Wessex Archaeology

Unknown Wreck, Drumbeg, Highlands

Undesignated Site Assessment Report

Ref: 83800.15.04

November 2012

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ARCHAEOLOGICAL SERVICES IN RELATION TO THE MARINE SCOTLAND ACT (2010)

UNKNOWN WRECK, DRUMBEG, HIGHLANDS

UNDESIGNATED SITE ASSESSMENT REPORT

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Summary

WA Coastal & Marine was commissioned by Historic Scotland to undertake an undesignated assessment of a newly reported wreck near Drumbeg in the Parish of Assynt in the Highland Council region. WA Coastal & Marine were asked to liaise with the discoverer of the site, Ewen Mackay, and to conduct a photographic, acoustic and measured survey of the site to confirm the nature and extent of recovered and *in situ* artefacts reported by local divers to Historic Scotland. Fieldwork was conducted at the site between the 18th and 21st of September 2012. Conditions were found to be ideal for diver survey.

Initial survey of the site recorded three concreted iron cannons lying close together approximately 35 m from the MLWS mark. It was subsequently established that the cannon lay on top of a preserved section of hull of around 10.65m length which was lightly covered by mobile sand. Discussions with the local diver revealed that there were two 'arrow'-shaped anchors possibly associated with the site. One of these had lain beside the cannons but had been moved by the local divers to facilitate metal-detecting. Its current location is on the seabed 350m away from its original position on the seabed. This anchor was surveyed by divers. A second anchor was reported approximately 200 m to the north-east of the main site. No survey was made of this anchor in order to focus resources on the main site but it is described as being similar to the first anchor.

A number of isolated unstratified finds were recorded on the seabed in the area around the cannons by the dive team. Some of these were recovered for analysis. Recovered finds included an 17th/18th - century Dutch delft tile depicting a three-masted ship; a number of orange and yellow hand-made un-frogged bricks; and a large fragment of heavily gribbled timber, thought to be the end of one of the hull timbers. Two small cannonballs were also found in close proximity to the cannons. A number of finds previously recovered from the site were handed to WA Coastal & Marine by one of the two local divers, Ewen Mackay, to allow for specialist analysis. These included a well preserved cannonball, a wooden rigging block, and a brick similar to those discovered on the site. It was noted that several cannonballs previously discovered at the site had been heavily corroded and had disintegrated upon recovery.

Initial analysis of the vessel remains, cannons, and associated artefacts suggest the wreck is of a substantial armed wooden sailing vessel dating to the late 17th/18thcentury. The recovery of a Delft tile and discovery of the possible Swedish origins of cannons at the site suggests a provenance in Northern Europe.

In addition to measured survey and diver tracking, the relatively new technique of automated photogrammetry was applied to the cannons and the results are presented below.

A number of recommendations for further investigation of the site have been made. These include geophysical survey and diver excavation and survey, all of which should include liaison with the local divers who discovered the site.

During the diving operations WA hosted non-diving visits to the site by Philip Robertson and Ewen Mackay.

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Acknowledgements

This investigation was commissioned by Historic Scotland, and the assistance provided by Phil Robertson and other members of staff is gratefully acknowledged.

Wessex Coastal & Marine would also like to thank the following people and organisations (alphabetical order):

- Henk Bussink of www.dutchdelfttiles.com;
- Michael Errington, local diver and co-discoverer of the wreck;
- Frank L. Fox, independent researcher;
- Pieta Greaves, Conservator, AOC Archaeology;
- Ewen Mackay, local diver and co-discoverer of the wreck;
- Mari Mackay, local researcher;
- Jimmy McIntosh, skipper of the MV Nimrod;
- Museum of London Archaeology Service (MoLAS), in particular Ian Betts, Building Materials Specialist;
- Charles Trollope, independent cannon specialist

John McCarthy, Jonathan Benjamin, Kevin Stratford and Daniel Pascoe carried out the fieldwork, with the able assistance of local contact Ewen Mackay and vessel skipper Jimmy McIntosh. Kevin Stratford and Daniel Pascoe supervised the diving and John McCarthy supervised the fieldwork. Jonathan Benjamin was principal photographer and John McCarthy processed the images into photogrammetric models.

