

SHORELINE SURVEYS LIMITED

HYDROGRAPHIC – GEOPHYSICAL – TOPOGRAPHIC

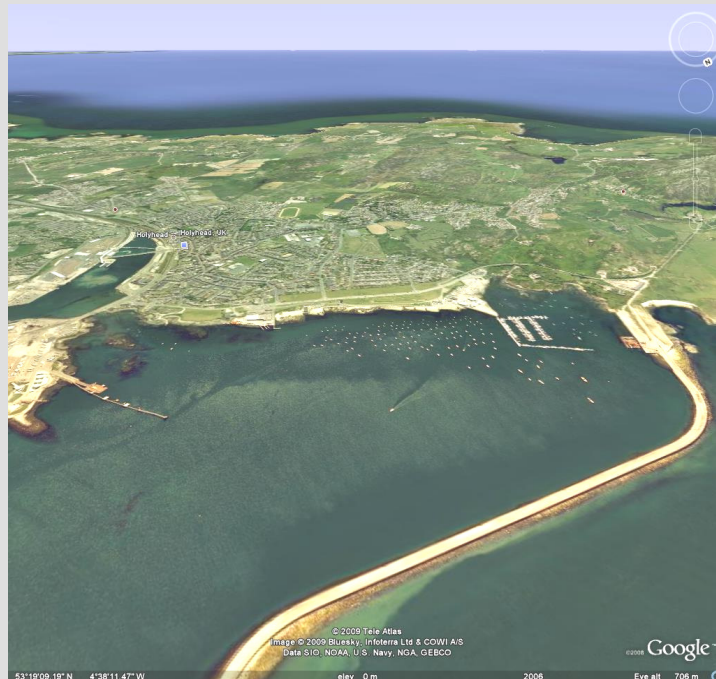
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SURVEY REPORT

HOLYHEAD HARBOUR INVESTIGATIONS

SIDE SCAN SONAR SURVEY



PREPARED FOR:

AXIS

MARCH 2010

Reference: J500_SSS_REPORT

**Compiled by: E M J Foote BSc
Version 1.0**

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1. **INTRODUCTION**

Axis (in conjunction with Black & Veatch Limited acting as consultants for the survey) contracted Shoreline Surveys Limited to execute bathymetric and sub-bottom profiling surveys within Holyhead Harbour, Anglesey. Although not contracted to do so Shoreline Surveys Limited executed a side scan sonar survey within the defined survey area. Shoreline did this for two reasons. Firstly to assist the geophysicist in his interpretation of sea seabed conditions and secondly to speculatively collect the data in the event that it would subsequently be required.

The survey took place on Wednesday 13th January in sea conditions ideal for the survey.

This report describes the survey methods employed and presents the results obtained.

2. **SCOPE OF WORK**

2.1. **General**

Side scan sonar area coverage is illustrated within the drawing J500_01.

2.2. **Navigation System**

- Minimum absolute horizontal accuracy of hydrographic positioning equipment: +/-0.5 metre.
- Minimum relative horizontal accuracy of hydrographic positioning equipment: +/- 0.05 metre.

2.3. **Side Scan Sonar Survey**

- A towed side scan sonar system was used to execute the survey.
- Survey lines were ran at 40 and 60 metre intervals (50 and 75 metre range respectively).
- The side scan sonar frequency was 325 kHz.

2. 4. Deliverables

- This additional survey report.
- Three paper copies of one survey drawing.
- A digital copy of one AutoCad drawing.
- A digital copy of one AutoCad drawing in PDF format.
- Target list (contained within this report).
- All digital data has been emailed to the client.

3. METHOD

3. 1. Positioning

A Trimble RTK Global Positioning System (RTK DGPS) enabling sub-decimetre accuracy in the horizontal and vertical planes was used for positioning all surveys. Differential corrections were received via the Leica SmartNet real-time RTK service.

