive of: 'target 99' and 'target 318' tiff images;
2005	UKHO (12917);

2005	NMR (800540);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	Port of London Authority, <i>Marine Diving Services Report</i>
2005	Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 1</i> University of Wales Lampeter;
2006	Wessex Archaeology, Geophysical Analysis of 2006 of multibeam and 2001& 2002 sidescan sonar data, inclusive of: one geo tiff and five tiff images.

3. SITE DESCRIPTION

Position (UTM) obtained from 2006 multibeam data: 341911.6889 E 5707550.2472 N

Location: The site is located near Sea Reach 4, 50 metres outside the northern edge of the dredged channel (**Figure 1**).

Depth: 13 metres

Minimum Target Depth: 12.45 metres

Extent: 15 x 15 x 0.6 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site consists of a linear anomaly with two hard reflective edges (in the along track direction). The NGR recorded was 589074 E 181073 N. The anomaly is 10 metres long and 5 metres wide, no length of shadow was recorded. The tiff file created was labelled as ‘target 99’.

2002 WA sidescan sonar interpretation:

The site consists of a group of anomalies which are not clearly defined. There is the possibility of other targets in the vicinity. This anomaly corresponds to PLA 686 (wooden vessel - iron bars recovered) and **5020**. The NGR recorded was 589083 E 181079 N. The anomaly is 15 metres long and 15 metres wide, no length of shadow was recorded. The tiff file created was labelled as ‘318’ (**Figure 2**).

2005 PLA Dive Description:

The PLA dived the site on the 5th and 6th February 2005. A multibeam survey undertaken by the PLA in 2004 identified two main areas within the site. The diver located a debris field mainly consisting of iron bars and large concretions. The concretions consisted of iron section, baulks of timber with treenails, scattered smaller pieces of timber and a large number of hand made bricks. A small piece of timber and section of concreted rope were recovered for further identification.

The 30 metre scour hole to the northwest of the site was investigated but the diver reported only undulating seabed.

The timber sample and concreted rope were taken away by Nigel Nayling of UWL for further analysis.

2005 UWL Dive Description

Nigel Nayling of UWL dived the site on behalf of the PLA on the 5th and 6th February 2005. A multibeam survey undertaken by the PLA in 2004 identified two main areas within the site.

The first area was dived and reported to be a minor scour hole but with no associated wreckage material. The scour hole was located to the northwest of the site's charted position. Two dives were undertaken on the main disturbance identified by the 2004 multibeam. The first dive located a scatter of a variety of material including iron bars and timber. The second dive identified numerous sections of folded iron bars and one large concreted mass of bars (possibly relating to one of the large features identified on the 2004 multibeam). Other debris included fragments of oak frames with oak treenails consistent with the disturbed remains of a wooden vessel previously subjected to salvage.

Recovered Finds:

A sample of timber and concreted rope were recovered from the site and taken by Nigel Nayling for further analysis (**Figure 3**). The timber sample was made from oak and had oak treenail fastenings but was not suitable for dating.

2006 WA interpretation of PLA multibeam data:

The site consists of an amorphous mound which is 7 metres long by 7 metres wide and 0.6 metres upstanding. This is surrounded by a raised area of seabed which maybe related to the feature. This raised area is 15 metres long by 15m metres wide (**Figure 1A-B**).

The feature is situated in a large area of sandwaves. These are typically orientated in a north-east by south-west direction. They are generally 5 metres wide, 0.1 to 0.25 metres upstanding and 3 to 20 metres in length.

The southern end of the main feature appears to have a steep edge. It is 15 metres long, 1 metre wide and 0.6 metres upstanding (**Figure 1A-B**).

The northern edge of the main feature has a linear feature extending from it (**Figure 1A-B**). The linear feature is curved in the middle. It is 11 metres long, 4 metres wide at the base and 0.15 metres upstanding. The longer section of the linear feature is similar in size and orientation to the surrounding sandwaves in the area, and thus may only be a natural seabed feature.

4. SITE HISTORY

The identity of the wreck is not currently known. The site was discovered in 1978 when it was partially salvaged by the PLA. A report from the salvage office in 1978 stated "it could not be guaranteed that all the remains of this old vessel had been cleared" (342/79), particularly as signs of debris were visible on the echo sounder record on subsequent channel surveys (PLA 125). There appears to be no record of where the salvaged material was deposited.

Since 1978 there are no reports of salvage or clearance works having been carried out on the site.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'probable' archaeological interest. The key aspect of the site that have lead to the above rating are:

- The oak timber frames with oak treenail fastenings possibly indicate a vessel of earlier date. The survival of rope (although as concretion) suggests the possibility that other small finds of a similar delicate nature may survive;
- The PLA divers report indicates much of the cargo / vessel is still present even after clearance in 1978, thus the material remaining on the seabed may provide further information on the character and nature of the site;
- The reference by Nigel Nayling to folded iron bars is reminiscent of the iron bar cargo of the 16th century Princess Channel Wreck;
- The multibeam data indicates upstanding features present on the seabed.

6. CONSTRAINTS

The identity of the wreck is not currently known, it is therefore not possible to state whether there will be issues with ordnance or human remains.

7. OUTLINE OF FURTHER STAGE MITIGATION

To date recording to Level 1a has been undertaken. The presence, position and type of site have been confirmed. Although the extent of features on the seabed has been established through a multibeam survey, the full site extent, including buried features is still unknown. Character, date and importance of the site are still unclear.

The site will be avoided during dredging operations by changes to the design of the channel on account of its archaeological sensitivity. Mitigation will be achieved by establishing an Archaeological Exclusion Zone and monitoring it through a programme of multibeam surveys.

8. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will be located outside the dredged channel and will remain *in situ*. Dredging operations will not affect the site. An Archaeological Exclusion Zone will be established, which will be monitored by multibeam survey.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

Findings	Dated recovered and by who	Location
Large proportion of vessel	1978, PLA	Unknown
Concreted rope	2005, PLA / Nigel Nayling	UWL
Timber sample	2005, PLA / Nigel Nayling	UWL

DIGITAL ARCHIVE

Material	Location
2001 sidescan sonar data	WA
2002 sidescan sonar and magnetometer data	WA
2005 multibeam data	WA

PAPER ARCHIVE

Material	Location
UKHO (12917)	WA
NMR (800540)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam	WA
Port of London Authority, 2005, <i>Marine Diving Services Report</i>	WA
Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 1</i> University of Wales Lampeter	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Inter-tidal and Marine in respect of the proposed development of London Gateway	WA
Wessex Archaeology, 2003, <i>London Gateway Appendix Q: Enhanced Wreck Site Identification Report</i>	WA
Five printed images of the 2006 multibeam data	WA

**London Gateway Project: Yantlet Channel Diving Inspection
Report 1**

Nigel Nayling

Summary

Three seabed targets, identified as of high archaeological potential within the possible area of impact of proposed dredging for the London Gateway Project, were inspected by a diving archaeologist in line with the agreed Archaeological Mitigation Framework. Coherent remains of archaeological significance were identified at two of the locations, and scattered remains detected over a wide area in a third location.

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1 Background

1.1 INTRODUCTION

This document is a factual technical report on results of diving operations carried out in the Yantlet channel of the Thames to confirm the presence of material of archaeological interest in areas of proposed dredging for the London Gateway Project (LGP). Three locations, identified as probable wrecks of high archaeological significance in previous work (see below) were selected for inspection. Sites in this report are referred to primarily through use of codes assigned by Wessex Archaeology to facilitate cross-referencing with previous reports

1.2 PREVIOUS WORK

Previous assessment of the underwater cultural heritage in the area potentially affected by the London Gateway Port Development has included:

A desk-based assessment distributed as Appendix B of *The (London Gateway Port) Harbour Empowerment Order 2002: Assessment of Effects on Cultural Heritage in Respect of the Proposed Development of London Gateway Port Development* based on investigations undertaken by Wessex Archaeology

An updated wreck site identification exercise carried out by Wessex Archaeology between October 2002 and February 2003 to enhance the Environmental Assessment of London Gateway, including *Enhanced Wreck Site Identification*. This task comprised two elements, a review of existing sidescan survey and wreck data held by the Port of London Authority, and additional sidescan and magnetometer survey. The Survey Area comprised the Limit of Deviation (LOD) and an area of proposed dredging extending 2.77km eastwards along the channel from the Sea Reach No.1 navigation buoy.

1.3 AIMS AND OBJECTIVES

The aim of this study was to assess the character of three sites on the seabed within the area of proposed dredging in the Yantlet Channel to inform future decisions on appropriate mitigation. In line with the Archaeological Mitigation Framework for LGP, direct observation by a competent and suitably experienced archaeologist (the author), by means of diving, was employed. The aim of diving operations was to investigate each of the sites, sufficient to determine whether they are, or are not, of archaeological significance. This report does not attempt to assess the extent, or detailed nature of the archaeological resource at each location, or to provide guidance on their future management.

1.4 METHODOLOGY

In accordance with the Archaeological Mitigation Framework, each of the sites had been surveyed by the Port of London Authority using multibeam bathymetry, prior to inspection. The results of these surveys were used to assist in determining the diving programme, and to assist location of the sites. Some of the survey results are integrated within this report. Diving operations were undertaken by a dive team from the PLA under the supervision of Kevin Leadbetter, with the author acting as diving archaeologist. Each site was located using onboard GPS, and a shot dropped to mark its position. The boat employed as the diving platform was then positioned over the site using fore and aft anchors. Typically, a member of the PLA dive team would enter the water at the beginning of slack water, descend the shot line, and commence a circular search in order to locate the target. Having done so, a stray line would be laid between features located on the seabed to assist in their subsequent inspection by the author. On the next slack water, the author would carry out the archaeological inspection.

1.5 RESULTS

1.5.1 WA5029, "London", "Cannons" wreck, OSGB 36 590285 180965

This site was identified by Wessex Archaeology in its desk based assessment as the London, a 64-gun ship dating to AD 1665 (Leather 2003). It is described in the PLA wreck database as the "Cannons" wreck reflecting the recovery of two cannon in 1980. The presence of the site was confirmed by sidescan survey undertaken by the PLA (Leather 2003). Recent multibeam bathymetric survey, undertaken by the PLA as part of this appraisal, shows clear wreckage in three distinct sections. Each section appears to be approximately 10m E-W and 5m N-S in extent and the site as a whole sits within a scour pit approximately 12m E-W.

The site was dived on twice on 29th January, 2005. On the first dive, the site was located and the presence of three main sections confirmed. A small section of timber found loose on the seabed was recovered for examination. On the second dive (made by the author) the three sections were inspected, starting with the northernmost. This comprised a disturbed concentration of timbers, including both planking and framing elements. Apparently modern metal items might be related to earlier clearance or salvage operations, or fishing snags. The middle section was the largest and most coherent comprising large, squared oak frames attached to thick timber planking, all on edge. The southernmost section appeared to lie somewhat deeper, on the edge of the channel. Again framing timbers were attached to planking. Smaller roundwood present between some of the frames may represent dunnage, packing material for cargo.

Dendrochronological analysis of the oak frame recovered indicates that the timber is British in origin and felled some time after AD 1639. The results are therefore consistent with the preliminary identification of the site as that of the wreck of the London.

1.5.2 WA5019, "King", OSGB 36 589844 180955

Identified by Wessex Archaeology in its desk based assessment, from PLA records which mention the recovery of a cannon dated to 1636. The site was surveyed in 2001 and 2002 using sidescan survey (Leather 2003), and more recently using multibeam bathymetry. The latter survey showed clear wreckage in two distinct

locations some 50m apart. The main section appeared to cover an area of 25m by 12m on a WSW/ENE axis. The outlying section appeared approximately 10m long but very narrow.

The site was dived over two days (30th and 31st January, 2005), with two dives being made on each of the identified sections. The first dive on the largest, easternmost section suggested the presence of disturbed fragments of wood over a wide area, with a concentration of timber around a single cannon found lying proud of the seabed and overlying a number of timbers. Examination on the second dive by the author confirmed the presence of this cannon, provisional measurements suggesting it is either a saker or demi-culverin. The gun overlies a concentration of apparent roundwood of 100-150mm diameter. Nearby, a plain chamfered beam (approximately 250-300mm sided) protruding from the seabed is most probably a carling (deck beam). A wooden wheel found lying embedded in sediment could be either a truck from a gun carriage, or part of a pulley block. A circular search of the area around the cannon revealed further timber but also steel cable and other debris probably of modern origin. Hull structure was not as clear as might have been expected from the bathymetric survey results, but this could in part be due to the quantity of smaller, loose material scattered over the area.

The western section was dived on twice. On the first dive, circular searches confirmed the absence of material on the seabed between the two sections, and located a concentration of chain. On the second dive, the author confirmed the presence of this large pile of chain, mostly of 100mm length links. This chain is probably relatively recent, as the links were readily moved. No historic items were identified in this vicinity.

1.5.3 WA5020, Iron Bar Wreck, OSGB 36 589072 181071

Two main locations associated with this site were dived on (5th and 6th February, 2005). A minor scour hole identified on the bathymetric results to the north-west of the anomalies charted position was examined but no associated wreck or other material located. Two dives were undertaken on an area shown on the survey as

disturbance largely covered by bed material some 17m by 7m. The first dive located a scatter of a variety of material including iron bars and timber. On the second dive, the author encountered numerous sections of folded iron bars and one large, concreted mass of bars which probably generated one of the larger anomalies identified on the survey. Other debris included fragments of oak frames with oak treenails consistent with the disturbed remnants of a wooden vessel previously subjected to salvage/clearance as indicated in PLA records.

1.6 DISCUSSION

This is the first diving inspection of submerged sites undertaken as part of the Archaeological Mitigation Framework for LGP. As such, some initial comments on the approach taken might be appropriate. The methodology employed reflects the difficult marine environment with limited slack water (approximately 1 hour maximum around each high and low water), very limited (or zero) visibility, and location of sites within the busy navigation channel. The approach taken has made fullest use of the very considerable expertise of the PLA's survey and diving sections, focusing the archaeologist's dive time purely on inspection rather than location of previously agreed targets. This has proved a successful and cost effective approach, offering a model for future work.

1.7 ACKNOWLEDGEMENTS

Hydrographic data and bathymetric survey results were supplied by John Pinder, PLA. The advice of Peter Steen and the support of the dive team at the Port of London Authority are gratefully acknowledged.

1.8 REFERENCES

Leather, S, 2003 *Updated Wreck Site Identification: Sidescan Sonar and Marine Magnetometer Survey*, Wessex Archaeology, **London Gateway Development Technical Report Appendix Q**

London Gateway Project: Diving Inspection Report 2

Nigel Nayling

Summary

Three seabed targets, identified as of varying archaeological potential within the possible area of impact of proposed dredging for the London Gateway Project, were inspected by a diving archaeologist in line with the agreed Archaeological Mitigation Framework. One site comprises two large sections of a steel built vessel identified as the *Dovenby*, a barque which sank in 1914. Closely stacked bricks located at a second site may relate to the documented sinking of a brick-carrying barge in 1922. A third site, comprising the partially exposed remains of a wooden wreck, is unidentified.

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1 Background

1.1 INTRODUCTION

This document is a factual technical report on results of diving operations carried out to assess the archaeological nature of previously identified underwater anomalies in areas of proposed dredging for the London Gateway Project (LGP). Three locations, identified as probable wrecks of possible archaeological significance in previous work (see below) were selected for inspection. Sites in this report are referred to primarily through use of codes assigned by Wessex Archaeology to facilitate cross-referencing with previous reports.

1.2 PREVIOUS WORK

Previous assessment of the underwater cultural heritage in the area potentially affected by the London Gateway Port Development has included:

A desk-based assessment distributed as Appendix B of *The (London Gateway Port) Harbour Empowerment Order 2002: Assessment of Effects on Cultural Heritage in Respect of the Proposed Development of London Gateway Port Development* based on investigations undertaken by Wessex Archaeology.

An updated wreck site identification exercise carried out by Wessex Archaeology between October 2002 and February 2003 to enhance the Environmental Assessment of London Gateway, including *Enhanced Wreck Site Identification*.

This task comprised two elements, a review of existing sidescan survey and wreck data held by the Port of London Authority, and additional sidescan and magnetometer survey. The survey area comprised the Limit of Deviation (LOD) and an area of proposed dredging extending 2.77km eastwards along the channel from the Sea Reach No.1 navigation buoy.

1.3 AIMS AND OBJECTIVES

The aim of this study was to assess the character of three sites on the seabed within the area of proposed dredging in the Yantlet Channel to inform future decisions on appropriate mitigation. In line with the Archaeological Mitigation

Framework for LGP, direct observation by a competent and suitably experienced archaeologist (the author), by means of diving, was employed. The aim of diving operations was to investigate each of the sites, sufficient to determine whether they are, or are not, of archaeological significance. This report does not attempt to assess the extent, or detailed nature of the archaeological resource at each location, or to provide guidance on their future management.

1.4 METHODOLOGY

In accordance with the Archaeological Mitigation Framework, each of the sites had been surveyed by the Port of London Authority using multibeam bathymetry, prior to inspection. The results of these surveys were used to assist in determining the diving programme, and to assist location of the sites. Some of the survey results are integrated within this report. Each site had previously been visited by a dive team from the PLA under the supervision of Kevin Leadbetter and relevant observations are also included here. Using procedures broadly in line with those employed previously (Nayling 2005), each of the sites was visited by the PLA dive team with the author in attendance.

1.5 RESULTS

1.5.1 WA 5230, 343/99, OSGB 36 591581 180324

The site is located on the south side of the main channel between Sea Reach No 3 and Sea Reach No 4 buoys. The wreck may be that of barge that sank in 1922 (Admiralty Reference No 12886) which was shown on charts prior to 1926 located some 110m from the surveyed anomaly. The site was located by PLA survey and inspected by divers in 2002. Although not subjected to additional magnetometer and sonar survey by Wessex Archaeology in 2001/2, the site was listed in its updated wreck site listing (Leather 2003, table 1). More recent survey (2005) indicated two areas of debris: an area extending 8 x 4 m and 1m above the general bed level and a smaller area of debris 14m south in the original charted position (591581 180310) extending from the shoal to the south-west. PLA Marine Services diver inspection reported that the obstruction is composed of piles of bricks (some of which are neatly stacked), wood and concreted metal indicating that the

obstruction could be the wreck of a wooden dumb barge or sailing barge. Diving on 28/7/05 confirmed this description. Samples of stamped brick were recovered for possible identification. Features observed are consistent with presence of a relatively modern, brick carrying barge as indicated in Admiralty records.

1.5.2 WA5204, 343/93, OSGB 36 593858 180121

The site is located east of Sea Reach No. 3, 20m from the southern edge of the existing, dredged channel. The wreck was apparently first surveyed by the PLA during channel extension survey in 1999. Although not subjected to additional magnetometer and sonar survey by Wessex Archaeology in 2001/2, the site was listed in its updated wreck site listing (Leather 2003, table 1). PLA survey in 2005 revealed a smooth mound measuring some 7m (NS) by 3m (EW) with signs of debris up to 10m to the north. Initial inspection by PLA divers indicated that the obstruction is the remains of a wooden vessel with framing timbers protruding from the sand in a debris field roughly 7m x 3m.

The site was dived twice by the author on 29/7/05. The presence of apparently articulated framing timbers protruding from a marked mound was confirmed. Additionally, a section of keel some 7m in length was found to extend out from this mound, sloping upwards such that, at its exposed uppermost end, it was some 2m clear of the seabed. A small number of pottery sherds from the debris mound were recovered for possible identification. Small pieces of loose timber which had previously been recovered from the site were examined but, although oak, found to be unsuitable for dendrochronological dating.

1.5.3 WA5010 and WA 5012, *Dovenby*, 343/11 and 12, OSGB 36 597736 180646 and 597665 180831

This site is extensively recorded in the records of the PLA. Built in the Sunderland yard of Pickersgill in 1891, this steel barque sank in collision with the Dutch steamer *Sindoro* carrying a cargo of *guano* from Lobos d'Afuera to London in 1914. Records indicate that the wreck was dispersed with explosives soon after wrecking and had also been reduced by cutting with oxy-acetylene in 1967. The site was surveyed in 2001 and 2002 using sidescan and magnetometer survey (Leather

2003), and more recently using multibeam bathymetry. Surveys show clear wreckage in two distinct locations some 100m apart. Both main locations associated with this site were dived. The presence of substantial, upstanding metal frames was confirmed. Seabed inspection was consistent with the remains representing those of the *Dovenby*.

1.6 DISCUSSION

The identification of the *Dovenby* seems secure. Wreck structure has been substantially degraded through intentional clearance and subsequent erosion. The dating of the two other sites examined might best be resolved by examination of ceramics (brick from one, pottery from the other) recovered during diving inspections. The extent of any surviving wooden wreck structure at these latter two sites remains unclear.

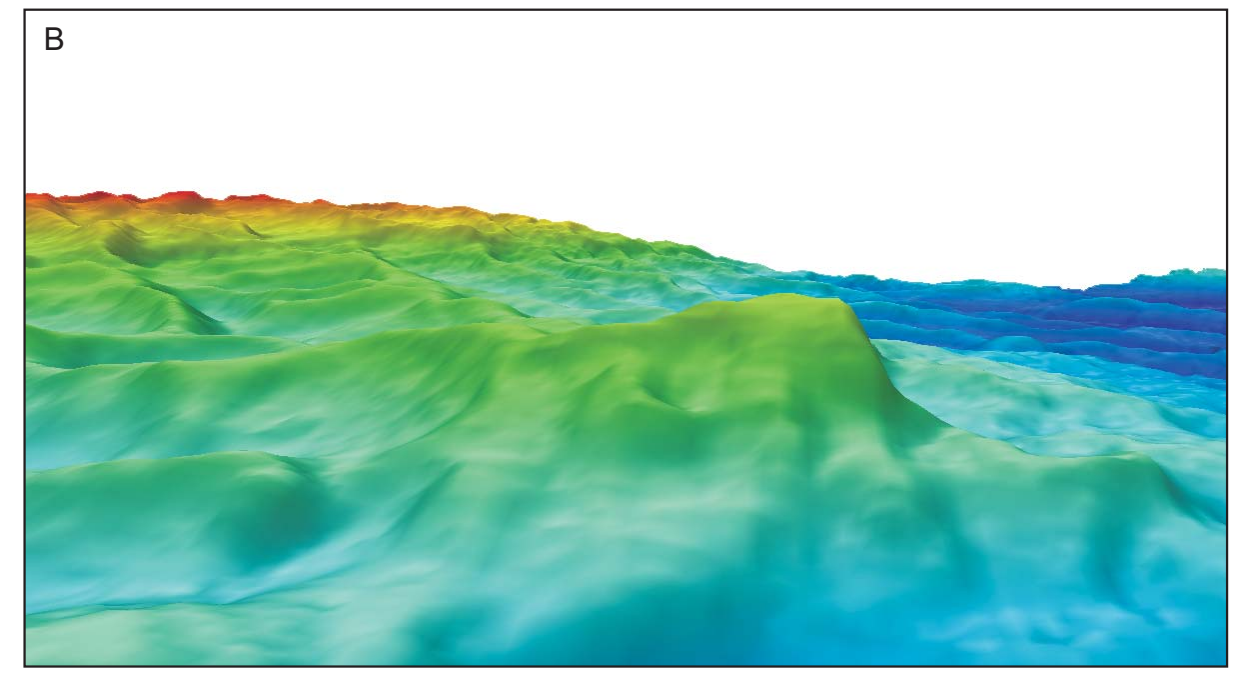
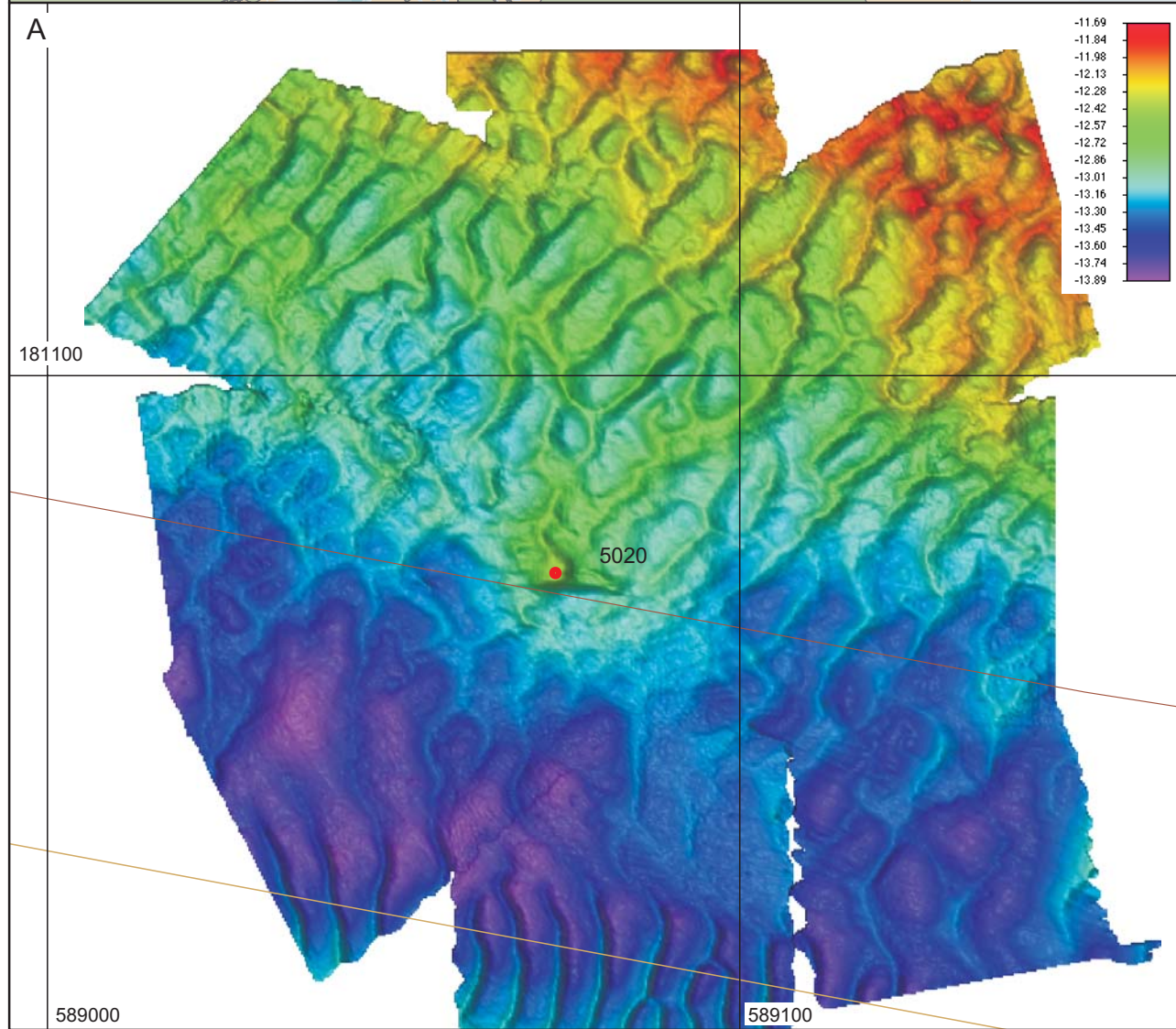
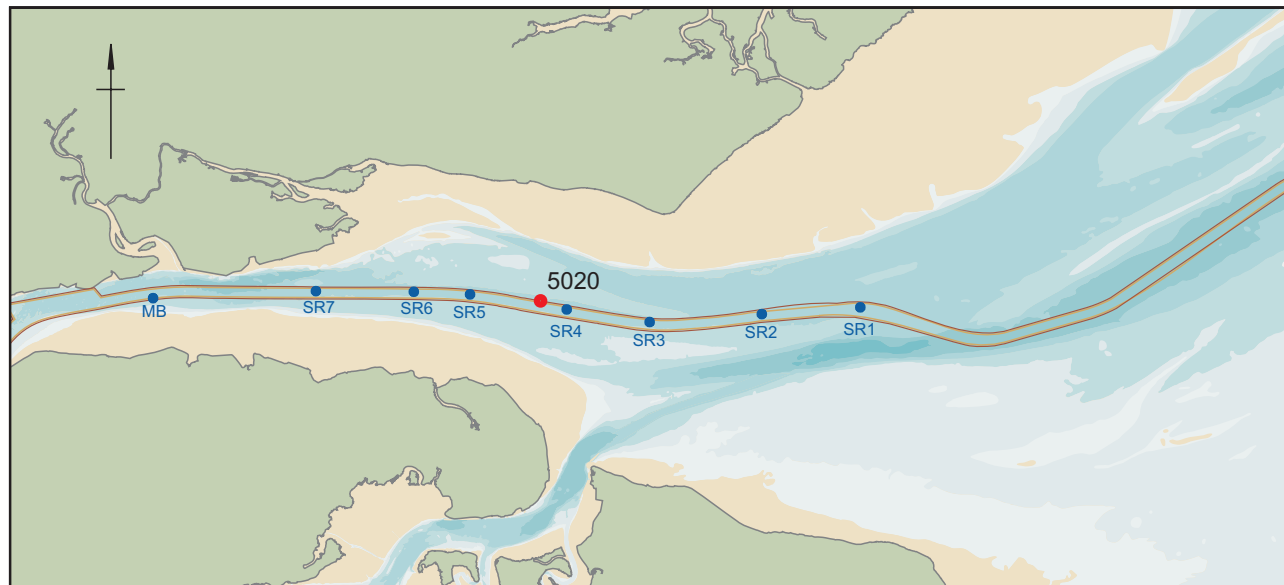
1.7 ACKNOWLEDGEMENTS

Hydrographic data and bathymetric survey results were supplied by John Pinder, PLA. The advice of Peter Steen and the support of the dive team at the Port of London Authority are gratefully acknowledged.

1.8 REFERENCES

Leather, S, 2003 *Updated Wreck Site Identification: Sidescan Sonar and Marine Magnetometer Survey*, Wessex Archaeology, **London Gateway Development Technical Report Appendix Q**

Nayling, N, 2005 *London Gateway Project: Diving Inspection Report 1*, **University of Wales Lampeter London Gateway Archaeology Report 01/2005**



Oblique view from west.

Not to scale

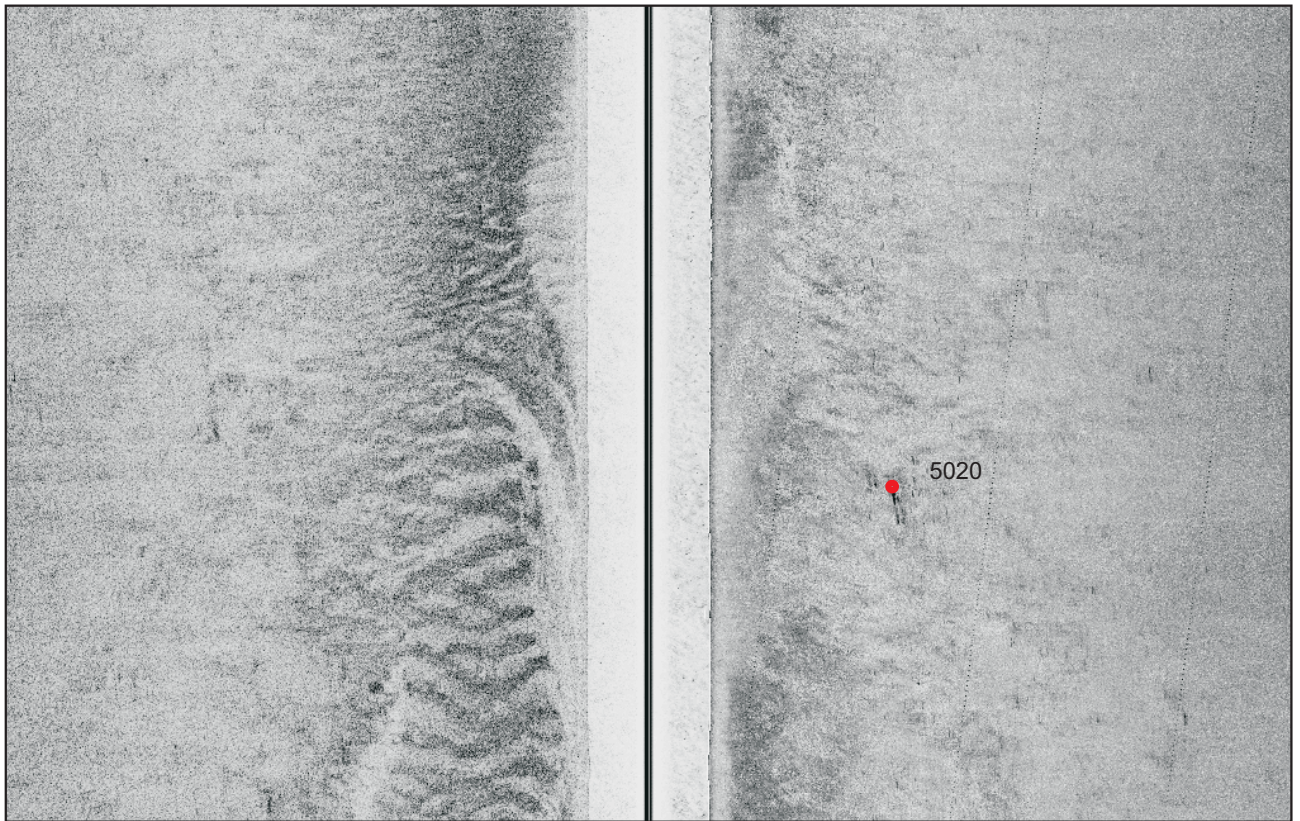
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



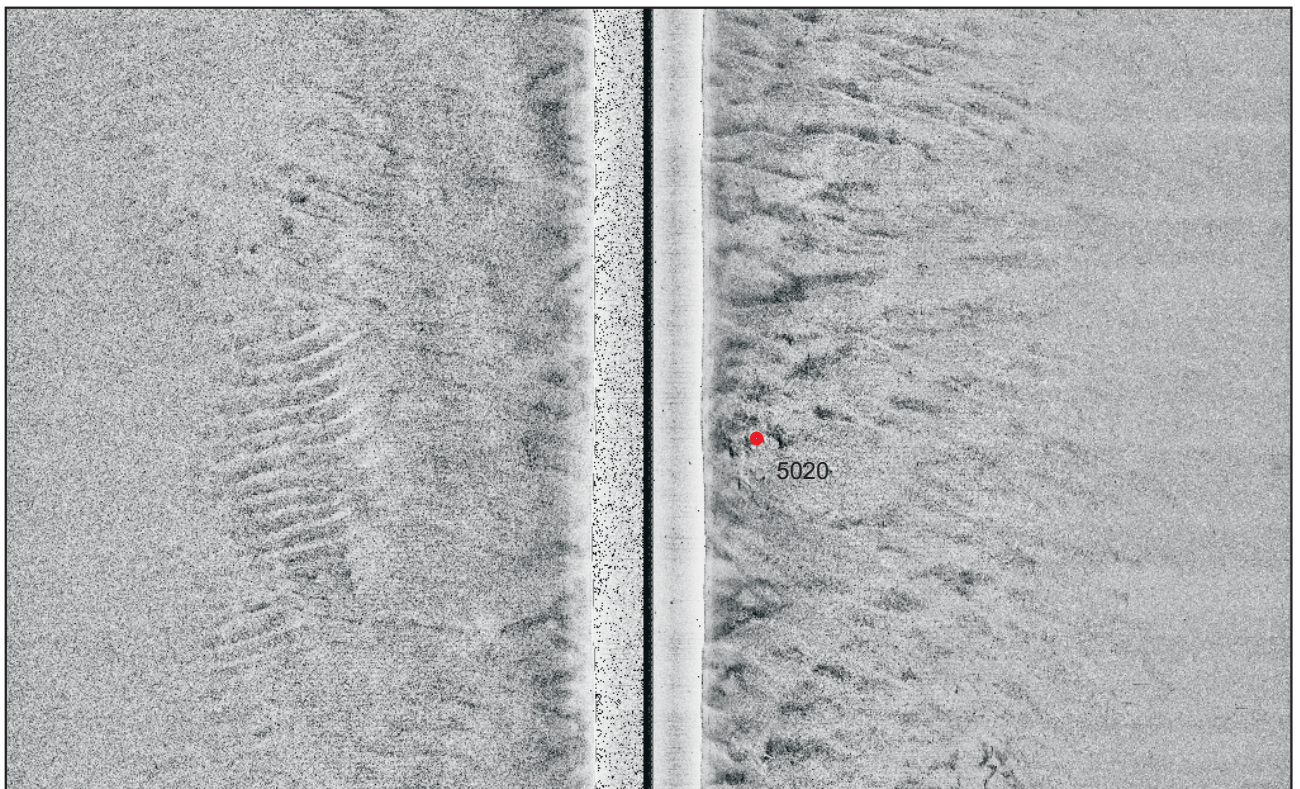
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Seazone Licence Number: 122003.003			
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Date:	25/03/06	Revision Number:	0
Scale:	1:250,000 1:1000	Illustrator:	KMN
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Location and Multibeam data for Site 5020.



Figure 1



2001 Sidescan Sonar image of Site 5020.



2002 Sidescan Sonar image of Site 5020.

 Site location 	This material is for client report only © Wessex Archaeology. No unauthorised reproduction.			
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Sidescan Sonar images of Site 5020.