The report was compiled by John McCarthy with contributions by Graham Scott, Dan Atkinson and Jonathan Benjamin and edited by Toby Gane. Karen Nichols prepared the illustrations and Toby Gane managed the project for WA Coastal & Marine.

Data Licences

Material derived from the UKHO is subject to licence 820/020220/11 and the conditions on end-users and third parties contained therein. The following chart has been added to Schedule 1 Annex A: Digital use of Chart 2502 (edition 2011). The chart used in **Figure 1** was obtained from the UK Hydrographic Office. The following notice applies:

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1. ASSESSMENT BACKGROUND

1.1.1. In December 2011, Historic Scotland (HS) made contact with a recreational/ commercial diver, Ewan Mackay, about the discovery of a partially buried wreck site under water, close to his home at Drumbeg, a small harbour on Eddrachilis Bay, Sutherland.

1.1.2. Mr Mackay's descriptions of the site included reference to wooden hull structure, partially buried in sand/gravels, with evidence for survival of both inner and outer hull planking, in association with a galley brick, an anchor, at least three cast iron guns and cannon ball visible on the seabed surface, possibly with potential for more to be buried. Charts of this area show seabed depths <30m. Mr Mackay had described the site to Historic Scotland as not being heavily (if at all) colonised by kelp. Mr Mackay had previously recovered wood samples with a view to dendro-chronological dating but this had not been progressed.

1.1.3. There are no records of a wreck fitting the description of this site within the UKHO SeaZone/RCAHMS database/Highland HER. As discoveries of apparently well preserved and undisturbed wreck sites prior to the early 19th century are unusual in a Scottish context, Historic Scotland wrote to Mr Mackay to recommend that an assessment of this wreck be carried out.

1.1.4. WA Coastal & Marine were commissioned by Historic Scotland under the auspices of the UK-wide marine archaeology services contract to carry out an undesignated site assessment, in liaison with the finder and Historic Scotland. Four days of scuba diver survey were undertaken at the site.

2. OBJECTIVES

2.1.1. This work was commissioned in line with objectives defined in *The Marine Historic Environment Strategy for the Protection, Management and Promotion of Marine Heritage 2012-15* (Historic Scotland 2012). Historic Scotland is considering a small number of high priority undesignated sites as candidate Historic Marine Protected Areas in Scotland (under the Marine Scotland Act 2010) on the basis of national importance.

2.1.2. The level of site investigation required by Historic Scotland was defined using Wessex Archaeology's Level of Recording (**Appendix 2**). A Level 2a approach was requested (non-intrusive). It was felt that this would be sufficient to enable Historic Scotland, if appropriate, to develop a proposal to designate the site as a Historic Marine Protected Area. In the event the sheltered and fair conditions meant that there was sufficient time for the WA

team to carry out a more detailed investigation which would be more appropriately characterised as level 2b (a limited record based on investigations including vigorous cleaning, test pits and/or trenches and recovery of elements).

2.1.3. WA Coastal & Marine was also asked to liaise with the co-discoverer of the shipwreck, Mr. Mackay to facilitate the programme of works.

2.1.4. The minimum requirements of the work programme were defined as follows:

- a structured record of field observations; preferably including a photographic record of the site and a basic site plan, delineating the location of any surviving remains within the area. Information should also be provided as to how locations have been recorded and to what level of accuracy. Key artefacts on the seabed are to be subject to detailed examination and recording (for example, position by tracked diver survey, taped measurements, photographs and video and written database entries);

- an assessment of survival and site condition, with reference to Historic Scotland's guidelines on the selection, designation and management of Historic Marine Protected Areas (with particular reference to Annex B);

- information on socio-economic and environmental factors observed at the site and in the surrounding area which might pose significant risks to the survival of marine historic assets and site condition, if no change in the management regime takes place

2.1.5. Historic Scotland also required that the feasibility of dendrochronological dating as a dating strategy should be further investigated. In particular if dendrochronology was considered to be cost effective WA Coastal & Marine were asked to identify optimum sample locations for sampling at a later date.

