The British Sub-Aqua Jubilee Trust

PROJECT REPORT

Visualising the unidentified, recording the GAD8 Protected Wreck

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Prepared for:

The British Sub-Aqua Jubilee Trust

1 Preface

1.1 Document Control

Applicant's Name	Douglas M. M^{c}Elvogue
Nature of Project	Archaeological survey and recording
Scientific/non-scientific	Scientific
Grant awarded	10 July 2019
BSAC Membership No.	A737544
Club or Branch of BSAC	Mary Rose 1980 & Southsea Dive Club
Profession of applicant	Projects and Assurance Lead, Secure Satellite Communications
Date of Report	24/07/2023

1.2 Summary

1.2.1 Diving took place on the Protected Wreck Site GAD8 over a week at the end of July 2022. The diving was scheduled to coincide with other diving. Weather conditions meant that the other sites could not be dived whilst GAD08 could, thus more work was conducted on the site than planned.

1.2.2 A total of 7 divers conducted 24 dives over 4 days totaling 1428 minutes on the site. A total of 4375 digital stills photographs and 35 videos totaling 675 minutes off underwater footage was recorded during the project. The maximum depth for all dives was 15 meters. Activities conducted on site include locating and tagging all cannon on site, recording all cannon and seabed features, such as concretion and timbers. Additional activities included conducting initial biological and metal detector surveys on site as well as area searchers to the North, East, South and West of the site. Digital stills and video were taken throughout the dives. The initial site plan based on the 2009 side scan sonar data and 2015 multibeam survey has been completed.

1.2.3 Project Visualising the Unidentified, recording the GAD8 Protected Wreck acknowledges and is grateful to the British Sub-Aqua Jubilee Trust for the grant funding that supported this work.

1.3 Acknowledgements

1.3.1 Project Visualising the Unidentified, recording the GAD8 Protected Wreck is grateful to the British Sub-Aqua Jubilee Trust for grant funding that supported this work.

1.3.2 This project also acknowledges the support of and help of:

- Site Licensee Robert Peacock
- Hefin Meara of Historic England for general support in helping to facilitate this project
- Dan Pascoe of Pascoe Archaeological Services for use of the MBES survey data within this report
- Mark James of MSDS marine for data post processing
- TrenDive for financial sponsorship
- Wessex archaeology for use of images presented within the reports.

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2 Introduction

2.1.1 On the morning of the 19th of September c.1700, whilst at anchor off Deal in the Downs, Kent, *HMS Carlisle* unexpected blew up killing all onboard. The *Carlisle* was a 50 gun 4th rate warship built at Plymouth dockyard in 1698 by Elias Waffe (Larn, 1995, 48). Commissioned under Captain Francis Dove the *Carlisle* was anchored in the Downs awaiting Admiral Rookes fleet and onward travel to the Baltic. Captain Dove was ashore at the time of the explosion. The Admiralty carried out an enquiry into the explosion of the *Carlisle*, then requested Trinity House to carry out a survey of the wreck to establish its exact position, condition and to make recommendations as to its dispersal (Larn, 1995, 48).

2.1.2 To date no records have been found to say the *Carlisle* was broken up and dispersed or its cannon raised. Even if this had happened there is the strong possibility that some ordinance, parts of the hull and other artefacts may have remained. Recognizing that any remains of the *Carlisle* represented a unique time capsule of life aboard a late seventh century 4th rate ship of the line, charitable organization SeaDive (lead by local diver Bob Peacock) searched for the wreck site in 2007 and 2008. The aim of Operation *Carlisle*, as the search was called, was to try and locate the last resting place of *Carlisle*. The site, currently known as Goodwins and Downs wreck site number 8 (GAD8), was found by SeaDive Organization in 2008. It was tentatively identified as the *Carlisle* as it was the only wreck site off Deal that could be considered that of the *Carlisle*.

2.1.3 In 2010 during archaeological investigations timbers were found beneath the sediments. Due to the potential archaeological significance of the site, Historic England (then English Heritage) designate the site as Protected Wreck Site (REF). Whilst the identity of the site remains unconfirmed, that GAD8 represents a coherent site is currently not disputed. The central mound consists of cannon ball and is considered to be shot lockers. There are also at least seven cast iron guns on site and a section of what has been identified as coherent ship's structure exposed on the seabed (WA 2011). Such features suggest a heavily armed vessel and are consistent with what ought to be found on fourth rate ship or armed merchantman of the late seventeenth century (Historic England, 2021).

2.1.4 Despite an initial survey in 2011 by Wessex Archaeology (WA, 2011) on behalf of Historic England, the site of GAD8 has not undergone an extended campaign of diver survey and a coherent baseline plan of the site had still not been achieved. The aim of this project was, for the current licensee of GAD8 to lead a team of archaeologically trained volunteer divers, to dive the site and record what remains on site. This would then allow an initial site plan to be developed, giving a better understanding of the site and its archaeological potential. This in turn would be utilized to inform a report and forward looking plan to Historic England for the site's continued management and engagement with volunteer divers.

2.1.5 This document reports on the project and the historical and diving aspects that form the report to Historic England. The British Sub-Aqua Jubilee Trust funding, support and patience has proved instrumental in ensuring a significant piece of our maritime

heritage is better understood for all current and future generations.

3 Project Aim and objectives

3.1.1 This project proposed to produce a baseline survey of the Protected Wreck Site known as GAD8. This would define its current state and condition and identify features on the seabed. This aim has been achieved by completing the following objectives.

- Objective 1: record through digital photography and direct measurements any exposed surface archaeology on the site.
- Objective 2: record any flora and fauna seen whilst diving on the site.
- Objective 3: produce a report on the project and any archaeology or flora and fauna recorded onsite.
- Objective 4: produce a 3D survey of the site to act as baseline survey of the site for its future management.

3.1.2 These objectives were facilitated by the British Sub-Aqua Jubilee Trust (BSAJT or Jubilee Trust) grant funding. The Jubilee Trust funding allowed a team of BSAC volunteer divers, including military veterans (ex-Navy and RAF personnel) to record this significant site. The financial support of the Jubilee Trust has allowed volunteer divers to enhance their archaeological surveying, 3D photogrammetry and marine identification and survey skills. It also facilitated their access to a Protected Wreck Site.

3.2 Applicants Role

3.2.1 The applicant, Douglas M^{c}Elvogue, was tasked to organize the project diving with the aim of locating GAD8 and completing a survey of the site. The applicant was also tasked to:

- Gain a license to dive the site from Historic England
- plan all diving
- coordinating all divers with the dive times and free boat space
- liaising directly with volunteer divers for any required training
- ensure all required data was recorded and to plan further visits if/when required to complete the surveys
- present all field work and research in a report format.

3.2.2 This report full fills the applicants' responsibilities.

4 Previous Work

4.1 SeaDives search for *HMS Carlisle*

4.1.1 In 2008 SeaDive, a Ramsgate based charitable marine archaeological organisations, proposed to search for *HMS Carlisle* (referred to this document as *Carlisle* or, the *Carlisle*). Led by local diver and entrepreneur Robert (Bob) Peacock the search was named Operation Carlise. The aims and objectives of which were to:

- locate the last resting place of *HMS Carlisle*, c.1700
- record any remains of the vessel *in situ*
- better understand vessels of the type and period of *HMS Carlisle*.

4.1.2 To attain the aim and objectives a methodology with four main elements was proposed. These being:

- Archival research
- Cartography research to identify most likely position/area for *HMS Carlisle*
- Side scan and magnetometer survey
- diving any targets discovered to record and positively identify them.

4.1.3 The diving and recording methodology stated that all diving would be done using "SCUBA gear", recorded with video and stills photography. Further recording where deemed appropriate would be done by drawing site plans and creating a photo-mosaic of the site. Surface recovery of artifacts at risk would be considered to help identify the site. SeaDive also considered the possibility of excavation on site using water dredges.

4.1.4 The project was divided into 3 phases that would run one after the other. These being:

- archival and cartographic research November 2007 to March 2008
- geophysical survey March 2008
- diving May to September 2008
- Identifying the *Carlisle*'s Position
- Historical reference to *HMS Carlisle*

4.1.5 It was known that after the sinking of the *Carlisle* the Admiralty carried out an enquiry into the explosion of the *Carlisle*, and then requested Trinity House to carry out a survey of the wreck. This was to establish its exact position and condition and to make recommendations as to its dispersal. The survey was completed and a report submitted on 11th October 1700. The first part of the report outlines the positional data for the wreck and read as follows:

> *"...we [Trinty House] having, with all exactness we were capable of at this season, sounded upon and about the said wreck [HMS Carlilse], do humbly report to their Lordships [the Admiralty], that the said wreck lies in about seven fathoms [13 m] at low water. The ground, a kind of blue clay, with a few stones on the top of it; with her stern to the southward, and lying North and by West, and South and by East, the South Foreland bearing South and by West 1 West, and the North Foreland, North and by West. The leading mark to find the wreck is, to keep the Upper Deal windmill a little open to the southward of that castle. The thwart mark is a reddish brick stable at the North end of the town, which is to be kept half a ship's length open to the southward of a windmill standing up in the country, and called Wingeham Hill."* (Larn, 1995, 48)

4.1.6 The report continues to outline the wrecks' condition and suggest methods for dispersal, including leaving it to the winter storms.

> *"That the after part of the said wreck as far forward as the bulkhead of the quarterdeck, we judge to remain whole, the taffrail being but 4 feet under water at a low ebb. The rest of the ship forward, we believe to be blown abroad, excepting the floors and some of the futtocks, which do remain about 12 feet above the ground. That the said wreck, in the posture it is at present, must needs be dangerous to ships passing into and out of the Downs, as lying in the best of the Road. That it may be expected the sea and tides, if it happens to blow hard from the north or south upon spring tides will, in some short time, break away the upper works at least, of the said wreck as it hath, in a manner, wholly done those of the merchantmen sunk by the storm in the year*

1689/90, though some remains thereof, or of some others, are sometimes met with by those that sweep for anchors, which must doubtless cut or damnify the cables of ships lying in that Road."

"That the after part of the wreck which yet sits whole, or at least, the upper works, may be blown up, which in our opinion ought to be done as soon as may be, and that the bottom, or what part afterwards remains, may be swept, and being lifted as it may, by four vessels of about 100 tons each, may be carried into shoal water. And when that is done, if not before, her guns and cables may undoubtedly be taken up in a proper season of the year. But what the charge of blowing up or weighing the said wreck as proposed, it is impossible to make any reasonable calculation of, since there is no answering for the weather or other accidents that may attend a work of this nature. In the meantime...a distinguishable buoy be laid on the broadside of the wreck, if not one on each side." (Larn, 1995, 48)

4.1.7 **Note:** The name *Carlisle* was promptly branded by the fleet as being unlucky, since the frigate lost in the vicinity of the North Sand Head was only a little over a year old, having replaced a namesake wrecked in January 1696 on Shipwash. Since those two disasters the name has only once been given to a British warship (Larn, 1995, 48).

4.2 Plotting the Position of the *Carlisle*

4.2.1 Using the detail in the Trinity House survey the most likely position for *HMS Carlisle* was plotted on Landranger Map 179 by retired Merchant Navy Captain, Brian Smith (now deceased). Whilst it was noted that Ordnance Survey Maps use a different projection to Admiralty Charts, it is usually by Transverse Mercator, the use of land based transits by Trinty House meant this was preferred to a Chart. Recognizing this difference, highlighted that the vertical divisions would not line up with true north and in fact can vary across the Landranger Map 179. Therefore, an error of 2.72º W at the position of the wreck was allowed for within the search patterns (Smith, 2008).

4.2.2 To plot the position of the Carlise required the Trinity House bearing and transits to be reversed plotted. First the landmarks were identified, and their positions noted. Deal Castle (DC) is still in place, however "Upper Deal windmill" has been replaced by a water tower, called Upper Deal Tower (UDT). The position of the water Tower is used instead. The other landmarks "a reddish brick stable at the North end of the town" and "a windmill standing up in the country and called Wingeham Hill" proved problematic. The stable position is unknown except it is stated to be at the north end of Deal Town. A rough position for this would suffice for the a "best guess position" for the site. So a position based on the known northern extent of Deal town during the period in question (1690-1710) is used.

4.2.3 The statement "a windmill standing up in the country and called Wingeham Hill" is open to interpretation. Is this one landmark, a windmill on Wingeham hill or two, a windmill standing up in the country and Wingeham hill behind it. Wingeham Hill can be found at the current village of Windham near Canterbury. However, this is too far inland and would not have been seen from the Downs in 1700, except for a low rise. It also did not have a windmill on it. Using a contemporary chart from the period it is

noted that there is a "Small Windmill or Lower Dell [Deal] Mill" used as a landmark.

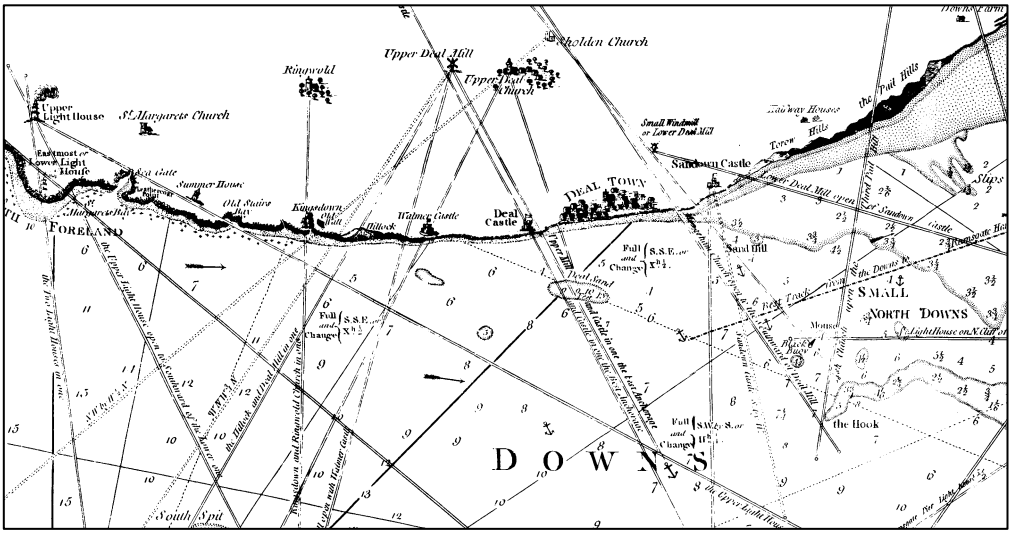


Figure 1 Chart of the Downs based on Trintiy House plots and Greenville Colins Chart c.1800.

4.2.4 This can be interpreted as "a windmill standing up in the country". It is possible this is what was referred to. It is also on a rough bearing towards Wingham so any "hill" in the background might be consider such. As this created the thwart mark it only sufficed to say how far out into the Downs the wreck lay. The depth of 7 fathoms at low water can be used to correlate the rough position of the wreck along the main bearing and a rough position of the known northern end of Deal Town in alignment with "Lower Deal Mill". This would give the "best guess area" to search for the wreck.