Figure 2



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**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5029.02
December 2007**

Site ID: 5029

Site Name: *London*

PLA Wreck No.: 343/02

Mitigation Group: 2.1.1. Site of certain archaeological interest, above SR1

No. of Casualties: approximately 300

Vessel Type: Warship

Cause of Loss: Internal explosion

Current Recording Status: Level 1b

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the sites discovery and includes all forms of investigation to date:

1665	Vessel sunk due to internal explosion (07/03/1665);
1979	Reported as an unusual looking feature (23/11/1979);
1980	Site salvaged by Yantlet, divers recovered two cannons (03/09/1980);
1981	Site swept, no further salvage work is anticipated on the wreck (07/11/1981);
1985	Wreck located at 51°29'43''N 00° 44'29.5''E (OGB) swept clear to 8.2 metres (07/10/1985);
1985	Site identified during search for the London at 51°29'44''N 00°44'31''E (OGB). Site is located in a general depth of 12 meters, but has a large iron content for a 17 th century sailing vessel (23/10/1985);
1990	Site located at 51°29'42.1''N 00°44'29.5''E (OGB using microfix) in a least depth of 8.7m in a general depth of 9.5 - 11 metres with a scour of 12.3 metres (09/04/1990);
2002	Site identified as important during London Gateway archaeological assessment (14/11/2002);
2004	Site located at 51°29.753' N 00°44.405' E (WGD using DGPS);
2004	Site surveyed by PLA with multibeam and echo sounder, the wreck was located in three distinct sections of wreckage 30m south of charted position. The southern section was located at NGR 590284 E 180956 N (07/10/2004);
2005	Site dived by the PLA and Nigel Nayling of UWL (29/01/2005); the wreck was located and timber samples were recovered for dating;
2005	Site located at 51°29.732' N 00°44.391'E (WGD using DGPS). Wreck lies in a least depth of 9.83 metres in a general depth of 10.9 metres with a scour of 0.1 metres. The sites is 47.1 metres long, width 28.4 metres and lies in a ne/sw orientation in a broken up state (23/08/2005);
2006	PLA site investigation using Reson 8125 multibeam system (09/03/2006);
2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i> ;
2003	Wessex Archaeology, London Gateway <i>Enhanced Wreck Site identification Further Work on Sites within the Survey Area</i> ;
2005	UKHO (13169);
2005	NMR (908042);
2005	Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 1</i> University of Wales Lampeter;
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	Port of London Authority, <i>Marine Diving Services Report</i> ;
2006	Wessex Archaeology, Analysis of 2006 multibeam (inclusive of one geo tiff and six tiff images);
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and four tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from 2006 multibeam data: 343112.194 E 5707357.706 N

Location (derived from 2006 multibeam data): The site is located 300 metres northeast of Sea Reach Buoy No 4, 139 metres outside the northern edge of the dredged channel (**Figure 1**).

Bed Depth: 11.2 metres

Minimum Target Depth: 10.27 metres

Extent: 30 x 20 x 1.1 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

Site **5029** was not situated within the 2001 sidescan sonar survey area.

2002 WA sidescan sonar interpretation:

Site **5029** was not situated within the 2002 sidescan sonar survey area.

2005 PLA Dive Description

The site was dived by the PLA on the 29th January 2005. The diver identified three distinct sections of wreckage all of which consisted of timber. A sample of timber, which included treenails, was recovered to the surface for dating. Two concreted features were also recovered to the surface but on inspection are thought to be corroded wire. The diver also identified several piece of wooden planking lying on the river bed in the surrounding area.

2005 UWL Dive Description:

The site was dived by Nigel Nayling on behalf of the PLA on the 29th January 2005. Two dives were undertaken on the site, the first by the PLA and the second by Nigel Nayling. The first dive located the site and the presence of the three sections of wreckage identified in the 2005 multibeam data was confirmed. On the second dive the three sections of wreckage were

inspected. The inspection of the northern most area was undertaken first. It comprised a disturbed concentration of timbers including both planking and framing elements. Modern metal items were noted and thought to be the result of earlier clearance, salvage operations or fishing snags.

The middle section of wreckage was the largest and most coherent. It comprised thick wooden planking attached to large, squared oak frames. The southernmost section is further into the channel, it consisted of planking attached to framing timbers. Smaller roundwood was located between the frames which may represent dunnage (packing material for cargo).

The dendrochronological analysis of the recovered sample indicates that the timber was British in origin and felled after AD 1639.

2006 WA interpretation of PLA multibeam data:

Site **5029** consists of three main sections of wreckage and a large scour hole on the eastern side of the wreck. The overall site dimensions are 30 metres by 20 metres. The site is 1.1 metres upstanding (**Figure 1A**).

To aid the description of this site in the report the three sections of wreckage have been labelled Features 1, 2 and 3.

The northern most section (Feature 1) is curved shaped, it is 13 metres long, 6 metres wide and 1.1 metres upstanding. A small scour is located to the north feature which is orientated east-west. It is 25 metres long, 17 metres wide and 0.8 metres deep in the north-eastern section of the scour (**Figure 1A-C**).

The middle section (Feature 2) is rectangular in shape and is located 4 metres away from Feature 1. It is 10 metres long, 5 metres wide and 1.1 metres upstanding. The feature is split into two sections which appear as two cone shaped features (**Figure 1C**). The western peak is 3.5 metres long, 4 metres wide and 1 metre upstanding. The eastern peak is 6.5 metres long, 5 metres wide and 1.1 metres upstanding.

To the north-west of Feature 2 there is a small outlying feature which is rectangular in shape. It is 2.5 metres long, 1.5 metres wide and 0.6 metres upstanding (**Figure 1A**).

The southern most section (Feature 3) is L shaped and located 5 metres from the middle section of wreckage (Feature 2). There is a low linear feature which joins these last two sections together, the linear feature is 5 metres long, 2.5 metres wide and 0.25 metres upstanding. Feature 3 is 8.5 metres long (orientated north-south) then extends a further 12 metres to the south-east. Feature 3 is 8 metres wide and 1.2 metres upstanding. There are also indistinct outlying features to the south of this feature (**Figure 1A-C**).

To the east of the three main features is a large scour, which is orientated east-west. It is 65 metres long, 15 metres wide and 1.5 metres deep with steep sides (**Figure 1A-B**).

To the west of Features 2 and 3 there is a shallow scour orientated east-west. It is 20 meters long, 10 metres wide and 0.9 metres deep (**Figure 1A and C**).

To the south of Feature 3 is a small mound which has a diameter of 2 metres and is 0.15 metres upstanding. To the east of the main site there is a small feature located in a scour. The

feature is square in shape with dimensions of 2.5 metres and 0.35 metres upstanding. The scour has a diameter of 10 metres and is 0.4 metres deep (**Figure 1A**). Both features may be outlying debris from the wreck.

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data and provided additional detail. The sidescan sonar data indicate a wreck broken into three distinct sections. The entire wreck site measures 33 x 20 metres (**Figure 2**).

The northernmost section covers an area of 12 metres by 10 metres and comprises three dominant reflectors indicating structure: two parallel reflectors approximately 9 metres long, 5 metres wide and 0.5 metres high, orientated north-south. The third reflector is curved and lies to the south. This feature is 7 metres long, has no obvious height and is orientated north-west to south-east.

The central section of the wreck exhibits the most height measuring 10 x 3 x 1.1 metres. In this section five distinct reflectors are observed. The southernmost section of the wreck is the largest and measures 10 x 10 metres, however exhibits no measurable height.

Further small (less than 1 metre diameter) features are observed within 10 metres of the south-eastern side of the main wreck site. It is possible that these represent small items of associated debris.

Approximately 10 metres to the north of the northernmost limit of the wreck site lies a small feature, possible debris associated with the site measuring 1.7 x 0.7 x 0.2 metres.

Shallow scour, identified on the multibeam data, is also observed on the sidescan sonar data.

4. SITE HISTORY

Build

The *London* was built by Captain Taylor in Chatham as a Second Rate for the Commonwealth Fleet. Observations made by Nigel Nayling of the UWL indicate that the frames were made of oak, which is the typical construction material for the period. She was launched in 1657. The following dimensions and specifications are taken from a table called:

The rates, kinds, names, originals, dimensions, burdens and force in men and guns of every ship in the Royal Navy of England from May 1660 to 25 March, 1686, the day whereon the Kings commission to Sir Anthony Deane and others for the general repair, &c. of the said navy took place. Together with different exits of said 25 March, 1686 (Tanner 1903).

Length by the keel (ft, in)	123, 6 (37.64m)
Breadth by the beam (ft, in)	41, 0 (12.5m)
Depth in hold (ft, in)	16, 6 (5.02m)
Draught of water (ft, in)	18, 0 (5.48m)
Burden (tons)	1104
Men in peace everywhere	280
Men in war abroad	360
Men in war at home	450
Guns in peace everywhere	68

Guns in war abroad	68
Guns in war at home	76

In 1656 the *London* carried a total of 62 guns: 12 demi-cannon and 12 culverins in the lower tier; 12 culverins and 12 demi-culverins in the middle tier; and six demi culverins on the forecastle, four in the waist and another six on the quarterdeck (Lavery 1984). A note in the Journals of the Proceedings of the Board of Ordnance dating to September 29 1657 indicates that the *London* was fitted with cast iron cannon of seven to test the performance of larger cast iron guns in service (War Office: Ordnance Office: Board of Ordnance: Minutes: 1657).

No plans, models or other pictorial sources could be found for the *London*. However, a model of an unknown English warship, possibly dating to 1659, which is preserved in Sweden, gives an indication of the possible appearance (Howard 1979) (**Figure 3**).

Use

In 1659 the *London* was part of the English Naval Squadron that was sent to the Øresund to support the Swedish fleet against the combined Danish/ Dutch forces under the command of Rear Admiral Richard Stagner (Warship Histories).

On the 14th May 1660 the *London* was part of a strong English Squadron that arrived off the Dutch coast to collect King Charles II and restore him to the throne in an effort to end the anarchy which followed the death of Cromwell in 1658

In the same year, the vessel, now under the command of J. Lawson became part of the new Royal Navy of Charles II. In 1664 the vessel was commanded by Captain William Poole and acted as flagship of the Earl of Sandwich (Anderson 1939). In 1665 she was again the flagship of Sir J. Lawson (Warship Histories).

Loss

The *London* exploded on March 7, 1665 in the Thames. A fairly detailed account of the loss of the *London* is given in the diary of Samuel Pepys (Latham;Matthews 1972):

“... This morning is brought to me to the office the sad news of the *London*, in which Sir J Lawsons men were all bringing her from Chatham to the Hope, and thence he was to go to sea in her – but a little a-this-side the buoy of the Nower, she suddenly blew up. About 24 and a woman that were in the round house and coach saved; the rest, being 300, drowned – the ship breaking all in pieces – with 80 pieces of brass ordinance. She lies sunk, with her round house above water. Sir J Lawson hath a great loss in this, of so many good chosen men, and many relations among them.”

A reference in the Calender of State Papers, Domestic mentions that attempts were made to salvage the entire vessel, but only the guns could be recovered (Calendar of State Papers Domestic 1665-6).

Salvage and Clearance

The *London* was claimed to be salvaged in 1980 when two cannons were recovered from the site, and the area was swept. However, in 1985 the HMS Sheraton was searching for the wreck of the *London* implying the location was still unknown. The location of the salvaged guns is unknown (pers. Comm. Peter Steen 30.03.2006).

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'certain' archaeological interest. The key aspect of the site that have lead to the above rating are:

- The potential to learn a vast amount about the technological construction of a second rate warship for which there are no plans in existence;
- Diver reports of substantial timbers and small finds remaining on the site;
- The large sections of wreckage identified during the 2006 multibeam survey;
- A number of features identified during the 2007 sidescan sonar survey which probably represent associated debris;
- The reported confusion between this site and WA **5019** (cf. WA reports 2003), the *King*, indicating the possibility that there may be a connection between the two sites as they appear to be very similar in date.

6. CONSTRAINTS

There were approximately 300 reported deaths on this vessel. It is therefore likely that there will be issues with human remains.

As the site is upstanding by 1.1 metres it is possible that entanglement may be an issue when investigating the site with divers.

7. SCOPE OF FURTHER STAGE I MITIGATION

Stage 1 Mitigation is intended to achieve a Level 2 record of the site, which is a record that provides sufficient data to establish the extent, character, date and importance of the site.

Level 2 recording has not yet been achieved for this site. Diver reports and the early date of the site suggest that the majority of the site may be buried. The geophysical surveys only show the extents of the upstanding features on the seabed. Further diver investigations would be necessary to establish the full site extents, including any buried sections.

Due to the early date of the wreck, documentary research does not provide sufficient detail to establish character and importance of the site. Very few Admiralty Board models are preserved for the period prior to the 17th century. The use of plans to construct ships only became common practice around 1700 and the earliest English warship plans date to the 1680's.

8. OUTLINE OF STAGE II MITIGATION

The wreck lies 139 metres outside the dredged channel. The wreck will be avoided during dredging operations by changes to the design of the channel on account of its archaeological sensitivity. Mitigation will be achieved by establishing an Archaeological Exclusion Zone and monitoring it through a programme of multibeam surveys.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site is located outside the dredged channel and will remain *in situ*. Dredging operations will not affect the site. An Archaeological Exclusion Zone will have been established, which will be monitored by multibeam survey.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital and material archive.

ARCHIVE**RECOVERED MATERIAL**

Findings	Dated recovered and by who	Location
Timber sample	Nigel Nayling	UWL
Two cannons	PLA? In the 1980's	Unknown

DIGITAL ARCHIVE

Material	Location
2006 multibeam data	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

Material	Location
UKHO (13169);	WA
NMR (908042);	WA
Wessex Archaeology, London Gateway <i>Enhanced Wreck Site identification Further Work on Sites within the Survey Area;</i>	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures;	WA
Port of London Authority, 2005, <i>Marine Diving Services Report;</i>	WA
Nayling, N, 2005, <i>London Gateway Project: Diving Inspection Report 1</i> University of Wales Lampeter;	WA
Wessex Archaeology, 2003, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification Report;</i>	WA
Seven printed images of the 2006 multibeam data.	WA

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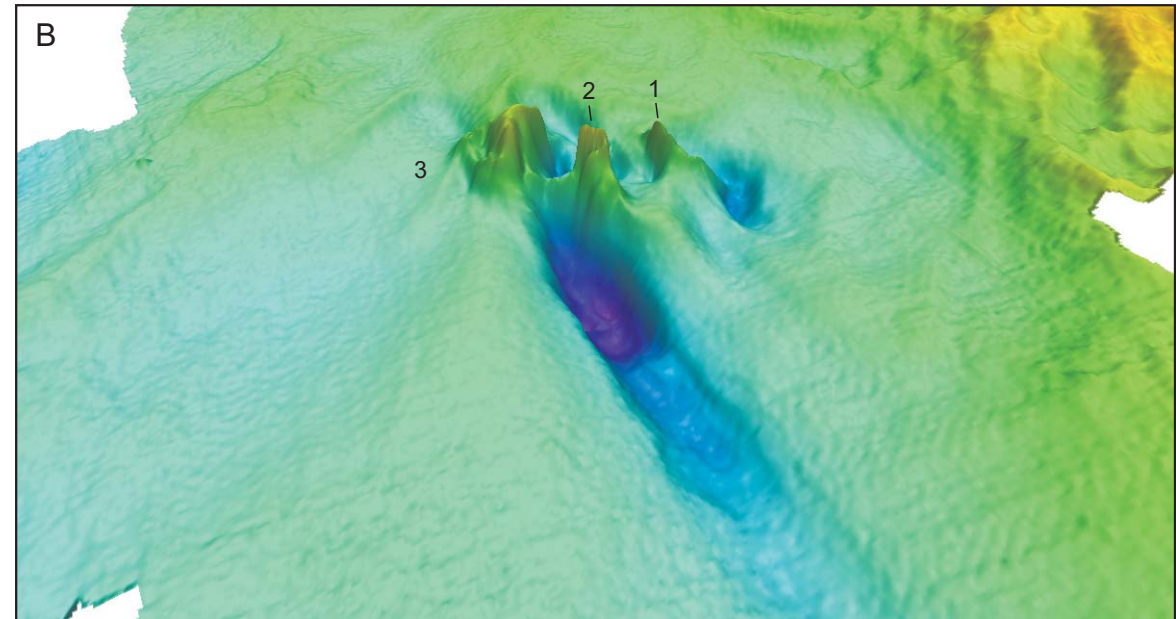
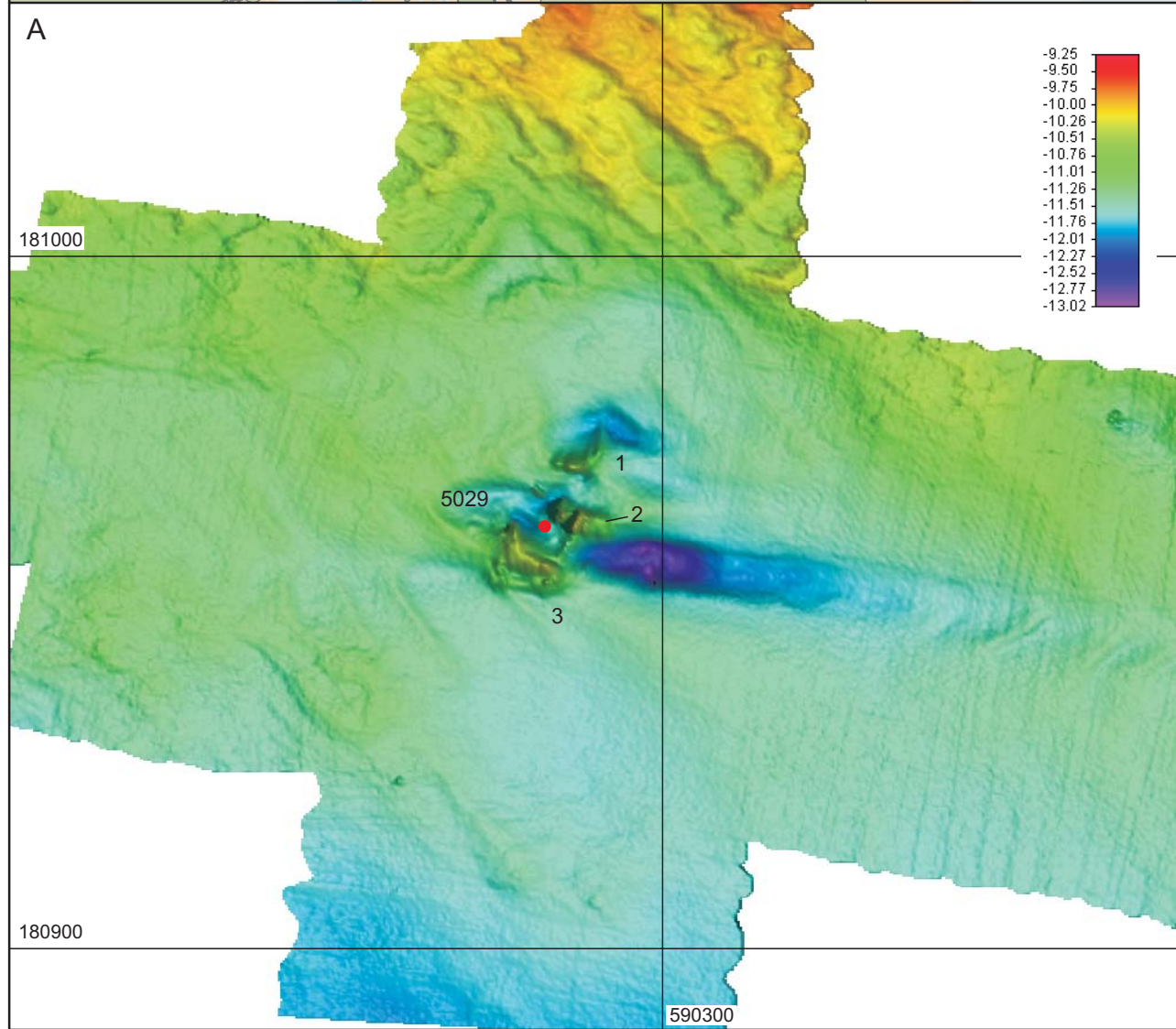
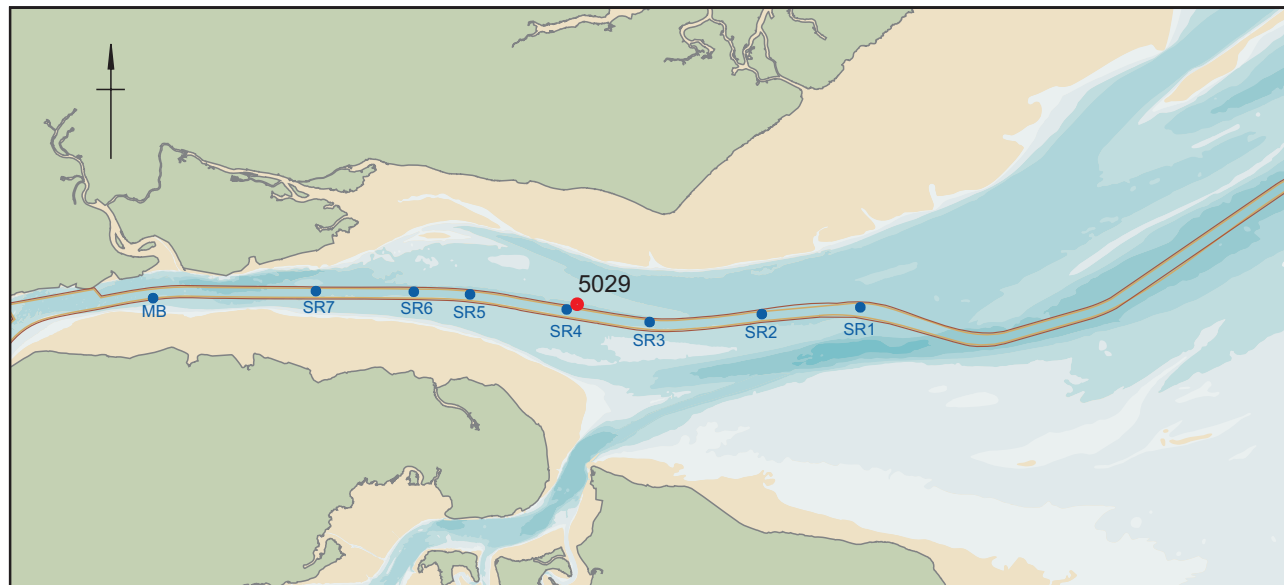
Lavery, B. (1984). *The ship of the line 2: Design, construction and fittings*. London: Conway Maritime Pr.

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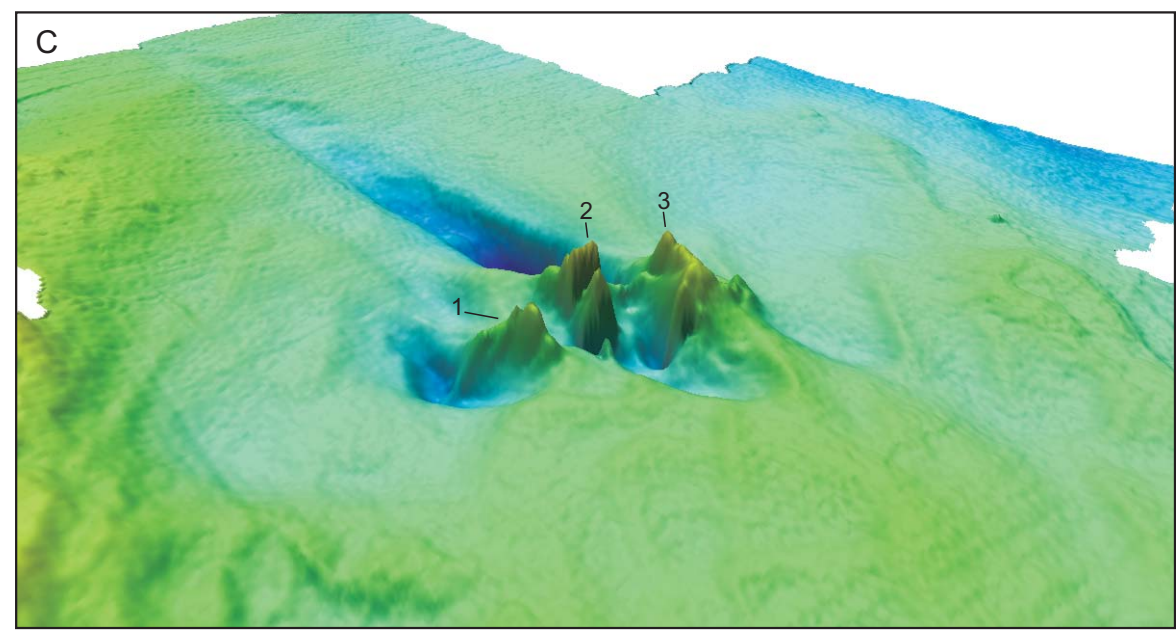
CSPD, Calendar of State Papers Domestic, p.279, 1665-6.

NMR, Warship Histories, *London*.

TNA WO 47/4, War Office: Ordnance Office: Board of Ordnance: Minutes:, *Journals of Proceedings 29th Sept, 1657*.



Oblique view from east.



Oblique view from north-west.

Not to scale

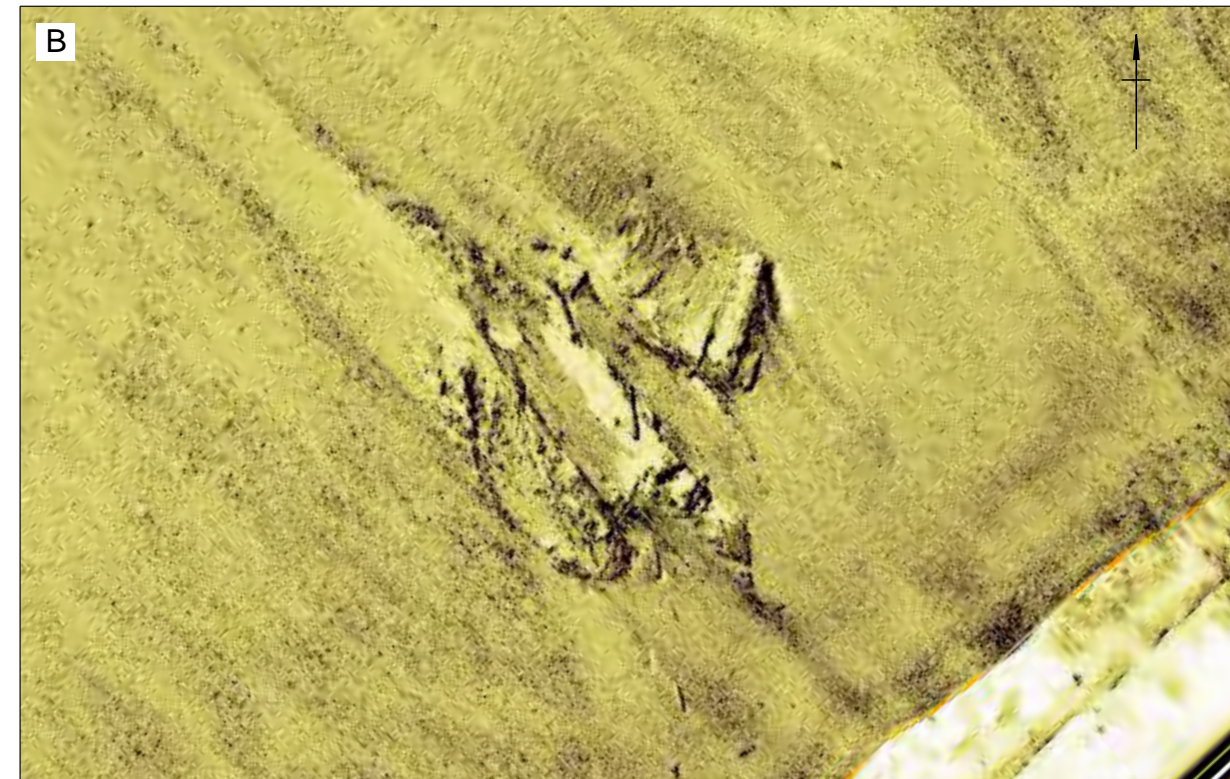
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



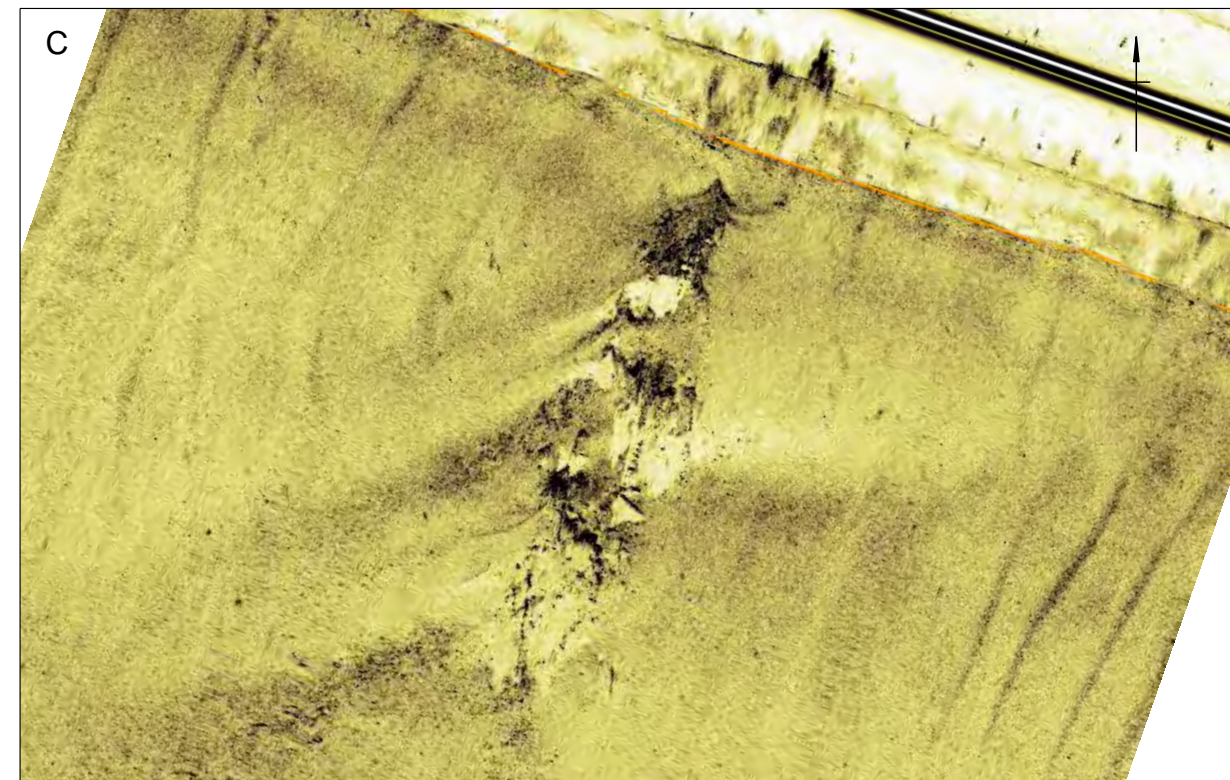
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Location and Multibeam data for Site 5029.

Figure 1



Not to scale



Not to scale

● Site location



Projection OSGB


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Sidescan Sonar image of Site 5029.

Figure 2



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Navy Board model of a 3-decker.

Figure 3

**London Gateway Project: Yantlet Channel Diving Inspection
Report 1**

Nigel Nayling

Summary

Three seabed targets, identified as of high archaeological potential within the possible area of impact of proposed dredging for the London Gateway Project, were inspected by a diving archaeologist in line with the agreed Archaeological Mitigation Framework. Coherent remains of archaeological significance were identified at two of the locations, and scattered remains detected over a wide area in a third location.

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1 Background

1.1 INTRODUCTION

This document is a factual technical report on results of diving operations carried out in the Yantlet channel of the Thames to confirm the presence of material of archaeological interest in areas of proposed dredging for the London Gateway Project (LGP). Three locations, identified as probable wrecks of high archaeological significance in previous work (see below) were selected for inspection. Sites in this report are referred to primarily through use of codes assigned by Wessex Archaeology to facilitate cross-referencing with previous reports

1.2 PREVIOUS WORK

Previous assessment of the underwater cultural heritage in the area potentially affected by the London Gateway Port Development has included:

A desk-based assessment distributed as Appendix B of *The (London Gateway Port) Harbour Empowerment Order 2002: Assessment of Effects on Cultural Heritage in Respect of the Proposed Development of London Gateway Port Development* based on investigations undertaken by Wessex Archaeology

An updated wreck site identification exercise carried out by Wessex Archaeology between October 2002 and February 2003 to enhance the Environmental Assessment of London Gateway, including *Enhanced Wreck Site Identification*. This task comprised two elements, a review of existing sidescan survey and wreck data held by the Port of London Authority, and additional sidescan and magnetometer survey. The Survey Area comprised the Limit of Deviation (LOD) and an area of proposed dredging extending 2.77km eastwards along the channel from the Sea Reach No.1 navigation buoy.

1.3 AIMS AND OBJECTIVES

The aim of this study was to assess the character of three sites on the seabed within the area of proposed dredging in the Yantlet Channel to inform future decisions on appropriate mitigation. In line with the Archaeological Mitigation Framework for LGP, direct observation by a competent and suitably experienced archaeologist (the author), by means of diving, was employed. The aim of diving operations was to investigate each of the sites, sufficient to determine whether they are, or are not, of archaeological significance. This report does not attempt to assess the extent, or detailed nature of the archaeological resource at each location, or to provide guidance on their future management.

1.4 METHODOLOGY

In accordance with the Archaeological Mitigation Framework, each of the sites had been surveyed by the Port of London Authority using multibeam bathymetry, prior to inspection. The results of these surveys were used to assist in determining the diving programme, and to assist location of the sites. Some of the survey results are integrated within this report. Diving operations were undertaken by a dive team from the PLA under the supervision of Kevin Leadbetter, with the author acting as diving archaeologist. Each site was located using onboard GPS, and a shot dropped to mark its position. The boat employed as the diving platform was then positioned over the site using fore and aft anchors. Typically, a member of the PLA dive team would enter the water at the beginning of slack water, descend the shot line, and commence a circular search in order to locate the target. Having done so, a stray line would be laid between features located on the seabed to assist in their subsequent inspection by the author. On the next slack water, the author would carry out the archaeological inspection.

1.5 RESULTS

1.5.1 WA5029, "London", "Cannons" wreck, OSGB 36 590285 180965

This site was identified by Wessex Archaeology in its desk based assessment as the London, a 64-gun ship dating to AD 1665 (Leather 2003). It is described in the PLA wreck database as the "Cannons" wreck reflecting the recovery of two cannon in 1980. The presence of the site was confirmed by sidescan survey undertaken by the PLA (Leather 2003). Recent multibeam bathymetric survey, undertaken by the PLA as part of this appraisal, shows clear wreckage in three distinct sections. Each section appears to be approximately 10m E-W and 5m N-S in extent and the site as a whole sits within a scour pit approximately 12m E-W.

The site was dived on twice on 29th January, 2005. On the first dive, the site was located and the presence of three main sections confirmed. A small section of timber found loose on the seabed was recovered for examination. On the second dive (made by the author) the three sections were inspected, starting with the northernmost. This comprised a disturbed concentration of timbers, including both planking and framing elements. Apparently modern metal items might be related to earlier clearance or salvage operations, or fishing snags. The middle section was the largest and most coherent comprising large, squared oak frames attached to thick timber planking, all on edge. The southernmost section appeared to lie somewhat deeper, on the edge of the channel. Again framing timbers were attached to planking. Smaller roundwood present between some of the frames may represent dunnage, packing material for cargo.

Dendrochronological analysis of the oak frame recovered indicates that the timber is British in origin and felled some time after AD 1639. The results are therefore consistent with the preliminary identification of the site as that of the wreck of the London.

1.5.2 WA5019, "King", OSGB 36 589844 180955

Identified by Wessex Archaeology in its desk based assessment, from PLA records which mention the recovery of a cannon dated to 1636. The site was surveyed in 2001 and 2002 using sidescan survey (Leather 2003), and more recently using multibeam bathymetry. The latter survey showed clear wreckage in two distinct

locations some 50m apart. The main section appeared to cover an area of 25m by 12m on a WSW/ENE axis. The outlying section appeared approximately 10m long but very narrow.

The site was dived over two days (30th and 31st January, 2005), with two dives being made on each of the identified sections. The first dive on the largest, easternmost section suggested the presence of disturbed fragments of wood over a wide area, with a concentration of timber around a single cannon found lying proud of the seabed and overlying a number of timbers. Examination on the second dive by the author confirmed the presence of this cannon, provisional measurements suggesting it is either a saker or demi-culverin. The gun overlies a concentration of apparent roundwood of 100-150mm diameter. Nearby, a plain chamfered beam (approximately 250-300mm sided) protruding from the seabed is most probably a carling (deck beam). A wooden wheel found lying embedded in sediment could be either a truck from a gun carriage, or part of a pulley block. A circular search of the area around the cannon revealed further timber but also steel cable and other debris probably of modern origin. Hull structure was not as clear as might have been expected from the bathymetric survey results, but this could in part be due to the quantity of smaller, loose material scattered over the area.