2.1.6. WA Coastal & Marine was not asked to undertake an assessment of cultural significance as this will be carried out by Historic Scotland. Information relating to the intrinsic, associative and contextual characteristics of the site that may assist in ascribing cultural significance was requested.

2.1.7. Statements of national importance for designation of Historic MPAs differ from those applicable under the Protection of Wrecks Act 1973. Guidance on the determination of national importance for the designation of Historic MPAs is provided in Annex A of the Historic MPA guidelines.

3. METHODOLOGY

3.1. DIVING

3.1.1. Diving was carried out by a four person team using scuba diving equipment. The site was reported to be highly sheltered with little or no tide at any time and this was confirmed on arrival. Visibility varied between 6-12m. Scuba diving equipment was chosen for operational and logistical reasons.

3.1.2. The diving operation complied with the Scientific and archaeological diving projects Diving at Work Regulations 1997 Approved Code of Practice. The diving operation was undertaken in daylight hours only. All finds were retrieved by hand and no Marine Scotland marine licence was required.

3.1.3. MV *Nimrod*, a coded converted fishing vessel adapted for diving was used as the diving support vessel. Loading and unloading took place at the slipway at Nedd.

3.1.4. Diver navigation was assisted by the use of an acoustic USBL diver tracking system, manufactured by Sonardyne. Positioning was achieved with a dGNSS with a measured offset to the sonar transceiver. Divers worked in pairs and wore transponders on their air cylinders allowing their positions to be tracked from the boat. Upon finding an object the Buddy communication systems used by the divers were used to request that an accurate fix be taken at the current location.

3.1.5. Normally the system is very reliable. However a technical issue that could not be resolved in the field meant that tracking was poor for some of the dives. Fortunately all dives but one were conducted from a fixed shot line and distances and bearings from the shot have been used to check positions where necessary. Positions for all features in the main part of the site are considered to be accurate to +/- 3 metres. A single dive was carried out on an anchor which was too close inshore to apply the USBL and for this site a GPS reading was taken at the surface (accurate to +/- 3 metres).

3.2. PHOTOGRAPHY/PHOTOGRAMMETRY

3.2.1. A waterproof digital camera was taken on every dive conducted for the survey. Record shots were taken of all archaeological features using an appropriate scale. A Canon PowerShot S100 was used with a waterproof housing and fish eye lens. A white balance correction was made for all shots in the water. All shots were taken in both RAW and JPEG.

3.2.2. The visibility was considered good enough to attempt photogrammetry. This involved large number of photographs being taken in a relatively short amount of time from all around the subject of interest (generally requiring one person's attention for less than 20 minutes). In order to get clearer photographs the red seaweed covering archaeological features was removed and a scale was placed in view.

3.2.3. These photographs were processed in photogrammetry software during post-excavation processing usingVisualSFM software, Autodesk's 123D Catch and Meshlab. Outputs of 2D screen grabs, fly-through videos and 3D models in ply format were created. Orthographic projections of the 2D vertical screen grabs from Meshlab were georeferenced in ArcGIS to assist in creating more detailed site plans.

4. REVIEW OF EXISTING DATA AND PREVIOUS SITE INVESTIGATIONS

4.1.1. There are no records of a wreck fitting the description of this site within the UKHO SeaZone/RCAHMS database or the Highland SMR or any other source consulted. This is perhaps surprising given the presence of a recorded wreck, *Bermuda* (Canmore ID 103010), only 250 m to the east. *Bermuda* was a single screw steamship built in 1927 which was burnt out in 1931 in Belfast and was under tow to be broken up in Rosyth in 1933 when it broke up and drifted ashore. The wreckage of the *Bermuda* was recorded in 12 m in the BSAC Wreck Register (1982, Vol. 4). This suggests that at least some recreational diving was occurring in the area from at least the early 1980s.