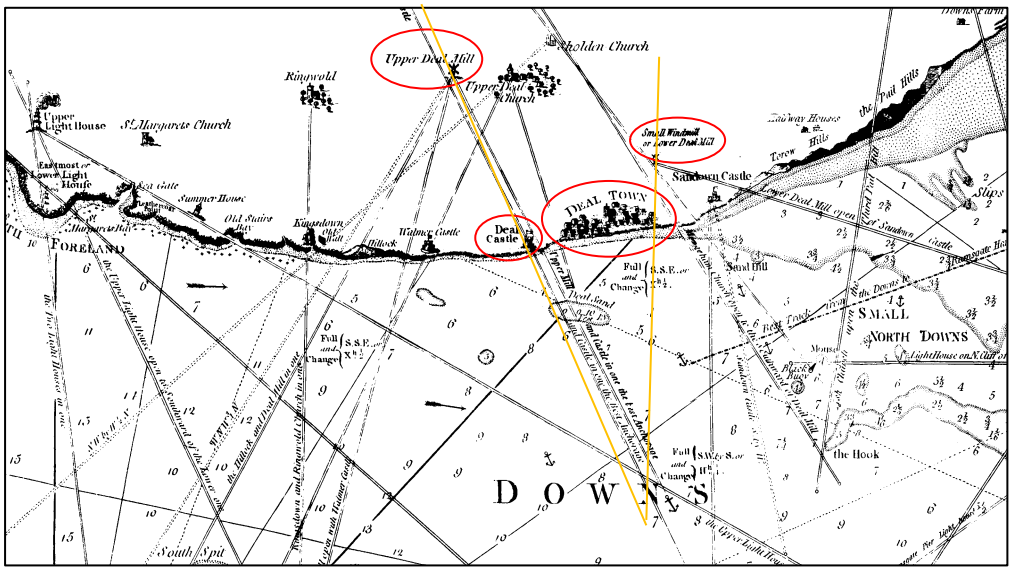


Figure 2 Chart with land marks and bearing marked on it to position the site of the Carlisle

4.2.5 The positions given by Brian Smith for the "best guess search area" are:

- Deal Castle (DC) - position of SE corner = Lat. 51º13.07'N Long. 1º 24.35'E
- Upper Deal Tower (UDT) = Lat. 51º 12.45'N Long 1º 22.98'E
  giving the transit bearing from UDT to DC - 054.15º (true), distance 1.06nm.

4.2.6 The original bearings from the c1700 Trinty House report were:

- North Foreland (NF) N by W = 348.75º

- South Foreland (SF) S by W ½W = 196.875º.

4.2.7 These bearings were then plotted, using an error to eradicate the cocked hat, so they line up with the transit of UDT to DC, on the 179 map. This gave a position of:

- Lat 51º 14.9'N
- Long 1º 27.9'E.

4.2.8 Then transferring that to the Admiralty Chart 1828 for Goodwins and Downs gave bearing NF 356½º and SF 205º. Brian stated that whilst these are true bearings, they give an error of about 8ºE.

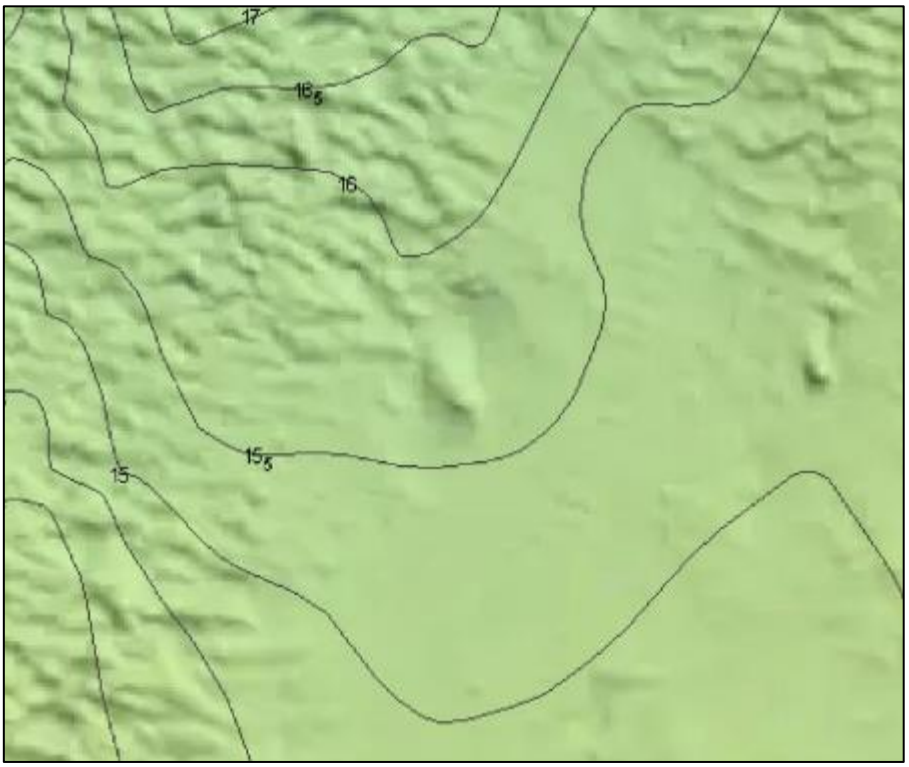


Figure 3 The position given by Brian Smith is in the center of this chart.

4.2.9 The position, as Brian states, could not be guaranteed (it was in deeper water than expected). It did however highlight the more accurate positions of Deal Castle and Upper Deal Tower to ascertain the main bearing along which the *Carlisle* settled on the seabed off Deal. SeaDive then utilized this information to search for the wreck.

4.3 Finding the Site

4.3.1 SeaDive first dived the site prior to 2003 (Peacock, 2022). It was reported as a fishing snag. At the time it was not associated with the *Carlisle*. Instead, they named it "The Mystery Wreck", or "Cannon Site".

4.3.2 The position given by Brian Smith is in the center of the chart in figure 3. There is a possible feature but when dived SeaDive stated it was considered to be geological (Peacock, 2022). No archaeological remains were found at Brian Smiths plotted position.

4.3.3 The search area was extended back from either side of the prime bearing. The "Mystery

Wreck" or "Cannon Site" proved to be the only site that had features relevant to the *Carlisle*, these being large cannon, cannon mound and hull structure. There are no SeaDive records from the dives at that time, nor are there any video or still photography. The site was reported to Historic England (then English Heritage) at the time and was dived by Wessex Archaeology (WA) under the Protection of Wrecks Act (PWA) (WA, 2009.7) contract in 2003. The Archaeological Diving Unit St. Andrews (ADUS) conducted a multibeam survey of the site in 2006, but this has not been made available for interpretation.

4.4 The Site

4.4.1 It lies at a charted depth of 11m, 10km south of Ramsgate and 2.6 miles from Deal Castle in 'The Downs'. The exact position is 51º13.9716'N 001º26.0090'E WGS84. This is along the main bearing line given by Brian Smith. Also no other site that might represent the *Carlisle* has been found within the vicinity of the Downs anchorage at the known depth (7 fathoms or 12.8 meters at low tide) of the last resting place of the *Carlisle*. The site lies on a bearing of 235 (SWbW) degrees and 2.6 miles from Deal Castle. As a reciprocal (or back) bearing this equates (235 – 180) to 55 degrees (NEbE). If the lower Deal Mill is used as a "thwart" bearing, then this puts the site within a few hundred meters of the plotted position for the *Carlisle* taken from the Trinity House survey report.

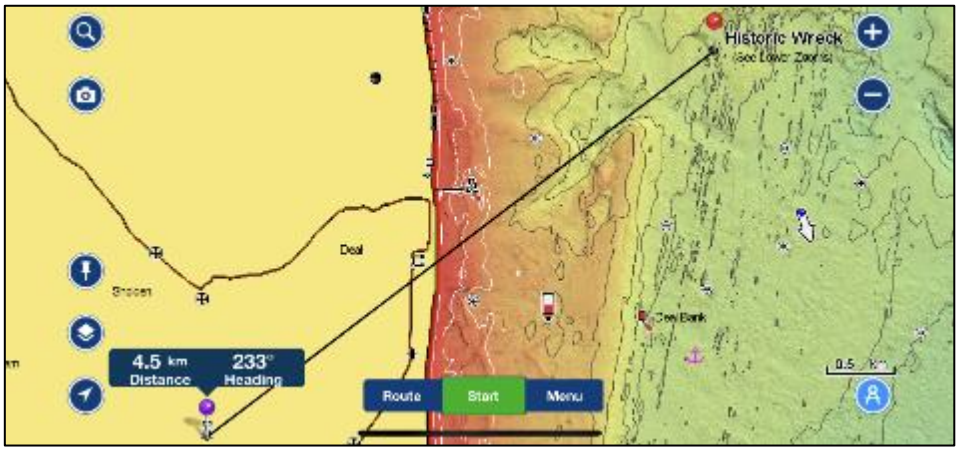


Figure 4 Charted position of GAD8 and bearing from Upper Deal Mill with Deal Castle a bit open to the South.

4.5 Pre-Designation Geophysical Assessments

4.5.1 Wessex Archaeology (WA) has been the Contractor for Archaeological Services in relation to the Protection of Wrecks Act (1973) since 2003. As part of this contract WA were tasked to examine the following Protected Wreck sites in the South-East of England during August and September 2008: the *Stirling Castle*, *Northumberland*, *Holland 5* and *Thomas Lawrence* (WA, 2011). The unprotected wreck site known as the "Goodwin Canon site" (GAD8) was also surveyed at this time (WA, 2009).

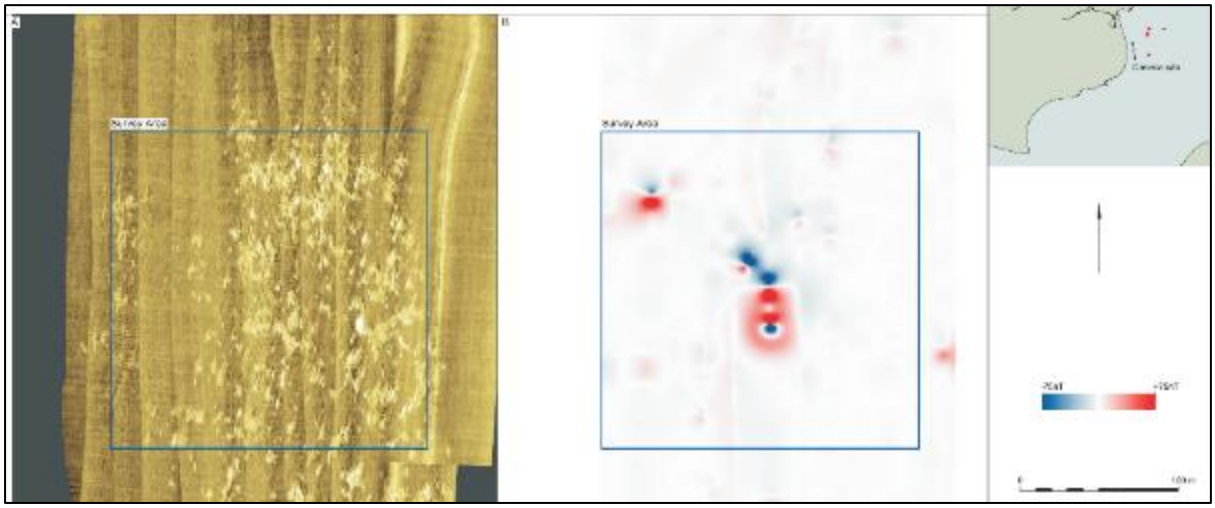


Figure 5 WA 2009 Fig 7, side scan sonar trace on the left and magnetometer on the right.

4.5.2 The side scan sonar data acquired during this project showed that the wreck is situated amongst an area of rock outcrops. The surrounding seafloor was interpreted as sand but with no evidence of sand waves or ripples (see figure 5). Magnetometer data identified a complex area of magnetic anomalies at the center of the survey area with a maximum amplitude of 330nT (see figure 5). Interpreted as "…caused by a number of large ferrous objects, with some remnant magnetization, lying in close proximity to each other." (WA, 2009) This is correlated to the cannon ball mound. An isolated magnetic anomaly was noted towards the northwest corner of the survey area. No obvious archaeological material was identified which corresponds to this magnetic anomaly, but a linear feature was identified at this location which may be part of material which is buried under sand (WA, 2009).

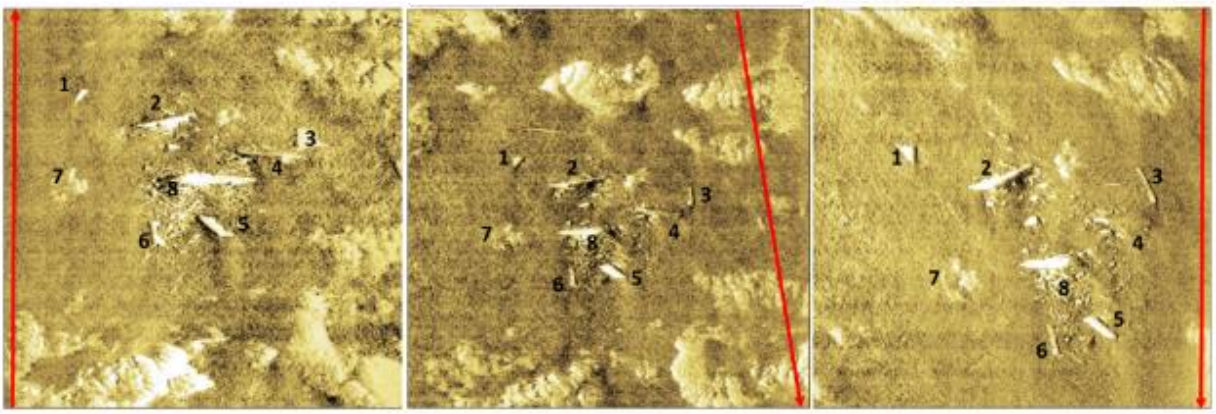


Figure 6 WA 2009 Figure 9 – three side scan sonar traces - red arrows show direct of tow fish.

4.5.3 GAD8 was resurveyed during another Historic England commissioned survey, the "South East of England Designated Wrecks" survey, Wessex Archaeology. During this survey WA reported "a total of 63 anomalies were identified in the survey area…" which "…includes 20 anomalies which could be identified as being of anthropogenic origin." (WA, 2009). Interpretation of the data this time noted that the center of the survey area "…consist of a central mound of debris surrounded by a number of cannons." (WA, 2009) This was illustrated by three different survey lines in Figure 9. It should be noted that the number, positions and lengths of the cannons are slightly

different in each image. This is because some of the cannons are lying almost perpendicular to the survey lines and therefore the apparent size of the features is close to the resolution of the side scan system (WA, 2009).

4.6 Pre-Designation Diving Operations

4.6.1 Further geophysical surveys around the Downs and Goodwins were conducted by WA, commissioned by Historic England, in 2008, 2009 and 2010. Based on these surveys a list of interesting sites was created. Diving operations took place during two diving sessions on the Goodwin Sands from 15th to 22nd May and from 20th to 29th June 2011. A total of 12 sites were dived including "the Goodwin Cannon Site" now called Goodwin and Downs Unknown Site number 8, or GAD8 (WA, 2011).