The western section was dived on twice. On the first dive, circular searches confirmed the absence of material on the seabed between the two sections, and located a concentration of chain. On the second dive, the author confirmed the presence of this large pile of chain, mostly of 100mm length links. This chain is probably relatively recent, as the links were readily moved. No historic items were identified in this vicinity.

1.5.3 WA5020, Iron Bar Wreck, OSGB 36 589072 181071

Two main locations associated with this site were dived on (5th and 6th February, 2005). A minor scour hole identified on the bathymetric results to the north-west of the anomalies charted position was examined but no associated wreck or other material located. Two dives were undertaken on an area shown on the survey as

disturbance largely covered by bed material some 17m by 7m. The first dive located a scatter of a variety of material including iron bars and timber. On the second dive, the author encountered numerous sections of folded iron bars and one large, concreted mass of bars which probably generated one of the larger anomalies identified on the survey. Other debris included fragments of oak frames with oak treenails consistent with the disturbed remnants of a wooden vessel previously subjected to salvage/clearance as indicated in PLA records.

1.6 DISCUSSION

This is the first diving inspection of submerged sites undertaken as part of the Archaeological Mitigation Framework for LGP. As such, some initial comments on the approach taken might be appropriate. The methodology employed reflects the difficult marine environment with limited slack water (approximately 1 hour maximum around each high and low water), very limited (or zero) visibility, and location of sites within the busy navigation channel. The approach taken has made fullest use of the very considerable expertise of the PLA's survey and diving sections, focusing the archaeologist's dive time purely on inspection rather than location of previously agreed targets. This has proved a successful and cost effective approach, offering a model for future work.

1.7 ACKNOWLEDGEMENTS

Hydrographic data and bathymetric survey results were supplied by John Pinder, PLA. The advice of Peter Steen and the support of the dive team at the Port of London Authority are gratefully acknowledged.

1.8 REFERENCES

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London Gateway Project: Diving Inspection Report 2

Nigel Nayling

Summary

Three seabed targets, identified as of varying archaeological potential within the possible area of impact of proposed dredging for the London Gateway Project, were inspected by a diving archaeologist in line with the agreed Archaeological Mitigation Framework. One site comprises two large sections of a steel built vessel identified as the *Dovenby*, a barque which sank in 1914. Closely stacked bricks located at a second site may relate to the documented sinking of a brick-carrying barge in 1922. A third site, comprising the partially exposed remains of a wooden wreck, is unidentified.

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1 Background

1.1 INTRODUCTION

This document is a factual technical report on results of diving operations carried out to assess the archaeological nature of previously identified underwater anomalies in areas of proposed dredging for the London Gateway Project (LGP). Three locations, identified as probable wrecks of possible archaeological significance in previous work (see below) were selected for inspection. Sites in this report are referred to primarily through use of codes assigned by Wessex Archaeology to facilitate cross-referencing with previous reports.

1.2 PREVIOUS WORK

Previous assessment of the underwater cultural heritage in the area potentially affected by the London Gateway Port Development has included:

A desk-based assessment distributed as Appendix B of *The (London Gateway Port) Harbour Empowerment Order 2002: Assessment of Effects on Cultural Heritage in Respect of the Proposed Development of London Gateway Port Development* based on investigations undertaken by Wessex Archaeology.

An updated wreck site identification exercise carried out by Wessex Archaeology between October 2002 and February 2003 to enhance the Environmental Assessment of London Gateway, including *Enhanced Wreck Site Identification*. This task comprised two elements, a review of existing sidescan survey and wreck data held by the Port of London Authority, and additional sidescan and magnetometer survey. The survey area comprised the Limit of Deviation (LOD) and an area of proposed dredging extending 2.77km eastwards along the channel from the Sea Reach No.1 navigation buoy.

1.3 AIMS AND OBJECTIVES

The aim of this study was to assess the character of three sites on the seabed within the area of proposed dredging in the Yantlet Channel to inform future decisions on appropriate mitigation. In line with the Archaeological Mitigation

Framework for LGP, direct observation by a competent and suitably experienced archaeologist (the author), by means of diving, was employed. The aim of diving operations was to investigate each of the sites, sufficient to determine whether they are, or are not, of archaeological significance. This report does not attempt to assess the extent, or detailed nature of the archaeological resource at each location, or to provide guidance on their future management.

1.4 METHODOLOGY

In accordance with the Archaeological Mitigation Framework, each of the sites had been surveyed by the Port of London Authority using multibeam bathymetry, prior to inspection. The results of these surveys were used to assist in determining the diving programme, and to assist location of the sites. Some of the survey results are integrated within this report. Each site had previously been visited by a dive team from the PLA under the supervision of Kevin Leadbetter and relevant observations are also included here. Using procedures broadly in line with those employed previously (Nayling 2005), each of the sites was visited by the PLA dive team with the author in attendance.

1.5 RESULTS

1.5.1 WA 5230, 343/99, OSGB 36 591581 180324

The site is located on the south side of the main channel between Sea Reach No 3 and Sea Reach No 4 buoys. The wreck may be that of barge that sank in 1922 (Admiralty Reference No 12886) which was shown on charts prior to 1926 located some 110m from the surveyed anomaly. The site was located by PLA survey and inspected by divers in 2002. Although not subjected to additional magnetometer and sonar survey by Wessex Archaeology in 2001/2, the site was listed in its updated wreck site listing (Leather 2003, table 1). More recent survey (2005) indicated two areas of debris: an area extending 8 x 4 m and 1m above the general bed level and a smaller area of debris 14m south in the original charted position (591581 180310) extending from the shoal to the south-west. PLA Marine Services diver inspection reported that the obstruction is composed of piles of bricks (some of which are neatly stacked), wood and concreted metal indicating that the

obstruction could be the wreck of a wooden dumb barge or sailing barge. Diving on 28/7/05 confirmed this description. Samples of stamped brick were recovered for possible identification. Features observed are consistent with presence of a relatively modern, brick carrying barge as indicated in Admiralty records.

1.5.2 WA5204, 343/93, OSGB 36 593858 180121

The site is located east of Sea Reach No. 3, 20m from the southern edge of the existing, dredged channel. The wreck was apparently first surveyed by the PLA during channel extension survey in 1999. Although not subjected to additional magnetometer and sonar survey by Wessex Archaeology in 2001/2, the site was listed in its updated wreck site listing (Leather 2003, table 1). PLA survey in 2005 revealed a smooth mound measuring some 7m (NS) by 3m (EW) with signs of debris up to 10m to the north. Initial inspection by PLA divers indicated that the obstruction is the remains of a wooden vessel with framing timbers protruding from the sand in a debris field roughly 7m x 3m.

The site was dived twice by the author on 29/7/05. The presence of apparently articulated framing timbers protruding from a marked mound was confirmed. Additionally, a section of keel some 7m in length was found to extend out from this mound, sloping upwards such that, at its exposed uppermost end, it was some 2m clear of the seabed. A small number of pottery sherds from the debris mound were recovered for possible identification. Small pieces of loose timber which had previously been recovered from the site were examined but, although oak, found to be unsuitable for dendrochronological dating.

1.5.3 WA5010 and WA 5012, *Dovenby*, 343/11 and 12, OSGB 36 597736 180646 and 597665 180831

This site is extensively recorded in the records of the PLA. Built in the Sunderland yard of Pickersgill in 1891, this steel barque sank in collision with the Dutch steamer *Sindoro* carrying a cargo of *guano* from Lobos d'Afuera to London in 1914. Records indicate that the wreck was dispersed with explosives soon after wrecking and had also been reduced by cutting with oxy-acetylene in 1967. The site was surveyed in 2001 and 2002 using sidescan and magnetometer survey (Leather

2003), and more recently using multibeam bathymetry. Surveys show clear wreckage in two distinct locations some 100m apart. Both main locations associated with this site were dived. The presence of substantial, upstanding metal frames was confirmed. Seabed inspection was consistent with the remains representing those of the *Dovenby*.

1.6 DISCUSSION

The identification of the *Dovenby* seems secure. Wreck structure has been substantially degraded through intentional clearance and subsequent erosion. The dating of the two other sites examined might best be resolved by examination of ceramics (brick from one, pottery from the other) recovered during diving inspections. The extent of any surviving wooden wreck structure at these latter two sites remains unclear.

1.7 ACKNOWLEDGEMENTS

Hydrographic data and bathymetric survey results were supplied by John Pinder, PLA. The advice of Peter Steen and the support of the dive team at the Port of London Authority are gratefully acknowledged.

1.8 REFERENCES

Leather, S, 2003 *Updated Wreck Site Identification: Sidescan Sonar and Marine Magnetometer Survey*, Wessex Archaeology, **London Gateway Development Technical Report Appendix Q**

Nayling, N, 2005 *London Gateway Project: Diving Inspection Report 1*, **University of Wales Lampeter London Gateway Archaeology Report 01/2005**

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5041.02
December 2007**

Site ID: 5041

Site Name: Unknown Aircraft

PLA Wreck No.: 201/11-12

Mitigation Group: Site of possible archaeological interest, seaward of SR1

No. of Casualties: Unknown

Vessel Type: Unknown Aircraft

Cause of loss: Unknown

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the discovery of the site and includes all forms of investigation to date:

1992	Obstruction fouled by fisherman who reported it to be a length of fuselage 40ft long (02/04/1992);
1991	PLA report - obstruction not found during search of the area (PLA 201/12 Havengore No. 14/91, 19/08/1991);
1992	PLA locate obstruction through echo sounder in 11.9m of water (PLA 201/19B and 230/2, 10/08/1992);
1998	PLA report obstruction not located during search of the area - area depth 13.1m (PLA Report 6/98, 05/06/1998);
2001	Emu sidescan sonar survey (29/03/2001);
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002) - site not located;
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2001	Wessex Archaeology, Assessment of Effects on the Archaeological Heritage: Inter-tidal and Marine, in respect of the proposed development of London Gateway. This report includes target 90;
2002	Wessex Archaeology, side scan data and magnetometer data;
2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i>
2005	UKHO (13319)

2005	NMR (831845)
2005	Wessex Archaeology, Geophysical Analysis of 2005 of multibeam and 2001& 2002 sidescan sonar data, inclusive of: one geo tiff and five tiff images;

3. SITE DESCRIPTION

Position (NGR OSGB36) obtained from fisherman (UKHO record): 601411 E 180242 N
Location (derived from Fisherman’s location): The site is located Seaward of Sea Reach 1, 96 metres from the southern edge of the existing dredged channel (**Figure 1**).

Dredged Depth: 13.1 metres

Minimum Target Depth: 11.9 metres

Extent: 40ft long

UKHO - Status DEAD

2001 WA sidescan sonar interpretation:

The site was covered by the 2001 sidescan survey area but was not identified during the interpretation of the data.

2002 WA sidescan sonar interpretation:

The site was covered by the 2002 sidescan survey area but was not identified during the interpretation of the data (**Figure 2**).

2005 WA Interpretation of PLA multibeam data:

The multibeam bathymetric survey specifically focused on locating site **5041**; however, it was not located during the survey (**Figure 1**).

General Description:

A 40ft length of aircraft fuselage was located by a fisherman’s snag in 1992. The PLA located a feature on the echo sounder later in the same year (it was not dived), and the obstruction has not been located since.

4. SITE HISTORY

The character of the site is currently unknown. The site was discovered in 1992 by a local fisherman and thought to be an aircraft fuselage. It is unclear how the fisherman knew the snag was a fuselage unless it was lifted. Since this initial report the PLA have only located the site once through echo sounder survey. WA has received no reports of salvage or clearance works on the site since its discovery in 1992.

There are known wrecks / obstructions in the area of the aircraft the closest of which lies 386 metres to the north of 5041.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of ‘possible’ archaeological interest, due to the anecdotal record that part of an aircraft fuselage was recovered from this location. The key aspects of the site that have lead to the above rating are:

- If proven to be a military aircraft, the site would be automatically designated under the Protection of Military Remains Act 1986.

If there is an aircraft at this location it is of unknown archaeological importance. However, the multibeam survey could not locate the site in the reported area further identification will not be possible.

6. CONSTRAINTS

The character and location of the site is currently unknown. Due to the location of the site within the Thames and the possibility that it could be a World War II aircraft, the potential for ordnance in the area should not be ignored. The possibility of human remains is also a possibility.

7. SCOPE OF FURTHER STAGE MITIGATION

As the site was not located during the 2002 and 2005 geophysical surveys no mitigation is required.

8. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site is reported to be located 96 metres inside the southern edge of the existing dredged channel. As no wreckage has been located during the geophysical surveys the site is ready for clearance and dredging activities.

ARCHIVE**RECOVERED MATERIAL**

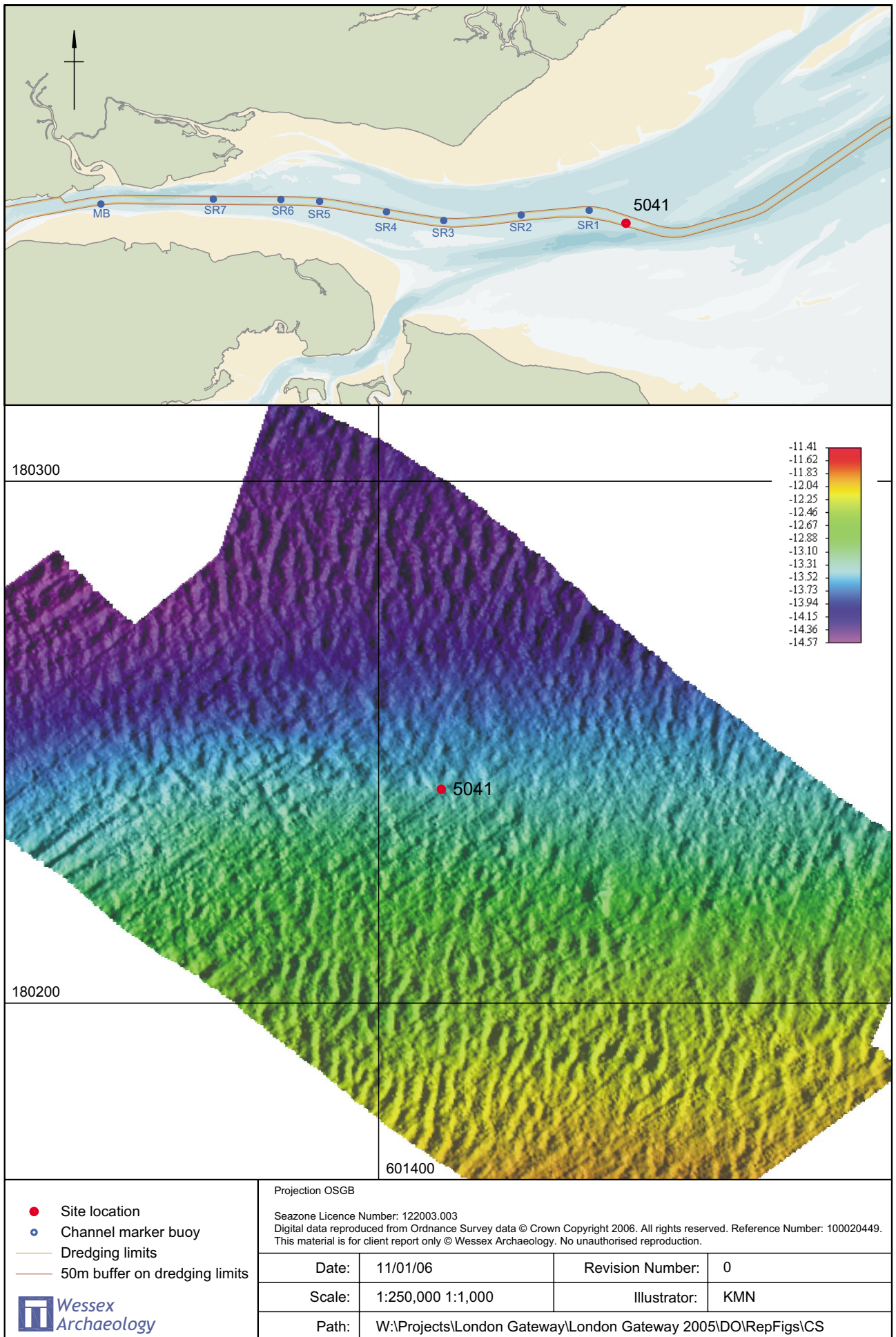
No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2002 side scan and magnetometer – site not visible	WA
2005 multibeam data – site not visible	WA

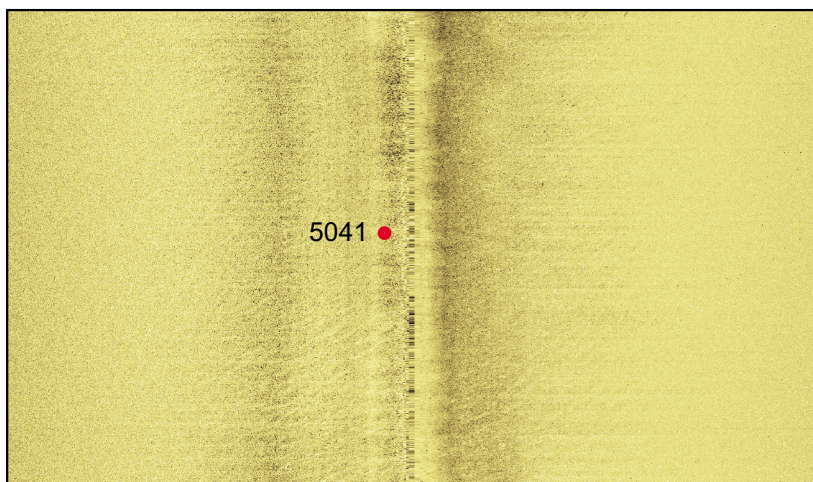
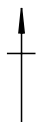
PAPER ARCHIVE

Material	Location
UKHO 13319	WA
NMR 831845	WA
Wessex Archaeology, 2003, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification Report.</i>	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Intertidal and Marine in respect of the proposed development of London Gateway.	WA



Location and Multibeam data for Site 5041.

Figure 1



● Site location



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Date:	17/01/06	Revision Number:	0
Scale:	N/A	Illustrator:	KMN
Path:	W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS		

Sidescan Sonar images of Site 5041.

Figure 2

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Fourth Draft**

**WA Ref: 61209.5046.04
August 2008**

Site ID: 5046

Site Name: Wreck NW of Sea Reach 1

PLA Wreck No.: 343/26

Mitigation Group: Site of probable archaeological interest, above SR1

No. of Casualties: Unknown

Vessel Type: Wooden wreck with ferrous metal elements

Cause of Loss: Unknown

Current Recording Status: Level 1b

1. INVESTIGATIONS TO DATE

The following table is a summary of all investigations of the site to date, including its first documented discovery:

1990	PLA located three small obstruction and a scour pit by echo sounder search with a general depth 13.3 metres, least depth 12.8 metres and a maximum depth of scour of 13.8 metres (24/05/1990);
2001	Emu sidescan sonar survey (29/03/2001);
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002);
2005	Site dived by the PLA – no objects were recovered (18/08/2005);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005);
2007	WA diving investigation (27/11/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2001	Wessex Archaeology, Assessment of Effects on the Archaeological Heritage: Inter-tidal and Marine, in respect of the proposed development of London Gateway. This report includes target 90;
2002	Wessex Archaeology, side scan data and magnetometer data;
2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i> , inclusive of: target 90 and target 513 tiff images;
2005	UKHO (13273);
2005	NMR (800490);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	Port of London Authority, <i>Marine Diving Services Report</i>

2005	Wessex Archaeology, Geophysical Analysis of 2005 of multibeam and 2001& 2002 sidescan sonar data, inclusive of: one geo tiff and six tiff images;
2007	Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report.</i>

3. SITE DESCRIPTION

Position (UTM) obtained from PLA multibeam data 2005: 351901.736 E 5706798.066 N
Location (derived from PLA Multibeam data): Approximately 685 metres north-west of Sea Reach 1. The NGR (above) is 40 metres from the northern edge of the existing dredged channel and 9.5 metres from the edge of the buffer zone (**Figure 1**).

Bed Depth: 14.5 metres

Minimum Target Depth: 12.8 metres

Extent: 43m long, 16m wide and 1.3m upstanding

UKHO: Status LIVE

2001 sidescan sonar interpretation:

The site consists of a large feature with associated sediment plume and targets to the south west. The NGR recorded was, 599095 E 181002 N. The anomaly is 20 metres long and 15 metres wide, no length of shadow was recorded. The tiff file created was referenced as ‘target 90’.

2002 WA side scan interpretation:

The site consists of a wreck shaped object with associated anomalies in the area. The NGR recorded was 599115 E 181000 N. This corresponds to PLA 729 (obstruction located by echo sounder) WA 5046/5842 and Emu 2001 target 90. The anomaly is 39 metres long and 12 metres wide, no length of shadow was recorded. The tiff file created was referenced as ‘513’ (**Figure 2**).

2005 WA interpretation of PLA multibeam data:

The site consists of an oval shaped feature approximately 43 metres long and 16 metres wide at its maximum extents. It is orientated northeast southwest with linear features lying parallel to the south of the site (**Figure 1A**).

At the western extents of the site the feature stands 1.3 metres proud of the seabed. This is its maximum height above the bed. Eleven metres east of this point there is another point upstanding 1.2 meters (**Figure 1A-D**).

The southern edge of the feature comprises an elevated section with a varying width between 7 metres and 9 metres.

At the eastern extents the southern edge of the feature widens to 12 metres. The northern edge of the feature is 22 metres long and 6 metres wide and appears to be trapezoidal in section with defined shear sides (**Figure 1B, C, E**). There is a hollow between the two edges approximately 8 metres wide and 15 metres long and depth of 1.2 metres.

Five metres to the south there is a linear feature running east west parallel to the main multibeam feature. It is 45 metres long with a maximum width of 3 metres and it stands 0.5m proud of the seabed at its maximum vertical extents.

2005 PLA dive description:

PLA divers conducted a 10 metre circular search of the area half a mile NW of Sea Reach No.1 buoy. They reported multiple targets in the area consisting of wood, metal and concrete. The seabed was undulating and sandy. The divers recorded the following measurements:

- A slightly curved object made of wood measuring 1800mm x 1200mm x 50mm with what appeared to be square batons spaced 100mm along its length, laying partially buried in the river bed;
- A metal object upstanding 600mm measuring 900mm by 30mm;
- A metal tube 125mm in diameter, upstanding 900mm at a 45 degree angle. The diver dug approximately 300mm into the river bed and established, by way of touch, that the diameter of the tube remained consistent.

2007 WA dive description:

The diver made bottom and within moving one or two metres north encountered a large mass of concretion upstanding approximately 0.5 metres from the surrounding seabed. A small part of the concretion appeared to extend 0.5 metres to the north into a mound. On the mound a large strut or frame approximately 0.1 metres wide and 0.05 metres thick protruded from the main body of concretion, probably 1.5 metres above the surrounding seabed, pointing north. The concretion extended to the east and the diver followed it in that direction.

The diver recovered a loose piece of concretion; this was identified after the dive as a short length of ferrous chain (0.39 metres long, size of chain link *c.* 70x20mm) (**Figure 3A**). Moving further east the diver encountered another strut 0.1 metres wide and 0.05 metres thick, pointing south out of the mound and extending out for approximately 1 metre.

Further east a small piece of round section ferrous metal was sticking out of the south side of the mass of concretion. The diver then encountered what appeared to be metal plate a part of which measuring 270x160x45mm was recovered to the surface. This proved to be a section of wood with evidence of a metal fastening passing through it (**Figures 3B-C**).

Lying just south of this area the diver felt some loose hard material on the seabed, and recovered some samples. They proved to be irregular flint and chalk pieces of different sizes (**Figure 3D**).

Near this and in the main mass of concretion was a flat piece of ferrous metal about 0.5 metres long, 0.1 metres wide and up to 0.05 metres thick with two clear rivet holes in it, both approximately 20mm/25mm in diameter (diameter of diver's index finger with glove on). Beside this there was a broken piece of what was probably wood with concretion on it and a small copper alloy nail or pin through it. Just to the east of this feature was another upstanding piece of concretion that appeared to be L-shaped, although insufficient time was available to record it in more detail.

The seabed was a hard substrate with small subangular stones and pebbles, probably mostly chalk and flint, although much of the seabed was comprised of small sand waves, with finer silt making up part of the mobile seabed cover.

Small sessile marine weed and fauna were attached to the harder upstanding parts of the seabed including upstanding parts of the site. A very fibrous sort of short weed covers a lot of material, it is yellow/white and bears a resemblance to *Rhodomela confervoides*. The flint and chalk pieces recovered from the site are very probably naturally occurring seabed/riverbed stones.

2008 WA dive description:

The April 2008 diving operation positively identified a coherent edge of timber structure running roughly east-west and resulted in the recovery of an identifiable structural element of a vessel. It can therefore now be said with a reasonable degree of certainty that Site 5046 represents the remains of a vessel.

While the timbers on the seabed were too heavily eroded to positively identify their form and function, the quantity of timber encountered may suggest that they represent part of the hull of the vessel. The ferrous knee or rider suggests that Site 5046 may have been a timber-hulled vessel with iron or iron alloy structural reinforcements. Though less likely, the possibility that this is a metal-hulled vessel with timber deck planking cannot be ruled out without further intrusive investigation.

The two bottles retrieved from the site were dug out from the seabed from within the wreck structure and it is highly probable that they are associated with the wreck. Therefore the wreck is of a post-World War II date.

The bottle 5046-008 is a green glass bottle moulded with the lettering “Buchanans Black and White Whisky”. Preliminary research indicates that Buchanan’s Black and White whisky was produced by the company founded by James Buchanan in 1884. It was originally sold as House of Commons whisky and gained the nickname Black and White whisky due to its distinctive labelling; a nickname which was later adopted as the official brand name. Though not currently sold in the UK, the Black and White whisky brand still exists, therefore the date range for this bottle extends from the late 19th century up to the present day.

The bottle 5046-007 is a small brown glass short-necked beer bottle. The shoulder on either side of the bottle is stamped with the lettering “No Deposit No Return” and the base is stamped with the lettering “0.33L PLM L18”. Preliminary research indicates that so-called “No Deposit No Return” beer bottles were common after World War II and as the labelling “0.33L” is presumed to indicate quantity, the labelling of a bottle with metric measurement units would conform to a date in the latter half of the 20th century.

4. SITE HISTORY

The identity of the wreck is not currently known. The site was discovered in 1990 by the PLA, and since its discovery WA has received no reports of salvage or clearance works carried out on the site.

5. ARCHAEOLOGICAL INTEREST

This wreck has been rated as of 'probable' archaeological interest. The key aspects of the site that have lead to the above rating are:

- The 2007 diving investigation confirmed the preliminary identification of anomaly 5046 as a shipwreck with substantial upstanding features;
- It appears to be of wooden construction with ferrous metal elements;
- The wreck dates from the middle of the nineteenth century most likely the Second World War.

6. CONSTRAINTS

The identity of the wreck is not currently known, it is therefore not possible to state whether there will be issues with ordnance or human remains.

7. SCOPE OF FURTHER STAGE I MITIGATION

A Level 2 record of the site has been achieved for this site

ARCHAEOLOGICAL DIVING INSPECTION (STAGE I, MITIGATION B)

Stage I (Mitigation B) has successfully been completed for this site and a Level 2a record of the site achieved.

8. OUTLINE OF STAGE II MITIGATION

Stage II, Mitigation II I

The wreck lies 40 metres north of the northern edge of the proposed channel and *c.* 9.5m south of the edge of the buffer zone. The wreck will be cleared.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

It is anticipated that the wreck will be cleared by grabbing.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital and material archive.

ARCHIVE**RECOVERED MATERIAL**

A section of wood with evidence of a metal fastening passing through it, a concreted piece of metal chain and five stones have been recovered from the site. These are currently stored at WA in Salisbury.

DIGITAL ARCHIVE

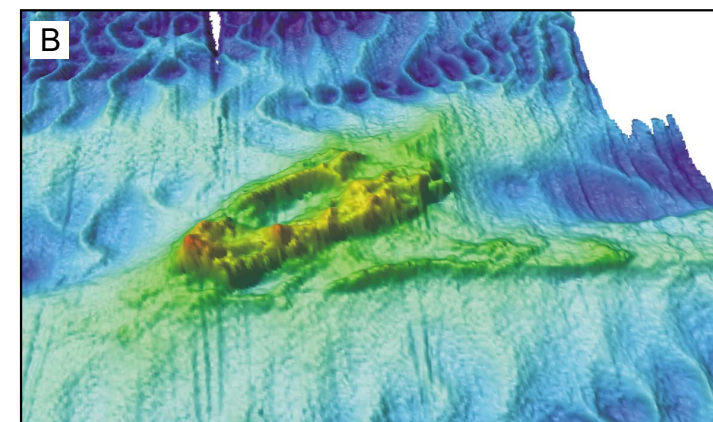
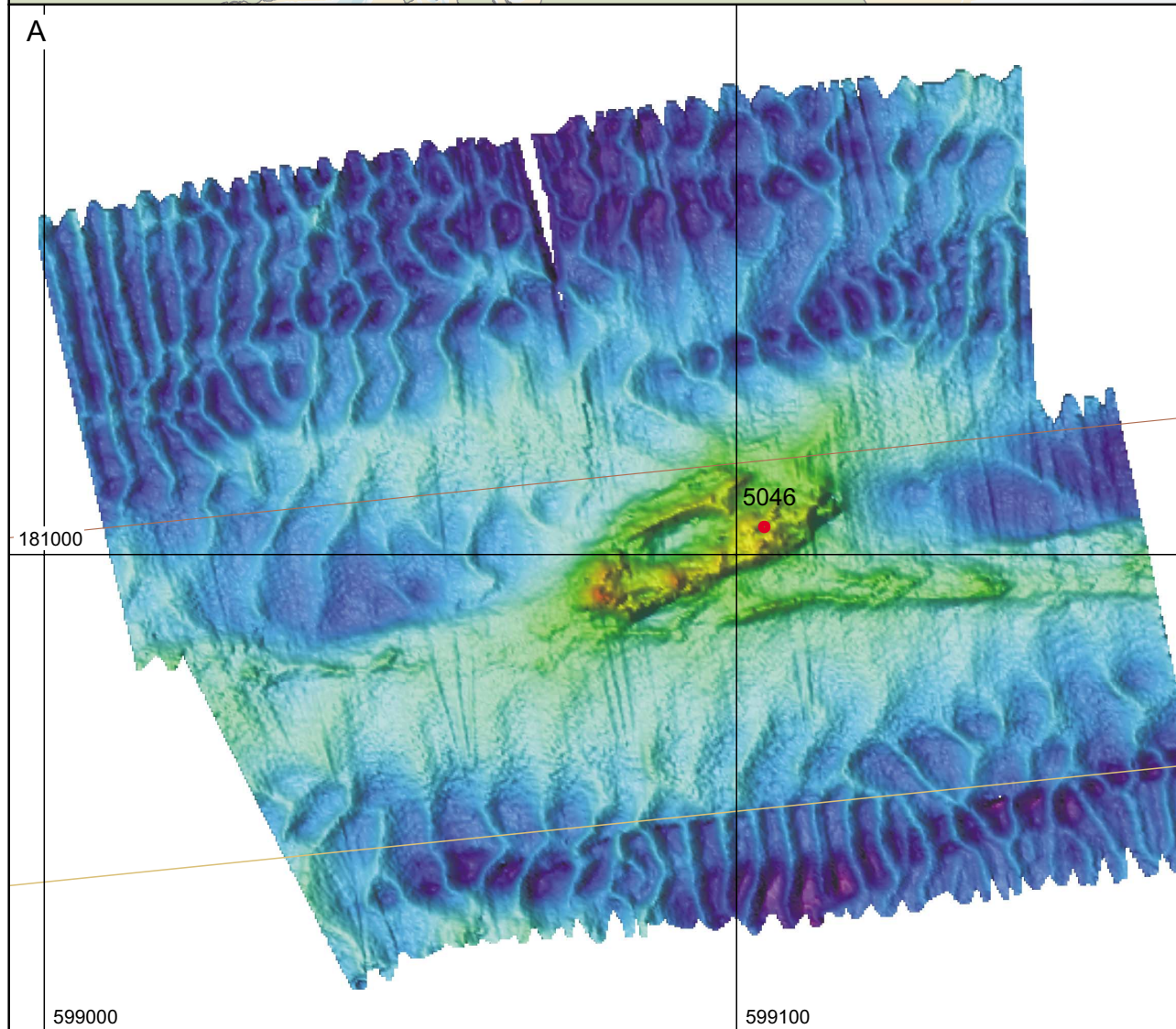
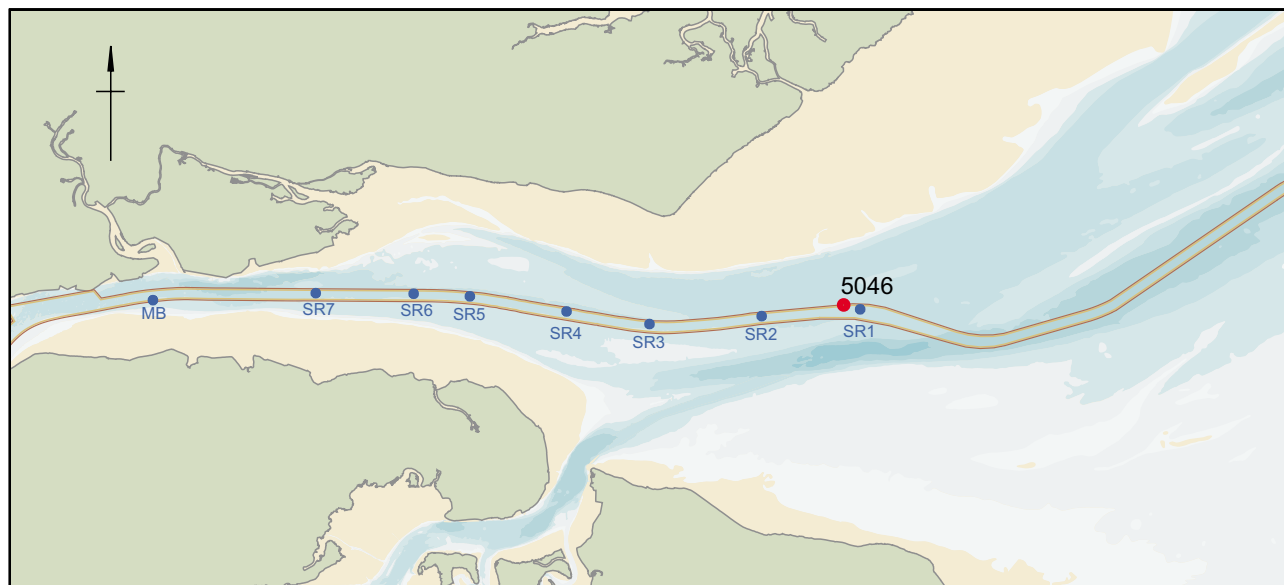
The digital archive consists of the following:

Material	Location
2001 side scan data and tiff file target 90	EMU/WA
2002 side scan and tiff file target 513	WA
6 tiff images 1 geo-tiff image from the 2005 multibeam data	WA
2005 multibeam data	WA
2007 dive recordings	WA

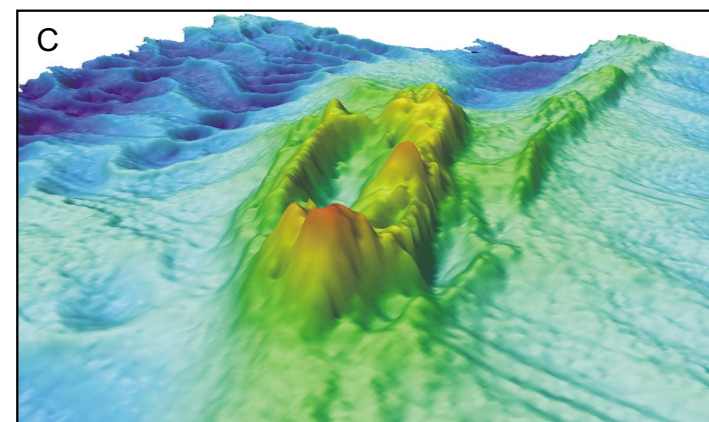
PAPER ARCHIVE

The paper archive consists of the following:

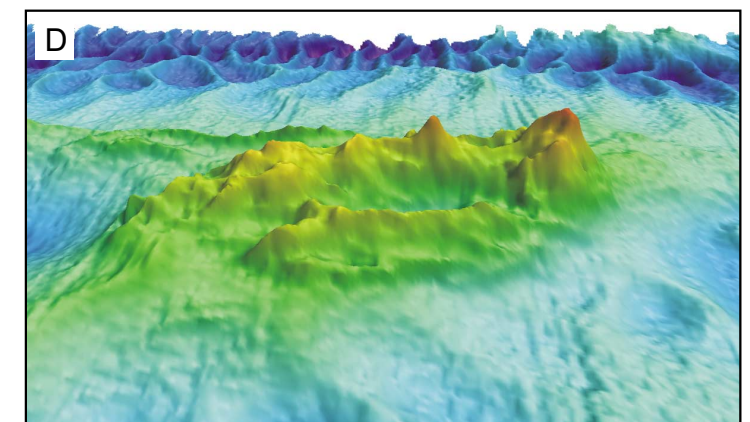
Material	Location
UKHO Report (13273)	WA
NMR Report (800490)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures	WA
Port of London Authority, 2005, <i>Marine Diving Services Report</i>	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Intertidal and Marine in respect of the proposed development of London Gateway	WA
WA target 90 tiff from 2001 side scan data	WA
Wessex Archaeology, 2003, London Gateway Appendix Q: <i>Enhanced Wreck Site Identification Report</i>	WA
WA target 513 tiff from 2002 side scan data	WA
Seven printed images of the 2005 multibeam data	WA
Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i>	WA



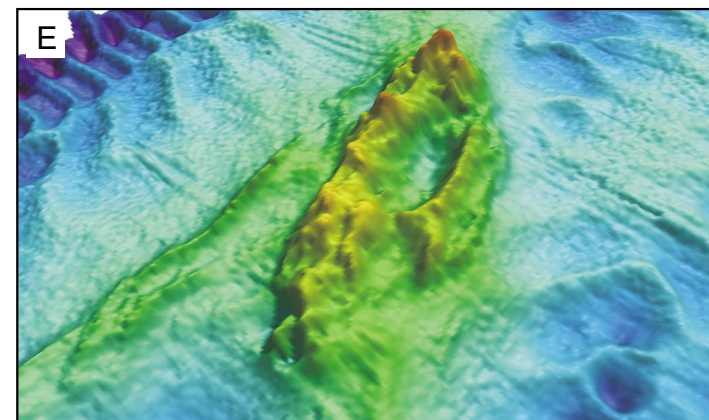
Oblique view from south.