Positional data was collected at five time per second. Positional data was electronically interfaced (RS232 via serial connections) into all other survey systems ensuring the achievement of an identical time base.

3. 2. Side Scan Sonar

The layback distance to the towfish was accounted for within the data collection survey program.

Further details of equipment specifications are given in Section 4.

4. EQUIPMENT SPECIFICATIONS

4.1. Navigation System

Manufacturer:	Trimble
Product name:	SPS751 MAX (base and rover)
Differential corrections:	Leica SmartNet
Absolute horizontal accuracy:	+/- 0.05 metre
Relative horizontal accuracy:	+/- 0.05 metres
Relative vertical accuracy:	+/- 0.05 metres
Channels:	12

4.2. Side Scan Sonar

Manufacturer:	CEEMAX
Product name:	Deep tow system
Frequency:	325 kHz
Record type:	Digital
Relative accuracy:	2% range

4.3. Survey Vessel *Shoreline*



Survey vessel *Shoreline* is towed to and launched from location

The survey was executed onboard survey vessel *Shoreline*, a 6.5m purpose built stable, manoeuvrable and shallow draft survey vessel, ideal for all coastal and harbour operations.

Make:	Leeward 18
Size:	6.5m x 2.2m
Draft:	30cm
Speed:	30 knots
Engines	Main: 100 HP Mariner outboard
	Auxiliary: 5 HP Mariner outboard

Class 3 MECAL certified (20 miles day and night)

Fully insured as survey vessel with full crew and third party cover

5. **GEODESY**

5.1. **Datum Parameters**

Projection:	Transverse Mercator, OSTN02
Central Meridian (W) (Lng):	2°
Grid Origin: (N) (Lat):	49°
False Northing:	-100000.000 m
False Easting:	400000.000 m
Scale Factor:	0.999601272

5.2. **Projection Parameters (OSTN02)**

Raw data was collected in WGS 84 (no projection) and converted to OSTN02 within the navigation software using point to point modelling parameters.

6. **EQUIPMENT PERFORMANCE**

6.1. **Navigation System**

The system performed without fault. A position check proved that the system was providing positional accuracy within the specified tolerance.

6.2. **Side Scan Sonar**

The system performed without fault. Contact positioning closure was observed to be within the expected tolerance.

7. **PROCESSING & PRESENTATION**

Industry standard DXF and ASCII text data formats have been used to present and archive the survey results. Data was processed and presented in house.

7.1. **Navigation**

All survey data was processed off-line. No smoothing algorithm was applied. Positional data was recorded and post processed using Hypack Software.

7.2. **Side Scan Sonar**

All survey data was processed off-line using Hypack Software. Interpretation was made from the digital records. Further details can be found within Section 8 (Side Scan Sonar Survey). Results are presented on sheet J500_04.

8. SIDE SCAN SONAR SURVEY

8.1. General

The purpose of the survey was to identify any significant archaeological features within the survey area. A towed side scan sonar system was used to achieve this.

The client, together with Cambrian Archaeological Projects Ltd, supplied detailed wreck information (via the UKHO) for a specified area within Holyhead Harbour. The locations of each wreck (with listed coordinates) were superimposed onto the side scan sonar data. The entire side scan sonar data was searched for significant man-made features that could possibly be of archaeological interest. In those areas where UKHO wreck information existed additional closer inspection was made in an attempt to validate the listed feature.

Results have been presented on sheet J500_04.

8.2. Comment

The data quality was good with sea conditions being ideal. Complete coverage within the area defined was achieved.

Two UKHO listed wrecks were plotted within the defined survey area (7476 & 50615). No evidence of wreckage or associated debris was interpreted as being present in either location. No contacts were interpreted within the side scan sonar records that were deemed to be of archaeological significance.