4.2. PREVIOUS SITE INVESTIGATIONS

4.2.1. This previously unknown wreck site at Drumbeg was reported to Historic Scotland by Ewen Mackay, of Drumbeg, Sutherland, who discovered it during the 1990s while scallop diving with his friend Michael Errington.

4.2.2. The site was first discovered circa 1994 when the northerly anchor was found by Mr. Mackay. The anchor was noted to be upright with one fluke in the sediment with its stem pointing south. The anchor was noted to be 'arrow' shaped. No record was made of the position at the time.

4.2.3. Around 1999 Mr. Mackay was scallop diving with a friend, Michael Errington, from Ullapool, when Mr. Errington mentioned he had noted some large 'pipes' on an earlier dive at a nearby location. Both divers visited this location and confirmed their suspicions that the pipes were actually three cannons. They investigated the area around the cannons but did not discover any further remains.

4.2.4. The divers reported their discovery to the Receiver of Wreck in 2002 administered under droit number 247/01. Mr Mackay and Mr Errington continued to carry out some further investigation of the site. These investigations included visual and metal detector surveys in the vicinity of the cannons. Some cannonballs and another arrow-shaped anchor were noted in the north part of the site and timber was also noted around the three guns. Mr Mackay reports that some shallow excavation was carried out by hand-fanning but the sediment over the timbers was a foot deep and too deep to remove by hand. It was noted that the depth of the sediment cover varied from time to time but no further remains were uncovered through natural site

dynamics. A handheld metal detector was also brought in to investigate the area immediately around the cannons but this proved to be largely unsuccessful.

4.2.5. Eventually a small water dredge was brought in to try to map the extent of the timber remains. A trench of approximately 4 m by 1 m was excavated and it became clear that the timbers formed part of a larger structure. At this point the divers decided to halt their investigation pending specialist input. From previous experience of volunteering on underwater archaeological surveys in Bermuda, Mr. Mackay was aware of dendrochronological dating and contacted specialists based in Edinburgh. On their advice he sent some samples for evaluation and funded an initial evaluation personally. However the samples were judged to be unsuitable and further analysis was priced at over £1,000 and was not pursued.

4.2.6. The divers recovered approximately six cannonballs in total, all from sediments in the immediate vicinity of the cannons. These were found to be of two distinct sizes, three of approximately 75mm (2.95 inches) and three of approximately 100mm (3.93 inches). All but one of these was in a degraded state and disintegrated shortly after recovery. One of the 100mm cannonballs was in good condition and was stored in fresh water at Mr. Mackay's home. A well-preserved but fragile rigging block and galley brick were recovered by Mr. Errington at the same time and also stored in fresh water at Mr. Mackay's home.

4.2.7. A local amateur historian, Iain Evans, heard of the site through a local fisherman Donnie MacLeod who was aware of the diving operations. He suggested to the divers that they contact Philip Robertson at Historic Scotland. When Historic Scotland decided to fund an investigation of the wreck Mr. Mackay offered to be present in order to ensure that the divers found the site quickly. Mr Mackay offered valuable assistance to the WA survey team throughout their work. On completion of the survey he passed all the archaeological material previously recovered and stored in water at his home to the dive team for transport to the conservation facilities of AOC Archaeology, Edinburgh.

4.3. OTHER SOURCES

4.3.1. No primary or secondary sources of information concerning a wrecking event of a 17th or 18th century vessel at Drumbeg have so far been discovered during the background research. Two sets of primary documents from the 18th century, part of the Earl of Sutherland's papers held in the National Library of Scotland, which appeared to relate to shipwrecks and salvage were consulted. The National Library were unable locate part of the records (#535 – letters and papers relating to ships 1711-14) while the second set of records (recovery of wrecks 1721-1723, bundle 17 – deed box 14) proved to relate exclusively to agreements between the Earl of Sutherland and John Knowe concerning salvage of two vessels. As is known from wrecks elsewhere in Scotland, salvors were active in Scotland from the 18th century

onwards and were targeting wrecks of a similar age to that at Drumbeg (see Martin 1998, 35).