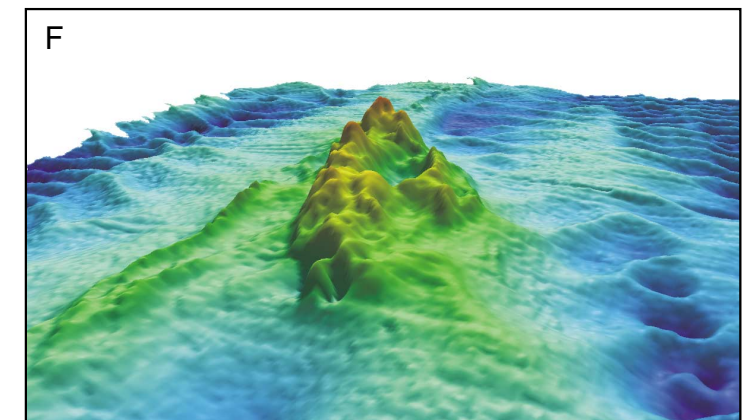
Oblique view from west.



Oblique view from north.



Oblique view from east.



Oblique view from east.

Not to scale

- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



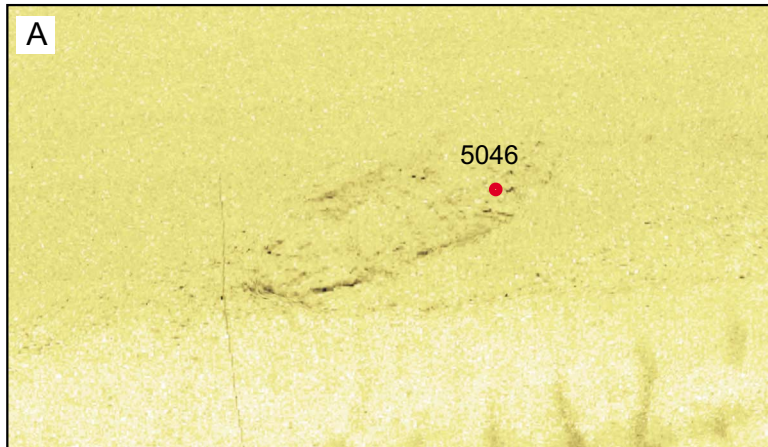
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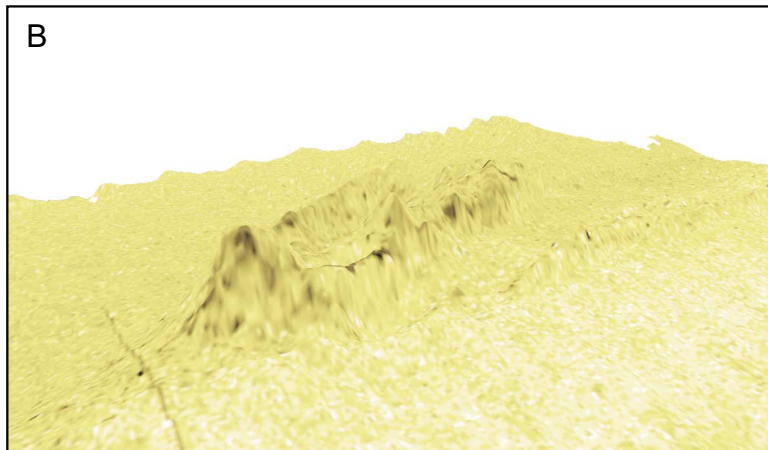
Date:	11/01/06	Revision Number:	0
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Path:	W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS		

Location and Multibeam data for Site 5046.

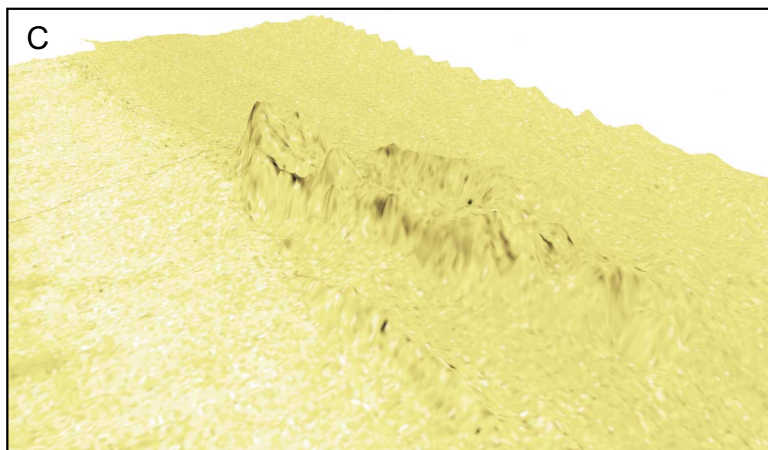
Figure 1



Plan view.



Oblique view from south-west.



Oblique view from south-east.

● Site location



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Date: 16/01/06

Revision Number: 0

Scale: N/A

Illustrator: KMN

Path: W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS



**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Third Draft**

**WA Ref: 61209.5050.03
January 2008**

Site ID: 5050

Site Name: Coal dump/ Aircraft engine

LA Wreck No.: 342/91

Mitigation Group: 2.1.2. Site of probable archaeological interest, above SR1

No. of Casualties: n/a

Vessel Type: n/a

Cause of Loss: n/a

Current Recording Status: Level 2a

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the site's discovery and includes all forms of investigation to date:

1978	Site located by PLA during a survey at 51°30'12" N 00°36'08" E at a depth of 13.4 metres (28/11/1996);
1979	Site located by PLA with a depth sounding of 13.4 metres (30/07/1979);
1995	Site located by Chartwell, 1 metre proud of the seabed, in a general seabed depth of 14.5m at NGR 580554 E 181524 N;
1995	Site located by PLA at 580542 E 181527 N. The least depth over the feature was 13.3 metres, with a scour bed depth of 15 metres. The obstruction appears to be a sizable feature 1.5 metres proud of the seabed, 30 x 15 metres in a west south to east north direction (July 1995);
1996	Site located by PLA and swept clear at 13.1m, foul at 13.4m. Sea conditions during the sweep were like a mirror, the sweep did not part when fouled, but there were traces of weed on it (11/04/1996);
2002	Emu side scan and magnetometer survey on behalf of Wessex Archaeology (14/11/2002);
2005	PLA multibeam and echo sounder survey (MBES) revealed a bed feature 17 metres east west by 9 metres north south at a least depth of 13.4m in a general depth of 14.5m in a area of sand ripples (26/04/2005);
2005	Site located by UKHO at 51° 30.230'N 00° 36.001'E (WGD using DGPS). The site has a least depth of 13.3 metres in a general depth of 14.7 metres, there is no visible scour. It lies east west with no magnetic anomaly, 33.6 metres long by 5.3 metres wide (24/08/2005);
2005	Site dived by the PLA. A piece of metal was recovered, possibly part of a aircraft frame? (17/07/2005);
2006	WA geophysical investigation using a PLA vessel and Reson 8125 multibeam system (09/03/2006);
2007	WA diving investigation (17/11/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2002	Wessex Archaeology, sidescan data and magnetometer data;
2003	Wessex Archaeology, <i>London Gateway Appendix Q: Enhanced Wreck Site Identification</i> , inclusive of: target 337 tiff images;
2005	UKHO (13360);
2005	Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation</i> , including PLA multibeam and pseudo side scan screen captures;
2005	Port of London Authority, <i>Marine Diving Services Report</i> ;
2006	Wessex Archaeology, Geophysical Analysis of 2006 of multibeam and 2002 sidescan sonar data, inclusive of: one geo tiff and five tiff images;
2007	Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i> .

3. SITE DESCRIPTION

Position (UTM) obtained from PLA multibeam data 2006: 333436 E 5708585 N

Location (derived from PLA multibeam data 2006): The site is located off Thorney Creek, Canvey. It lies 24 metres outside the northern edge of the dredged channel (**Figure 1**).

Bed Depth: 15 metres

Minimum Target Depth: 13.57 metres

Extent: 30 x 9 x 1.4 metres

UKHO Status - LIVE

2001 WA Sidescan Interpretation:

Site **5050** was situated within the 2001 side scan sonar survey area, but it was not identified during the survey.

2002 WA Sidescan Interpretation:

The site consists of an ephemeral outline on the seabed corresponding to PLA 698 **WA 5050** (Obstruction 1m high). The NGR recorded was 580547 E 181526 N. The anomaly is 10 metres long and 15 metres wide, no length of shadow was recorded. The tiff file created was labelled '337' (**Figure 2**).

2005 PLA Dive Description:

The PLA dived the site on the 17th June 2005. They commenced a search of the area from the anchor line of the diving support vessel. The diver reported the riverbed consisted of sand with small stones and shells. A small object was noted protruding from the riverbed, this was excavated and recovered to the surface. The PLA believe it to be a section of an aircraft (**Figure 3**).

The dive report mentions no evidence of the mound which is prominent in the multibeam data (discussed below). It is therefore difficult to determine if the object recovered by the PLA is associated with the mound.

2006 WA Multibeam Interpretation:

The site consists of an elongated mound (almost diamond in shape), orientated east-west. It is 30 metres long, 9 metres wide and 1.4 metres upstanding.

The mound has a slight scouring to the east which is 40 metres long, 10 metres wide and 0.15 metres deep. On the eastern edge of the mound there is an area of sediment build-up, which is 10 metres long, 15 metres wide and 0.3 metres upstanding (**Figure 1A-C**).

2007 WA Dive Description:

To the south of the shot the diver located a low mound-like feature of poorly sorted angular to sub-angular cobbles and boulders (estimated maximum dimension encountered 0.5 metres) of what appeared to be anthracite/coal. The profile of the feature was not measured but found to be fairly shallow, with a general height above the seabed of no more than 0.5 metres. The edge varied from well to moderately defined. There was some indication of a shallow scour around the edges, on the north side a depression possibly >0.5 metres deep was recorded. In places probing around the edge of the feature (approximately 1 metre away from the exposed edge) indicated similar material buried to a depth of up to 0.3 metres, therefore this feature could be significantly larger than is exposed.

The coal was sampled in two places (three samples were recovered: 24x10x7cm, 17x10x5cm, 11x11x4cm) (**Figure 4**).

Some soft degraded (possibly plastic) woven material was felt in a couple of places on the edge of the feature. Partly buried under cobbles and boulders, this material disintegrated when an attempt was made to sample it. At one point a small area of partially buried strands of what felt like monofilament net or line was encountered.

No other material was located within the mound, especially no metal or possible metal artefacts. The position of the feature appears to correspond with site 5050. No indication was found that the feature is a buried aircraft or a wreck. The feature appears more likely to be dumped material.

4. SITE HISTORY

The site was discovered in 1978 by the PLA, although the PLA Wreck and Categorisation Report suggests the site was only discovered in 1995. Since its discovery the site has been identified in 1979, 1995, 1996 (when it was swept), 2005, 2006 and 2007.

5. ARCHAEOLOGICAL INTEREST

The presence of the feature has been established. The feature is clearly defined and has been tracked for at least 10 metres E-W. The feature is a mound of coal. Woven material was found on the edge, possibly degraded plastic. Hence, even though the period cannot be exactly determined, it seems more likely that the feature is modern. It appears to be smaller than shown in the geophysical evidence, but probing demonstrated that part of the feature is buried. No evidence for the presence of an aircraft was observed, and the nature of the mound suggests that the presence of an aircraft is highly unlikely. It seems more likely that the possible aircraft part recovered by the PLA is not connected with the feature. At present, the feature seems to be a coal dump, probably from a vessel and possibly modern.

6. OUTLINE OF STAGE II MITIGATION

Stage I mitigation has achieved a Level 2a record of the site, which is a record that provides sufficient data to establish the extent, character, date and importance of the site. Further diving will not provide more information. The site lies 24 metres outside the dredged channel and will be cleared. No further mitigation is required.

7. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site lies outside the dredged channel but will be subject to clearance and all archaeological issues will be accommodated by the mitigation.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

A section of possible aircraft frame has been recovered from the vicinity of the site in 2005. It is currently residing with the PLA. Three samples of coal were recovered from the site in 2007. They are currently stored at WA in Salisbury.

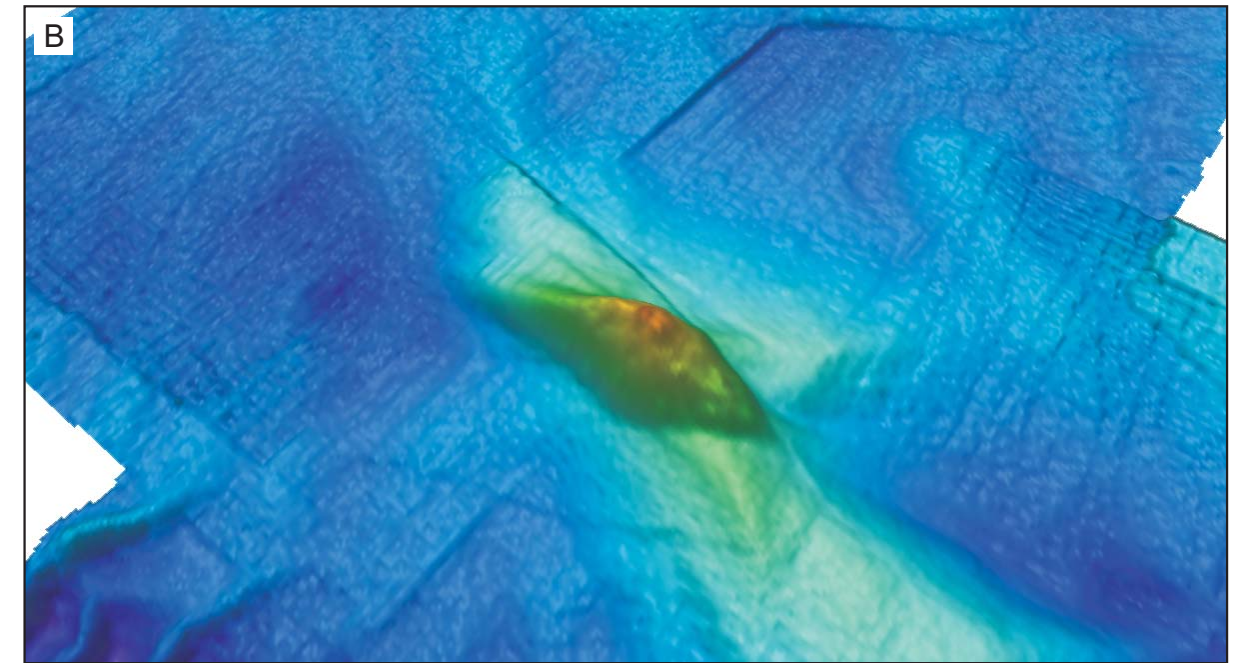
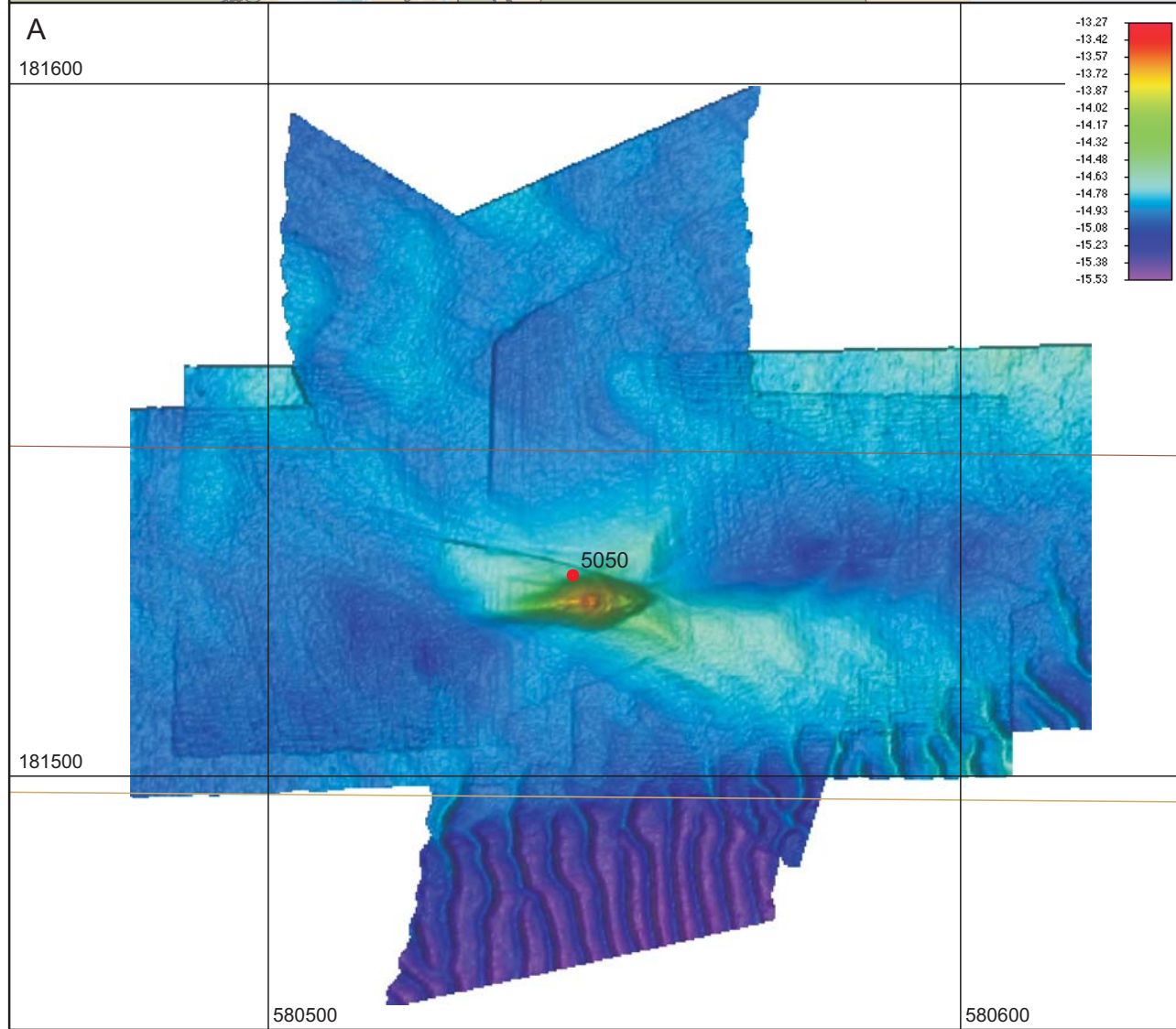
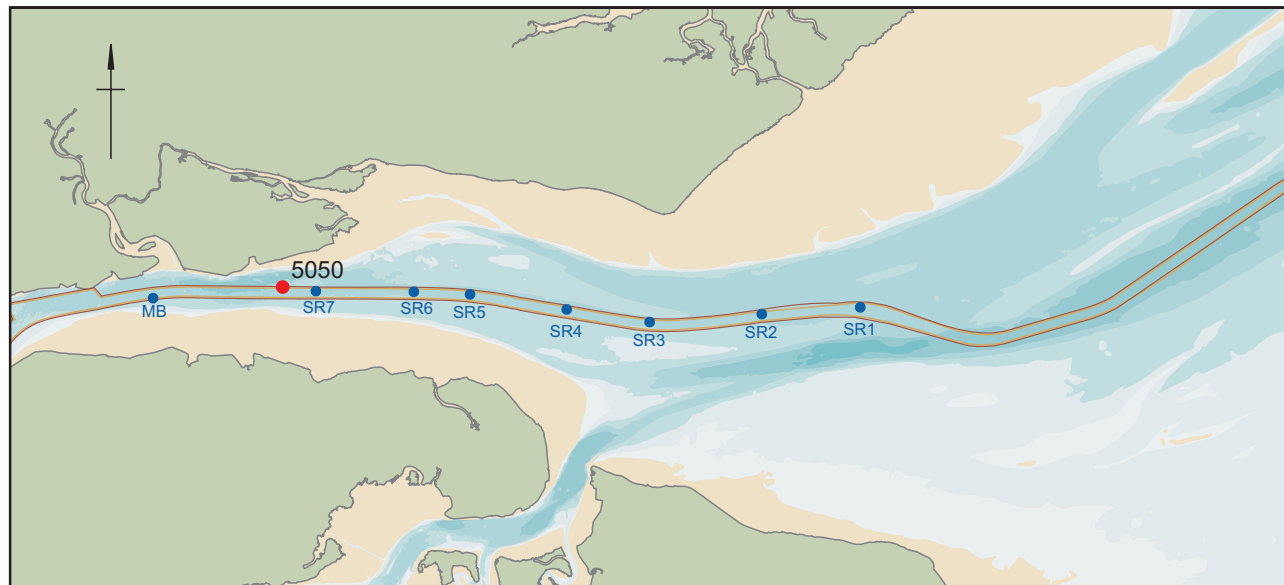
DIGITAL ARCHIVE

Material	Location
2002 sidescan sonar and magnetometer data	WA
2006 multibeam data	WA
2007 dive recordings	WA

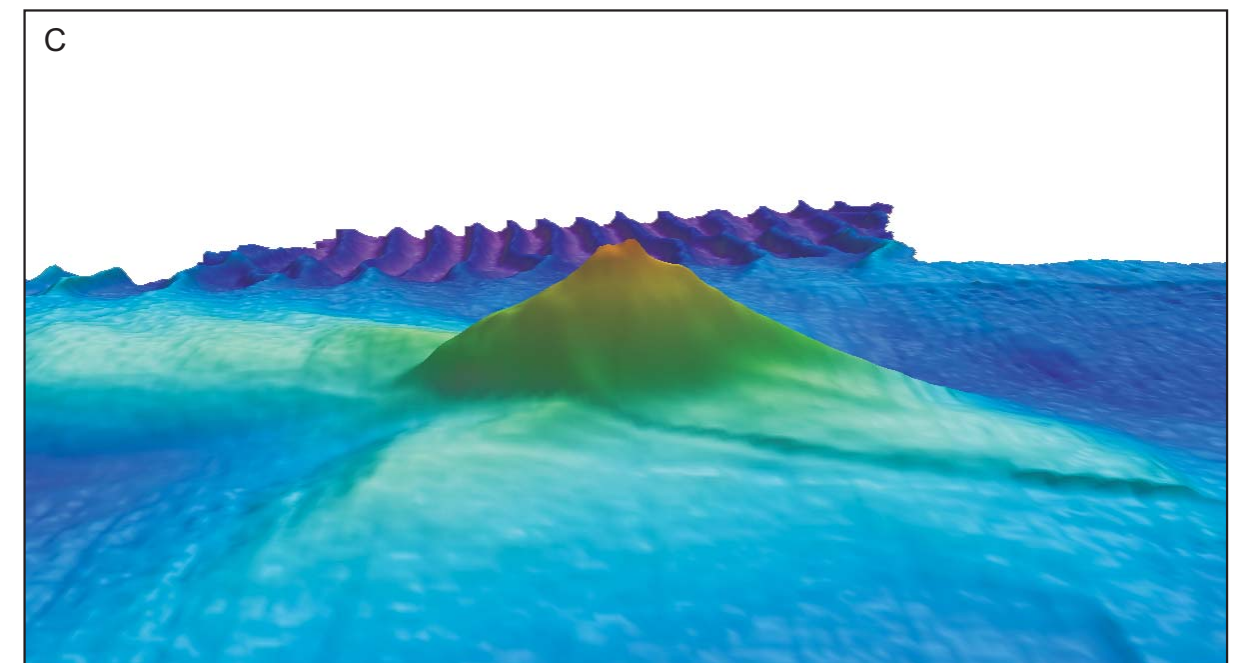
PAPER ARCHIVE

The paper archive consists of the following:

Material	Location
UKHO Report (13360);	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures;	WA
Port of London Authority, 2005, <i>Marine Diving Services Report</i> ;	WA
Wessex Archaeology, 2003, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification Report</i> ;	WA
WA target 337 tiff from 2002 sidescan data;	WA
Six printed images of the 2006 multibeam data	WA
Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i>	WA



Oblique view from south.



Oblique view from north.

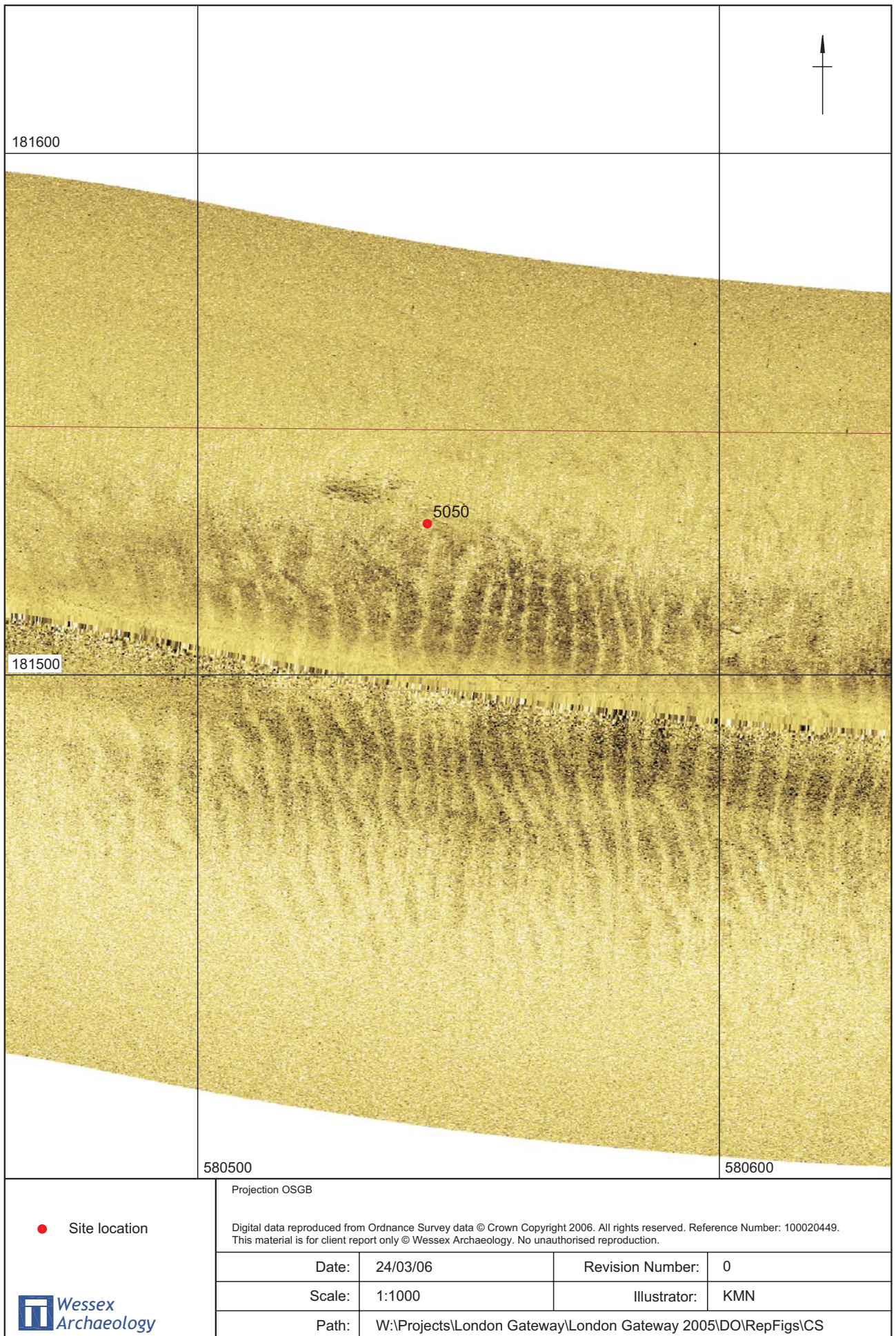
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



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Location and Multibeam data for Site 5050.


Figure 1



Sidescan Sonar image of Site 5050.

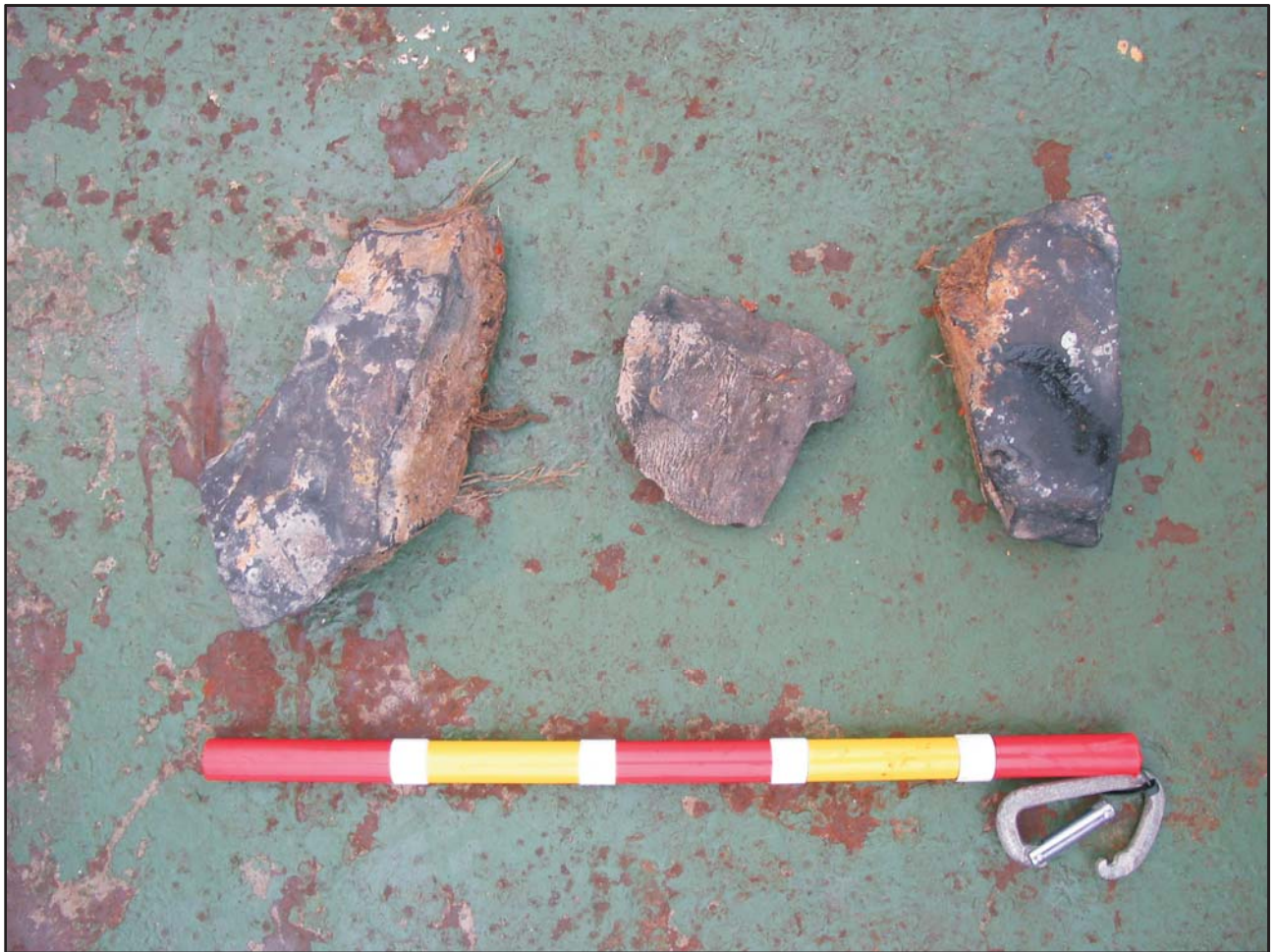
Figure 2




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2005 find

Figure 3



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**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Fourth Draft**

**WA Ref: 61209.5051.04
May 2008**

Site ID: 5051

Site Name: Unknown wreck (previously: 'Old timbers and concrete')

PLA Wreck No.: 341/02

Mitigation Group: 2.1.2. Site of probable archaeological interest, above SR1

No. of Casualties: Unknown

Vessel Type: Wooden vessel

Cause of Loss: Unknown

Current Recording Status: Level 1b

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the site's discovery and includes all forms of investigation to date:

1996	Site located when fishing vessel fouled trawl. The vessel reported traces of rust on the trawl when it was recovered (25/04/1996);
1996	Site surveyed by Chartwell at NGR 576552 E 181298 N. An area 25 metres east west by 20 metres north south was discovered, with spiky returns on the echo sounder trace, suggesting upstanding features. The obstruction is close to a 12 metre isolated sounding on a previous survey (25/04/1996);
1996	Site dived by the PLA. A collection of old timber, reinforced concrete and other debris protruding from the sand was reported. The presence of the timber suggests that there may be other older material in the area (21/05/1996);
1998	Site re-examined and located at NGR 576555 E 181296 N. In a general depth of 12.6 metres, with a least depth of 11.5 metres (07/10/1998);
2001	Emu sidescan sonar survey (29/03/2001);
2002	Emu sidescan sonar and magnetometer survey on behalf of Wessex Archaeology (14/11/2002);
2005	Site located at 51° 30.185'N 00° 32.547'E (WGD DGPS). Least depth 11.44 metres in a general depth of 12.2 metres. No scour or magnetic anomaly was detected;
2005	Site dived by the PLA, but nothing found on the seabed (23/02/2005);
2005	Site located during MBES survey. The survey confirms that the mound is 20 metres by 25 metres with a least depth of 11.5 metres, in a general depth of 12.3 metres. Site could easily have been missed by divers (06/04/2005);
2006	PLA site investigation using Reson 8125 multibeam system (09/03/2006);
2007	WA diving investigation (23-24/11/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

1996	Port of London Authority, <i>Marine Diving Services Report</i> – Report not supplied by the PLA;
2001	Wessex Archaeology, Assessment of Effects on the Archaeological Heritage: Inter-tidal

	and Marine, in respect of the proposed development of London Gateway. This report includes target 123;
2002	Wessex Archaeology, sidescan data and magnetometer data;
2003	Wessex Archaeology, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification</i> , inclusive of: 'target 123' and 'target 221' tiff images;
2005	UKHO (13365);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	Port of London Authority, <i>Marine Diving Services Report</i> – Report not supplied by the PLA;
2006	Wessex Archaeology, Geophysical Analysis of 2006 of multibeam and 2001 & 2002 sidescan sonar data, inclusive of: one geo tiff and five tiff images;
2007	Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i> .
2008	Wessex Archaeology, 2008, <i>London Gateway Clearance Programme, Diving First Tranche - Continuation, Field Report</i>

3. SITE DESCRIPTION

Position (UTM) obtained from fisherman (UKHO record): 329437.323 E 5708632.650 N

Location (derived from Fisherman's location): The site is located northeast of the mid Blyth Buoy, 100 metres inside the southern edge of the dredged channel (**Figure 1**).

Bed Depth: 13 metres

Minimum Target Depth: 11.86 metres

Extent: 22 x 16 x 1.2 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site consists of a faint impression on the seabed in an area of sand waves. The NGR recorded was 576556 E 181292 N. The position corresponds to site WA **5051**. The anomaly is 10 metres long and 15 metres wide, no length of shadow was recorded. The tiff file created was labelled '123'.

2002 WA sidescan sonar interpretation:

The site consists of a strong reflector with no height, which corresponds to PLA 592 WA **5051** (**Figure 2**). The NGR recorded was 576540 E 181289 N. The anomaly is 10 metres long and 20 metres wide, no length of shadow was recorded. The tiff file created was labelled '221'.

2006 WA interpretation of PLA multibeam data:

The site consists of a rectangular shaped object orientated north north-west by south south-east. It is 22 metres long, 16 metres wide with a maximum height of 1.2 metres (**Figure 1A**).