9. QUALITY CONTROL

Shoreline Surveys Limited strives to collect as good quality data as possible. The performance characteristics and operating constraints of the equipment are fully understood and on that basis survey work is undertaken only when the conditions permit. It is our objective to become fully accredited with the ISO 9002 Quality Standard and the groundwork for such accreditation has been implemented from the onset of our operations.

10. DATA ACCURACY

Although the survey data is of good quality the only way by which seabed/ sub-seabed type/ levels can be accurately identified is through the implementation of an extensive sampling/ boring program. All seabed/ sub-seabed interpretation is based on acoustic reflectivity and should be treated accordingly.

Although extreme care has been taken during the planning, acquisition, processing and charting of the project, it is important to recognise the limitations of data acquisition with a single beam echo sounder and the employed geophysical survey instruments. Unless extremely tight line spacing is adopted, it is possible that the location and extents of troughs or peaks within the survey area could remain undetected. Shoreline Surveys Limited cannot be held responsible for any loss, consequential or otherwise, as a result of the use of this data.

This project has been undertaken on the understanding that the client accepts the above.

Appendix – UKHO Wreck Data

Latitude = 53 19'.300 N Longitude = 004 38'.683 W [OGB] Square Number = 92
 State = DEAD
 223944E, 383787N

Wreck Number 7476 **Classification** = Unclassified
Symbol STP **Largest Scale Chart** = 2011
Charting Comments LENGTH 36MTRS

Old Number 009203710
Category Wreck showing any portion of hull/superstructure

WGS84 Position **Latitude** = 53 19'.315 N **Longitude** = 004 38'.752 W
WGS84 Origin 3-D Cartesian Shift (BW)
Horizontal Datum OGB ORDNANCE SURVEY OF GREAT BRITAIN (1936)

Position Method
Position Quality Precisely known
Position Accuracy
Area at Largest Scale YES

Depth
Drying Height
Height
General Depth -1 metres
Vertical Datum Lowest astronomical tide
Depth Method
Depth Quality Depth unknown
Depth Accuracy

Conspic Visual NO **Conspic Radar** NO
Historic NO **Military** NO **Existence Doubtful** NO
Non Sub Contact NO

Last Amended 18/01/2002
Position Last Amended
Position Last **Latitude** = **Longitude** =

Name
Type CONCRETE TANK BARGE
Flag
Dimensions **Length** = **Beam** = **Draught** =
Tonnage
Cargo
Date Sunk

Sonar Dimensions **Length** = 36.0 metres **Width** = **Shadow Height** =
Orientation 030/210

Magnetic Anomaly
Debris Field
Scour **Depth** = **Length** = **Orientation** =

Markers
General Comments

Circumstances of Loss

Surveying Details
 **HH212/420/01 29.8.95 DAMAGED CONCRETE TANK BARGE WHICH COVERS AT HIGH WATER LIES 70MTRS FROM NE
 END OF SOLDIERS POINT WHARF IN 531918N, 043841W. (AUTHORITY NOT STATED). CHART AS STP, 36MTRS LONG,
 LYING 030/210 DEGS. BR STD.

POSITIONS BELOW THIS POINT ARE IN DEGREES, MINUTES AND DECIMALS OF A MINUTE
 **HH212/420/08 18.1.02 DELETED. (HOLYHEAD LOCAL NM 2/02). BR STD.