4.6.2 During the 2011 WA diving operations, GAD08 was considered a fair weather "fall back" site when sea state and wind preclude diving further offshore (WA, 2011). At this time underwater visibility proved challenging to the WA divers, however they ascertained that the site consists of a scatter of at least seven pieces of cast iron ordnance, a central concretion mound and a section of coherent timber structure (WA, 2011). A number of intrusive excavations (WA test pits) were conducted. From these excavations a number of observations were made (WA, 2011.9-10), these being:

- the preservation of the timber structure was noted to be good
- timber interpreted as ships planking and beams were identified
- stratigraphy of the site suggests that there is the potential for additional well-preserved structure to exist buried beneath the seabed.

4.6.3 Whilst the diagrammatic position of the test pits is reproduced on the figure titled "Geophysical data and site plan" (WA, 2011), no detailed drawings or photographs are reproduced evidencing the described archaeology within the test pits.

4.6.4 An undesignated Site Assessment Report considering GAD8 (WA, 2011) followed the fieldwork phase of this project. Data from previous Wessex Archaeology investigations and surveys by other individuals and organisations were integrated into this assessment. The report recommended designation of the Site to protect it, *"WA is of the opinion that the site is of sufficient archaeological significance to warrant designation under the Protection of Wrecks Act (1973)."* (WA, 2011.21) In 2012 the site was designated on recommendation of Historic England and the work carried out by Wessex archaeology. After this no further diving was conducted on the site?? despite recommendations for further field work on site (WA, 2011.21).

4.7 Reasons for Designation

4.7.1 The principal reason for protecting GAD 8 is for its "Archaeological Importance". That is "…the site appears to be the remains of an armed wooden sailing vessel dated to between 1650 and 1750. The remains of boats and ships dating to between 1500 and 1815 are extremely rare; the majority of boats and ships from this period can be expected to be of special interest." (Historic England, 2021) The WA report (2011.18) highlighted that wrecks of this period were of interest and "…particularly those with preserved timber structure, are relatively rare within the archaeological record." The

extent and condition of ship structure within GAD8 is still to be ascertained.

4.8 Post Designation Surveys

4.8.1 Post designations surveys have primarily been limited to Multibeam Echo Sounder surveys (MBES). These being 2015 (TrenDive, 2016) , 2017 and 2018 (PAS, 2018). All the MBES surveys show the site consists of seabed feature within a 39m by 18m area that is orientated north–south. The majority of the features are low lying and concentrated within 10 meters of the upstanding cannon ball mound. Outlying features consist of exposed cannon. Of interest is that Pascoe Archaeological Services (PAS) MBES surveys (PAS, 2017 and 18) were unable to resolve the number of cannons exposed on the seabed (they only identified 5 in the MBES) or identify timber structure. This is due to the low lying and interrelated nature of some of the cannon and other features. It should be noted as a limiting factor of such surveys, which cannot replicate the fidelity of diver ground truthing and site survey.

4.9 Site Location

4.9.1 The site lies within English coastal waters of the East Kent Coast directly east of Deal. It lies at:

- Latitude: 51.23278300
- Longitude: 1.43348300
- National Grid Reference:TR3979153779

4.10 Legal

4.10.1 GAD 8 is designated under the Protection of Wrecks Act 1973 as it is thought to be the site of a wreck and on account of the possible historical, archaeological or artistic importance of the vessel, or of any objects contained within it. Therefore, it is protected to protect it from unauthorised interference. All diving on the site requires a licence from Historic England. A Protected Wreck Site is designated by Statutory Instrument and the relevant information has been extracted from the Statutory Instrument:

- Designation Order: 2012 No. 1807
- Made: 10th July 2012
- Laid before Parliament: 11th July 2012
- Coming into force: 3rd August 2012
- Protected area: 50 metres within 51 13.96698 N, 01 26.00898 E
- No part of the restricted area lies above the high-water mark of ordinary spring tides.

4.11 Ownership

4.11.1 The owner of the site is not known. If the site proves to be a Royal Naval ship, then it will be owned by the Ministry of Defence (MoD). Any personal finds will be owned by the descendants of the owner. All finds are reported to the Receiver of Wrecks (WoR) who will attempt to identify ownership. All finds will be considered in the ownership of the recovering diver. A salvage waiver has been signed by any diver recovering artefacts transferring ownership tot eh Project Lead Archaeologist, Douglas

M. M^{c}Elvogue. Ownership will then be transferred to the local museum where artefacts will be deposited.

5 Project Aims and Objectives

5.1.1 This project proposed to produce a baseline survey of the Protected Wreck Site known as GAD8. This would define its current state and condition and identify features on the seabed. This aim has been achieved by:

- ground-truthing and recording the archaeological features seen on the geophysical surveys of the site
- creation of a 3a level archaeological record of the site features (see Table 2) by recording through digital photography and direct measurements any exposed surface archaeology on the site
- a desk-based assessment to collate data from previous work carried out on site
- identification and recording of any diagnostic features for the identification of the site
- produce a 3D survey of the site to act as baseline survey of the site for its future management
- produce a report on the project and any archaeology or flora and fauna recorded onsite.

5.2 Current Site Knowledge

5.2.1 Despite past interventions on the site of GAD8 there is still no coherent or structured record to enable an understanding of the site. For example, the number and orientation of ordnance on site is still not know. Nor do we know if the site actual represents a shipwreck and if it does which ship wrecked at the site. What was known about the site is:

5.2.2 The ordnance on site:

- is identified as cast iron smooth bore muzzle loaders were heavily concreted varied in alignment
- consists of at least seven pieces (WA, 2011)

5.2.3 There are timber remains on site which:

- consists of an amount of coherent timber structure at the north-west of the site
- area of exposed coherent structure measured 0.7m x 4.4m
- highlights potential for a significant amount of additional buried timber remains.

5.2.4

The sediment coverage on the site:

- is composed of compact sandy gravel
- becomes more compact with depth
- up to 0.5m depth of sediment in places with in situ artefacts found at depths 0.3m
- lack of visible mobility of the sediment.

5.2.5 A number of artefacts have been found on the site including a green glass bottle stem, dated to 1650 to 1750. This highlights the potential for further artefacts to exist buried under seabed sediments.

6 Method Statement

6.1 Level 3a Record

6.1.1 The overall aim of the project is to create a level of record that will allow an archaeologist to comprehend the site. This is considered a Level 3a record (WA, 2006). This level of recording is defined in the following table.

6.1.2 The 3a level of record will be achieved by recording the site with digital stills and video accompanied by metric scales, positioned and surveyed photogrammetric targets to create a 3D photogrammetric site map. Additional 1 to 1 direct measurements, sketches and diver descriptions of archaeological features will also be recorded and entered into the projects common GIS based mapping system and database. Where applicable individual artefacts or features will be tagged (Cow tag and zip tie, or copper nail) with a unique identifier, for future identification.

Table 1 Level 3a

Level	Type	Objective	Sub-Level	Character	Scope	Description
3	*In Situ*	A record that enables an archaeologist who has not seen the site to comprehend its components, layout and sequences.	3a	Diagnostic	A detailed record of selected elements of the site. The first stage of a full record of the site.	This would include a full measured sketch and database (or equivalent) of the site and a database (or equivalent) entry for all identified surface artefacts.

6.2 Desk Based Assessment of Geophysical Data

6.2.1 The project's success was reliant on the successful collation of geophysical data relating to the Protected Wreck Site GAD8. This would facilitate the rapid recording of the site. A desk based survey of published reports that refer to GAD8 site was therefore to be conducted.

6.2.2 Any geophysical data reported on was assessed for archaeological features and anomalies. This assessment created a list, in the form of an Excel spreadsheet, of geolocated targets for diver ground truthing (see diving methodology).

6.3 Diver Ground Truthing of Targets

6.3.1 A series of dives were to be conducted by volunteer divers. These consisted of diving the known location of the site, ground truthing the geophysical target list and any other relevant areas within the Protected Area (50m circle of the centre of the site). All diving was conducted in diver pairs using SCUBA equipment and be compliant with BSAC and Southsea Dive Club rules. The ground truthing was undertaken utilising a shot line

and circular search survey technique (Bowen, 2009.101). It aimed to:

- identify the targets located by the geophysical data target list
- where possible photograph and measure those features located by the geophysical data target list
- create 3D models of any significant archaeological features located by the geophysical data target list
- collate the results of this work onto the projects common GIS based mapping system
- inform the recording strategy for the Level 3a Record diving activities.

6.4 Survey Methods

6.4.1 Structures, features and artefacts will be drawn, photographed or videoed in-situ and where appropriate labelled with features or artefact numbers. The methodological approach to carrying out archaeological survey work underwater followed the processes, procedures and guidelines set out in Underwater Archaeology: The NAS Guide to Principles and Practice (Bowen 2008). Specific survey methods include:

- Direct measurements using rulers and tape measures, with the measurements recoded onto an underwater drawing board using a pencil and permatrace or other suitable form of underwater writing material.
- Digital Stills Photography using an individual divers personal underwater cameras. All photographs to include where reasonable possible a scale and survey tag.
- Digital Video Photography using individual divers personal equipment to identify features and for review after diving.
- Photogrammetry of individual features such as cannon, to include scales and also identification tags where possible.

6.5 Marine Biology Survey

6.5.1 All biological surveys will be recorded following the guideline outlined in the Sea Search Observation Form Guidance Notes and the Sea Search Survey Form Guidance Notes (http://www.seasearch.co.uk/recording.htm). The Sea Search proforma sheets were utilized for all biological surveys.

7 Dive Management

7.1 Diving Operations Base

7.1.1 The project was scheduled to run for a week during the summer of 2022. Covid restrictions, poor weather winds and a backlog of other diving work due to Covid restriction had delayed this project.

7.1.2 The diving was planned during periods of neap tides in the last week of July 2022. All diving was programmed around a single dive per day.

Figure 7 Compressor and Nitrox mixing station.

7.1.3 A compressor and Nitrox mixing equipment was generously leant to the project by Southsea Dive club. Team members were trained in using the equipment and all members participated in evening site diving planning and discussions.

Figure 8 Team members enjoying an evening meal and dive briefing

7.1.4 The same RIB "Southsea Explorer" was to be used throughout. It was planned to launch the RIB at Ramsgate marina slipway and recover it at the end of the project. During the project it was moored alongside the Ramsgate marina visitor ponton. For loading dive equipment and divers, the RIB was transited to the loading ponton. Estimated time to transit to site was approximately 25 minutes.

Figure 9 Southsea Explorer at loading pontoon Ramsgate Mariner.

7.2 Dive Teams

7.2.1 A team of volunteer divers will be assembled primarily from Southsea Sub-Aqua Club (BSAC Branch 009). They are archaeologically trained with experience of diving in the robust conditions expected of the Goodwin's. Additions to this team will be welcomed from other dive clubs within the limits of space on the dive boat. Priority will be given to those who hold relevant archaeological qualifications.

Table 2 List of participants and their roles and responsibilities.

Name	Key Role	Responsibility	Dive Club
Douglas M. McElvogue	Project management & planning, report writing, diving	Overall project management Report writing Quality & assurance Diving	Mary Rose 1980
Martin Davies	Photogrammetry	Digital photography and photogrammetry	Southsea Sub Aqua Club
Alison Mayor	Marine Survey and photography	Marine surveys and species analysis	Southsea Sub Aqua Club
Tom Templeton	Diving	Survey and video	Southsea Sub Aqua Club
Keith Clark	Diving	Survey and video	Southsea Sub Aqua Club
Robert Watkins	Diving	Cannon Survey	Southsea Sub Aqua Club
Jenny Watkins	Diving	Cannon Survey	
Richard Rowley	Coxswain and GIS	Coxswain & GIS Site plan production	Southsea Sub Aqua Club
Bob Peacock	History and data	History of site intervention and geophysical data	Ex SeaDive
Victoria Harris	Project administration	Book keeping and bookings	TrenDive
Richard Endsor	Historian/Archival Research	To research and visit key archives where identified documents relating to the Mary/Speaker and Restoration are held	www.RichardEndsor.com

7.3 Diver Safety

7.3.1 When the initial project application was sent to the Jubilee Trust the Covid pandemic was unknown. Due to diver safety concerns and covid restriction no diving was carried out on the project in 2020 and 2021. Diving was programmed for 2022 and included additional safety requirements. These were:

- testing prior to meeting up
- reduced numbers of divers on the dive boat
- separate travel to site.

7.3.2 Prior to the fieldwork, all divers will produce proof of their diving qualifications and medical fitness to Dive. They also have to prove recent diving. All project diving operations followed BSAC's code of safe diving as well as the Southsea Dive Clubs procedures and policies. This included Dive Risk Assessments, Daily Risk Assessments and Dive logs.

7.4 Diving Operations

7.4.1 Whilst the site position is known, the unknown nature of the diving conditions on site prior to the first dive means no fixed schedule for diving will be determined. After the first dive and an assessment of diving conditions a schedule for fieldwork will be undertaken and reviewed after each dive. This will include against the daily risk assessment and the latest 24hour weather forecast. Each day's diving will be discussed with the dive team the evening before and at Ramsgate mariner prior to leaving the mariner for the dive site.

7.4.2 All diving operations are to observe the following requirements:

- the marine VHF radio on the dive boat tested prior to departure from Ramsgate mariner
- communications with Dover Coastguard and Ramsgate Harbour authority before leaving Ramsgate Harbour
- mobile phone to be made available on the dive boat as a secondary communication device
- international code flag 'ALPHA' to be prominently flown to warn other vessel in the local vicinity of diving operations
- all dives to be planned within no decompression limits of Nitrox gas being used
- noted that the maximum depth limit determined by the site and not more than 15m. This is to be checked by echo sounder prior to diving
- maximum time on surface for all divers agreed before diving
- all dives to carryout planned in-water safety stops
- shot line deployed at the site and all divers planned return to surface using the shot
- on the seabed all divers deploy a line from the shot to the working area, allowing a safe return to the shot and surface
- all divers to be in visual contact with their buddy at all times underwater or where necessary use buddy lines to maintain contact
- any unplanned ascents or in the event of an early tide change and increased in water current, divers are to return safely to the surface using the shot line or their delayed SMB
- all divers to carry a delayed SMB.

7.5 Incident Management

7.5.1 In the event of an emergency where a diver must be recovered, all diving operations are to cease and all available personnel should be ready to assist. All members of the dive team are suitably trained to carry out an emergency rescue procedure and will take control should a situation arise. All underwater rescue operations must ensure the safety of the other divers in the group.

7.5.2 The diver will be recovered to the vessel by their buddy with the surface standby able to provide assistance if required. First aid will be administered to the diver on the vessel, oxygen will be available should it be required.