The south western linear edge of the feature is split into two sections with a 3 metre gap. The southern most section is 8 metres long, 2 metres wide and 0.05m upstanding. The northern section is 7 metres long, 1 metre wide and 0.05 metres upstanding (**Figure 1A and C**).

There is a raised area on the western side of the feature, which is 9 metres long, 6 metres wide and 0.5 metres upstanding (**Figure 1A-C**).

A small cone shaped feature is located 4 metres to the south west of the main site. The feature is 2 metres in diameter and 0.4 metres upstanding (**Figure 1A and C**).

2007 WA diving investigation:

During the first dive, the diver approached the site from the west and moved from the middle section towards the northern end of the feature (**Figure 3**).

The first archaeological feature the diver noted on the site was a piece of timber which appeared to be a plank, lying flush with the seabed at the top of a gently sloping mound. A small gap could be felt between this and some further timber, which may indicate that they were two planks lying adjacent to each other. This area of timber had an approximate exposed length between 0.5 and 0.75 metres. A loose timber was found lying beside these timbers and was recovered to the surface. The timber (470x250x90mm) is soft and degraded and there is no evidence of tool marks (**Figure 4A**).

Adjacent to this the diver noted several timbers which were highly eroded, though appeared to be roughly square in section. These timbers protruded from the seabed at a close to vertical angle. The diver suspects that these are frames of a vessel, with square sections of approximately 0.2 by 0.2 metres. Progressing north, the frames became less clearly identifiable as they were buried amid sand and gravel. The diver could not establish with certainty how many of the frames were in place, but noted at least three. Their spacing seemed relatively regular, with a space approximately twice the width of each frame (c. 0.4 metres) between two frames. An animal bone with cut marks (c. 250x150x50mm) was found among these timbers and recovered (**Figure 4B**).

On the opposite side of the frames, the diver encountered some timber which are likely to be planking. This planking protruded from the seabed edge side up at an almost vertical angle. The edge was clearly identifiable and was easily followed northwards where it became buried as the slope of the mound declined. Where buried, the edge of this planking was still only a hand's width below the sediment and could be followed to a point where it became less coherent. The point at which the edge of this planking became more difficult to follow corresponds with a point on the multibeam image at which the outline on the image becomes less coherent. At this point the diver encountered a large loose timber, over 1 metre in length with a roughly circular section. It was very poorly preserved and as it was lying loosely on the seabed it was not possible to say if it was part of the same structure.

The site was covered by loose sand. Some gravel was noted, with gravel becoming increasingly common as the diver progressed north and the gradient of the mound declined. Probes were taken on what were judged to be the outboard (west) and inboard (east) sides of the timber structure. The first outboard probe encountered some modern fabric. The second outboard probe met no resistance. The probe taken on the inboard side of the timber structure met hard resistance after approximately 0.2 metres.

During the second dive, the diver approached the site from the west and moved towards the middle inner section of the site (**Figure 3**). The diver reported the seabed to be gravelly sand.

The diver came across one apparently isolated buried feature c. 2 metres off the site. This feature seemed to be a slightly bowed metal plate (c. 30mm thick and at least 0.5m² in size; no edges could be felt).

The diver arrived on site and encountered an area of coherent wooden structure. The diver reported an upstanding wooden feature (hull? *c.* 70-80mm thick) protruding from the seabed. Towards the east of this upstanding feature, the diver felt a wooden feature (deck planking?) flat on the seabed. Even though the diver uncovered *c.* 0.7m² of this plate-like structure, no edges could be felt. All over this area the diver noted flint stones of a uniform size (*c.* 70x50x20mm on average), of which samples were taken (**Figure 4C**). A very small piece of slag (30x15x12mm) was also recovered with the stones (**Figure 4D**).

Furthermore, the diver recovered two pieces of timber (those which he could work free – the more massive timber structures are firmly in place and could not easily be moved). Both timbers appear to be plank fragments. One timber (*c.* 470x100x40mm) is broken at one end and eroded at the other end (**Figure 4E**). It is also broken along its long sides, where a possible treenail hole is clearly visible (**Figure 4F**). The second timber (*c.* 290x100x40mm) is a broken fragment (**Figure 4G**).

The diver started clearing by hand a section of the western side of the upstanding wooden feature (hull). No separate planks could be distinguished, the surface of the feature seemed to be smooth. The diver then encountered a plank (probably wood) protruding at an angle out of the side of the upstanding hull, upright on its long edge. Within the small excavated area the diver encountered further flint stones and some small degraded wooden sticks with a semicircular diameter (*c.* 70mm long and 20mm in diameter). Stones and sticks were sampled (**Figure 4H**).

Turning south the diver reported more massive but heavily eroded and/or broken up timbers protruding from the seabed. At this point the diver found a curved ferrous concreted plate (270x290x60mm) and recovered it (**Figure 4I**).

2008 WA diving investigation:

Evidence of a linear wooden structure over 4m long was located within the site (**Figure 1**). This appeared to consist of small partially buried frame-like timbers set in a near vertical plane that appeared to be sandwiched within two layers of plank-like timbers. The spacing of the frames was approximately 0.5m. The sections of these timbers appeared to have similar dimensions to the frames identified in 2007. The exposed timber was highly eroded. The seabed where probed was highly resistant but relatively well preserved timber was felt immediately below the exposed eroded sections. A treenail was felt attached to one of the frames.

Timber structures consisting of frames and planks were located in positions that corresponded with both of the linear mounds identified on the multibeam bathymetry data.

Although the area searched included the southernmost end of the linear mounds, no evidence of stern or bow structures was recognised.

Numerous other small timber and concreted metal features were felt between the linear mounds. It was not established whether these were part of a coherent structure or more scattered wreckage. Three four sided possibly hollow closely spaced features were located that may have been containers of some kind. The material that they were made out of was not established, although the surfaces were very rough to touch.

A total of three finds were recovered from the search area: a stoneware upright bottle, a plate and a brick.

The finds suggest that a significant assemblage of artefacts could be associated with the site. The find of a pottery flagon associated with both Lambeth and Woolwich also indicates that the vessel is likely to have had a local connection. The nature of that connection is unknown as the bottle may have arrived on the vessel for a number of different reasons, either as cargo or as the possession of a crew member. The evidence is not yet strong enough to identify the type of vessel.

The wreck probably dates from the third quarter of the 19th century, with 1862 being the earliest possible loss date

4. SITE HISTORY

The identity of the site is not currently known. The site was discovered in 1996 by a fishing vessel snagging its trawl. Since its discovery WA has received no reports of salvage or clearance works carried out on the site.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'probable' archaeological interest. The diving report for 1996 suggested the presence of buried remains and the multibeam data indicated the presence of a substantial wreck-shaped feature.

The features observed during the 2007 dives indicate the presence of a partly buried wooden vessel. The hull structure is preserved in places and may consist of frames sandwiched between an inner and an outer layer of planking, though the first few timbers observed were not extensive and may not necessarily be inner planking. More timber structures were noted inboard of the hull. Even though the structure is eroded where it is exposed, it appears to be substantial, coherent and comparatively well preserved.

Probing outboard encountered some modern fabric, though this was very loosely and shallowly buried and does not necessarily indicate a disturbed context. The second outboard probe met no resistance, which may indicate that there is no further buried structure. Probing towards the middle of the anomaly indicated the presence of further buried structure, which supports the hypothesis that the anomaly is the hull of a vessel.

Due to the limited bottom time, the site could not be investigated comprehensively. The tracking of the north-western outline of the hull seems to indicate that the multibeam image reliably delineates the outline of the vessel structure. However, a buried feature was encountered outside the multibeam evidence, demonstrating that more features probably associated with the site might be encountered away from the site.

The evidence gathered so far consists of apparently coherent wooden vessel remains and one or two metal concretions. An animal bone (probably cattle shoulder) and a small piece of slag might not necessarily belong to the site, as they are easily transported by the current and were recovered loose from the surface of the riverbed, trapped in between timbers. Modern remains

(reinforced concrete) amongst 'old timber' have been noted in 1996 by the PLA. No concrete remains were encountered during the 2007 dives. The reinforced concrete may have been more recently intrusive material.

The surrounding seabed was sand with gravel. Many similar sized flint stones were noted on the site, not only on the surface, but also within the small pit excavated next to the upstanding wooden feature. It is unclear whether these are a natural feature or ballast.

The 2008 diving operation confirmed that the site was a vessel from that dates from the latter part of the nineteenth century.

6. CONSTRAINTS

The identity of the site is not currently known; it is therefore not possible to state whether there will be issues with ordnance or human remains.

7. SCOPE OF FURTHER STAGE I MITIGATION

A Level 2 record has been achieved for the site, sufficient to establish the presence, position and type of the site. The evidence gathered so far indicates a wooden wreck with singular concreted iron features and associated flint stones.

Three finds have been discovered and associated with the site, which date the site to the latter part of the nineteenth century.

ARCHAEOLOGICAL INTRUSIVE INVESTIGATION (STAGE I, MITIGATION B/E)

The requirements of this stage of mitigation have been achieved, a Level 2 record of the site.

8. OUTLINE OF STAGE II MITIGATION

The wreck lies 100 metres inside the dredged channel. The wreck will be subject to clearance. Archaeological recording at an appropriate level will be carried out. It is recommended that in-water archaeological observation is carried on this site prior to clearance operations. During clearance operations an archaeological watching brief will be carried out and limited recording of recovered vessel structure will be undertaken.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will have been cleared by grabbing. An archaeological watching brief will be carried out on board the clearance vessel and limited recording of structural remains would have taken place.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

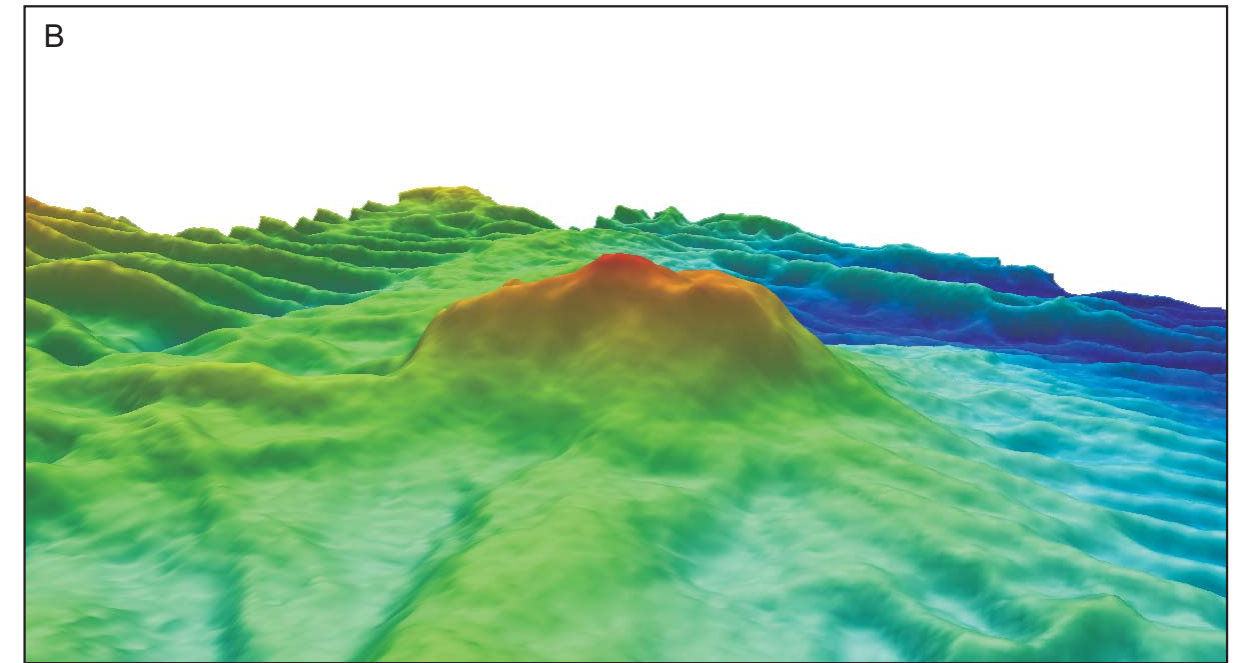
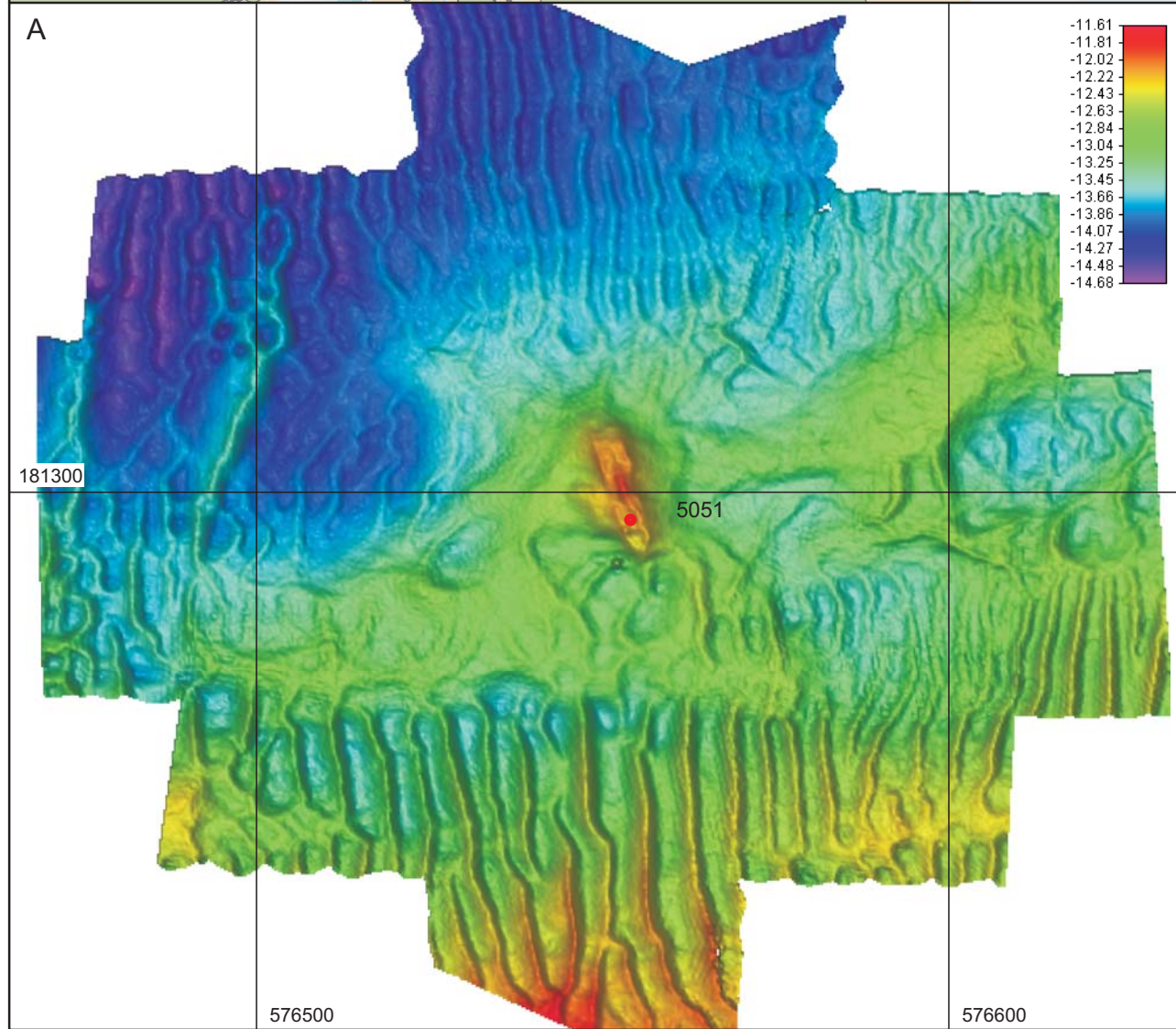
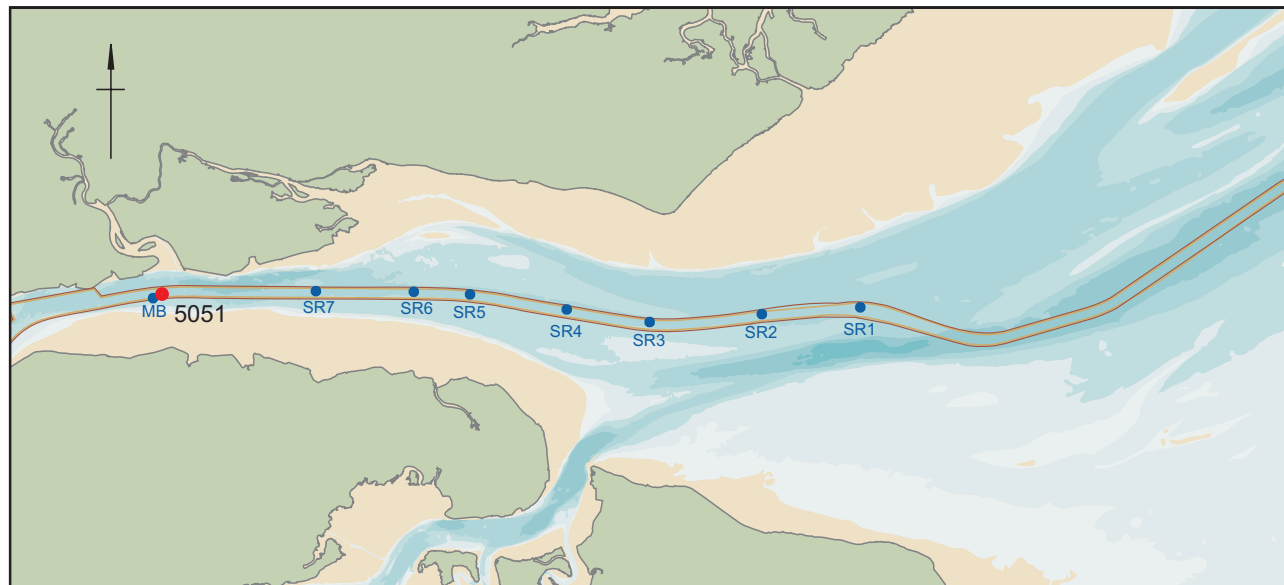
Three pieces of timber, an animal bone with cut marks, a concreted ferrous plate, 13 pieces of flint, two small pieces of degraded wood, six fragments of small semicircular wooden sticks and a piece of slag have been recovered from the site. They are currently stored at WA in Salisbury.

DIGITAL ARCHIVE

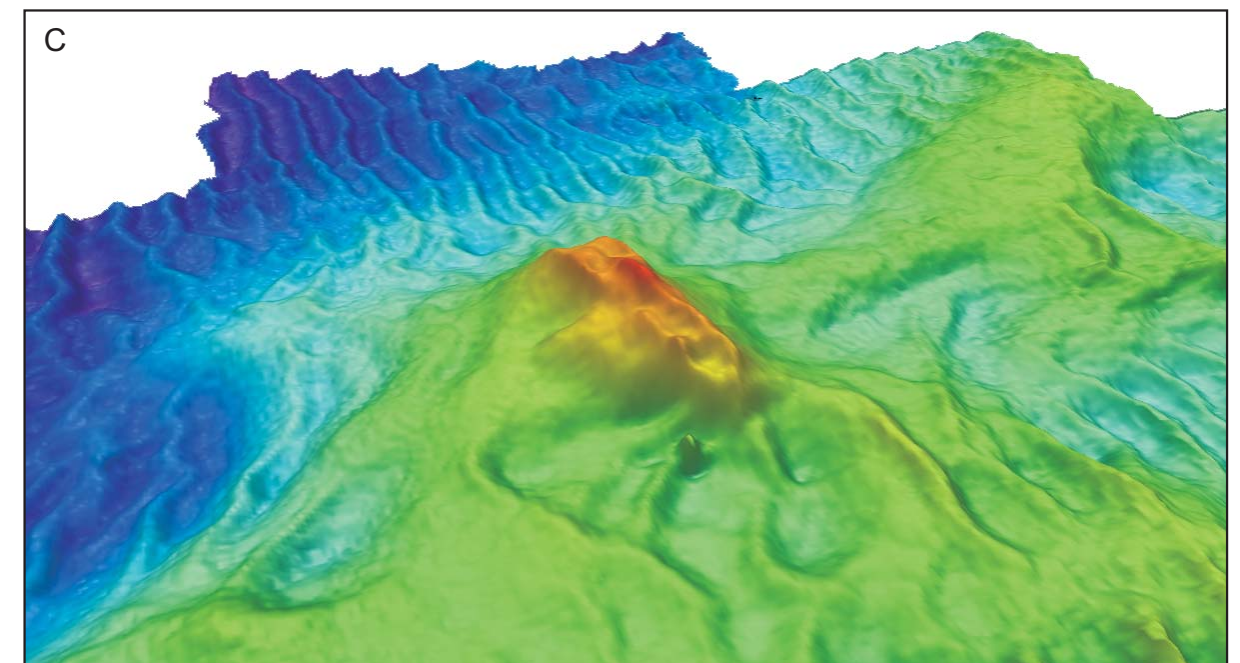
Material	Location
2001 sidescan sonar data	WA
2002 sidescan sonar and magnetometer data	WA
2006 multibeam data	WA
2007 dive recordings	WA

PAPER ARCHIVE

Material	Location
UKHO Report (13365)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Inter-tidal and Marine in respect of the proposed development of London Gateway	WA
Wessex Archaeology, 2003, London Gateway <i>Appendix Q: Enhanced Wreck Site Identification Report</i>	WA
Six printed images of the 2006 multibeam data	WA
Wessex Archaeology, 2007, <i>London Gateway Clearance Programme, Diving First Tranche, Field Report</i>	WA



Oblique view from east.



Oblique view from south-west.

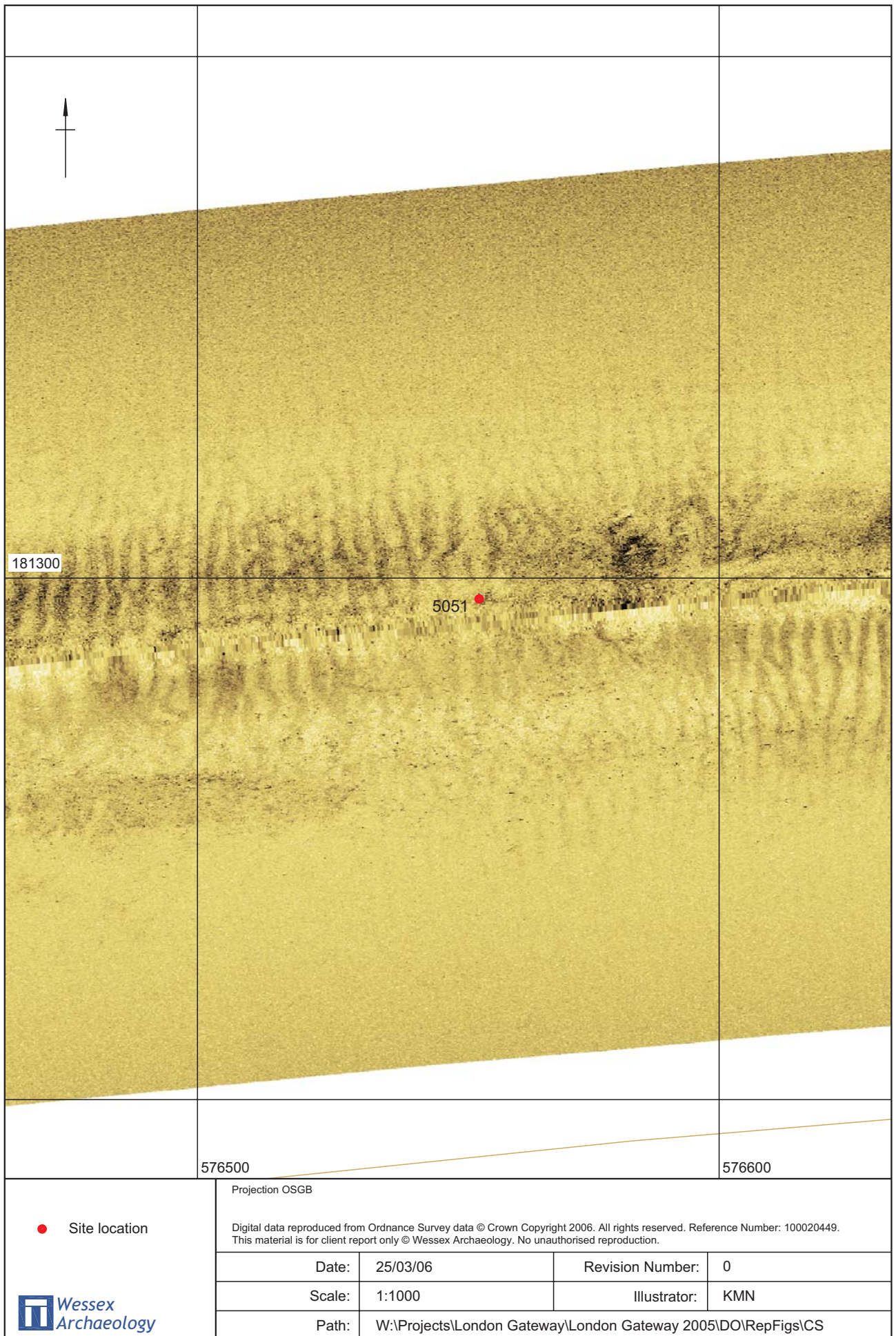
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



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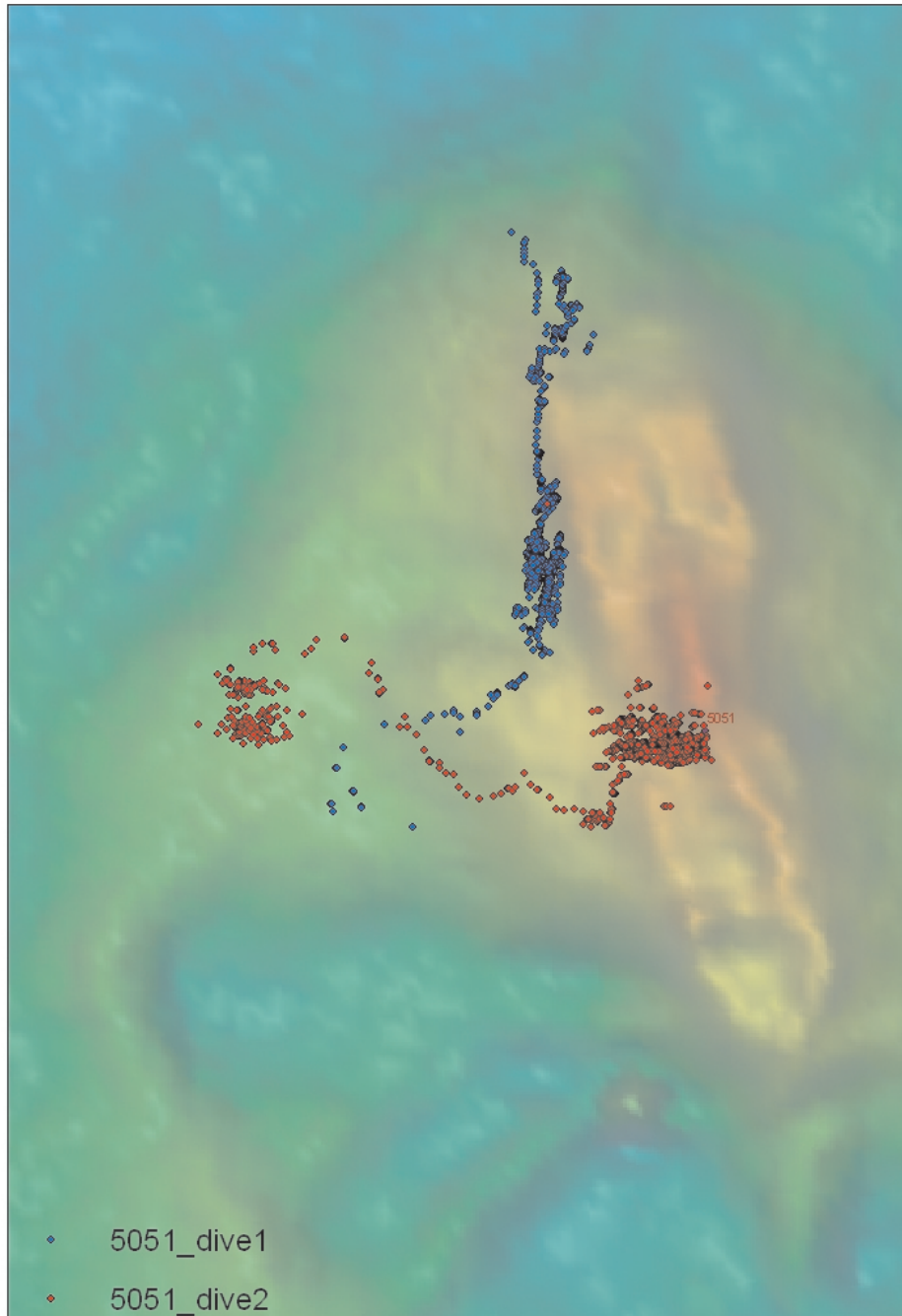
Location and Multibeam data for Site 5051.

Figure 1



2002 Sidescan Sonar image of Site 5051.

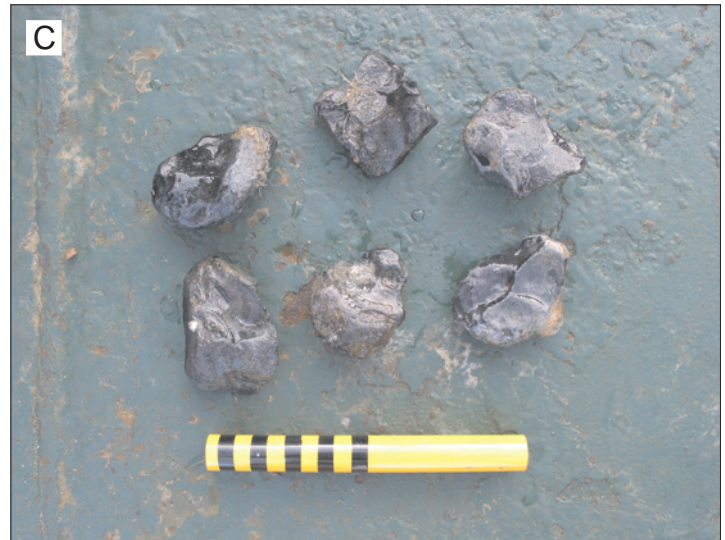
Figure 2



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**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Third Draft**

**WA Ref: 61209.5056.03
January 2008**

Site ID: 5056

Site Name: East Oaze Light Vessel

PLA Wreck No.: 201/59

Mitigation Group: 2.2.2. Site of probable archaeological interest, seaward of SR1

No. of Casualties: Unknown - vessel potentially unmanned

Vessel Type: Civil Light Vessel

Cause of Loss: Unknown

Current Recording Status: Level 2a

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the sites discovery and includes all forms of investigation to date:

1940	East Oaze Light Vessel sunk in November 1940, circumstances unknown;
1947	Drift swept 51° 30' 00" N 01° 01' 30" E clear at 13.41metres, foul at 13.71metres (19/1/1947);
1948	RN dispersal operations (30/12/1948);
1961	Swept clear by <i>HMS Enterprise</i> to 14.02 metres, scour depth 21.95 metres (8/12/1961);
1968	Examined in 51° 30' 02" N, 01° 01' 29" E (OGB) using Hifix. Swept clear at 12.8 metres, foul at 13.41m (27/6/1968);
1978	Maplin survey swept to 12.8 metres. 12.9 metres foul depth to seabed 13.3 metres, position NGR 609913 E 182329 N (4/12/1978)
1992	Wreck examined by PLA fixed position 609909E 182325 N. Wreckage found extends over 50 metres NE/SW and scour 300 metres overall (26/2/1992);
1998	Re-surveyed, found to be 13.8 metres, least depth in NGR 609907mE 182329mN. Wreckage over area of 60 x 40 metres in a NE/SW axis. Sidescan survey indicates ground moorings and anchors are still in position. Swept to 13.6 metres clear and just touching at 13.7 metres (26/5/1998): Drawing 113-201-168;
2001	Emu sidescan sonar survey (29/03/2001);
2005	PLA dive on site; bottom time of 48 minutes, max depth 24 metres (17/5/2005);
2005	PLA multibeam and echosounder survey (MBES);
2005	Examined by multibeam echosounder for London Gateway. Least depth sounded 14.5m, within 2m of current position. Scour 165m to SW, depth down to 23m, bed 19m. Vessel still appears intact with small area of wreckage 8m SE, possibly remains of mast. SSS shows all 4 ground moorings intact (13/6/2005);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005);
2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2001	Wessex Archaeology, Assessment of Effects on the Archaeological Heritage: Inter-tidal and Marine, in respect of the proposed development of London Gateway. This report includes target 85;
2005	UKHO (14052);
2005	NMR (904787);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2005	PLA Diving Report (17/5/2005);
2006	Wessex Archaeology, Geophysical Analysis of 2005 multibeam (inclusive of one geo tiff and five tiff images);
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and seven tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from 2005 multibeam data: 362781.542 E 5707383.695 N

Location: The wreck lies east of SR1 and is located in the middle of the dredged channel (**Figure 1A**).

Bed Depth: 21 metres

Minimum Target Depth: 15.5 metres

Extent: 50 x 40 x 7.5 metres

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site consists of a large linear anomaly with spurs/ridges to the south west and north east (**Figure 2**). The NGR recorded was 609914E 182324N. The tiff file created was labelled target 85. The dimensions of the anomaly are 20 metres long by 5 metres wide. No length of shadow was recorded.

2002 WA sidescan sonar interpretation:

The site was not located inside the 2002 survey area.

2005 WA interpretation of PLA multibeam data:

The remains of the light vessel lie upright on the seabed on a south-west to north-east axis, with the bow to the south-west (**Figure 1B**). The wreck appears generally intact with little scattered debris visible on the multibeam.

The wreck lies in a deep scour with the scour extending to the south-west beyond the multibeam area of coverage. The wreck is 40 metres long, 12 metres wide and 7.5 metres upstanding from the bottom of the scour pit. The stern area is the most intact area of the wreck. It is 8 metres long, 7 metres wide and 5 metres upstanding.

The forward area appears less intact with what may be the remains of the light derrick lying over the bow area. There appears to be the remains of a mooring block alongside the port side of the wreck near the stern (**Figure 1C**). The block is 6.5 metres long by 2.5 metres wide and is 1.7 metres upstanding with the possible remains of a mooring line connecting it to the wreck itself.

The sides of the vessel appear intact along the stern half of the wreck. Forward of the stern itself there is a section that appears intact and is 7 metres in length, 6 metres wide and 1 metre in depth. The port side of the vessel is 1.5 metres higher than the starboard side. The remains of what may be a bulkhead can be seen in the midships section of the wreck (**Figure 1D**).

The deepest point of the scour is by the stern of the vessel and is 23.8 metres in depth, 3 metres below the general depth of the surrounding seabed. The visible scour extends 160 metres in length to the south-west and the general area is 50 x 40 metres (**Figure 1A**).

2005 PLA dive description:

The PLA dived the site in 2005. The report describes the wreck as orientated on a north-east to south-west axis, with the stern to the north-east. The vessel was of steel construction with a heavy covering of marine growth. It was also reported that there was fishing gear snagged on the vessel between the keel and the seabed. There was no reported damage to the hull and there were still sections of timber fendering in place. There was also evidence of rigging and other debris on the seabed beside the wreck. The report notes that there was zero visibility for the duration of the diving operation.

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data and provided additional detail (**Figure 3**). The East Oaze Light Vessel sits relatively intact upright on the seafloor orientated north-east to south-west. The highest part of the wreck is to the west and measures 5.6 metres higher than the surrounding seabed. The central portion of the wreck appears more broken up than either end and debris is obvious lying within 10 metres of the wreck. However, the data suggest a certain amount of fine-detail structure remains. The eastern section of the wreck appears relatively intact and exhibits a height of 2.0 metres.

A further feature is observed situated 3 metres to the south-east of the wreck and measures 1.1 x 0.7 x 0.5 metres. It is considered that this is a further mooring block and concurs with the position of the feature observed on the multibeam data.

The scour to the south-west of the wreck observed on the multibeam was also observed on the sidescan sonar.

Two linear features are observed extending from either end of the wreck. The linear features are likely to be the anchor chains attached from the vessel to mooring blocks. The western feature extends 213 metres terminating at a mooring block at 362569 E, 5707292 N (UTM). The mooring block measures 1.2 x 0.7 x 0.4 metres. This linear feature lies along the length of the scour.

The eastern feature extends 155 metres terminating at a mooring block at 362935 E, 5707416 N (UTM). The mooring block measures 1.2 x 0.6 x 0.6 metres.

4. SITE HISTORY

Build

The East Oaze Light Vessel was built for Trinity House by R. Stephenson and Co. of Hepburn, Newcastle, in 1888.

R. Stephenson was the son of the railway pioneer George Stephenson. He set up his company in 1823 in Forth Street, Newcastle-upon-Tyne. Stephenson was the first person to set up a company specifically to build railway engines. In the 1880's the company acquired a yard at Hepburn, adjacent to shipbuilders Hawthorn and Leslie and Co. (to be later bought out by the Stephenson company in 1937), and expanded into shipbuilding.