NPRN 506415

NAME UNKNOWN

TYPE Wreck

NGR_DESC Grid reference converted from a latitude and longitude coordinate

CHECK_LAT 53.3197

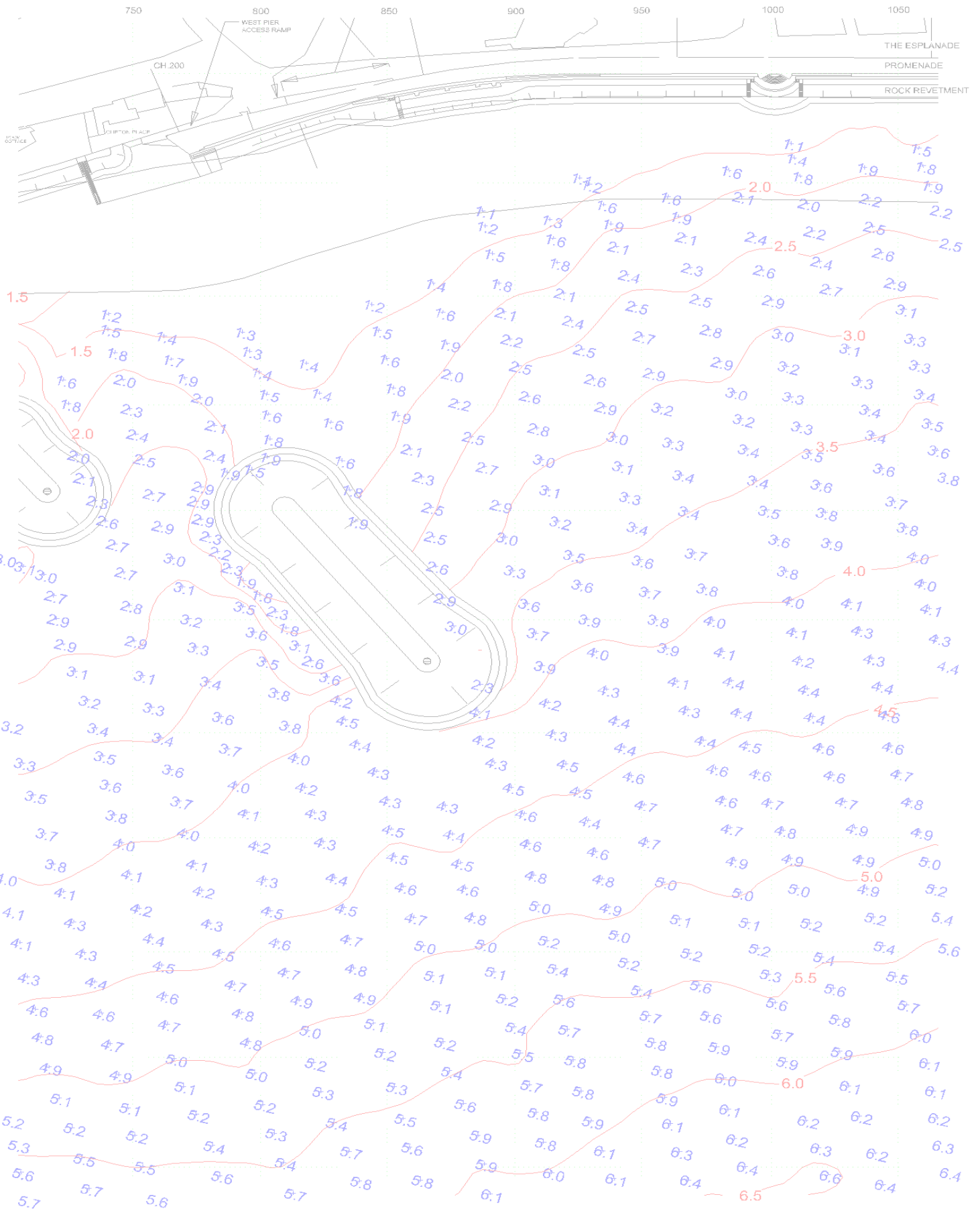
CHECK_LONG -4.64531

Site Description Archaeological remains associated with the loss of this vessel are not confirmed as present at this location, but may be in the vicinity.

Event and Historical Information:
A wreck was reported at this location by local sports divers in 1976.

Sources include:
UK Hydrographic Office Wrecks and Obstructions Database. © Crown Copyright and database rights. Reproduced by permission of the Controller of Her Majesty's Stationery Office and the UK Hydrographic Office (www.ukho.gov.uk)

Maritime Officer, November 2009.



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