7.5.3 The diving supervisor/manager will take control and direct any emergency rescue operation as soon as they are able to. If it is necessary to take the diver to shore the

Southsea Explorer will return back to shore. Otherwise, the team will respond as directed by HM Coastguard, who will have been alerted by the coxswain. In the event of a less serious injury the divers who hold first aid certificates and O2 therapy qualifications will be able to assist. Medical advice will be sought via HM Coastguard.

7.5.4 As with any diving related incident the individual's equipment should be preserved and a record made of its condition, it should not be dismantled.

7.6 Emergency Contact Numbers

7.6.1 Duty Diving Medical Officer (24 emergency helpline) - 07831 151523

7.6.2 Coastguard
- 999
- VHF Ch 16

7.7 Nearest Recompression Chambers

7.7.1 All emergency requests for hyperbaric treatment should go through HM Coastguard or a 999 call.

- London Hyperbaric Medicine Ltd day time phone numbers
  - Tel: 0208 539 1222
  - Fax: 0208 539 1333
- Emergency Helpline: 07999 292 999

7.8 Health and Safety

7.8.1 All diving operations were considered to be recreational and therefore adhere to the BSAC Rules and Regulations for diving (BSAC, 2022) and Southsea Dive Clubs code of conduct in their Member Guide (Southsea Suba-Club, 2022).

7.8.2 All volunteer divers are archaeologically trained (Nautical Archaeology Society Certification or degree) and therefore familiar with working underwater in pairs and with tape measures, drawing boards and photographic and video equipment. All divers are suitably qualified and experienced to dive within the Goodwin Sands expected diving conditions.

7.8.3 All team members are required to have an in date and valid certificate of diving fitness or medical.

7.8.4 All activities are governed by the overarching health and safety plan and project specific risk assessments.

7.9 Boat Handling

7.9.1 The project team had a dedicated coxswain, Richar Rowley. This added an additional layer of safety by ensuring the coxswain was:

- familiar with the boat
- appropriately qualified
- appropriately experienced

- used to the divers within the team
- had experience of working in and out of Ramsgate Harbour
- and experienced of working within the Downs and Goodwin Sands.

7.10 Capability building

7.10.1 The project has a "value add" for Heritage Management in that it facilitated underwater archaeological skills development. Specific areas for enhancing skills include but are not limited to:

- Underwater survey
- Underwater drawing and sketching
- Direct measurements
- Cannon recording
- Artefact recording
- Photogrammetry.

8 Project Results

8.1 Summary of Project and Diving Activity

8.1.1 A licence to dive the site was given Historic England. The project collated the geophysical data and published reports for GAD8, and ground truthed the seabed anomalies seen in the geophysical data. A total of 7 divers conducted 24 dives over 4 days totaling 1428 minutes on the site. Maximum depth for all dives was 15 meters. Activities conducted on site include:

- Locating 8 cannon
- Tagging 8 cannon
- Recording cannon features and orientations
- Identifying seabed features, such as concretion and timbers

and conducting an:

- initial biological survey of the site
- initial metal detector survey
- area search to the North, East, South and West of the site
- Digital stills and video were taken throughout the dives.

8.1.2 Details of the project and diving activities are outlined in the sections below.

8.2 Desk based research

8.2.1 It was known that there had been a number of reports written about GAD8. These reports were collated and assessed to understand the relevance of the information within them. Copies of any relevant geophysical surveys were then requested from the originating organisation. Pascoe Archaeological Service and MSDS Marine both provided detailed survey data that helped inform the project work. The prime site surveys used (2003 Side scan sonar and 2015 MBES) were provided by Bob Peacock and TrenDive.

Figure 10 Side Scan Sonar image of the site from 2003 provided by Bob Peacock.

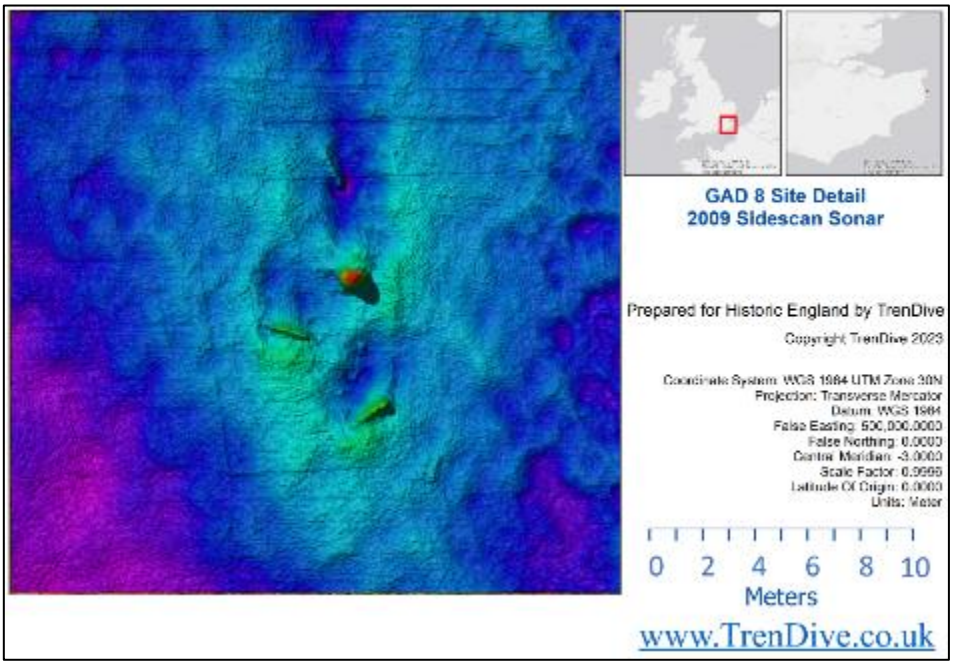


Figure 11 Multi Beam Echo Sonder survey 2015 supplied by TrenDive.

8.3 Initial site plan

8.3.1 An initial site plan based on the 2015 multibeam survey is presented below. A more up to date multibeam by Pascoe Archaeology and MSDS (PAS, 2018) was available but was deemed not to be any better. It was felt that the 2009 side scan survey of the site was also more representative, and this was used throughout the diving. Overlaying the side scan sonar and MBES Surveys highlighted areas within the MBES where with a closer look the cannons could be discerned (see overlay sequence below). This confirmed the position of most of the cannon and that the site, whilst swept by strong currents, had not changed significantly over the years.

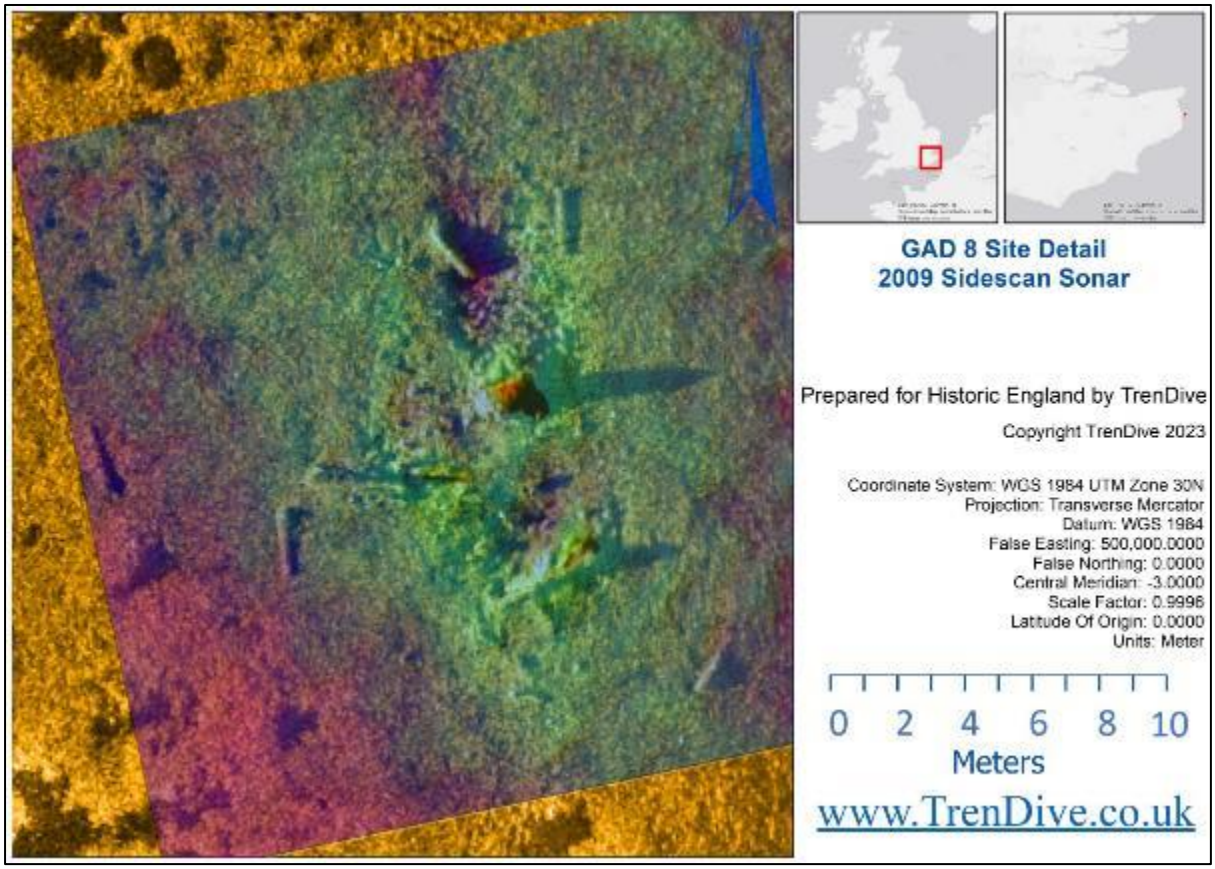


Figure 12 Overlay at 35% opacity combining the side scan sonar and MBES Surveys.

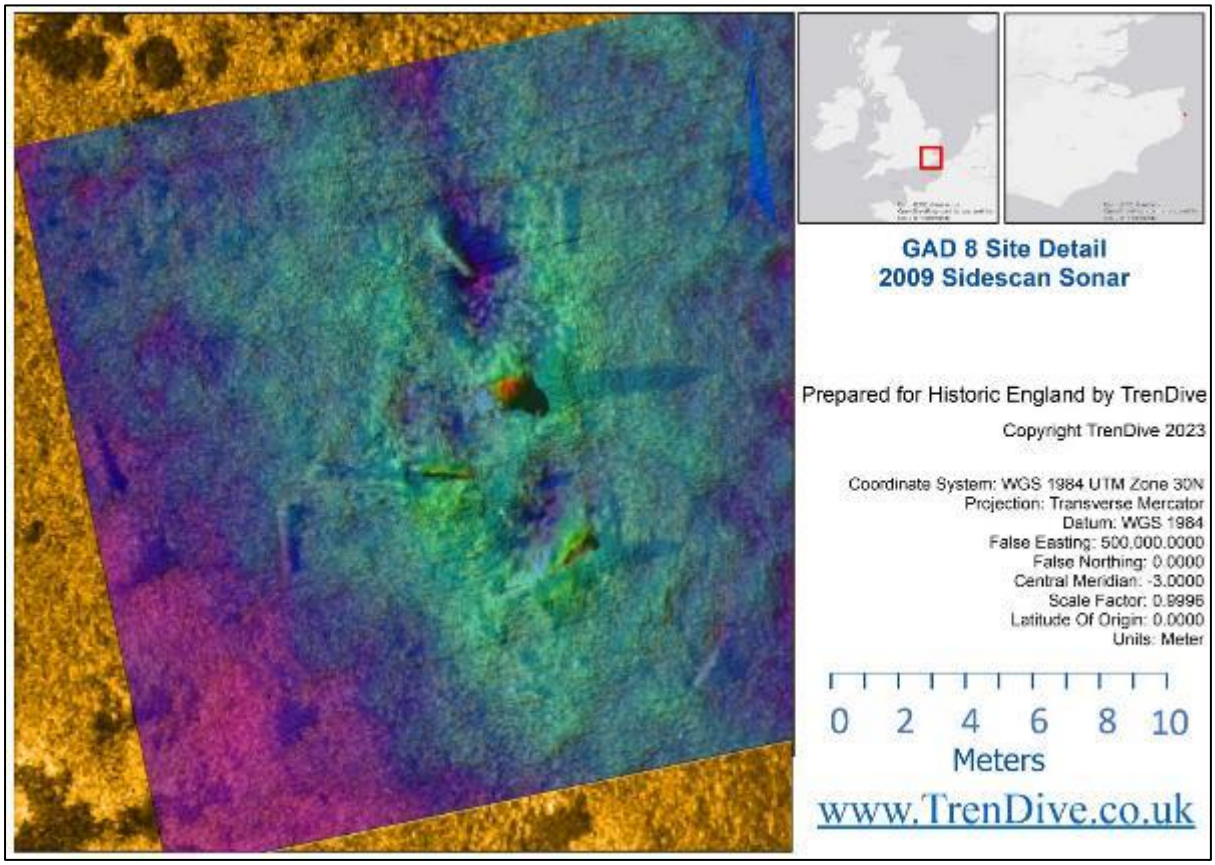


Figure 13 Overlay at 65% opacity combining the side scan sonar and MBES Surveys.

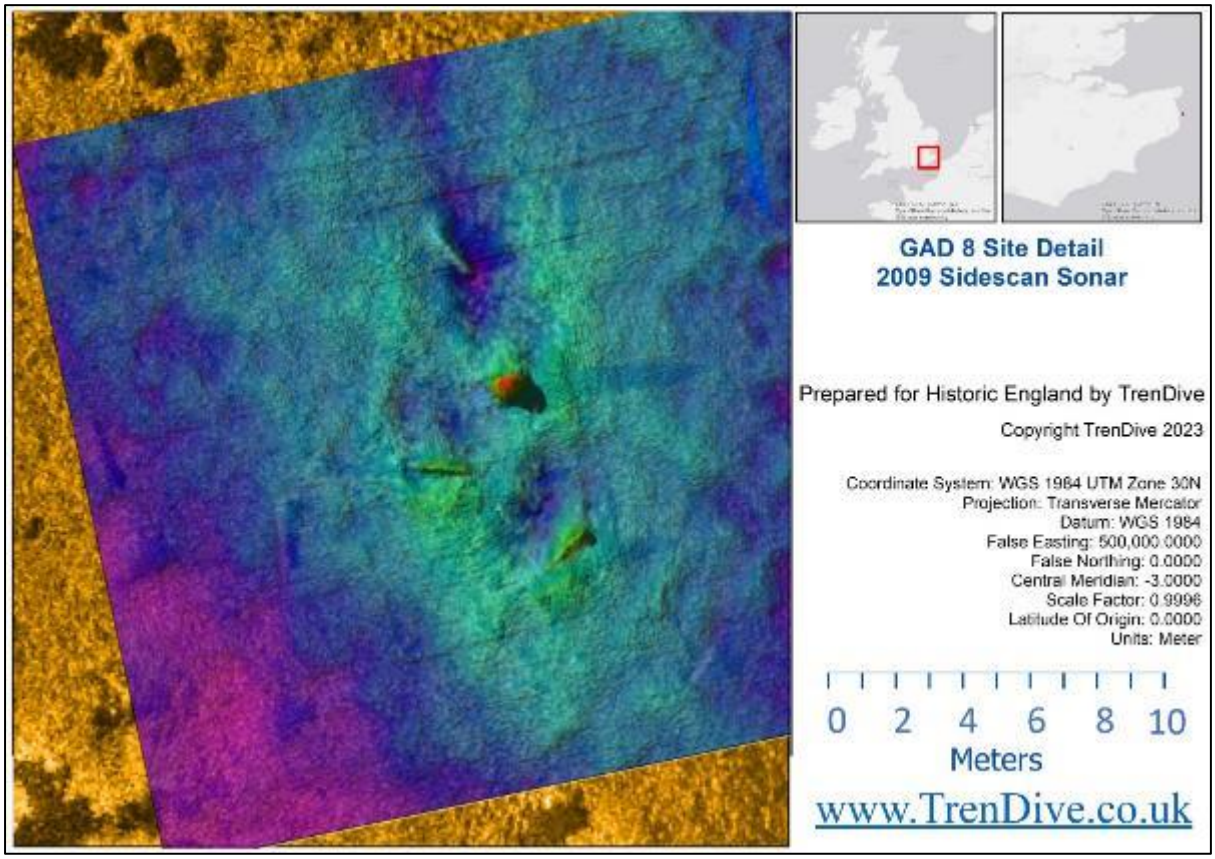


Figure 14 Overlay at 95% opacity combining the side scan sonar and MBES Surveys.