Anomaly WA **5065** is thought to represent Trinity House Light Vessel No. 60. Plans of Light Vessel No 61, sister ship to Light Vessel No 60 have been made available from Trinity House Engineers (via the PLA) (**Figure 4**). A photograph of Light vessel No 61 was also supplied by the PLA (**Figure 4**). Both vessels were composite wooden and iron vessels built by R. Stephenson and Co. The company also built Trinity House Vessels No 64 and 65 to the same specification (Peter Williams, UK moderator of the International Journal of Lighthouses, pers. Comm. 04/04/2006).

Technical details for Trinity House Light Vessel No. 60 according to Trinity House records are as follows:

Vessel name and designation	Trinity House Light Vessel No. 60
Registered tonnage	265
Build date	1888
By	R. Stephenson and Co.
Where	Hepburn
Registered Dimensions	
Length	103ft (31.39m)
Breadth	23ft (7.01m)
Height from upper part of topmark to rail	65ft (19.81m)
Height from upper part of topmark to waterline	72ft 3in (22.03m)
Height of focal plane of light above waterline	38ft 11.58
Material	Composite wood and iron
Propulsion	None
Illumination: number of burners and/or No. and power of lamps	7-2w Catoptric reflectors
Elevation	Focal Plane 38ft above the waterline
Fog Signal	Siren powered by a 14bhp Hornsby oil engine (with an extra on as standby)

Use

The East Oaze Light Vessel was serving as a war station. A war station was a light vessel that was positioned to control an entrance to a defensively mined entrance, or to mark a safe passage through a minefield for coastal convoys making their way up the Thames Estuary (Peter Williams, UK moderator of the International Journal of Lighthouses, pers. Comm. 04/04/2006).

Loss

The East Oaze Light Vessel was apparently lost to enemy action sometime in November 1940 but attempts to find out the exact cause of the sinking and the date have been unproductive. It is not known if the vessel was manned at the time of loss, if not this may explain the lack of records relating to the loss of the vessel.

Admiralty Casualty Reports contain detailed descriptions of a number of light vessels being attacked and/or sunk during World War II in the Thames Estuary (such as the Sunk light vessel being strafed by German aircraft), but despite all records for the relevant date being researched, no record of the sinking of the East Oaze Light Vessel could be found.

There are also several reports of light vessels being sunk by German aircraft in the Times (no details or names given) and The Lloyds Weekly Casualty Reports lists a number of light vessels sunk or attacked in the Thames, but there is no record of the East Oaze Light Vessel in either publication.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'medium' archaeological interest. The key aspects of the site that have lead to the above rating are:

- The vessel was built in a period of technological change from iron to steel construction;
- There are few surviving examples of these early composite light vessels;
- Diver reports suggest a large amount of surviving remains.

The East Oaze Light Vessel is of archaeological interest as it is an early example of a light vessel dating to the latter part of the 19th century. It is not known, without further documentary research, how many vessels of this type and date are still in existence, though it is known that only four vessels of the same specification were built at the Stephenson yard. There are a number of photographs of a sister ship and plans which reside with the PLA.

6. CONSTRAINTS

There is a possibility of the presence of human remains on the site, as some light vessels were constantly manned throughout World War II. In addition war time ordnance could be present in the area especially if the vessel was bombed in the course of war time enemy action.

The wreck is located in the centre of the existing dredged channel and therefore diving operations may be restricted.

The wreck stands 7.5 metres above the surrounding seabed, and it is reported to have fishing gear snagged upon it. This is also an area where underwater visibility can be severely restricted. In consideration of these factors there is a danger of entanglement during diving operations.

7. SCOPE OF FURTHER STAGE I MITIGATION

The aim of the Stage 1 Mitigation is to achieve a Level 2 record of the site. The Level 2 objective is the production of a record that provides sufficient data to establish the extent, character, date and importance of the site. The following aspects of the wreck will be considered, at the different evaluation stages, in addressing these objectives:

Build

- Construction (material, fastenings, methods)

- Propulsion (sail, steam, diesel or and combination)
- Diagnostic features(machinery, fittings, armament)

Use

- Artefact/Cargo (dating objects)

Survival

- General survival of the site

Investigation

Traces of any previous work on the site (salvage, excavation etc).

Level 2a recording has been achieved through geophysical surveys and documentary research. The extent of the site, as far as visible above the seabed, has been established through multibeam and sidescan sonar surveys. Character, date and importance of the site are evident from the documentary research.

8. OUTLINE OF STAGE II MITIGATION

The wreck lies inside the main dredged channel, *c.* 120 metres from the northern boundary line. The wreck will be cleared or resettled.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will be resettled and therefore no further archaeological work is required.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2001 sidescan sonar data	WA
2005 multibeam data	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

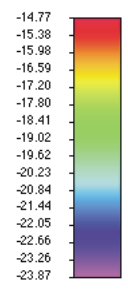
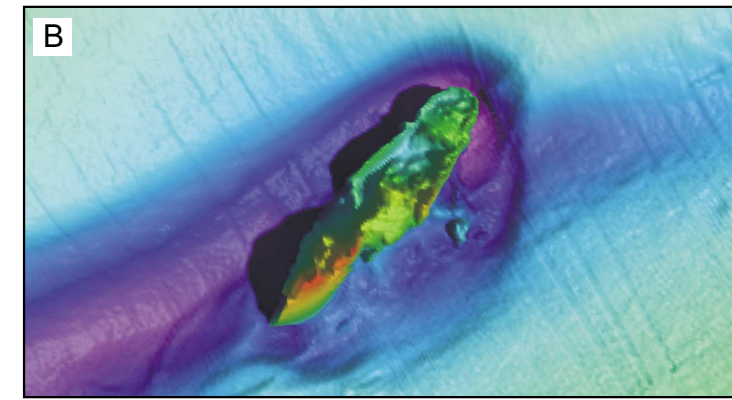
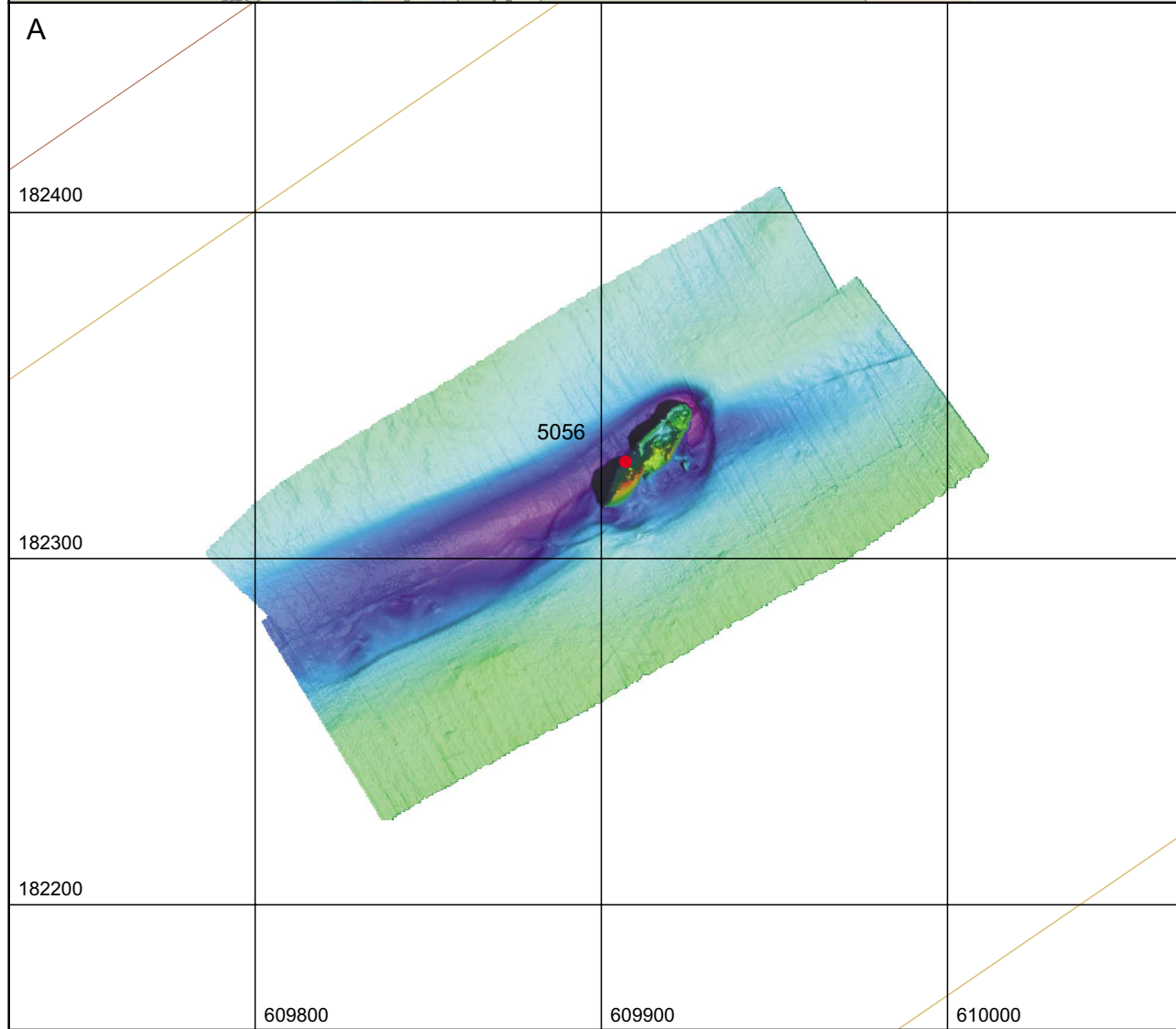
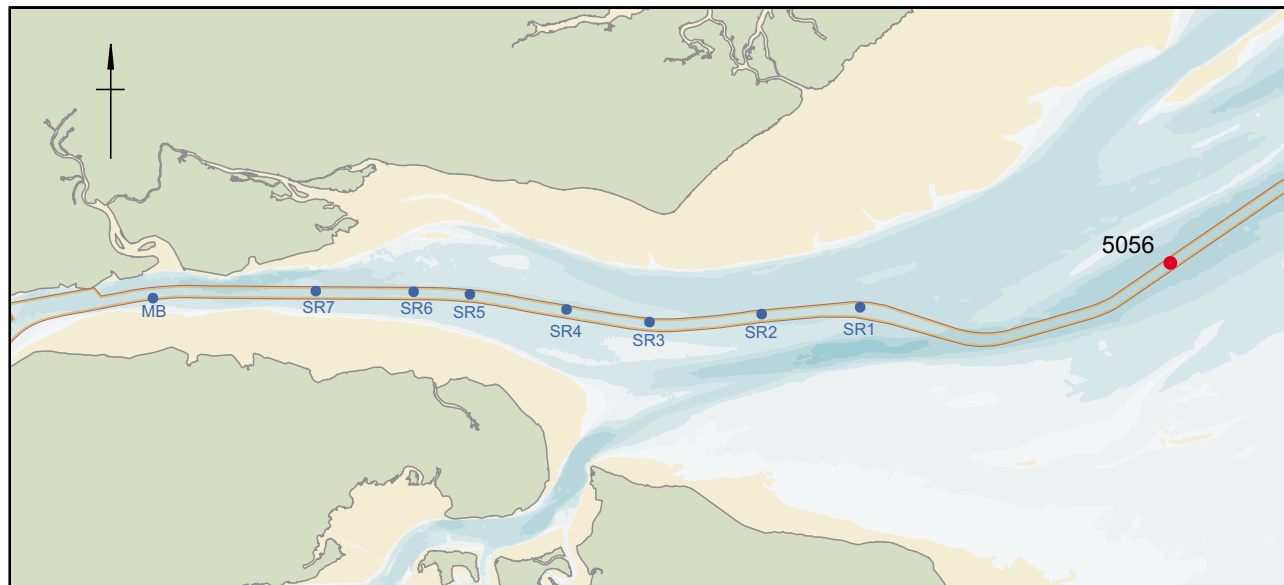
Material	Location
UKHO Report (14052)	WA
NMR REF (904787)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures	WA
Port of London Authority, 2005, <i>Marine Diving Services Report</i>	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Intertidal and Marine in respect of the proposed development of London Gateway	WA
Five printed images of the 2005 multibeam data	PLA
One printed image of sidescan sonar (2001)	WA

REFERENCES

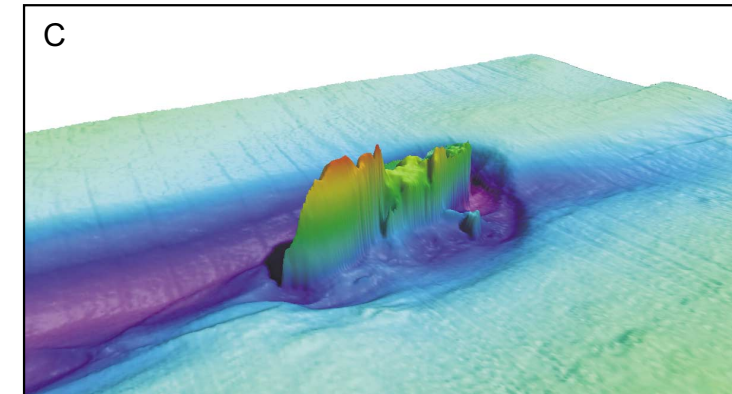
Klempau, I. (2006), *Die Feuerschiffseite*.

<http://www.feuerschiffseite.de/SCHIFFE/ENGLAND/LV55/lv55gb.htm>.

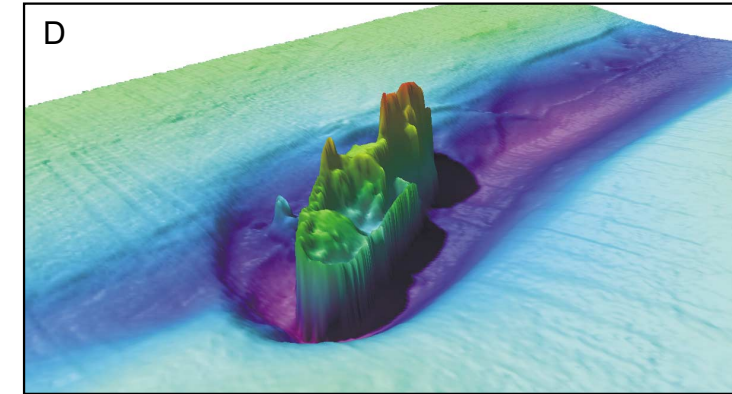
Woodman, R. (2005). *Keepers of the Sea: the story of the Trinity House Yachts and Tenders*. Ware: Chaffcutter Books.



Detail plan view.



Oblique view from south.



Oblique view from north.

Not to scale

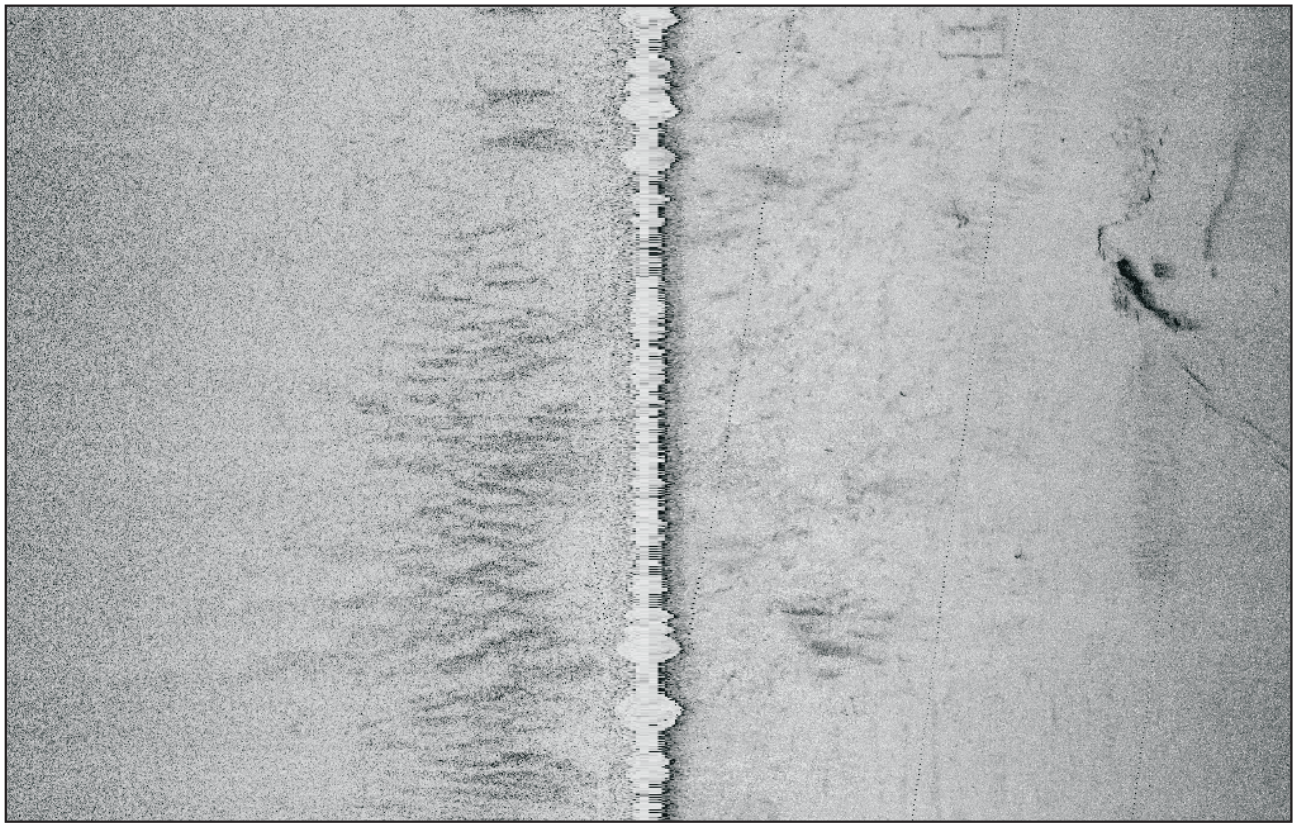
- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits




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Location and Multibeam data for Site 5056.

Figure 1

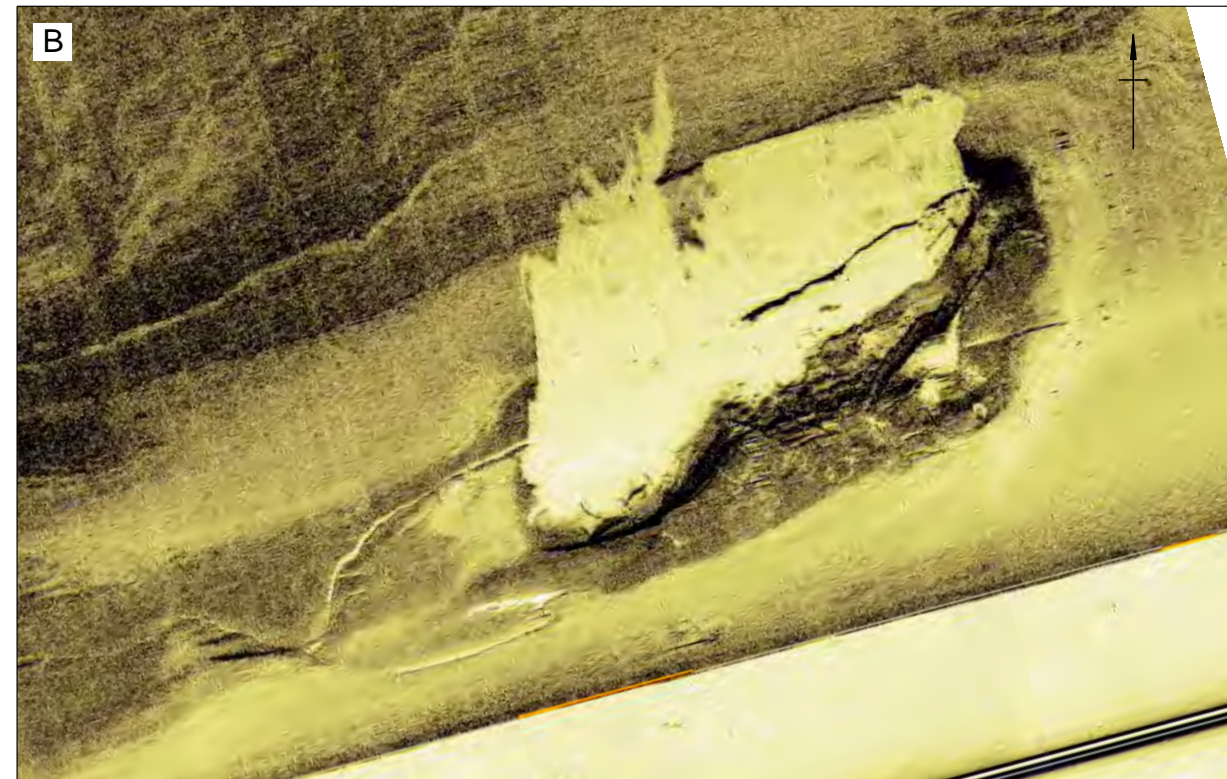


Plan view.

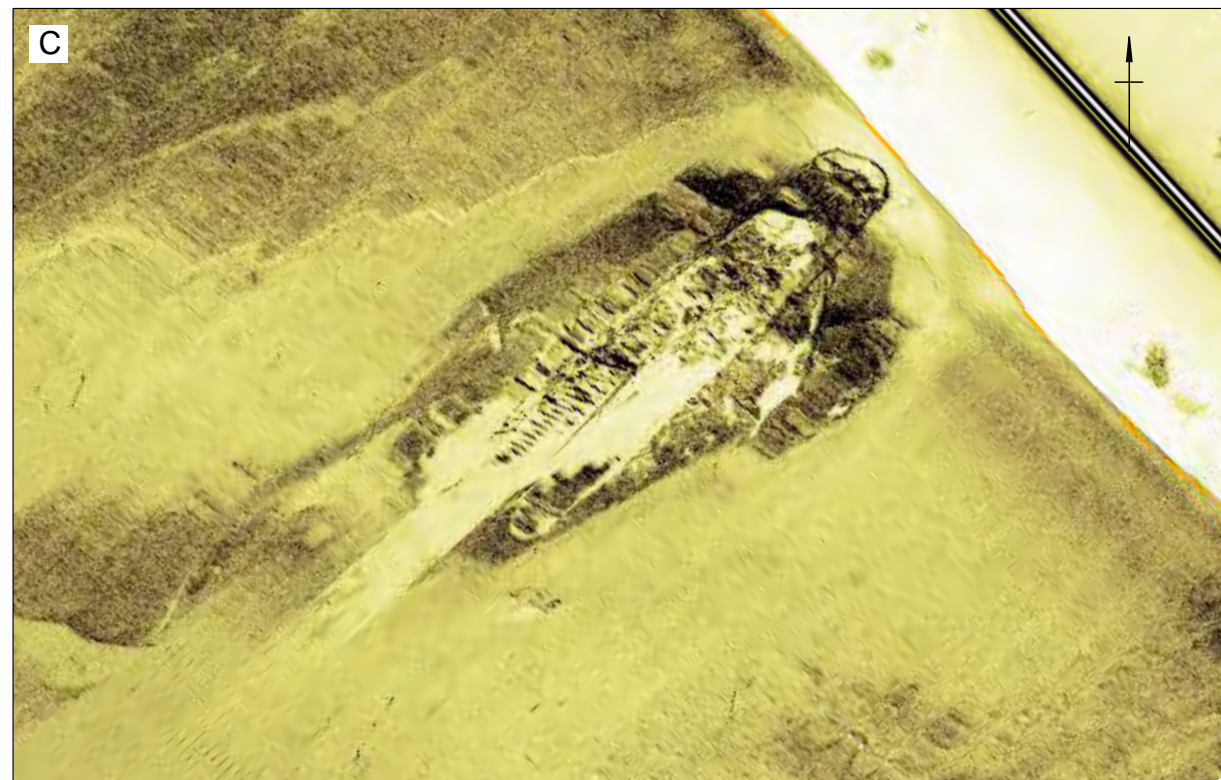
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2001 Sidescan Sonar image of Site 5056.

Figure 2



Not to scale



Not to scale



Not to scale

● Site location



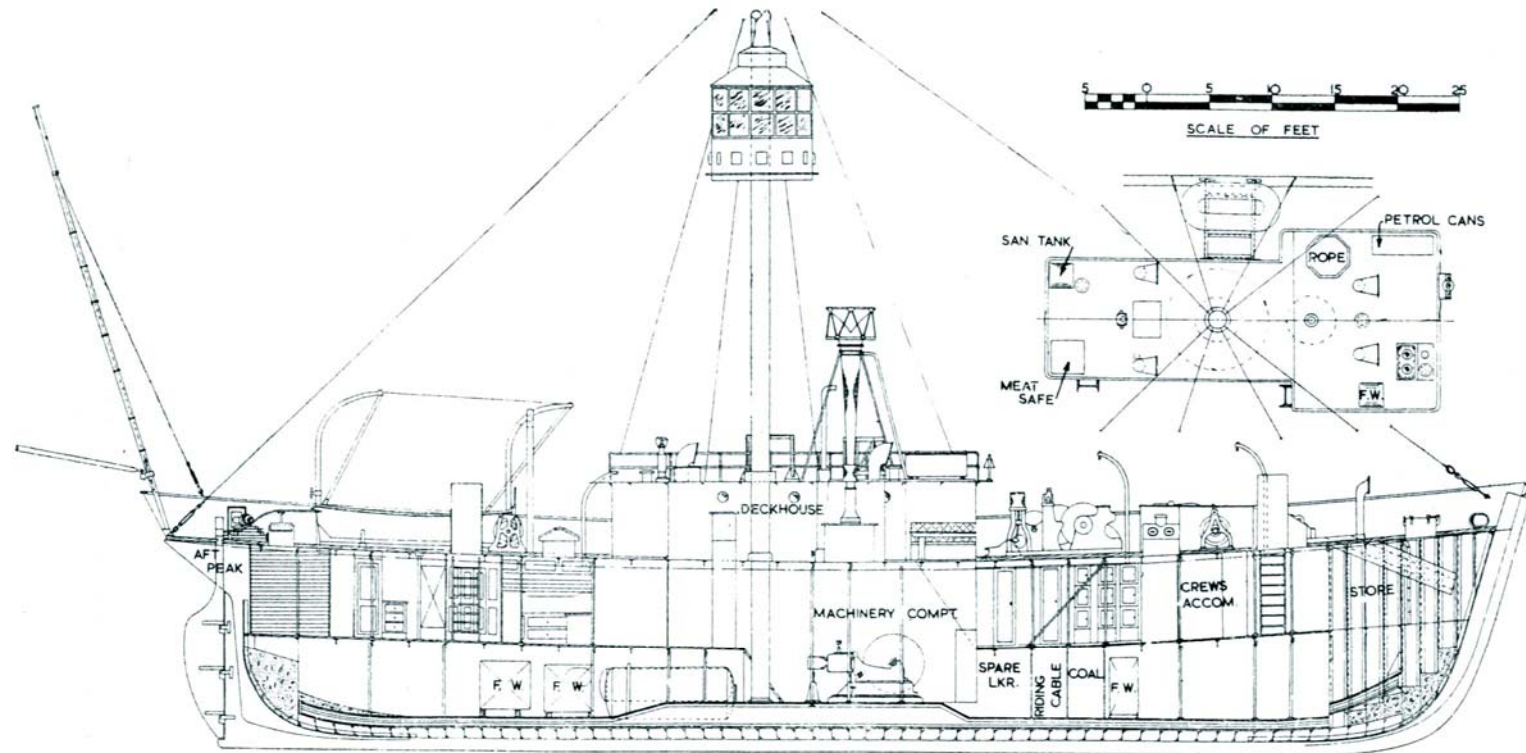
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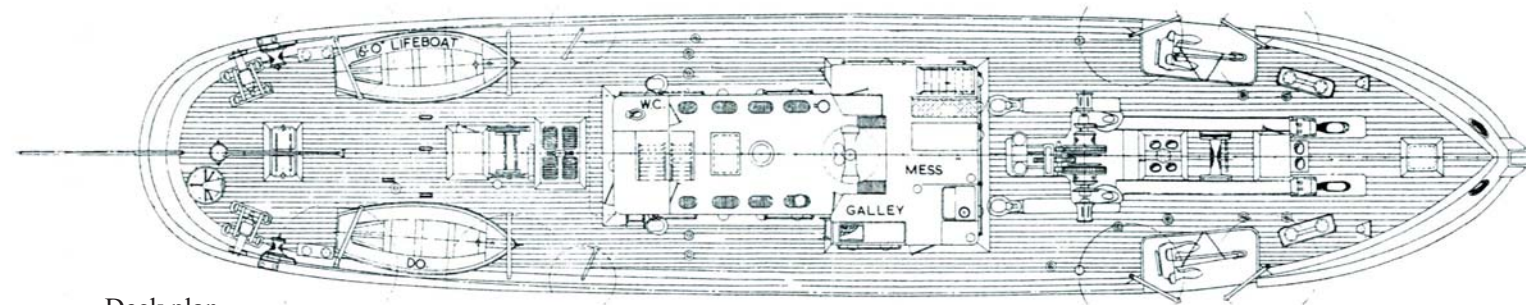
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2007 Sidescan Sonar image of site 5056

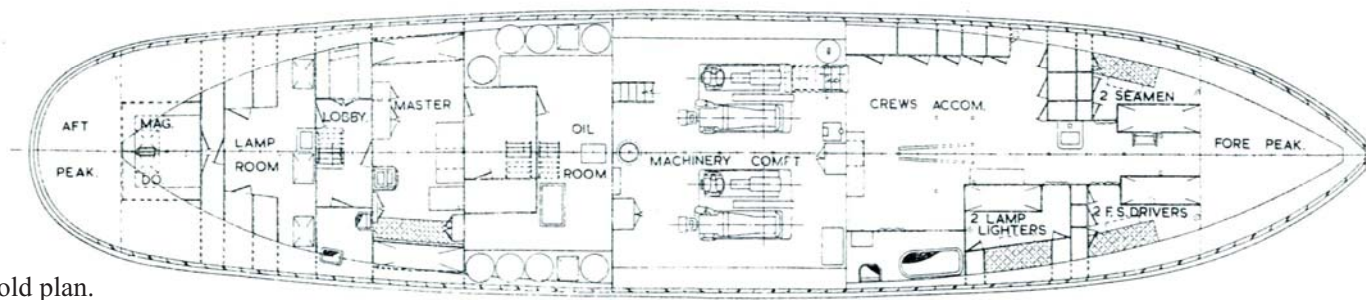
Figure 3



Elevation.



Deck plan.



Hold plan.



Corton Light Vessel.

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Date:	20/11/07	Revision Number:	1
Scale:	N/A	Illustrator:	KMN
Path:	W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS		

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
First Draft**

**WA Ref: 66895.5057.01
April 2008**

Site ID: 5057

Site Name: *HMS Aisha* (built as the *Wilna*)

PLA Wreck No.: 201/64

Mitigation Group: possible

No. of Casualties: Unknown

Vessel Type: Motor Yacht

Cause of Loss: Struck mine on 11th October 1940

Current Recording Status: Level 1b

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the wreck's loss and includes all forms of investigation to date:

Date	Activity
1940	Vessel mined (11/10/1940)
1940	PFNM 2736/40 issued (26/11/1940)
1940	INS DWPA in 531000N, 01230E – NM 2902/40
1943	Location amended to 5 fathoms 3 feet in 513009N, 010227E – NM 1322/43 (1/7/1943).
1946	Wreck examined in 513002N, 010227E using horizontal sextant angle. Wreck was swept after dispersal. Clear at 14.0 metres, foul at 14.3 metres. The least east-south depth was 14.0 metres and the general depth was 14.3 metres. Depth amended to 7 fathoms 4 feet (26/6/1946).
1959	Drift sweep asdic sonar sweeping and echo sounder after dispersal. Clear at 14.0 metres, foul at 14.3 metres. Least depth by echo sounder 14.0 metres. Surrounding seabed 14.3 metres. Position 51 30 02 N, 001 02 27 E (NMR 904791 – 27/5/1959).
1961	Swept clear with Lucas wire sweep at 15.8 metres, foul at 16.5 metres. The least east-south depth was 16.5 metres with a general depth of 18.3 metres. Scour depth of 19.2 metres. Amended to wreck, least depth by wire sweep: 8 fathoms 4 feet, branch standard, minor information to be shown on next New Edition (11/12/1961).
1968	Wreck examined in 513012 N, 010232 E. The least east-south depth was 17.1 metres, with a general depth of 18.3 metres, and scour depth of 18.9 metres. A very poor sonar contact. Position amended to branch standard, minor information to be shown on next New Edition (27/6/1968).
1973	Amended to wreck, least depth by wire sweep 15.5 metres (27/9/1973).
1979	Wreck examined 4/12/1978. The wreck was swept clear at 15.6 metres, foul at 16.1 metres. The least east-south depth was 15.7 metres in a general depth of 18.0 metres, and scour depth of 18.7 metres. It is a small wreck and easy to find (22/1/1979).

1993	Examined on 30/12/1992 in 513011.5N, 010232 E (OGB) using Microfix. The least east-south depth was 15.6 metres in general depths of 17.5 – 18.5 metres, and a scour depth of 18.7 metres. The wreck lies broken up in an area of 50 metres by 20 metres oriented south-west / north-east. No chart action (1/3/1993).
2005	Least depth is 15.7 metres in a general depth of 18.0 metres. No scour. Debris scattered over area 30 by 18 metres. The largest part is about 4 metres square at its base (PLA wreck report DTD10/4/2005).
2005	Wreck shown in 5130.224N, 0102.448E (WGD) on PLA 201/23 (13/6/2005).
2008	Multibeam and sidescan sonar surveys of the site. Data processed by Wessex Archaeology.

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2008	UKHO (14062)
2008	NMR (904791)
2008	Mercantile Navy List and Maritime Directory from 1935-1940

3. SITE DESCRIPTION

Position (UTM Z 31N) obtained from PLA multibeam survey data 2005 (point of wreck closest to channel): 364010 E 5707645 N

Location: The site is located in the centre of the Oaze Deep at the West end of Knock John Channel, 12.7 kilometres south-east of Foulners Island (**Figure 1**).

Bed Depth: c. 18.2 metres

Minimum Target Depth: 16.4 metres

Extent: 45 metres x 40 metres based on multibeam data, 52 metres x 44 metres based on sidescan data

UKHO Status: Live

2001 WA sidescan sonar interpretation:

The site was located outside the extents of the 2001 survey area.

2002 WA sidescan sonar interpretation:

The site was located outside the extents of 2002 survey area.

2008 WA interpretation of PLA multibeam data:

In 2008, a multibeam survey was undertaken over the site of the HMS *Aisha*. The wreck appears to be broken up and scattered with no particular orientation. The wreck site is roughly circular in shape and measures 45 metres north/south and 40 metres east/west (**Figure 1a**).

The general seabed depth adjacent to the wreck is around 18.2 metres, and the minimum target depth is 16.4 metres in the north-west area of the wreck (**Figure 1b**). This object is approximately 12 metres long (east/west) by 6 metres wide (north/south) and is 2 metres high. Five metres to the east of this object is another large object that measures approximately 5 metres (south-west/north-east) by 2 metres and is 1 metre high. Other than these objects, the wreckage is generally not upstanding more than 0.5 metres.

Approximately 15 metres south-east of the wreck are two items of outlying debris (**Figure 1c**). These items are lying 2.5 metres apart. One item measures approximately 3 metres by 2 metres by 0.4 metres and the other 2 metres by 1.5 metres by 0.3 metres.

2008 WA interpretation of PLA sidescan sonar data:

A sidescan sonar survey was undertaken in 2008 over the site of the HMS *Aisha*. The survey revealed a broken up wreck with items of outlying debris (**Figure 2**). The wreck measures approximately 52 metres by 44 metres by 2.8 metres, and is roughly circular in shape. The highest object appears to measure 3.8 metres by 1.2 metres by 2.8 metres.

Five items of outlying debris are visible. One of the objects lies 10 metres to the south of the wreck and measures 5.1 metres by 1.2 metres by 0.5 metres. There are two objects located 13 metres to the south-east; one measures 4.3 metres by 2.4 metres by 0.8 metres, and the other measures 1.9 metres by 0.4 metres by 0.5 metres. Nineteen metres to the east is another object that measures 5.4 metres by 0.6 metres by 0.3 metres. The final object lies 22 metres to the north-east and measures 6.7 metres by 1.3 metres by 0.3 metres.

4. SITE HISTORY

Build

The HMS *Aisha* was a British motor yacht built in Selby in 1934 and was originally named the *Wilna*. The yacht was made of steel and was 56 net tons and 117 gross tons. The vessel was 29.87 metres (98.0 feet) in length, with a breadth of 5.49 metres (18.0 feet) and a depth of hold of 2.53 metres (8.3 feet). The vessel had an oil engine with a single shaft, and horsepower of 480 BHP.