9 Diving Operations

9.1 Diving Dates

9.1.1 Diving took place on the site over a week in August. The diving was scheduled to coincide with other diving. However, weather conditions meant that the other sites could not be dived whilst GAD08 could, thus more work was conducted on the site than planned.

9.2 Accommodation & Subsistence

9.2.1 Diving accommodation and subsistence was sponsored by TrenDive. The accommodation was located at Sandwich, 20 minutes' drive from Ramsgate. Evening meals were provided at local restaurants within Sandwich. Breakfast was provided either at the accommodation or in Ramsgate. Lunch was brought from the local sandwich bar in Ramsgate.

9.3 Personal Diving Safety

9.3.1 Prior to commencement of diving activities all divers meet at Sandwich where they were required to produce proof of,

- their diving qualifications
- medical fitness to dive
- cylinders in date

- regulators serviced and working
- and evidence of third party insurance or BSAC membership.

9.3.2 The rules and regulations of the British Sub-Aqua Club and Southsea Sub-Aqua Club rules were followed by all divers.

9.4 Diving Equipment

9.4.1 All diving was undertaken using open circuit scuba equipment. All divers used their own personal diving equipment and either 15 litre or 18 litre cylinders. A pony cylinder or buddies spare regulator was carried for out of gas emergencies. All divers carried a delayed SMB and real for their ground line.

9.5 Diving Gas

9.5.1 All divers were Nitrox trained. Therefore, to maximise dive times and to give margins of safety all divers used Nitrox for their dives. Nitrox was blended each evening at the accommodation.

9.6 Diving Procedure

9.6.1 Prior to leaving Ramsgate harbour the local coastguard were informed of the diving operations. Prior to each dive the project team were briefed on:

- the dive plan
- current and forecast weather conditions
- current and forecast tidal conditions
- boat and diving procedures (entering and exiting water)
- survey and recording methods
- boat and diving procedures (entering and exiting water
- survey and recording methods
- individual recording tasks
- any health and safety issues.

9.6.2 The diving was planned during a period of neap tides in the last week of July 2022. Diving took place on 22nd to 27th of July 2022. All diving was programmed around a single dive per day. A total of 1428 minutes were completed diving the GAD8.

9.6.3 Diving operations were run using a Diving Project Plan, which included the following:

- Diving Risk Assessment
- Dive Plan
- Dive Logs

Table 3 Table of Summary dive information.

GAD8 Diving Expedition 2022							
Dive Summary							
Dive Site	**GAD 8**						

Date	Diver name	Quals	Cylinder (litres)	Gas Mix (O2%)	Time In	Dive Time (Mins)	Max Depth (Metres)
7/22/2022	Doug McElvogue	AD	18	36	11:25	48	15
	Martin Davies	AD	18	34	11:25	48	15
	Alison Mayor	AD	15	32	11:25	48	15
	Tom Templeton	AD	15	36	11:36	42	15
	Keith Clark	DL	15	32	11:36	42	15
7/23/2022	Doug McElvogue	AD	18	32	11:37	50	15
	Martin Davies	AD	18	31	11:37	69	15
	Alison Mayor	AD	15	32	11:37	69	15
	Tom Templeton	AD	15	31	11:52	59	15
	Keith Clark	DL	15	31	11:52	59	15
7/24/2022	Doug McElvogue	AD	18	33	12:44	68	15
	Martin Davies	AD	18	33	12:44	68	15
	Alison Mayor	AD	15	32	12:44	68	15
	Tom Templeton	AD	15	32	12:59	59	15
	Keith Clark	DL	15	33	12:59	59	15
	Robert Watkins	AD	15	36	13:18	63	15
	Jenny Watkins	AD	15	35	13:18	63	15
7/26/2022	Doug McElvogue	AD	18	32	14:12	62	15
	Martin Davies	AD	18	31	14:12	74	15
	Alison Mayor	AD	15	32	14:12	74	15
	Tom Templeton	AD	15	32	14:30	51	15
	Keith Clark	DL	15	32	14:30	51	15
	Robert Watkins	AD	15	32	14:20	67	15
	Jenny Watkins	AD	15	31	14:20	67	15
					Total	**1428**	

9.7 On-Site Diving Operations

9.7.1 The onsite diving operations followed the below general procedures.

- All divers meet at Ramsgate Mariner 2.5 hours before predicted slack on site. A pre-dive brief was conducted prior to loading equipment (see above)
- All boat equipment was loaded onto the boat, the boat fuel, oil and battery levels checked prior to motoring to the "pick up" pontoon
- All diving equipment was loaded onto the dive boat at the "pick up" pontoon
- The dive boat left Ramsgate harbour 1 hour before predicted slack. A travel time to site was 30 minutes
- Once at the site, the site would be checked with the onboard side scan sonar. Then a buoyed shot was deployed just off the site for the divers to descend. This shot had a secondary line with a small pill buoy on it. When the pill buoy surfaced it signalled time to kit up, as the tide was backing off
- Prior to the commencement of diving operations, the international code flag Alpha was deployed at the stern of the dive boat. Once slack water was encountered then the divers

entered the water and commence their dive. Divers were deployed in 3 waves of diver pairs

- When the divers reached the bottom, they clipped onto the bottom of the shot and reeled out their ground line. This method ensured that divers could always return safely to the shot, then to the surface to be picked up by the dive vessel
- After all divers had been picked up, their dive kit stowed and they signalled they were all OK, the Dive boat returned to Ramsgate harbour.

9.7.2 **Note:** the first pair of divers moved the shot to the site and tied it to a feature south of the central mound. This ensured the shot would not move as divers descended and ascend or between dives. On the last dive it was untied ready for recovery.

9.8 Geophysical Survey

9.8.1 Southsea Explorer is fitted with a Ray Marine Down Vision side scan sonar and echo sounder. This was utilized throughout the project to check the depth of water over the site prior to diving. It also highlighted any anomalies on the seabed.

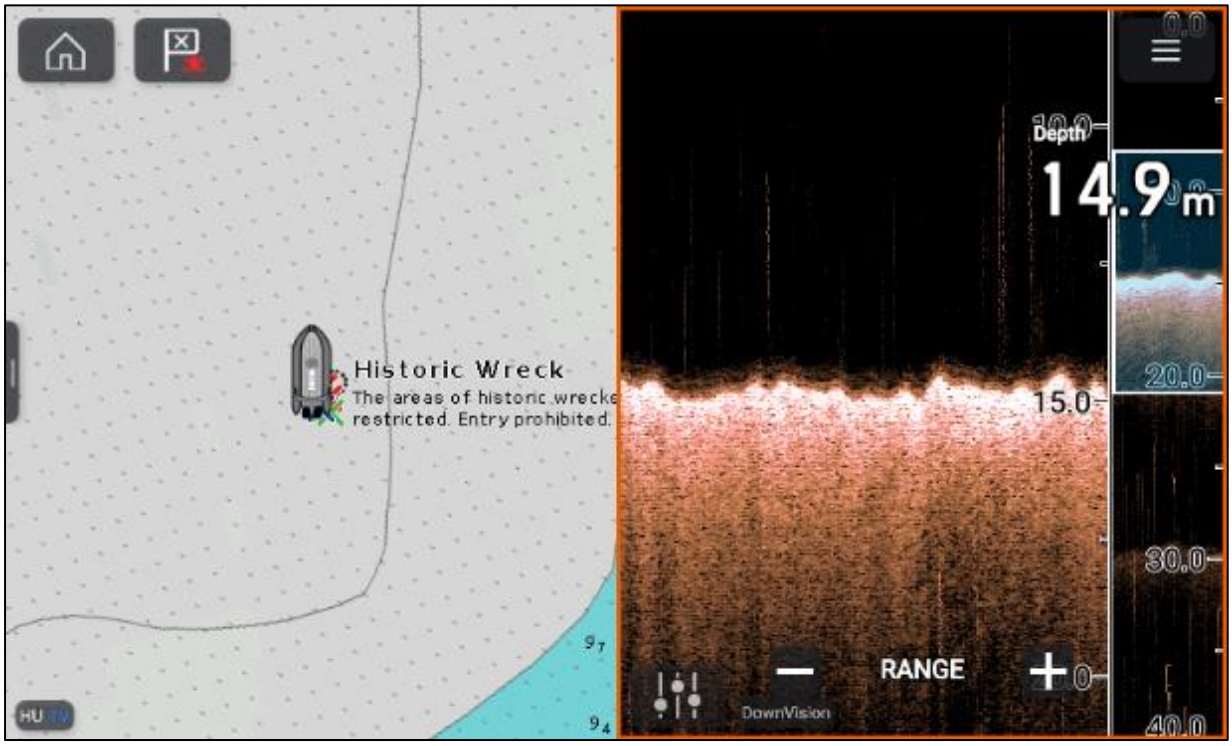


Figure 15 Screen shot from side scan sonar display. The boats position is on the left showing it above the site and the echo sounder trace on the right show depth of water at the site.

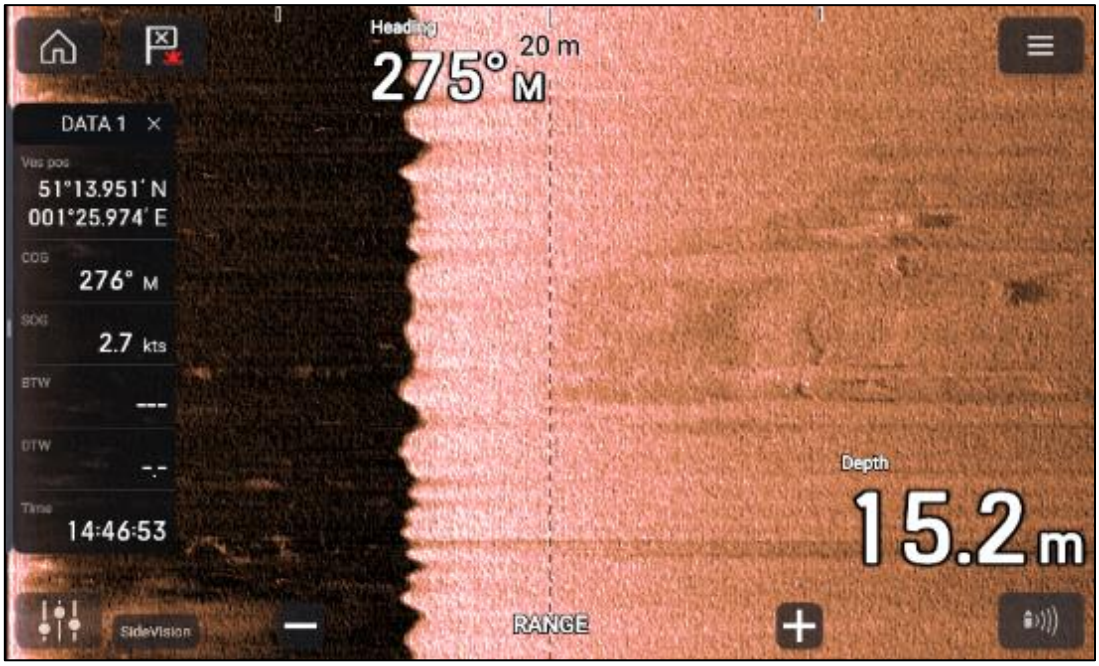


Figure 16 Screen shot from side scan sonar display. The boats position as Latitude and Longitude is shown on the left whilst the side scan sonar trace is seen on the right. The site can be seen as upstanding anomalies.

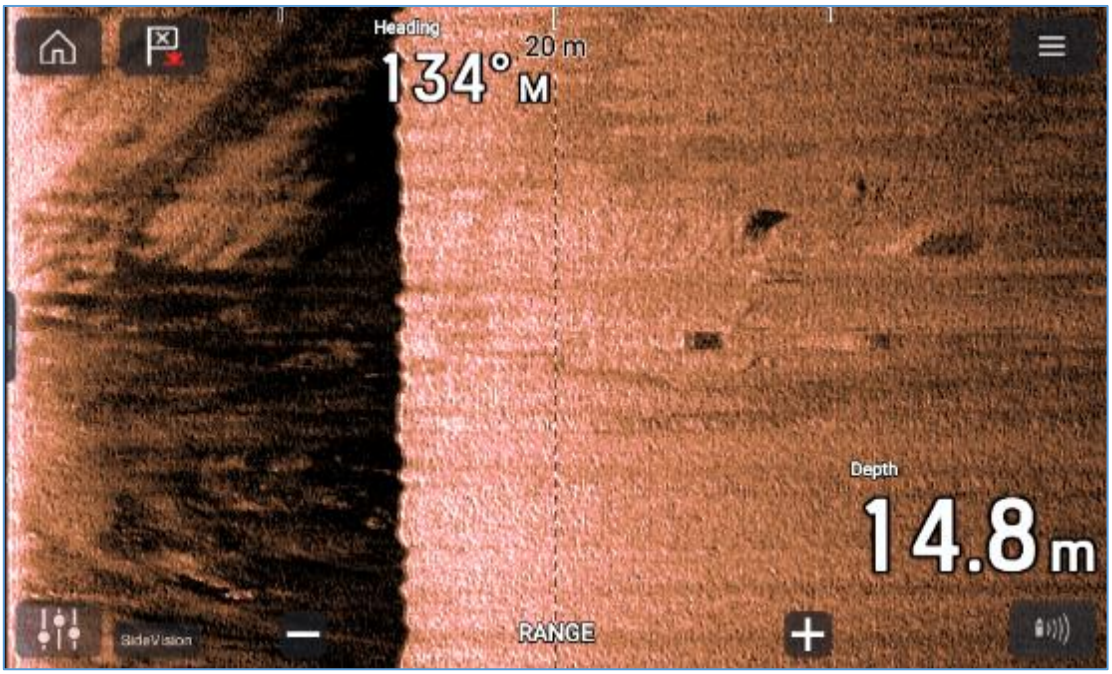


Figure 17 Screen shot from side scan sonar display. The boats course steered is different from figure 13. The site can be seen as upstanding anomalies in the side scan sonar trace on the right.