Ship's Name, Material, Rig, &c.	HMS <i>Aisha</i> (originally the HMS <i>Wilna</i> , until 1939) Steel motor yacht
Registration Number	163530
Registered Tonnage	
Gross:	117 gross tons
Under deck:	
Net:	56 net tons
Build Date	1934
By	
Where	Selby
Owners	1934–1938 William H. Collins, Wexham Park, Slough, Bucks. 1939–1940 Robert H. Turner, Greyfriars, Compton, Guildford, Surrey
Registered Dimensions, Deck Erections &c.	
Length	29.87m (98.0 ft)
Breadth	5.49m (18.0 ft)
Depth	2.53m (8.3 ft – in feet and tenths of a foot)
Quarter Deck	
Forecastle	
Bar keel (depth in inches)	
Port of Registry	London
Engines	Oil engine, single shaft
Boilers	
Horsepower	480 BHP
Engines built by	
Ballast	
Anchors and chains	

Use

The vessel was originally named the *Wilna*, and is listed by this name in the Mercantile Navy List and Maritime Directory from 1934 to 1939. From 1934 to 1938, the vessel was owned by William H. Collins, Wexham Park, Slough, Bucks. It is not known what the vessel was originally used for.

The vessel was purchased by Robert H. Turner, Greyfriars, Compton, Guildford, Surrey in 1939, and the vessel was renamed the HMS *Aisha* in 1940. In February 1940, the vessel was hired as a Harbour Defence Patrol Craft (HDPC) (Colledge 1989: 18).

Loss

On 11th October 1940, the HMS *Aisha* hit a mine and sunk in the Thames estuary (Colledge 1989: 18). No loss of life was reported at the time the vessel sank.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'possible' archaeological interest. The key points of interest are as follows:

- Despite earlier clearance, there are still scattered debris and upstanding features, indicating considerable remains on the seabed;
- In contrast to the well-known and well-researched ships from World War II, such as the aircraft carriers, battleships, corvettes, cruisers, destroyers, minesweepers and even converted trawlers, little information has been collated regarding the smaller vessels, such as the ones that patrolled the harbours; and therefore, this vessel could provide insight into a little-studied area.

6. CONSTRAINTS

No loss of life was reported when the vessel sank and therefore the possibility of the presence of human remains within the site is unlikely.

It is unknown whether the vessel was carrying armaments at the time of sinking, however, as a Harbour Defence Patrol Craft, it is probable that the vessel was carrying at least some light armament.

As the site has sections of wreck upstanding, it is possible that entanglement may be an issue if visiting the site with divers.

7. SCOPE OF FURTHER MITIGATION

Stage 1 Mitigation is intended to achieve a record that provides sufficient data to establish the extent, character, date and an indication of the importance of the site.

A level 1b record of the site has been achieved through geophysical survey and limited documentary research. The extents of the site have been established through multibeam bathymetry and side scan sonar survey undertaken specifically for archaeological purposes. The character and date of the site has been established through limited documentary research, and from this information the importance of the site is evident.

8. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will be cleared by mechanical means.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2008 multibeam data	WA
2008 sidescan data	WA

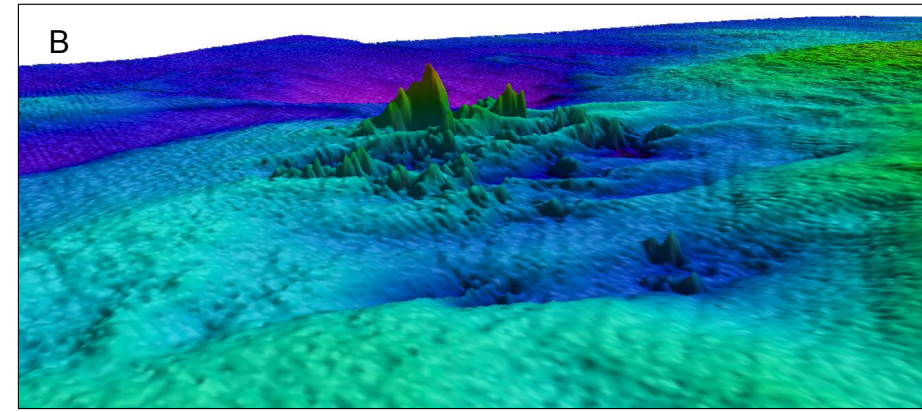
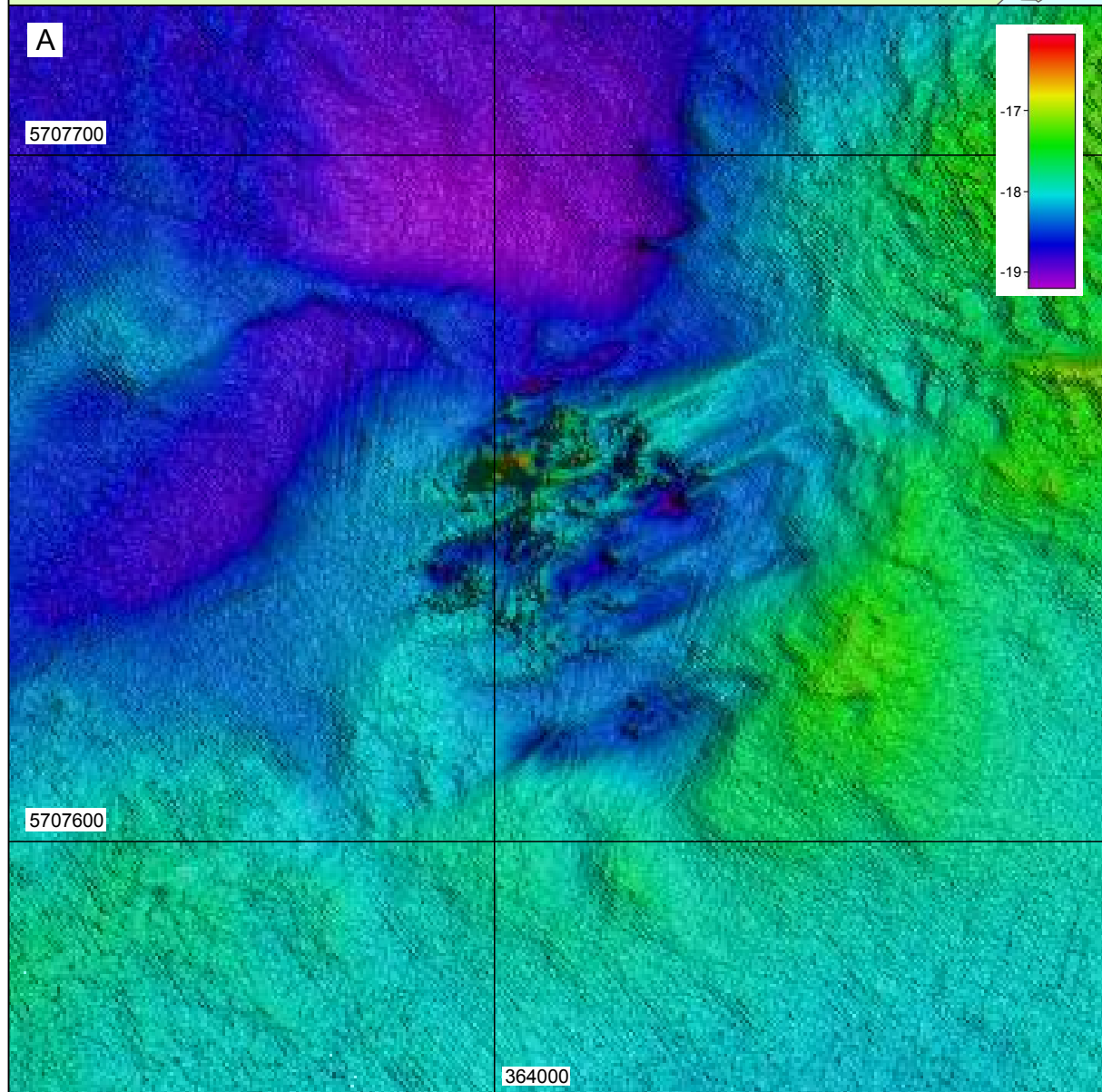
PAPER ARCHIVE

Material	Location
UKHO Report (1402)	WA
NMR Report (904791)	WA
Six printed images of the 2008 multibeam data	WA
Ten printed images of the 2008 sidescan data	WA

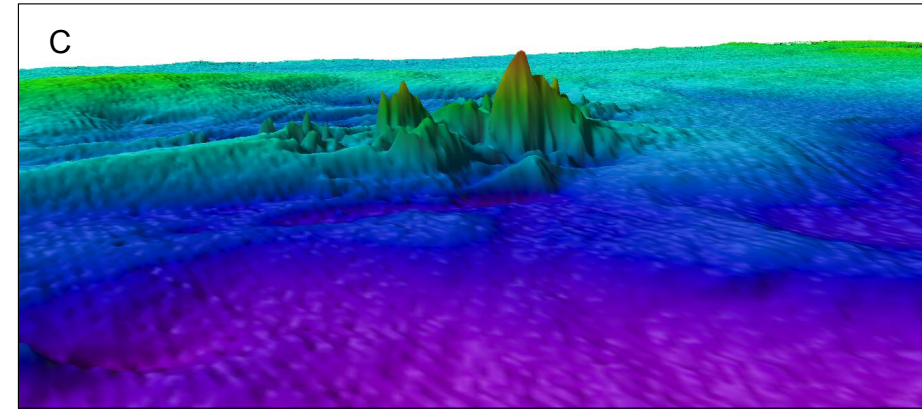
REFERENCES

1935 – 1940, *The Mercantile Navy List and Maritime Directory*

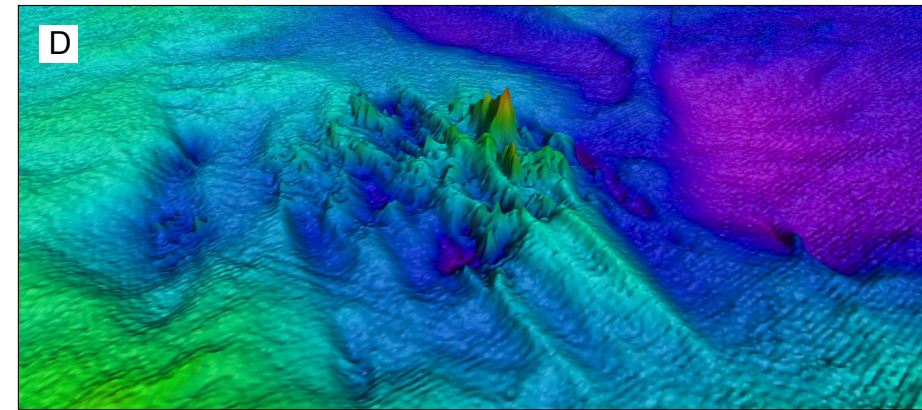
Colledge, J.J., 1989, *Ships of the Royal Navy*, Greenhill Books (2nd Edition).



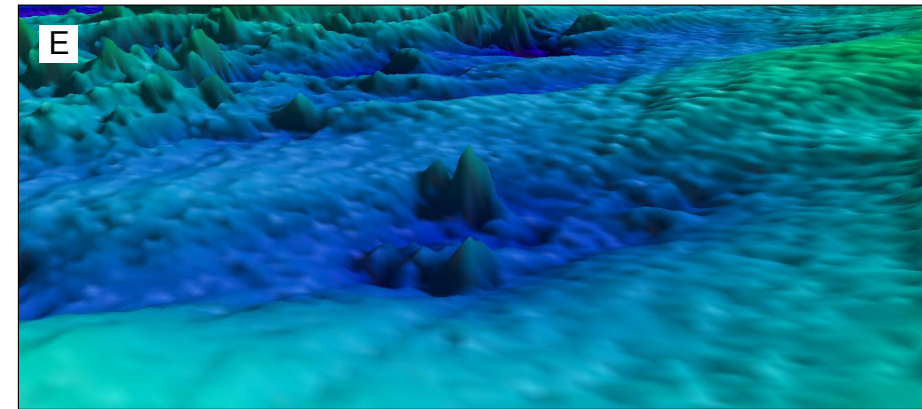
Oblique view from south.



Oblique view from north.



Oblique view from east.



Oblique view of south east debris from south.

Not to scale

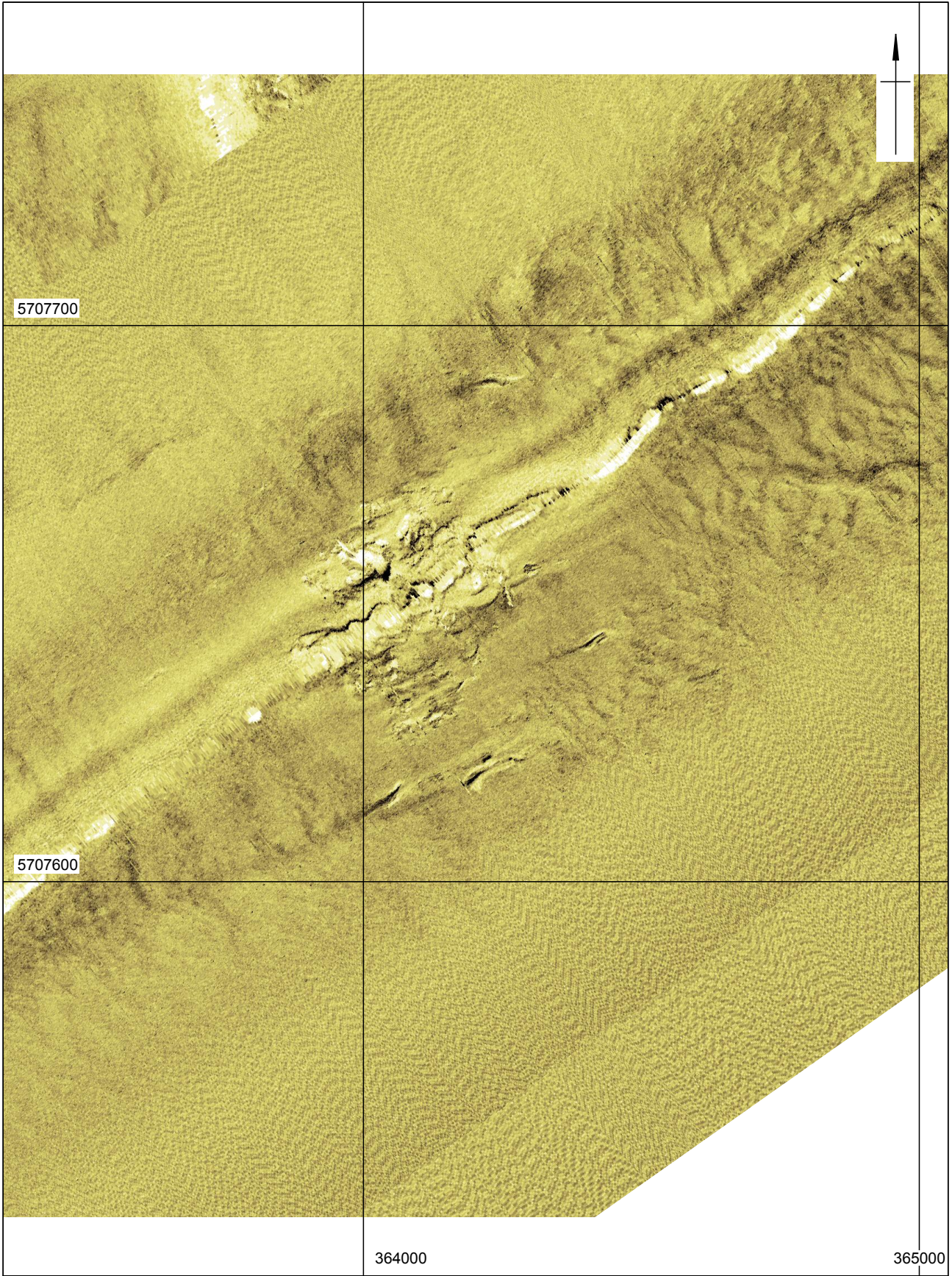



• Site location

Projection UTM WGS84 Z31N.

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Sidescan Sonar image of Site

Figure 2

**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5063.02
December 2007**

Site ID: 5063

Site Name: *HMT Amethyst* (T12); built as *Phyllis Rosalie* (FD24).

PLA Wreck No.: 201/ 78

Mitigation Group: 2.2.3 Site of possible archaeological interest, seaward of SR1

No. of Casualties: All crew saved

Vessel Type: Military (anti-submarine trawler)

Cause of Loss: Mined

Current Recording Status: Level 2

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the site; the summary begins with the wreck's loss and includes all forms of investigation to date:

1940	Vessel mined (24/11/1940);
1941	Mast reported showing 1 metre at low water at 51°30'45"N 01°02'57"E on 12/12/1940 (13/06/1941);
1941	A lightbuoy was installed 50 metres and 230 degrees from the wreck (13/06/1941);
1941	Wreck dispersed, clear to 9.75 metres. Buoy withdrawn. (13/10/1941);
1944	Wreck drift swept, clear at 12.65 metres, foul at 12.8 metres (10/03/1944);
1946	Wreck drift swept on the 6/10/1945. After dispersal the site was clear at 13.72 metres and foul at 14 metres (23/02/1946);
1961	Wreck swept clear at 14 metres, foul at 14.3 metres. Least E/S depth 18 metres, in a general depth of 20.1 metres and a scour depth of 22.3 metres (11/12/1961);
1968	Wreck located in charted position. Least E/S depth 15metres, in general 21.3 metres. A fair sonar contact (25/06/1968);
1973	Position amended to the south-west 13.7 metres (27/9/1973);
1975	Wreck examined at 51° 30'43"N 01° 02'54"E (OGB-using HIFIX). Site swept clear at 14 metres, foul at 14.3 metres. Least E/S depth 16.2 metres in a general depth of 19-20 metres and a scour depth 22 metres. The site is a large wreck and easy to locate. The scour lies mainly to the south west of site. (PLA wreck report no. 13/75 27/08/1975) (11/12/1975);
1992	Wreck examined at 51°30'44.1N 01°02'54.3E (OGB-using microfix). Site swept clear at 14.1 metres, least E/S depth 15.8 metres in general depth of 18.7 metres and a scour depth 22.4 metres. Retain as charted (20/05/1992);
1998	Wreck swept clear to 15.6 metres, foul at 15.9 metres. Sweep just touched at 15.9 metres;
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005);
2007	PLA site investigation using sidescan sonar (EG&G 272 dual frequency towfish), with WA in attendance (7-8/8/2007).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the site:

2005	UKHO (14092);
2005	NMR (904800);
2005	Port of London Authority, <i>Wreck and Obstruction Categorisation</i> ;
2006	Wessex Archaeology, Geophysical Analysis of 2005 multibeam (inclusive of one geo tiff and five tiff images);
2006	http://uboat.net/allies/warships/ship/6295.html .
2006	http://www.battleships-cruisers.co.uk/naval_trawlers.htm
2006	http://fleetwood-trawlers.connectfree.co.uk/antisub.html
2006	http://fleetwood-trawlers.connectfree.co.uk/phyllisrosalie.html
2007	Wessex Archaeology, Geophysical Analysis of 2007 sidescan sonar data (inclusive of one geo tiff and five tiff images).

3. SITE DESCRIPTION

Position (UTM) obtained from multibeam (point of wreck closest to channel):
364473.541 E 5708635.036 N.

Location: The site is located Seaward of SR1 92 metres from the northern edge of the dredged channel (**Figure 1**).

Bed Depth: 16.5 metres

Minimum Target Depth: 15.8 metres

Extent: 50 x 25 metres, 2.5 metres upstanding

UKHO Status – LIVE

2001 WA sidescan sonar interpretation:

The site was located outside the 2001 survey area.

2002 WA sidescan sonar interpretation:

The site was located outside the 2002 survey area.

2005 WA interpretation of PLA multibeam data:

The multibeam image shows a wreck lying upright on the seabed in a roughly oval shape with a large scour to the south (**Figure 1A-C**). The centre of the site appears to be enveloped by a sandbank up to the upper works of the vessel, with the stern and bow of the vessel protruding. The site is orientated north-north-west by south-south-east with little evidence of surrounding debris.

The wreckage is *c.* 50 metres long by 25 metres wide and 2.5 metres upstanding. The south eastern end of the vessel lies in a large scour hole which runs off at 90 degrees to the wreck. Although interpretation is difficult, the rounded shape of the anomaly to the south might suggest that this is the stern (**Figure 1C**). The scour is over 100 metres long, 25 metres wide and 3.5 metres deep. The total length of the scour extends beyond the area of data coverage (**Figure 1A**).

In the scour pit, 2 metres from the end of the vessel is a feature 2 metres in diameter and 1.6 metres upstanding. The deepest point of the scour is 23.62 metres (**Figure 1B**).

The tallest feature within the wreck is 6 metres long by 5 metres wide and 2.5 metres upstanding. The upper areas appear to have been cleared away (through dispersal) and show no distinct ship-like structures apart from a box shaped structure which is visible in the presumed stern of the vessel. This area protrudes out of the scour by 3.5 – 4 metres (**Figure 1A-C**).

2007 WA sidescan sonar interpretation:

The sidescan sonar data confirmed the information gathered from the multibeam data. The *Amethyst* site comprises a broken up wreck orientated north-north-west to south-south-east measuring 50 metres by 20 metres (**Figure 2**). The sidescan sonar data indicates that the wreck comprises numerous pieces of structure upstanding from the seabed lying parallel and obliquely to the length of the wreck. The highest point of the wreck is situated in the southern portion and measures 2.8 metres high. Generally, the wreck sits around 1 metre above the level of the surrounding seabed.

10 metres to the west of the centre of the wreck a thin rope/cable is observed and is approximately 9 metres long. Approximately 30 metres east of the site lies a small feature measuring 1.6 x 0.4 x 0.6 metres. It is possible that this is debris associated with the wreck site.

The scour to the south of the wreck observed on the multibeam was also observed on the sidescan sonar. The scour is orientated south-west to north-east indicating the general current direction.

4. SITE HISTORY

Build

HMS *Amethyst* was built as the Fishing trawler *Phyllis Rosalie* for the Boston Deep Sea Fishing and Ice Co Ltd, Fleetwood by Smith’s Dock Co Ltd, Middlesbrough in 1934 (Lloyds of London 1774-).

Smith’s Dock Co Ltd was formed in 1899 at North Shields. Shipbuilding began in 1910. Up to and through the First World War a large amount of small vessels, such as trawlers, tugs, whalers and coasters were built at the yard. In 1920/22 the arc welding technique was introduced into the company. Smith’s Dock Co Ltd continued to build smaller vessels in the Second World War. The famous Flower Class corvette was based on a design of this yard, the whaler Southern Pride. The yard finally closed gates in 1987 (Middlemiss 1993).

Phyllis Rosalie is listed in Lloyds Register of 1934 with the following specifications (Lloyds of London 1774-):

Steamer’s Name, Material, Rig, &c.	<i>Phyllis Rosalie</i> (renamed HMT <i>Amethyst</i> when requisitioned by the Admiralty in 1935) Ketch, 1 deck, cruiser stern, wireless, direction finder (wireless), echo sounding device
Registered Tonnage	
Gross:	433
Under deck:	369
Net:	162
Build Date	1934

By	Smith's Dock Co. Ltd., Middlesbrough
Where	Middlesbrough
Owners	Boston Deep Sea fishing Co. Ltd., South Bank, Middlesbrough (B.A. Parkes, manager)
Registered Dimensions, Deck Erections &c.	
Length	157.3ft (48m)
Breadth	26.4ft (8m)
Depth (in feet and tenths of a foot)	12.3ft (3.7m)
Quarter Deck	86ft (26.2m)
Forecastle	29ft (8.8m)
Bar keel (depth in inches)	7½ in (0.19m)
Port of Registry	Fleetwood, British
Engines	Triple expansion 3 cylinder steam engine Cylinder diameter and length of stroke in inches: 14, 23½, & 40½ - 27
Boilers	1 single ended boiler 3 corrugated furnaces Area of grate surface: 60sqft Heating surface area: 2500sqft
Horsepower	137 Nominal Horse Power
Engines built by	Smith's Dock Co. Ltd., Middlesbrough
Ballast	Double bottom, 67ft long with a capacity of 58 tonnes Side tanks in engine room After peak tank 8 tonnes
Anchors and chains	Proved at a machine recognised by the committee of Lloyd's registers

Further detail is given in the Lloyds Survey Report of 1934, which also contains a plan of the vessel's boiler (Lloyds Survey Reports 1934). The ship plan collection in the National maritime Museum contains a general arrangement plan of *Phyllis Rosalie* as built, before she was converted into a naval trawler.

Plan No	Scale	Content
SDK/964/SDK26/1	1:96	Profile & decks
SDK/964/SDK26/2	1:24	Lines
SDK/964/SDK26/3	n/a	Boiler. 1933 (blueprint) LSR in Box W/1292

Use

Phyllis Rosalie was delivered to Fleetwood in 1934. In the same year she made the port's best single trip landing (1611 x ten-stone boxes). In 1935 *Phyllis Rosalie* beat her previous record by landing 1796 x ten-stone boxes. The trawler represented Fleetwood at the King George V Silver Jubilee Spithead Review and the skipper, W. Holmes was presented to the King (The Bosun's Watch 2003). A photograph shows *Phyllis Rosalie* as a fishing trawler in 1935 (The Bosun's Watch 2003) (**Figure 3A**) In November 1935 the vessel was purchased by the Admiralty. The register was closed and no further Lloyds Surveys conducted (Lloyds Survey Reports 1934). The vessel renamed HMS *Amethyst* and classed as a Gem Group Trawler. The Gem group consisted of 15 trawlers of 568 to 641 tons, purchased from trade in two batches in 1935 and 1939 respectively. HMS *Amethyst* was one of the ten trawlers forming batch one of this group. All trawlers were converted for anti submarine service. They were fitted with ASDIC and armed with a single 4in gun on the bow and depth charges at the stern. No plans of the conversion are preserved, but a photo shows HMS *Amethyst* as anti submarine trawler during World War Two (Toghill 2003 and Page 2002) (**Figure 3B-C**). The bow gun and depth charge rails can clearly be seen. The vessel was also fitted with a higher enclosed bridge, presumably to increase the field of view.

The logbooks for HMS *Amethyst* are preserved for the pre-war years in the National Archives (Admiralty: and Ministry of Defence: Navy Department: Ships' Logs 1936 Feb 20-Mar 24), (Admiralty: and Ministry of Defence: Navy Department: Ships' Logs 1938 Sept 26-Oct 13). According to logbook entries, the vessel was mainly occupied with fleet and anti submarine exercises before it became a tender to the submarine depot ship *Cochrane* in Rosyth in 1939. A typical logbook entry would read:

24th Feb 1936 at Portland:

09:45 Cast off from coaling jetty.
09:53 Called action stations.
10:05 Dispersed stations.
10:12 Dropped target.
10:16 Commenced firing, range 1000.
10:40 Ceased fire.
10:45 Picked up target and proceeded to harbour

In 1940 HMS *Amethyst* took part in the Dunkirk operation (NMR, Warship Histories). According to the Dunkirk List (Ref), the trawler carried out patrols in May and June 1940, and came under fire from the shore on June 2, 1940.

Loss

On November 24, 1940 HMS *Amethyst* was mined in the Barrow Deep. The sinking of the trawler is described in the book *Trawlers go to War*:

"... Like *Amethyst*, an asdic trawler operating from Parkeston Quay on patrol for the East Coast Convoys. Steaming in the Barrow Deep on a beautifully fine and quiet November day she hit one of the very early acoustic mines- Hitler's latest "secret weapon". When the ship blew up at the stern, wounding seven men, all thought they had been bombed. *Amethyst* took ten minutes to sink, which allowed everyone to get off safely. They were picked up by the trawler *Le Tiger* and taken to Southend Pier, where, adding insult to injury, they were promptly taken in charge by suspicious police, who had earlier arrested the survivors of a little Dutch schoot which had also hit a mine and sunk. It took *Amethyst*'s crew half an hour to convince the police of their identity before they were released ..." (Lund and Ludlam 1971).

Out of the ten trawlers in batch one of the Gem group, five sank during the war. Two of the five trawlers in batch two were also lost (Toghill 2003).

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'possible' archaeological interest. The key points of interest are as follows:

- Despite earlier dispersion, there appears to be extensive and coherent remains present;
- There are likely to be many other wrecks of steam trawlers and anti-submarine trawlers around the world, but few have been subject to archaeological recording;
- The wreck is likely to contain evidence of the original construction and use of the vessel, and of the subsequent re-fitting of the vessel for military purposes;
- The wreck may contain evidence of life on board the vessel at the time of loss;

- The wreck has an interesting history as a fishing trawler, and then in military use, and is likely to have documentary and other associations with Middlesbrough, Fleetwood and the Thames.

6. CONSTRAINTS

The vessel was armed with a deck gun, and possibly with machine guns and depth charges. Ordnance may be present on the wreck site.

As the site is upstanding by 2.5 metres it is possible that entanglement may be an issue when investigating the site with divers.

7. SCOPE OF FURTHER STAGE I MITIGATION

Stage 1 Mitigation is intended to achieve a Level 2 record of the site, which is a record that provides sufficient data to establish the extent, character, date and importance of the site.

Level 2 recording has been achieved for this site through geophysical surveys and documentary research. The extent of the site, as far as visible above the seabed, has been established through multibeam and sidescan sonar survey. Character, date and importance of the site are evident from the documentary research. Further archaeological diving is not necessary.

8. OUTLINE OF STAGE II MITIGATION

The wreck lies 92 metres outside the dredged channel. The site will be cleared by grabbing. No further mitigation is required.

9. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE ACTIVITIES

The site will have been cleared by grabbing.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the provision of any material conservation and deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2005 multibeam data	WA
2007 sidescan sonar data	WA

PAPER ARCHIVE

Material	Location
UKHO Report (14092)	WA
NMR (904800)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures	WA
Five printed images of the 2005 multibeam data	WA

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Middlemiss, N. L. (1993). *British shipbuilding yards 1: North-East Coast*. Newcastle-Upon-Tyne: Shield Publ.

Page, D. (2002), *Navyphotos*. <http://www.navyphotos.co.uk/amethyst%20trawler.htm>.

The Bosun's Watch (2003), *The Fleetwood Trawler Phyllis Rosalie*. www.fleetwood-trawlers.connectfree.co.uk/phyllisrosalie.html.

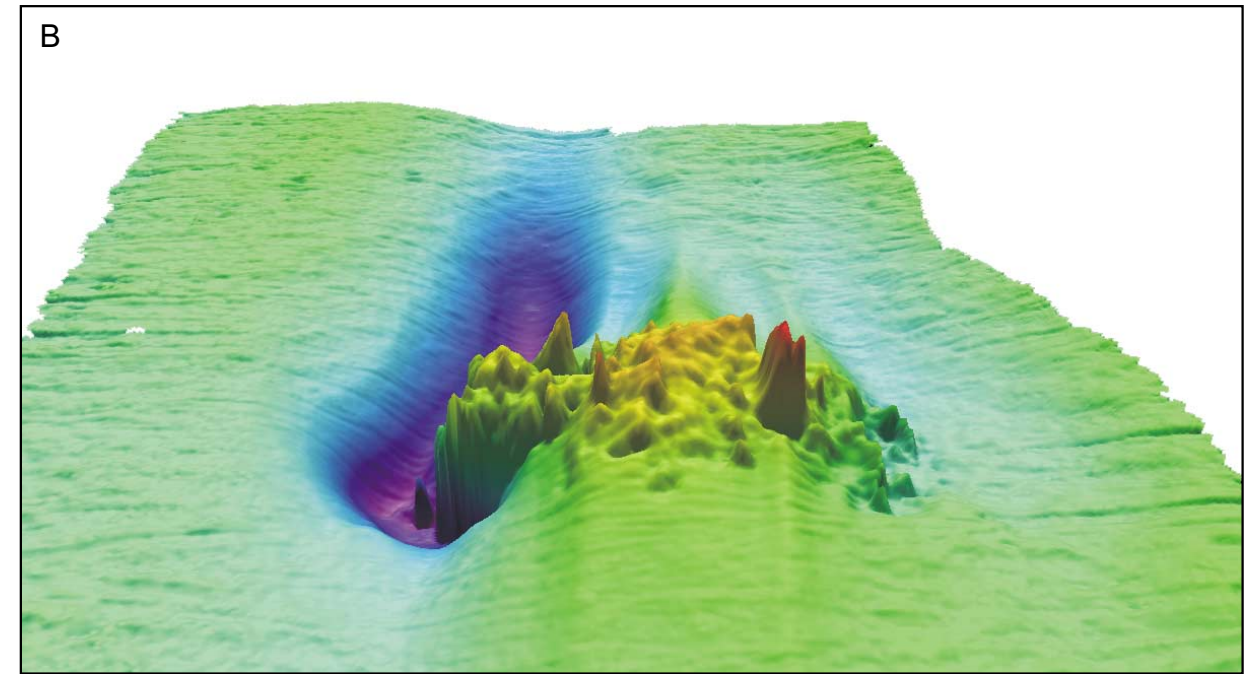
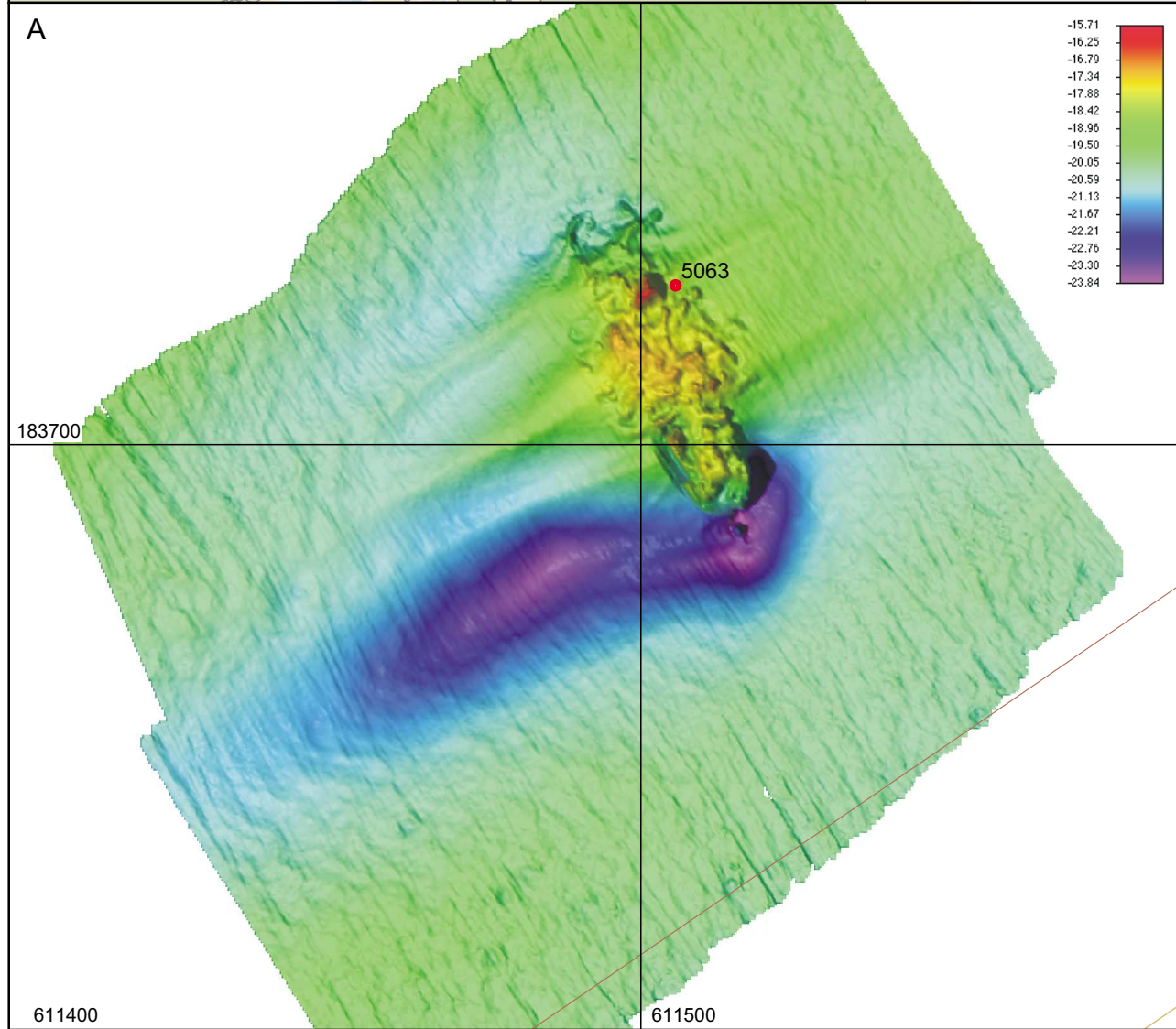
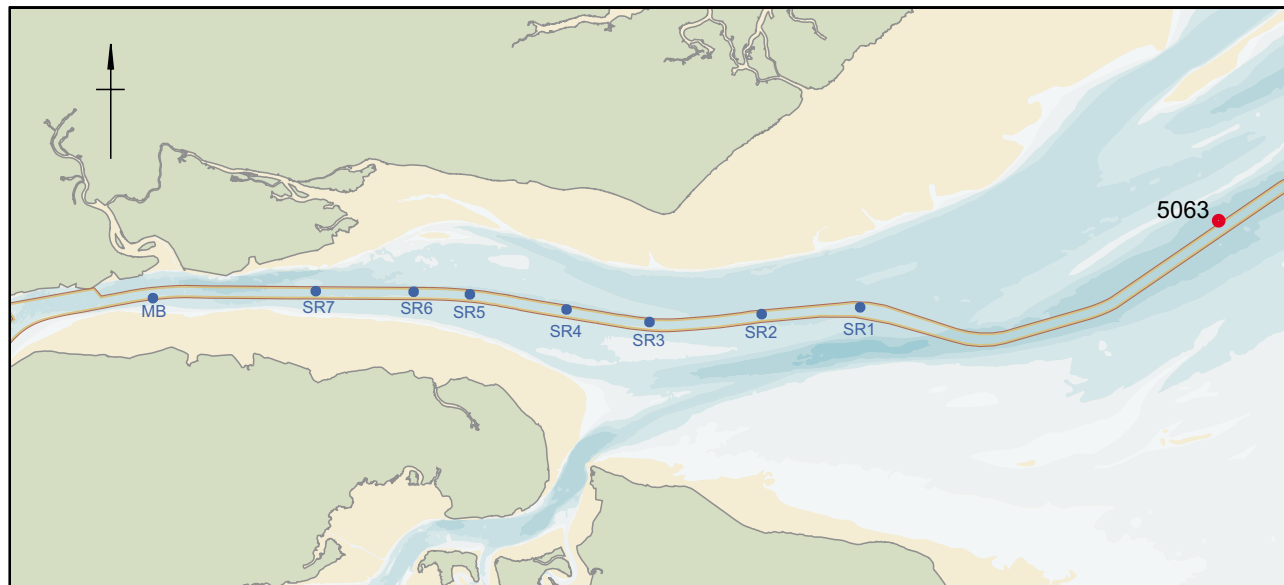
Toghill, G. (2003). *Royal Navy trawlers 1: Admiralty vessels*. Liskeard: Maritime Books.