10 Diver Survey and Ground Truthing

10.1 Diving Conditions

10.1.1 The divers onsite diving conditions experienced at GAD8 are outlined below.

- **Depth -** The site lies between 13 and 15 metres depth of water, on a low neap tide. The shallowest part of the site is to the west where a large mud bank appears.

- **Tidal Conditions -** The site of GAD8 is swept by strong tidal currents during spring and neap tides. The tide runs in a general south to north direction over the site. The current speed backs off 30 minutes before the predicted slack.
- **Dive Time -** There is a predicted slack during neap tides of over 1 hour. This gave a safe bottom time of 45 minutes either side of slack on neaps. The late morning or early afternoon dive times were preferred to enhance light on the site.
- **Scheduling Dives -** Diving times were scheduled only for neap tides. This is due to neaps giving longer diving times and shallower maximum depths. Dives were also schedule for late summer so that there is enough light penetration to the seabed and also better visibility in the Downs, which is usually in late July, August and early September.
- **Seabed Typography -** The general seabed typography consists of a chalk seabed covered by flints and gravel overlain by coarse sand with clay inclusions. Sand waves up to 0.25 meters in height are normal around the wreck site. To the north and south of the site "dunes" of mud, 0.5 metre deep, lye on top of the sand.

10.2 Diver surveying

10.2.1 The methodological approach to carrying out archaeological work underwater followed the procedures and guidelines set out in *Underwater Archaeology: The NAS Guide to Principles and Practice* (Bowen 2008). Any ship timbers were recorded out in accordance with the *IFA Standard and Guidance for Nautical Archaeological Recording and Reconstruction* (IFA 2008).

10.2.2 Divers filled in archaeological/biological record sheets or recorded data on drawing boards and underwater notebooks where required. This provided details of specific work undertaken. The survey record sheets reference any numbers utilized e.g context numbers, feature numbers, species type and number seen. In summary the principal record sheet system includes:

- Dive log sheet
- Archaeological or Biological record sheet
- Context log
- Drawing index
- Photo index
- Video index

10.2.3 The first dives saw divers carry out a swim over of the site and record the position of any upstanding features, as well as tie the ground line to the feature. This allowed for familiarization of the site and also identified the main features seen on the initial site plan, these being the cannon ball mound and several cannons to the to the south and east of the this.

10.2.4 The next dives built on the success of the first. The survey was extended beyond the initial few cannon and cannon ball mound to include outlying cannon and other features. The third dive then allowed for recording of individual features as well as cannon and also tagging the cannon. A total of eight cannons were tagged, one more than and been previously seen.

10.2.5 With this ground line in place to each cannon was tagged. This also allowed hull structure, anthropological features, cannon and artefacts to be photographed or videoed in-situ and/or identified on the initial site plan. A single piece of ordnance Gun 7 was double tagged by mistake (numbers 42 &31), A biological survey was also carried out at this time.

10.2.6 Due to wind conditions (Force 6 gusting to 8) diving was cancelled on one day. This allowed for diving records to be transcribed and the planning of the final days dive. The last dive saw all cannon recorded, and the last of the photogrammetry completed. The shot was untied by the last diver and recovered once all divers had been recovered to the boat.

10.3 Cannon/Ordnance recording

10.3.1 A total of 8 cannons (referred to in this report as cannon, guns and ordnance) were identified, tagged and either photographed with a scale bar, recorded with photogrammetry or by direct measurements. All the pieces of ordnance recorded are classed as smooth bore muzzle loaders made of cast iron. This is of a type expected to be recorded on a ship of the period of the *Carlisle*. Bob Peacock suggested that the pieces of ordnance lay in a line. However, on close inspection this is not exactly the case. Some line in a rough line but can be perpendicular to the piece next to it. So, they don't represent cannon lying at their gun ports. Further details of the ordnance and interpretation of the piece of ordnance is given in the table below and described after it.

10.3.2 **Note:** lengths of ordnance are measured from the base ring to the end of the muzzle unless otherwise stated.

Table 4 Table of Ordnance recorded on site.

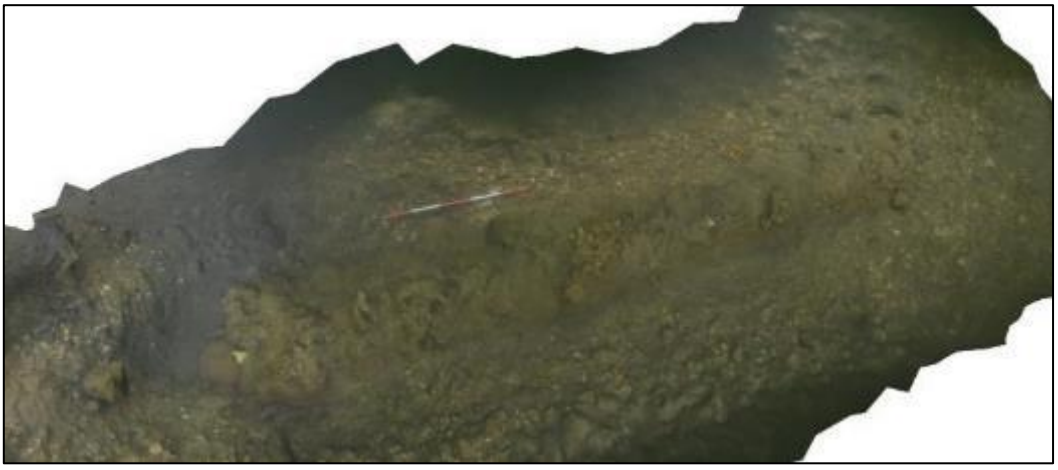
Context Number	**Ordnance Number**	**Full length exposed**	**Orientation**	**Description**
36	1	Yes	E-W	heavily concreted - length 2.4m - Cascabel and one trunnion seen – on its side - 0.75m E of 2
26	2	Yes	N-S	heavily concreted - length 2.9m - 0.75m W of 1
28	3	No		heavily concreted - approximate length 0.75m
30	4	Yes	N-S	heavily concreted -length 2.8m
32	5	Yes	NNW-SSE	heavily concreted - length 2.7m - 0.9m to trunnion - Bore concreted 0.08m in diameter - cascabel and one trunnion seen – on its side - orientation NNW-SSE
35	6	Yes	NNE-SSW	heavily concreted - length 2.8m
42/31	7	Yes	E-W	heavily concreted - length 2.8m - cascabel
37	8	Yes	NE-SW	heavily concreted -length 2.7m

- Cannon 1 (tagged number 36) is 5m south-west of the mound. Its length is 2.4m and is aligned east-west. It is heavily concreted with a defined cascabel and one trunnion visible. The size of this piece suggests a 'medium' sized gun in the range from a long 6-pounder to a short 12-pounder.

- Cannon 2 (tagged number 26) is 7m south-west of the mound and 0.75 metres from cannon 1. Its length from muzzle to base ring is 2.9m and it is orientated north-south. It is heavily concreted but its cascabel and trunnions are discernable. The size of this piece suggests a 'medium' sized gun in the range from a long 6-pounder to a short 12-pounder.

- Cannon 3 (tagged number 28) lies 0.5m from cannon 2. Its full length was not exposed, being only 0.75m long. It is heavily concreted but the detail of its cascabel could be seen.

- Cannon 4 (tagged number 30) is 10m west of the mound. Its length from muzzle to base ring is 2.8m and it is orientated north to south. It is heavily concreted but the cascabel and trunnions are discernible. The size of this piece suggests a 'medium' sized gun in the range from a long 6-pounder to a short 12-pounder.



- Cannon 5 (tagged number 32) is 5m north of the mound and sits to the west of cannon 6. It is 2.7m long with trunnions 0.9m from the base ring. Its open, but concreated bore was measured as 8 cm. Again, this is a medium sized piece of ordnance.

- Cannon 6 (tagged number 35) is 5m north of the mound and less than 2m from cannon 5. It is 2.8m long and orientated NNE to SSW. It appears to have been partially deconcreted at some point in the past. Again, this is a medium sized piece of ordnance.

- Cannon 7 (tagged number 42/31) is located approximately 13m to the south-southeast of the mound. It is 2.8m long and orientated east to west. It is heavily concreted but the cascabel is well defined. As with the other pieces of ordnance this is of medium size.

- Cannon 8 (tagged number 37) is located 8m due south of the mound and between it and cannon 7. It is 2.7m long and orientated east to west. It is heavily concreated but its cascabel and trunnions are discernible. Again, it is considered a medium sized piece of ordnance.

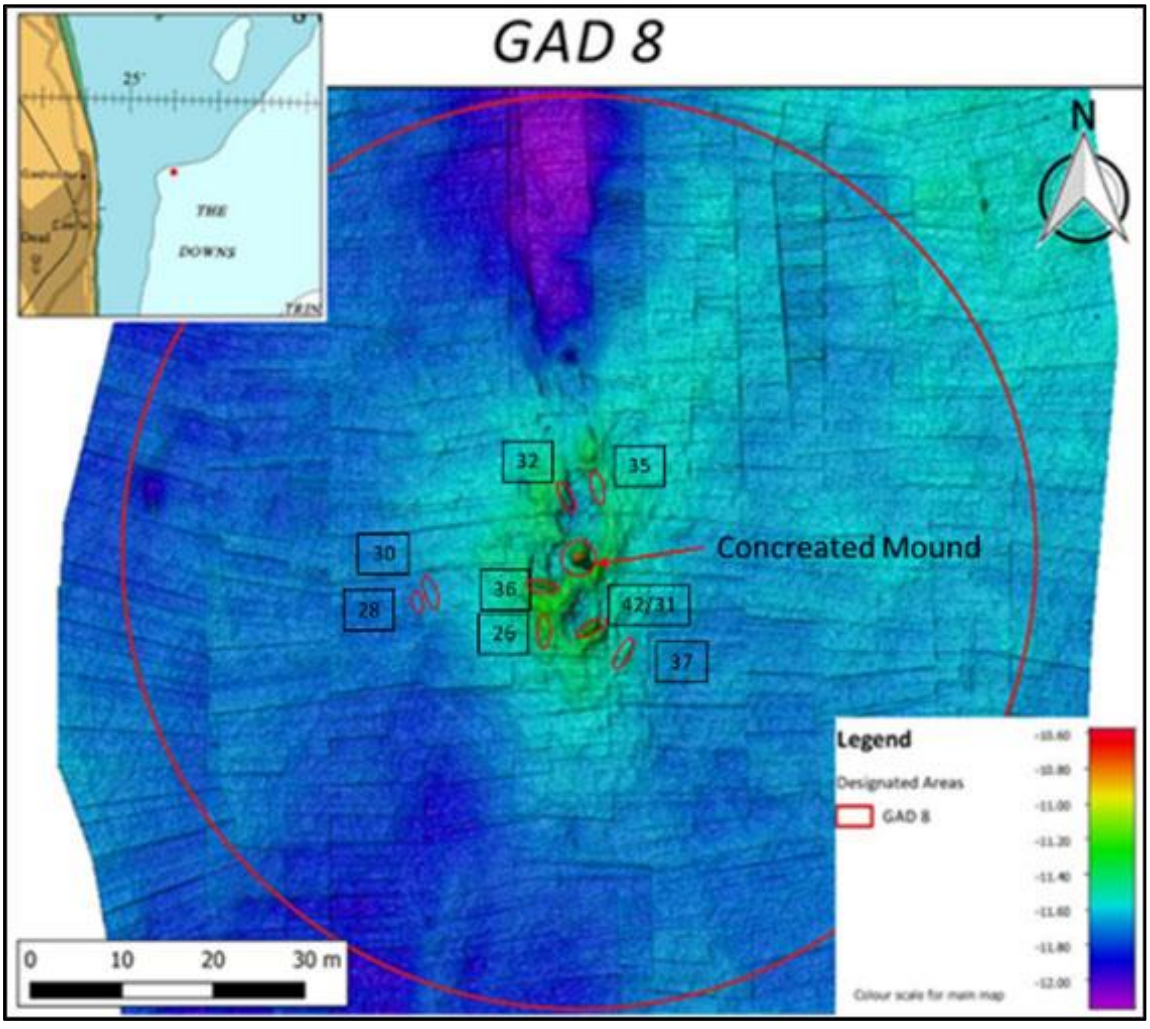


Figure 18 Initial site plan of the GAD8 based on 2022 field work and 2015 MBES.

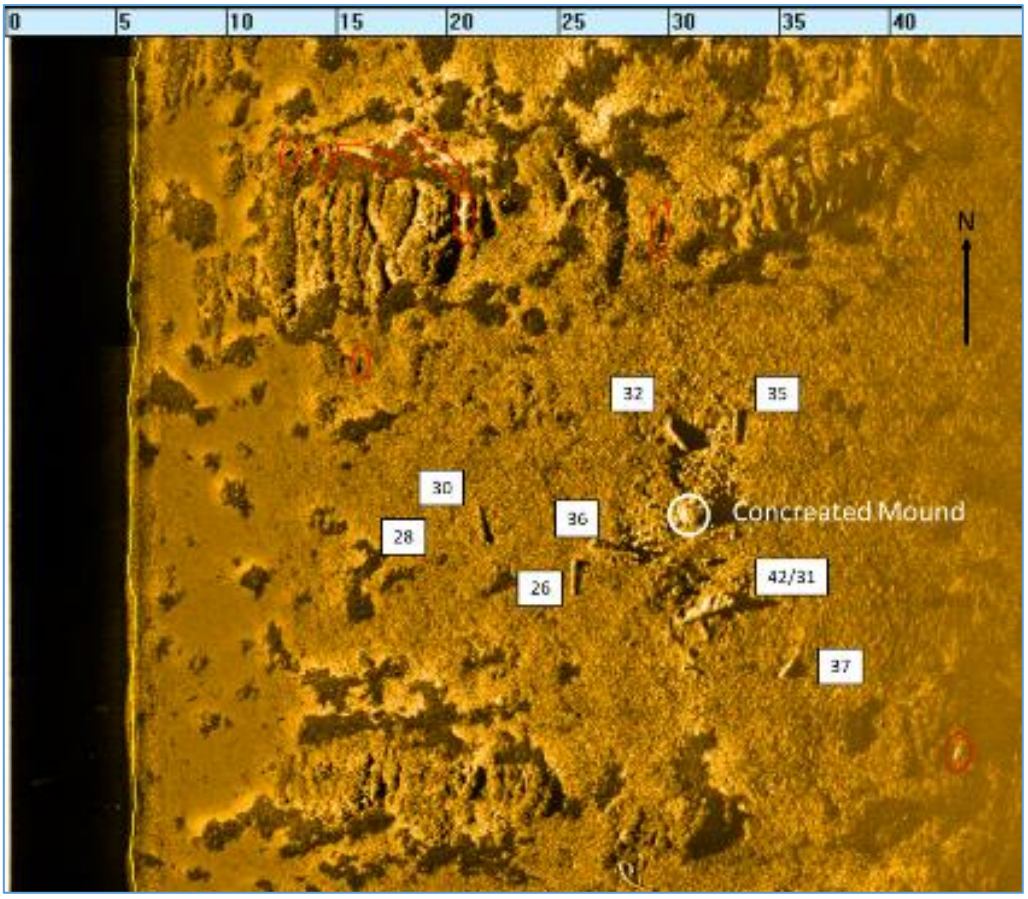


Figure 19 Initial site plan of the GAD8 based on 2022 field work and 2009 Side scan sonar. Red ovals are other anomalies.

10.4 Direct measurements

10.4.1 A series of direct measurements between cannon and the mound and also individual cannon were undertaken. This helped to confirm their position on the initial site plan and also to rescale the site plan in the GIS application.

10.5 Digital Still & Video Photography

10.5.1 A total of 4375 digital stills photographs and 35 videos totalling 675 minutes off underwater footage was recorded during the project. Digital stills and video photography was used to record features on the site. These could then be reviewed in the evening to help plan the next dives. Also, they have formed a record of the project and the features on site. Where an archaeological record was required each cannon, artefact or feature was photographed with a scale. Video and stills were also used to assist with the species identification for the biological survey.

10.6 Photogrammetry

10.6.1 A total oof 22 photogrammetric 3 dimensional models were produced by the project. This includes all the cannon, the central mound and timbers. The photogrammetric models have contributed to creating the level 3a record of the site.

10.7 Biological survey

10.7.1 All biological surveys were recorded following the guideline outlined in the Seasearch Observation Form Guidance Notes and the Seasearch Survey Form Guidance Notes (Seasearch, 2022). The Seasearch proforma sheets were utilized for all biological surveys. Each diver recorded their observations and where possible photographs or video of sea life. This record was then used to identify the species from a guide to sea and shore life (Gibson et.al., 2001; Erwin and Picton 1995). with the assistance of a professional Marine Biologist Ali Beal. The correct species is transferred to the Seasearch proforma sheets and then posted to Seasearch for inclusion in their database. See the table below for a list of species seen and identified.

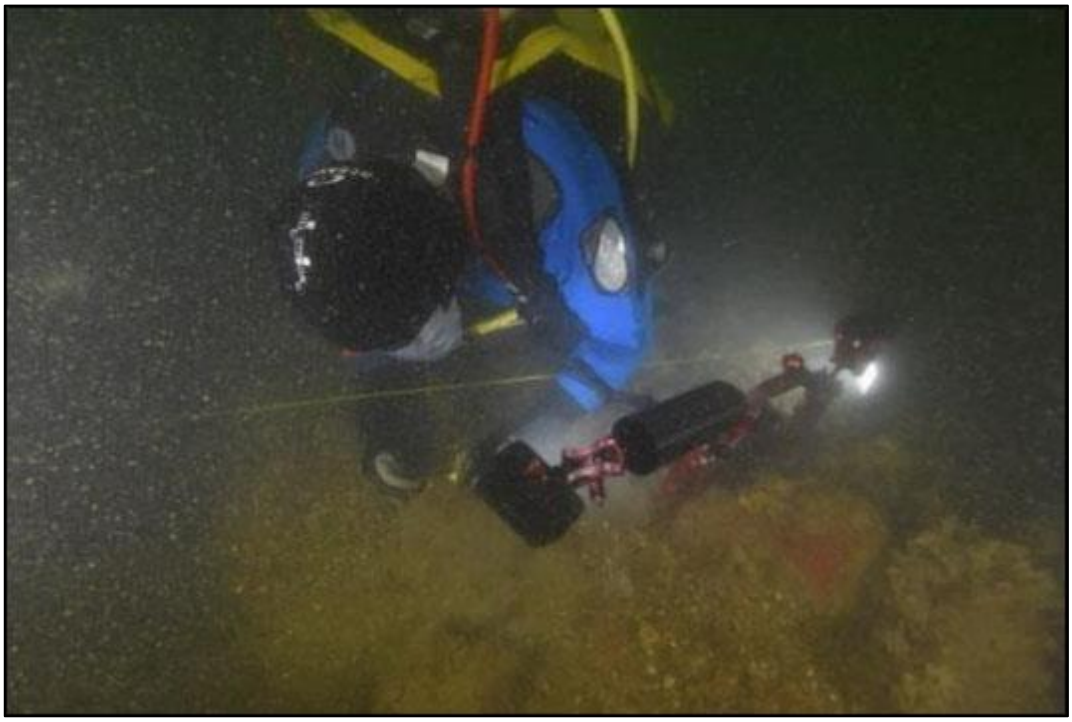


Figure 20 Diver surveying marine biology along a transect

Figure 21 Hydroids seen on GAD8

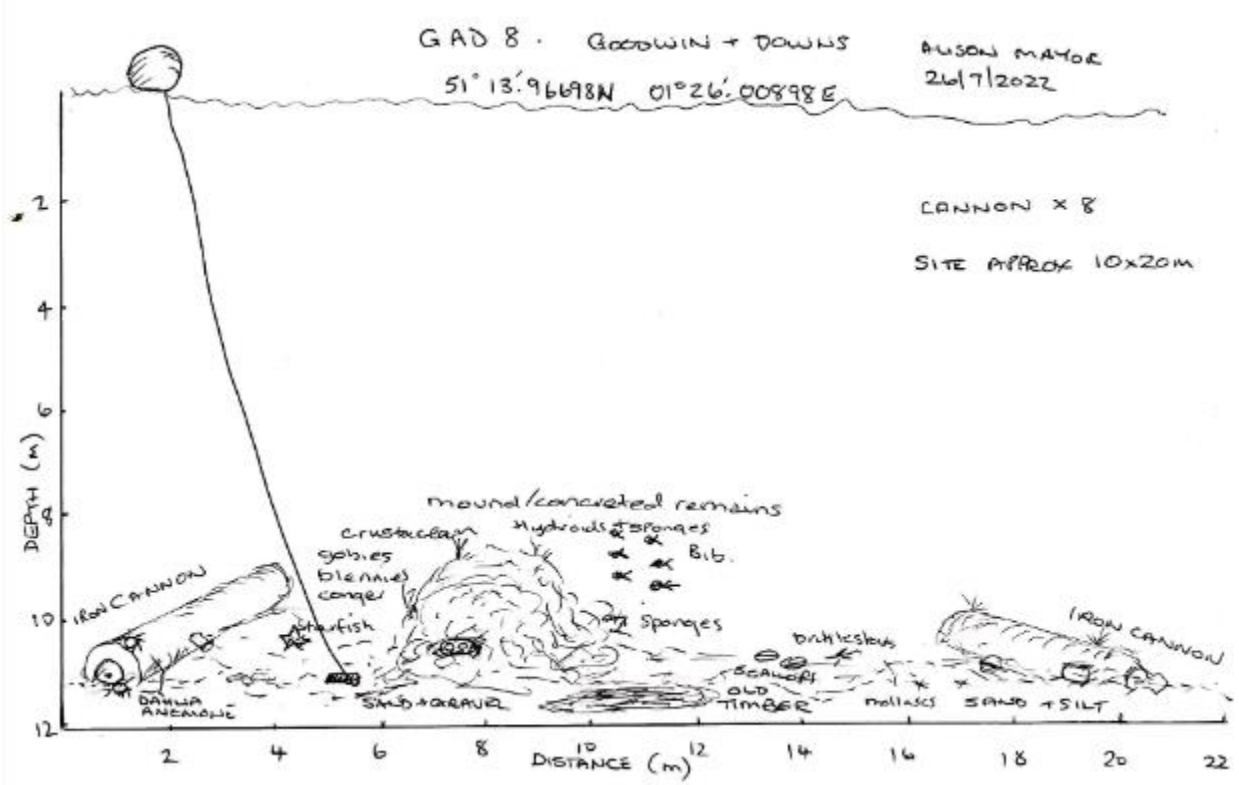


Figure 22 Sketch of marine biological survey transect (Alison Mayor)

Table 5 Table of marine species seen on GAD8

Species seen and identified on GAD8				
Sponges				
	Suberites (species)		sulphur sponge or Sea Orange	
Sea Anemones				
	Dahlia anemone			Urticina felina
	white anemone		Sandy creeplet	Epizoanthus couchii
Corals				
	Dead Men's Fingers			Alcyonium digitatum
Hydroids				
	Oaten Pipe Hydroid			Tubularia indivisa
	Antenna Hydroid		Sea Beard	Nemertesia antennina
Molluscs				
	Whelk			Buccinum undatum
	Queen Scallop			Aequipecten opercularis
	Sting Winkle		Oyster Drill	Ocenebra erinaceus
	common wentletrap			Epitonium clathrus
Segmented worms				
	Peacock worm			Sabella pavonina
Crustacean				
	lobster			homarus gammarus
	Great spider crab		Sea toad	Hyas araneus
	edible crab			Cancer pagurus

	Common hermit crab			Pagurus bernhardus
	Velvet swimming crab			Necora puber
	spider crab		Scorpion spider crab	Inachus dorsettensis
Bryzoans				
	Hornwrack			Flustra foliacea
Echinoderms				
	Common Starfish			Asterias rubens
	Sand Brittle Star			Ophiura ophiura
Fish				
	conger eel			Conger conger
	dragonet			Calliomymus lyra
	bib			Trisopterus luscus
	tom pot blenny			Parablennius gattorugine
	Sand goby			Pomatoschistus minutus
	evidence of cat shark (Mermaid's purse egg)			Scyliorhinus canicula
	pollock			Pollachius pollachius
	bib or pout			Trisopterus luscus

Figure 23 A crab seen on GAD8

10.7.2 The flora and fauna colonizing GAD8 proved it to be a marine oasis in a barren seabed. The surface features were covered in an abundance of sea life, sponges, seaweeds and hard encrustation. Unlike the wrecks further offshore hey was a paucity of barnacles

and mussels. These were however toed off site within the mud layers. The exposed surfaces collect light silt and has layers of common mussels in clumps throughout. Velvet crabs graze over this layer during slack waters, whilst Hermit crabs scurry around the seabed in between starfish, brown crabs peek out their hidey holes and young Pout and Pollock dart around in small shoals along with other fish.

Figure 24 Bib seen on GAD8

Figure 25 Starfish seen along marine biological survey transect.

10.8 Metal Detector Survey

10.8.1 A handheld metal detector survey was carried out on the last dive. This consisted of surveying 2 meter wide sweeps along East west corridors. The aim was to understand if there were any other buried cannon and or other features. The initial results would suggest the outlying cannon is isolated find and not associated with other parts of the wreck, but that the wreck and an area 6 meters out from the central mound consists of buried features with iron within them.

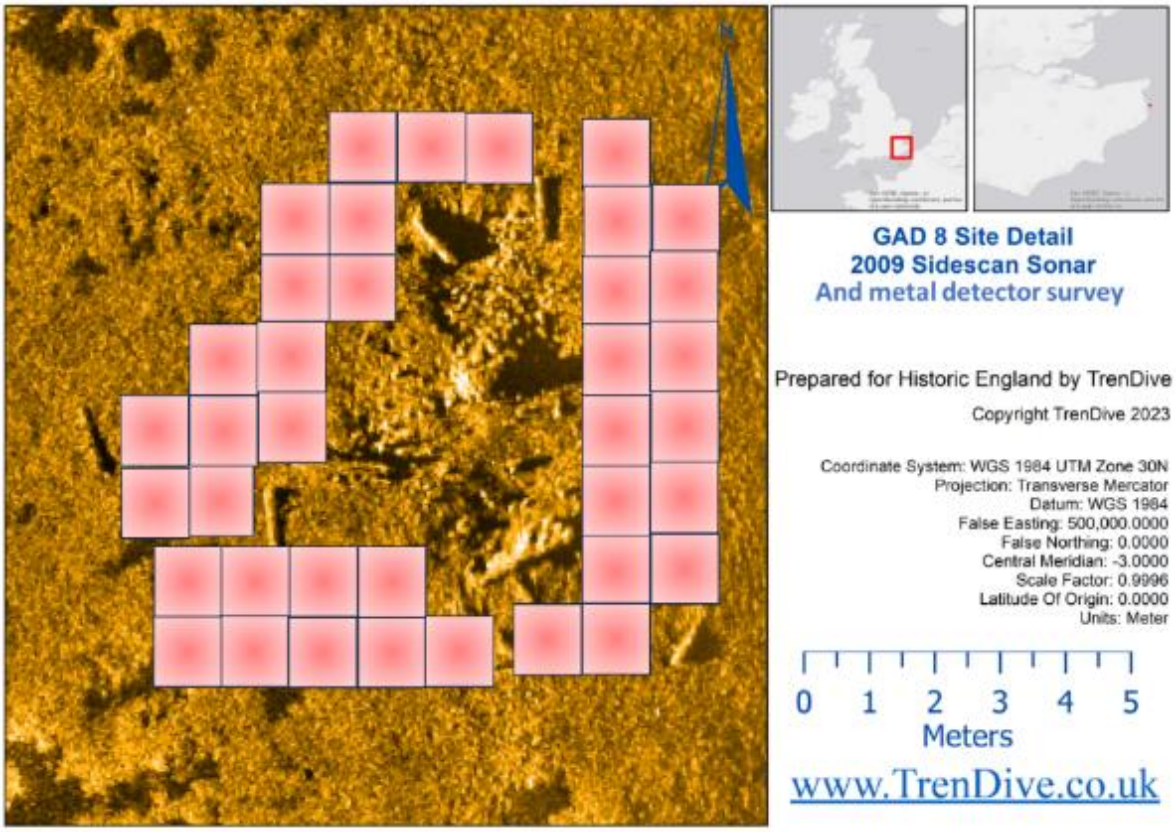


Figure 26 Metal detector survey of the site. Each red 1m square represents where there was a signal.

10.9 GAD8 Level 3 Record

10.9.1 GAD8 consists of a central up standing mound of concretion. It is approximately 2m in diameter and 1m upstanding from the surrounding seabed. The mound is a conglomerate of concretion, cobbles and other sub-circular objects, possibly heavily concreted shot. It is interpreted as a mound of cannon balls representing the remains of the shot lockers around the main mast and pump well. The mound has concreated features evidenced within it, including a flat face which may represent the side of a shot locker.