NMR, Warship Histories, *HMS Amethyst*.

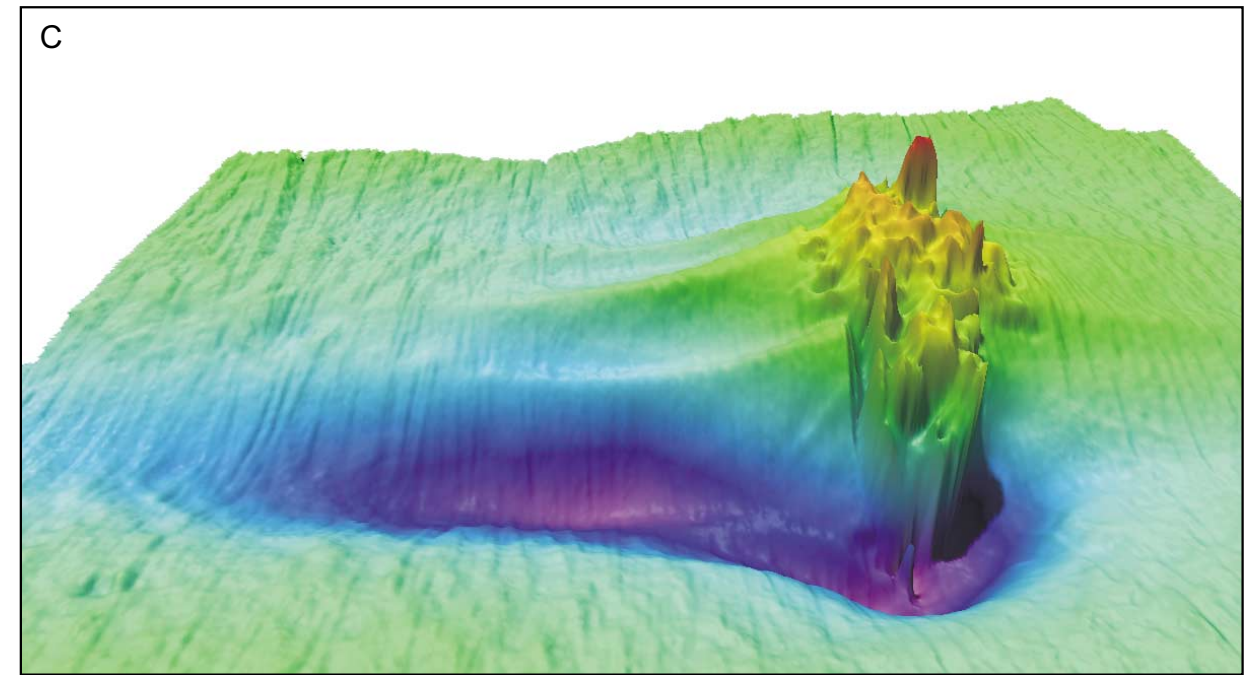
NMR LSR 106266, Lloyds Survey Reports, *Phyllis Rosalie*, 1934.

TNA ADM 53/101095, Admiralty: and Ministry of Defence: Navy Department: Ships' Logs, *Amethyst*, 1938 Sept 26-Oct 13.

TNA ADM 53/94739, Admiralty: and Ministry of Defence: Navy Department: Ships' Logs, *Amethyst*, 1936 Feb 20-Mar 24.



Oblique view from north east.



Oblique view from south east.

Not to scale

- Site location
- Channel marker buoy
- Dredging limits
- 50m buffer on dredging limits



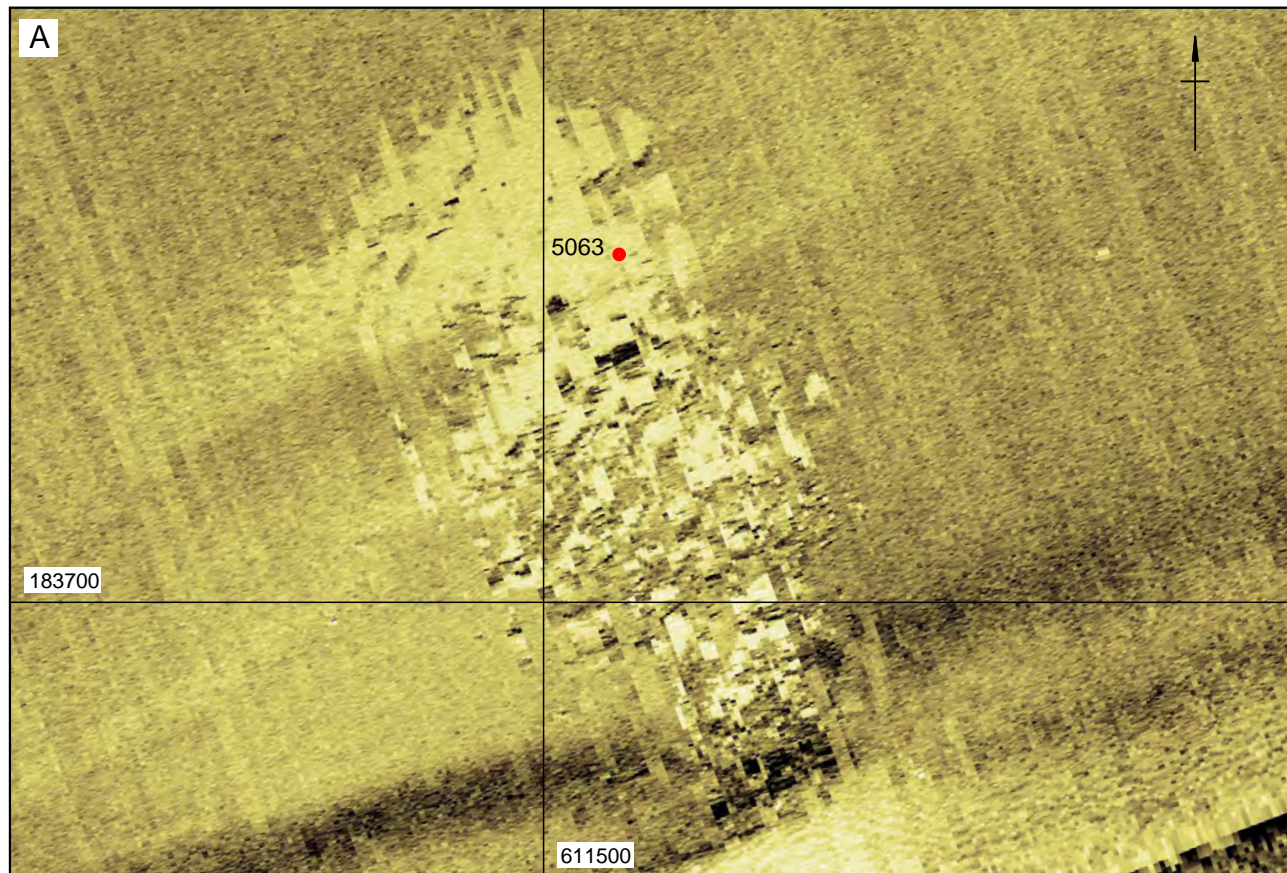
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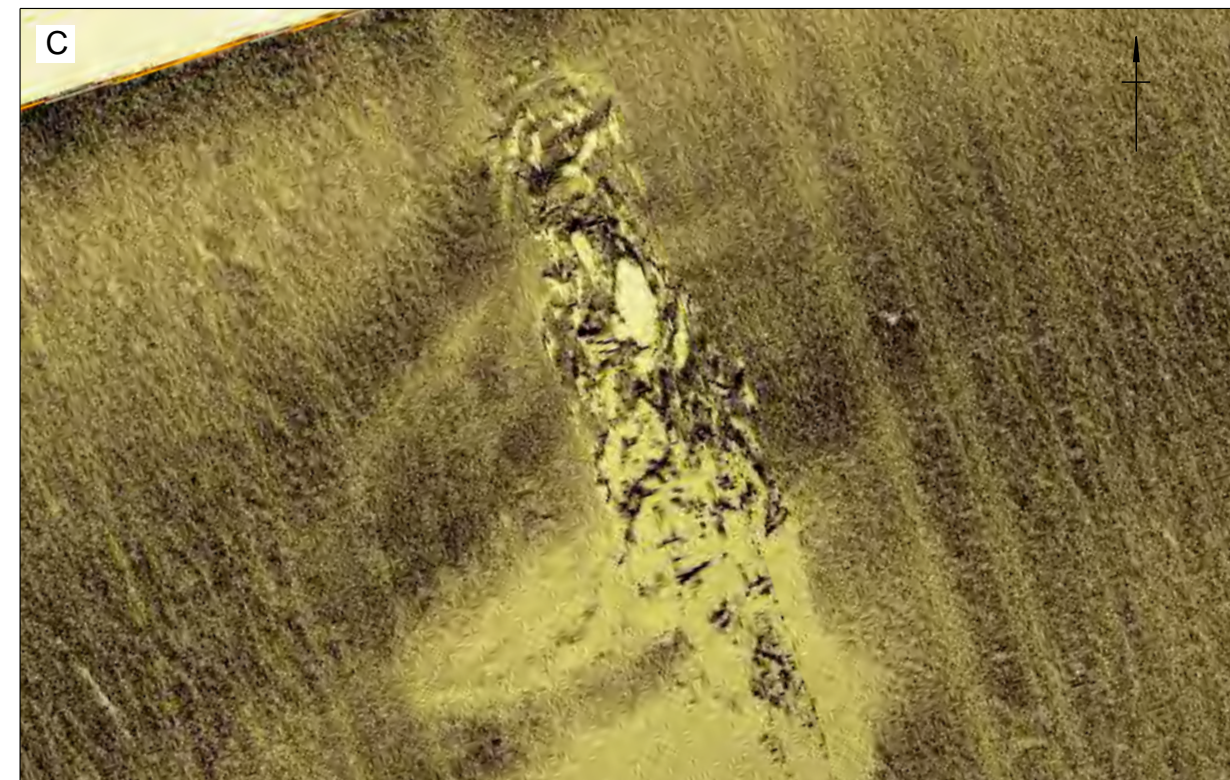
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Location and Multibeam data for Site 5063.

Figure 1



Not to scale



Not to scale

● Site location



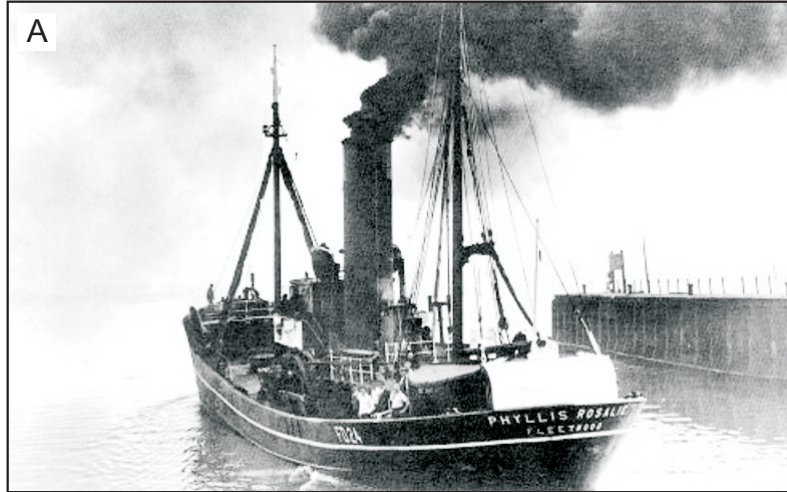
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Sidescan Sonar image of Site 5063.

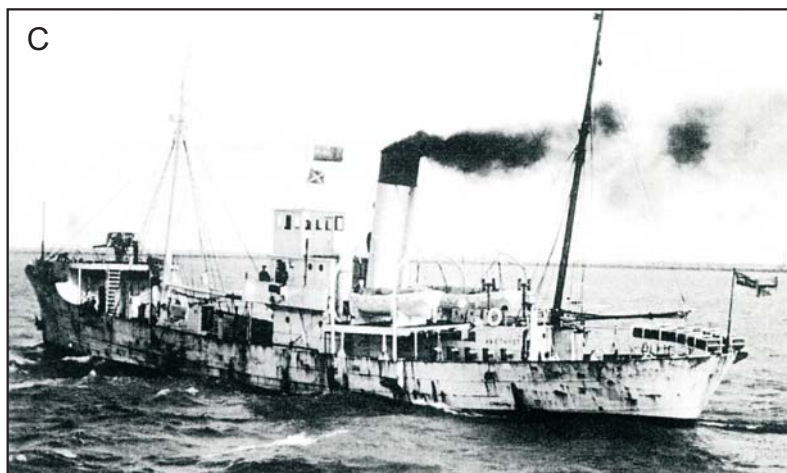
Figure 2




Phyllis Rosalie (The Bosun's Watch 2003).



HMS Amethyst.



HMS Amethyst showing signs of wear.

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**LONDON GATEWAY
WRECK CLEARANCE: ARCHAEOLOGY**

**CLEARANCE MITIGATION STATEMENT
Second Draft**

**WA Ref: 61209.5070.02
December 2007**

Site ID: 5070; 7209

Site Name: *MV Ryal*

PLA Wreck No.: 202/4

Mitigation Group: 2.2.3 - Site of possible archaeological interest, seaward of SR1

No. of Casualties: 9 reported deaths

Vessel Type: Commercial cargo vessel

Cause of Loss: Mined during World War II

Site **5070** is the remains of the wreck *MV Ryal*, it appears to be relatively coherent in shape with scattered debris.

1. INVESTIGATIONS TO DATE

The following activities have been undertaken on the sites; the summaries begin with the discovery of the sites and include all forms of investigation to date:

Site 5070

1940	<i>MV Ryal</i> sunk by mine (24/11/1940);
1941	Dangerous wreck located at approximate position 51° 31'15" N 01° 04'45" E (22/1/1941);
1945	Wreck dispersed, clear at 13.72 metres (20/9/1945);
1945	Wreck drift swept 30/9/1945, clear at 14 metres, foul at 14.33 metres. Position 51° 31'23" N 01° 04'36" E (18/10/1945);
1954	Wreck drift swept by <i>Shackleton</i> on 23/4/1954. Clear at 14.62 metres, foul at 14.94 metres in general depth of 19.8 metres. Seabed grey mud. Length 30.5 metres, lying NE/SW (10/9/1954);
1973	Wreck clear at 14.6 metres, foul at 14.94 metres. Least E/S depth of 17.22 metres in general depth of 19.5 metres and a scour pit with a depth of 22 metres. Position 51° 31'23" N 01° 04'35" E (fixed by HI-FIX). The site lies NE/SW. The highest point is at the NE end and is approximately 45 metres long. (11/10/1973);
1990	National Grid Co-ordinates 613416 E 185007 N (9/4/1990);
2001	Emu sidescan sonar survey (29/03/2001);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005).
2006	http://www.bpears.org.uk/NE-Diary/SindexA.html

Site 7209

2001	Emu sidescan sonar survey (29/03/2001);
2005	PLA site investigation using Reson 8125 multibeam system, with WA in attendance (06/12/2005).

2. SUMMARY OF AVAILABLE DATA

The following sources were used to collate information on the sites:

2001	EMU side scan survey data
2001	Wessex Archaeology, Assessment of Effects Archaeological Heritage: Inter-tidal and Marine in respect of the proposed development of London Gateway
2005	UKHO (14124)
2005	NMR (904811)
2005	Wessex Archaeology, Geophysical Analysis of 2005 multibeam, inclusive of: one geo tiff and four tiff images.
2006	Wessex Archaeology, Geophysical Analysis of 2005 multibeam, inclusive of: one geo tiff and five tiff images

3. SITE DESCRIPTION

Site **5070** is located 1 mile southwest of Knob Light Vessel seaward of Sea Reach No. 1 and 76 metres north of the dredged channel (**Figure 1**). Site **7209** is located in the middle of the dredged channel, 73 metres to the south east of **5070**.

Site	Position (NGR)	Position derived from:	Dredged depth (metres)	Minimum target depth (metres)	Site extent (metres)	UKHO status
5070	613412.25 E 184986.83 N	2005 multibeam	19	14.6	40 x 20 x 3	Live
7209	613490.22 E 184954.43 N	2005 multibeam	22	22.3	2.5 x 1.5 x 0.35	Not listed with the UKHO

Site 5070

2001 WA sidescan sonar interpretation:

The site consists of an area that contains distinctive reflectors (**Figure 2**). The NGR position is given as 613437 E 185005 N. The anomaly is 20 long by 25 metres wide and no length of shadow was recorded. The tiff file created was referenced target 83-84.

2002 WA sidescan sonar interpretation:

The coverage of the 2002 sidescan sonar data does not extend to this part of the channel.

2005 WA interpretation of PLA multibeam data:

On the multibeam the site is located emerging from the edge of a sandbank that demarks the topographic edge of the shipping channel (**Figure 1**). The topographic edge of the channel is located 90 metres north of the charted navigation channel at this point edge. The sites emergence out of the sandbank (the extent of which is currently unknown) suggests buried debris may exist on the upper edge of the sandbank.

The wreck is rectangular in shape and orientated north east, south west. It is 45 metres long by 20 metres wide and is 3 metres upstanding on the north-eastern end, three scour pits are located to the south east of the wreck.

The middle scour pit is 9 metres to the south-south-east of the main wreck and contains an upstanding feature. The feature is 2 metres in diameter and 0.7 metres upstanding from the base of the surrounding scour (**Figure 3A**). The scour pit is 10 metres long, 5 metres wide and 0.7 metres deep.

To the north east of this feature is the second scour pit, it is 20 metres long, 10 metres wide and 0.2 metres deep and is located at the base of the slope. To the south west of the middle scour pit is the third scour pit, which is 12 metres long by 5 metres wide and 0.1 metres deep (**Figure 3A**).

On the northern side of the wreck a feature is located 6 metres from the main site. The feature is 2.5 metres long, 1.5 metres wide and 0.1 metres upstanding (**Figure 3A**).

Twenty metres north-east from the main site is an area of debris. One of these features is in a scour pit (**Figure 3B**), the feature is 2.5 metres long, 1.5 metres wide and 0.3 metres upstanding. The scour surrounding the feature is 8 metres long, 4 metres wide 0.4 metres deep. This feature appears to be a possible continuation of other similar linear features approximately 12 metres from the north-east end of the wreck (**Figure 3B**). This feature is 4 metres long, 1.5 metres wide and 0.2 metres upstanding. Smaller clusters of objects are visible 5 metres to the south of this feature (**Figure 3B**).

Site 7209**2001 WA sidescan sonar interpretation:**

The site consists of a small target with possible linear features with a possible mark 10 metres north. The NGR position is given as 613504 E 184964 N. The anomaly is 2 metres long by 2 metres wide and no length of shadow was recorded. The tiff file created was referenced target 83-84.

2002 WA sidescan sonar interpretation:

The coverage of the 2002 sidescan sonar data does not extend to this part of the channel.

2005 WA interpretation of PLA multibeam data:

Site **7209** (**Figure 1**) is located 71 metres south east from the north east end of **5070**. The feature is located in a scour which is 10 metres long, 6 metres wide and 0.6 metres deep. The feature itself is 2.5 metres long, 1.5 metres wide and 0.35 metres upstanding. To the north, north east of **7209** is a small upstanding feature (**Figure 4**). It is 0.2 metres upstanding and has a diameter of 2 metres. It is suggested site **7209** is debris associated with wreck **5070**.

4. SITE HISTORY

The *MV Ryal* was lost on the 21st November 1941 after hitting a mine one mile south-west of the Knob Light Vessel. The vessel was lost whilst en-route to Middlesbrough carrying a cargo of 350 tonnes of steel. Nine members of the crew perished as a result of the sinking.

Length	39.6m
Breadth	7m
Draft	3.4m
Tons (Gross)	367

Salvage and Clearance

The *MV Ryal* was lost in 1941, since this time there have been various reports of clearance works carried out on the site (**5070**). The wreck was first dispersed in September 1945 to a depth of 13.72 metres, it was then drift swept to a depth of 14 metres in October 1945. The wreck was further drift swept in 1954 to a depth of 14.62 metres. The site was surveyed again in 1973, 1990, 2001 and 2005 but no further clearance work was carried out.

Site **7209** was first located in 2001 during a sidescan sonar survey, and again in 2005 during a multibeam bathymetric survey. There has been no reported clearance / salvage works carried out to date.

5. ARCHAEOLOGICAL INTEREST

This site has been rated as of 'possible' archaeological interest. The key aspect of the site that have lead to the above rating are:

- Despite earlier clearance, there appears to be extensive and coherent remains present;
- The wreck may contain evidence of life on board the vessel at the time of loss;
- Its use in wartime may have led to changes in structure or design that may result in a unique example of such a vessel;
- It is likely to have documentary and other associations with Newcastle, the vessel's home port.

6. CONSTRAINTS

There were nine reported deaths on this vessel. It is therefore likely that there will be issues with human remains. The vessel although commercial in trade was a war time loss and thus the potential for ordnance should not be ignored.

7. SCOPE OF FURTHER STAGE MITIGATION

Site **5070** is located 76 metres outside the dredged channel and will therefore be avoided and not impacted by the scheme. No further mitigation is required.

**8. ANTICIPATED SITUATION AT CONCLUSION OF CLEARANCE
ACTIVITIES**

Site **5070** will be avoided by the scheme and remain *in situ*.

A post fieldwork program will be required to assess, analyse and publish the results of the mitigation, to include the deposition of the paper, digital, and material archive.

ARCHIVE**RECOVERED MATERIAL**

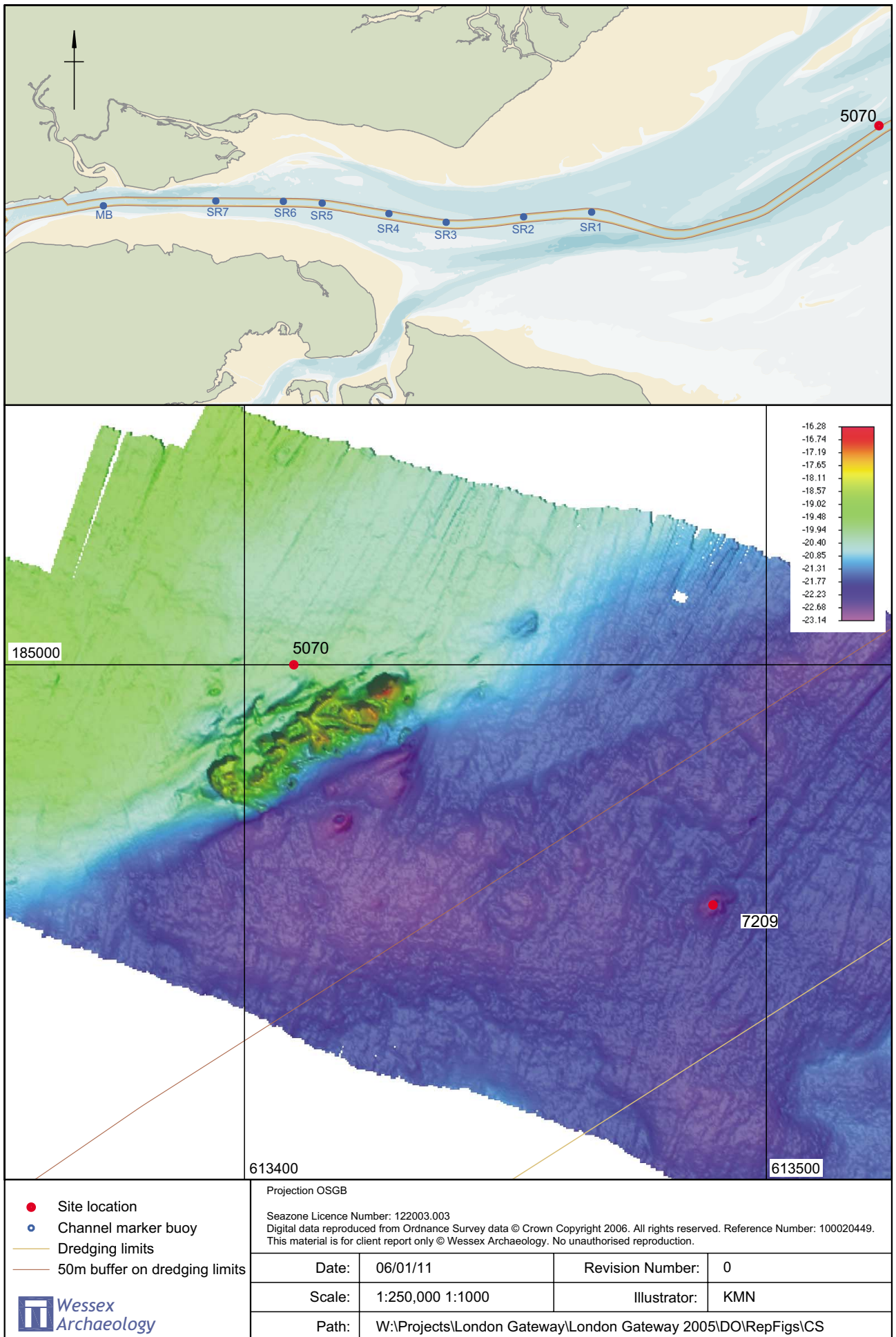
No material has currently been recovered from the site.

DIGITAL ARCHIVE

Material	Location
2001 side scan and magnetometer data	WA
2005 multibeam data	WA

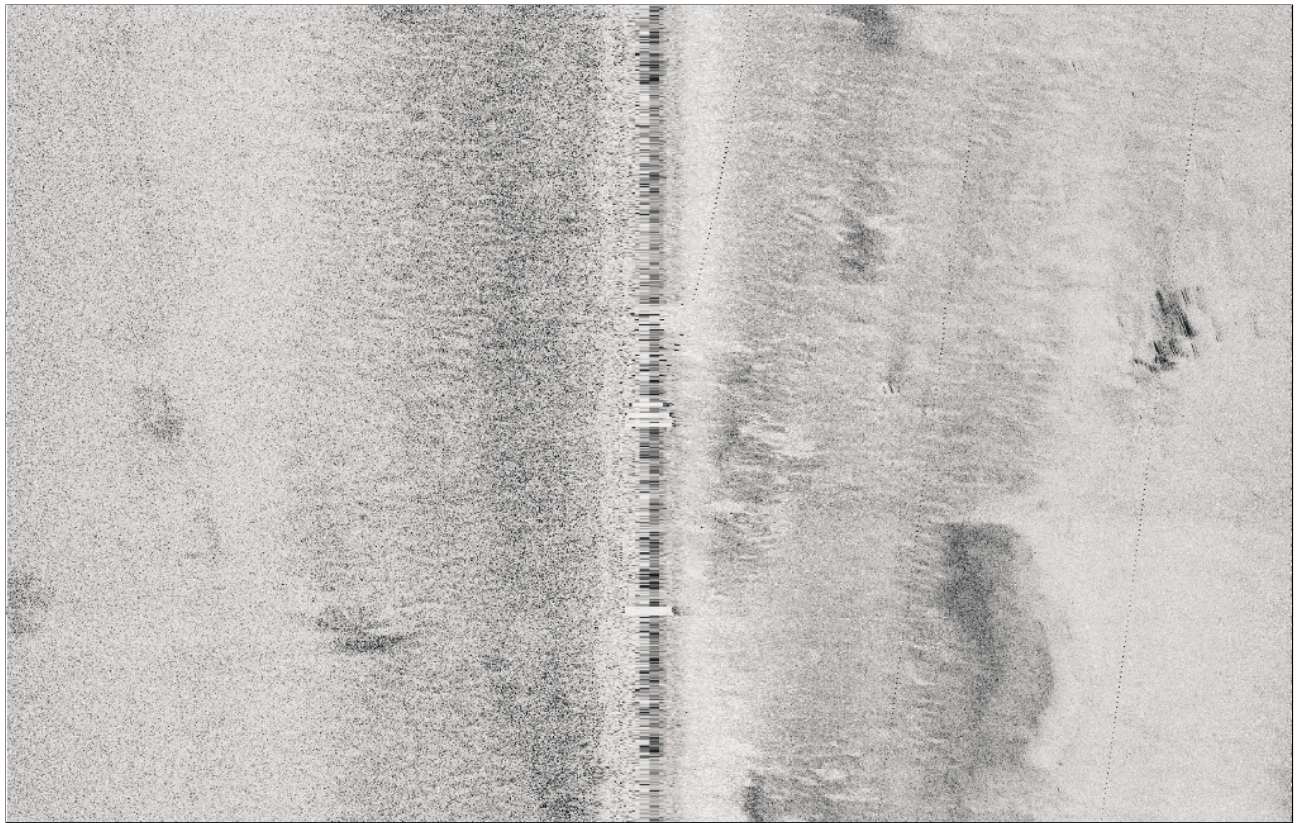
PAPER ARCHIVE


Material	Location
UKHO (14124)	WA
NMR (904811)	WA
Port of London Authority, 2005, <i>Wreck and Obstruction Categorisation Report</i> , includes PLA multibeam and pseudo side scan screen captures;	WA
Wessex Archaeology, 2001 Assessment of Effects Archaeological Heritage: Intertidal and Marine in respect of the proposed development of London Gateway	WA
One printed image of 2001 sidescan survey data	WA
Nine printed images of the 2005 multibeam data	WA



Location and Multibeam data for Site 5070.

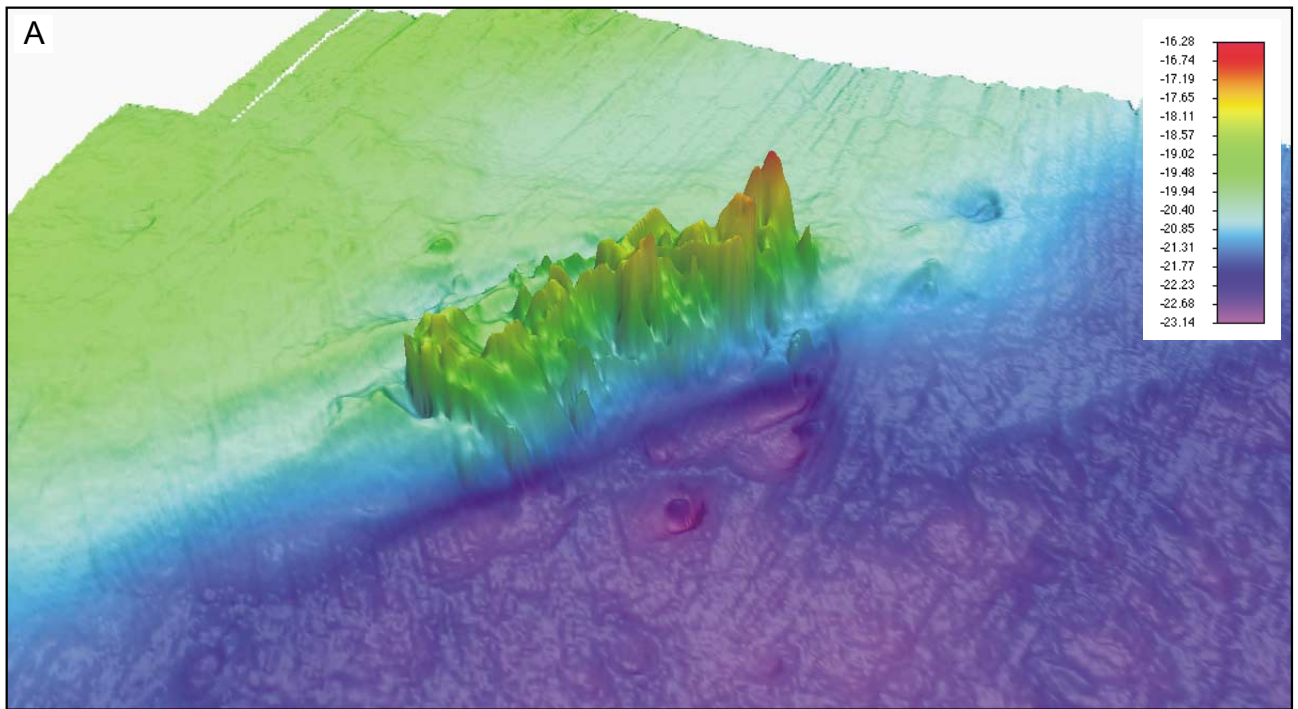
Figure 1



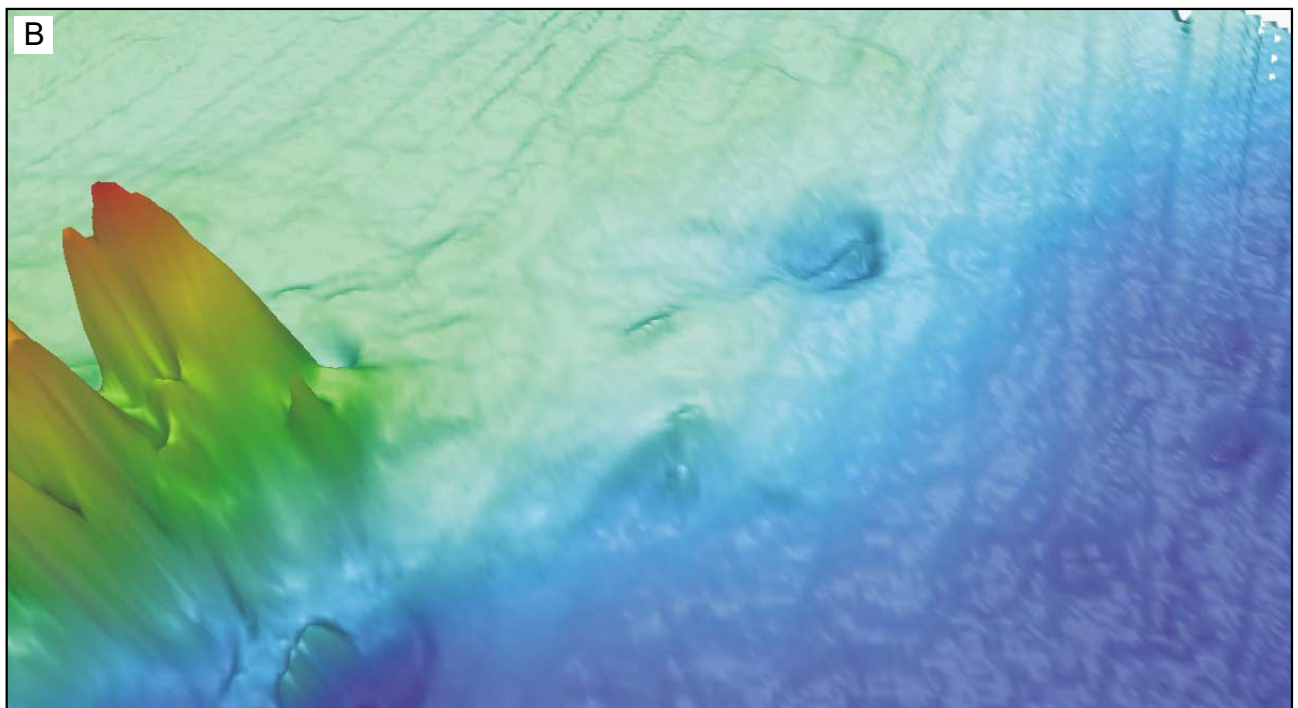
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	Date:	21/02/06	Revision Number:	0
	Scale:	N/A	Illustrator:	KMN
	Path:	W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS		

Sidescan Sonar image of Site 5070.


Figure 2




Oblique view from south.



Oblique detail view from south.

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	Path:	W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS		



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	Date:	21/02/06	Revision Number: 0
	Scale:	N/A	Illustrator: KMN
	Path:	W:\Projects\London Gateway\London Gateway 2005\DO\RepFigs\CS	

Multibeam data for Site 7209.

Figure 4