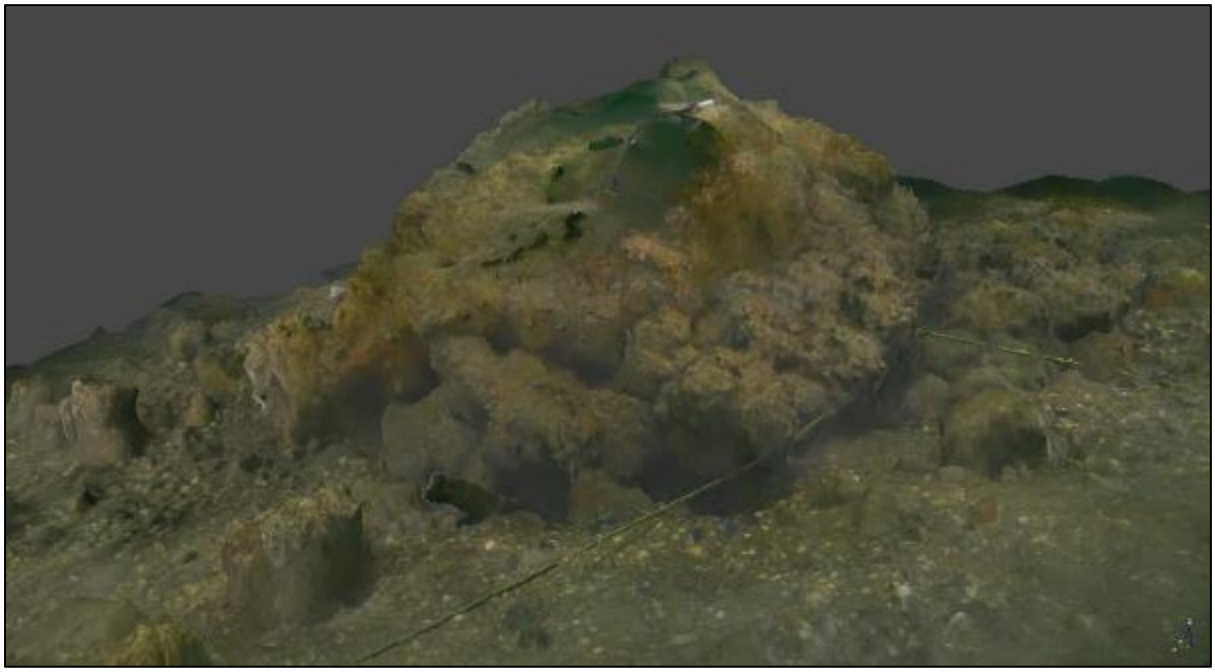


Figure 27 The central mound seen from the south eastern corner.

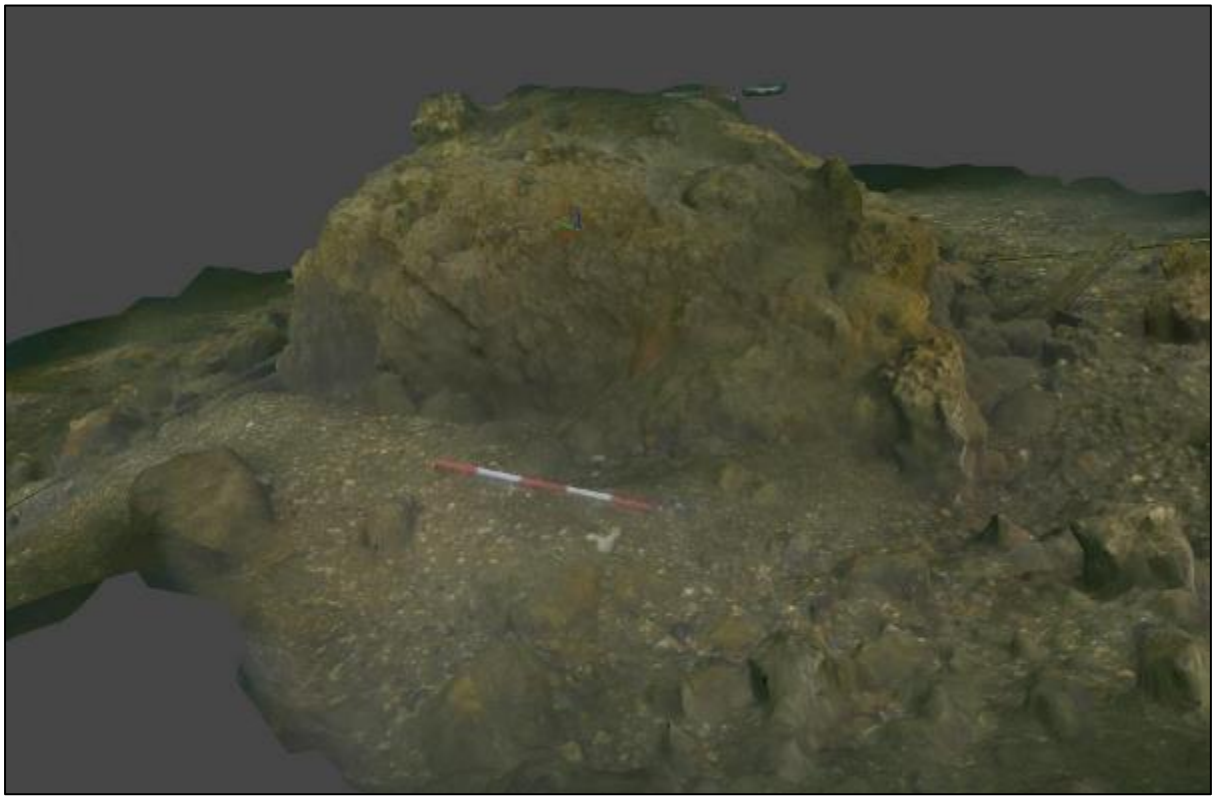


Figure 28 The central mound seen from the north western corner

10.9.2 There are a number of loose timbers around the site. These vary in size from small pieces less than 0.25 m, to longer pieces up to 2 meters long. There is also a large articulated timber to the east of the central mound.

Figure 29 Photogrammetric model of a loose lying timber on site.

10.9.3 This timber structure is composed of what is interpreted as flush laid planking and at least one larger structural timber running in a north/south orientation. This could be a frame or beam. Additional layers of timber can be seen beneath the planking. Theis exposed structure has been interpreted as being "…likely to represent part of the hull or deck of the vessel, although further investigation is required to state this with certainty" (WA, 2011). It is in this area that Wessex archaeology excavated "fragments of timber recovered from a small test pit excavated in the northwest of the site were found to have an almost decorative appearance and were thought to represent a window or door frame or molding for paneling" (WA, 2011). Therefore, it is possible that the remains of the internal ship structure may be buried on the site.

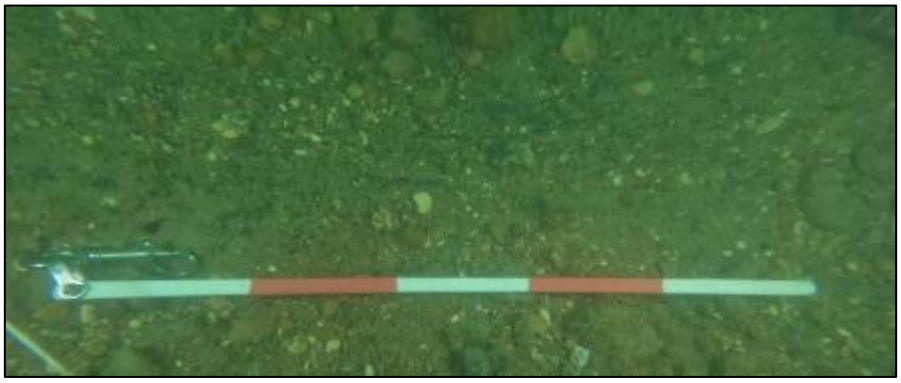


Figure 30 Part of the large articulated timber, seen partially burried just above the scale.

Figure 31 Part of the large articulated timber.

10.9.4 The seabed around the site is scattered with artefacts, from broken green glass wine bottles to pottery and modern day detritus. A number of artefacts were recovered from this site by Wessex Archaeology in 2011. These included a glass bottle neck dating from 1650 to 1750 (WA, 2011). Broken shards of similar glass ware is seen all round the site.

Figure 32 Base of a green glass bottle on GAD8.

Figure 33 Small glass jar on GAD8.

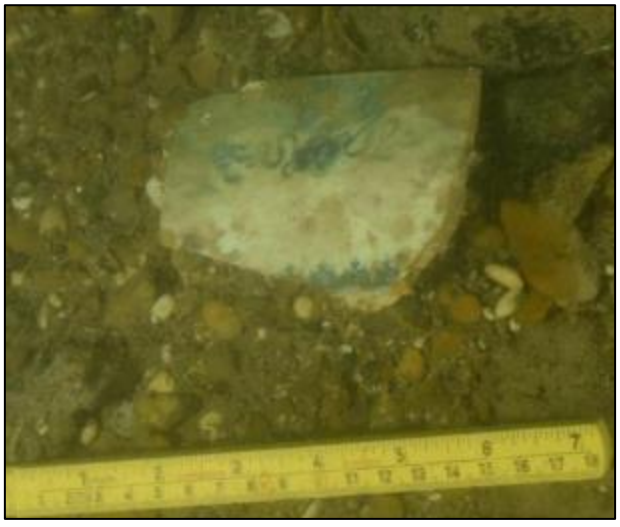


Figure 34 Pottery sherd on GAD8.

10.10 Site Identification

10.10.1 This year the general location and overall dimensions of the cannon have been recorded. Whilst not conclusive their sizes do confirm that this is a warship or large armed merchant ship. The ordnance is more diagnostic for a fourth or fifth rate as opposed to the larger third or second rates. Other features have also been identified, such as large timbers, a concreated mound and cannon balls.

10.10.2 The site is noted to be scattered with pottery and glass sherds, some of which are of the same type of glass ware as the bottle top date to between 1650's and 1750. Of significance is that the single piece recovered by Wessex archaeology (WA, 2011) was recovered from excavated sediments 0.3 meters deep, meaning it was *in situ* and contemporary to the wreck. However, none of this archaeological evidence currently identifies the site.

10.10.3 One theory is that instead of being a wreck, the site could be considered a "dumping" ground. A reason for this interpretation is finding rope wrapped around some of the cannons. It is possible that they were lifted over the side of a boat and dumped. However, these strop's could represent a salvage attempt.

10.10.4 The Downs are known to be the site of numerous wrecks, from ships cast up on the beach in front of Deal to Fleets of Merchant men sunk at their anchors during storms. Most of these wrecks are known to disperse during winter gales, as reported by Trinity House in their survey of the *Carlisle*. Such wrecks became seabed obstructions causing damage to the unknown ships when anchoring, as reported on September 25th, 1730, to Commissioner Richard Hughes at Portsmouth.

> *"Report of damage to the Fox's cables, when she anchored foul of a wreck in the Downs…"* (ADM 106/819/194).

10.10.5 As late as 1869 Trinity House was urging the *"…removal of Wrecks in St. Nicholas (Yarmouth) and "The Downs"…"* due to them being *"…obstruction to navigation"*. (MT 10/73/8)

10.10.6 It is known that a number of ships wrecked, blew up or foundered at their anchors in the Downs of Deal. These included *HMS Carlisle*. It is also known that there would be attempts at salvage or to sweep the area to clear any obstructions or recover any cannon or anchors. Therefore, it is not surprising that the site may not have the full complement of ordnance and anchors expected of an armed sailing ship of the period 1650-1750, including the Carlisle.

10.10.7 Further archaeological work is required on site to gain more information with which to positively identify the wreck. This project has taken big steps in securing future funding to carry out further investigations into this unidentified wreck.

11 Project Budget

11.1.1 The project was carried planned ot be carried out at the same time as other diving was

taking place on the Goodwin Sands. This would allow the project to maximise its time and costs for diving the site. Weather conditions however meant that the off shore diving was cancelled. However, TrenDive decided to sponsor any short fall so that diving could continue on site. The project budget is outlined below. The short fall was paid for by TrenDive.

Item	Rate	Multiple	Total
Travel	0.44	504	£340.20
Fuel & Oil	100	6	£450.00
Subsistence	75	21	£1,575.00
Accommodation	£89.99	21	£1,889.79
	Grand Total =		**£3,914.79**

12 Future work

12.1 Recommendations

12.1.1 The current team will continue their investigation of the site called GAD8 in 2023. A single anomaly to the Northeast of the site, and outside of the designated area can be seen in the 2015 site plan. This anomaly was not ground truthed, but consideration should be given to ground truthing it in 2023.

12.1.2 A separate project proposal will be submitted to Historic England. This will cover diving on the site to:

- Excavate the full length of the cannons to recorded them
- Sample the timbers for species analysis and possible dendroecological analysis
- Systematically carryout a metal detector survey to identity further buried material
- Finalise the photogrammetric survey of the site
- Ground truth other anomalies seen in the side scan and MBES surveys
- reapply for a license.

12.1.3 The proposal will seek funding to assist with the continued investigation and hopeful positive identification of this significant site.

13 Conclusion

13.1.1 The British Sub Aqua Jubilee Trust (BSAJT) grant has allowed the site of GAD8 to be

recorded, interpreted and the results presented in a format accessible to the diver and the public. The BSAJT grant has inspired a new team of BSAC divers in their local underwater heritage and to become custodians for this heritage. These divers' future tasks will be further:

- archaeological and biological survey training
- training in 3d photogrammetry
- training in archaeological illustration
- further site surveys of archaeological significant wrecks in and around the East Kent coast.

13.1.2 The grant aid from the BSAJT has acted as an enabler for the continued survey of GAD8. This will hopefully progress with further recording of the site and its features as well as a 3D photogrammetric survey of the site.

13.1.3 The British Sub Aqua Jubilee Trust grant has significantly helped to facilitate the long term care and management of the Protected Wreck GAD8, an unidentified wreck in the Downs off Deal, Kent. This is a big step in the future management of the site to save it for current and future generations.

14 References

14.1.1 **Note:** Historic England is referred to even when it was formerly English Heritage. WA refers to Wessex Archaeology.

14.1.2 Erwin and Picton. 1995. *The Species Directory of the Marine Fauna and Flora of the British Isles and Surrounding Seas*. Belfast.

14.1.3 Gibson, R. *et. al.* 2001. *Photographic Guide to the Sea & Shore Life of Britian & North-west Europe*. Oxford.

14.1.4 Historic England. 2012. *The Goodwin Sands and the Downs, off Kent, Overview of Archaeological Investigations.* Unpublished document. London.

14.1.5 Historic England. 2012. *English Heritage (Protected Wreck) Advice Report for GAD8 - unknown wreck site*. Unpublished document. London.

14.1.6 Larn, R. 1995. *Shipwrecks of the Goodwin Sands.* Meresborough Books. Totnes.

14.1.7 Seasearch. 2022. *Recording Data*. Accessed on: 20/06/2022/ Accessed at: https://www.seasearch.org.uk/record.

14.1.8 WA. 2009. *South East of England Designated Wrecks: Marine Geophysical Surveys*. Unpublished document. Salisbury.

14.1.9 WA. 2010. *East of England Designated Wrecks: Marine Geophysical Survey and Interpretation*. Unpublished document. Salisbury.

14.1.10 WA. 2011. *Unknown site GAD 8, the Downs, Kent*. Unpublished report. Ref:53111.02k-22. Salisbury.

14.1.11 WA. 2012. *The Goodwin Sands and the Downs, off Kent. Overview of archaeological investigations.* Unpublished report. Ref: 53111.02k-27. Salisbury.