5. SITE DESCRIPTION AND INTERPRETATION

5.1. SITE LOCATION

WA Site Position

Lat.	**58° 15.033297**
Long.	**-5° 11.851862**
WGS 84	

5.1.1. The position given above is based on the centre point of the cannons.

5.1.2. The wreck site is located in Eddrachillis Bay (**Figure 1**) a small bay at the mouth of the sea-loch Loch a' Chàirn Bhàin. It lies within 500 m of Drumbeg village to the east of a group of small rocky islets which sit in the bay off Drumbeg. The wreck lies to the immediate east of the easternmost islands. In the 18th century these islands were known as *Elan-in-du* (Black Islands) (Sinclair 1799, 175). These are now marked on the Ordnance Survey maps as 'Eilean Dubh Dhroimbaig' (Black Island of Drumbeg) and lying further back from the village, 'Cul Eilean' (Back Island). The wreckage is just on the northern side of a narrow channel cutting between the islands and the mainland. The channel is named as 'Dornaidh an Fheoir' (which roughly translates to narrow sea-channel of the hay). This channel is around 60 m at its narrowest point and widens out to around 200 m by the wreck site where it meets the wider loch.

5.1.3. The village of Drumbeg is within 500 m of the wreck site and the channel can be seen from some parts of the village. The village is relatively recent in origin. Roy's map of 1747-55 shows a small settlement 'Trombag'. A detailed view of the village is available on John Home's Survey of Assynt (1774) which shows several farmsteads around the bay and which names the bay as 'Bay of Culkein', a name now confined to the inlet to the west of Eddrachillis Bay. By the time of the 1st Edition of the Ordnance Survey in 1878 (Sutherland, Sheet XLIX) a road had been built and the village already had much of its present layout.

5.2. ENVIRONMENT

5.2.1. As a result of its position among narrow islands, Dornaidh an Fheoir is highly sheltered (**Plate 1**) and almost no tide was discernable during any of the survey dives. The bridge between the two islands to the west of the site does appear to become inundated at high tide but only briefly. The channel appears exposed to the wider Eddrachillis Bay to the north-east but the Admiralty maps show that even this side is sheltered due to the presence of two or more reefs which are awash at Low Water.

5.2.2. The seabed around the cannons and is characterised by mobile sands, with occasional small rocks. The seabed is generally characterised by a very clean and fine shell sand. This sand contained very little silt and within a few minutes of disturbance of the seabed the visibility was found to return to its prior level even after the deepest hand-fanning. Small red seaweeds, possibly *Heterosiphonia plumosa* or *Heterosiphonia japonica* have colonised the cannons and any other protrusions on the sandy seabed. To the west and north of the site the seabed slopes gradually up to meet the rock face of the islands at a depth of around 9 m. The rock face of the islands is generally a near vertical wall of talus and scree but also has extensive piles of eroded boulders and small gullies, particularly in the area between the two islands. The rocky coastline around the two islands is characterised by a moderate covering of kelp although this was not found to be a significant obstacle to diver survey.

5.3. ARCHAEOLOGICAL FEATURES

General Description

5.3.1. The main part of the site (**Figure 2**) consists of three cannon lying in close proximity above a preserved part of wooden hull. The hull is parallel with the seabed under a shallow covering (5-15cm) of mobile sand. The hull appears to extend for approximately 15 m in total. There are also a number of stray finds on the sandy seabed or amongst the rocks to the north and west which appear to relate to the wreck.

Cannons

5.3.2. There are three cannons lying close together approximately 35 m from the MLWS of the eastern shore of Cul Eilean. Two are adjacent and parallel (**Plate 2**) and the third (**Plate 3**) lies at a distance of around 4.5 m to the north-east. The westernmost pair have their muzzles to the south while the smaller eastern cannon has its muzzle to the north. When first encountered by the dive team, all three cannons were lightly covered with red seaweed. In addition the westernmost cannons were overlain by a modern anchor with a buoy which had been used by the site's discoverers to mark the site. The cannons were recorded photographically as found and again after removal of the modern anchor and seaweed (**Plate 4**). The modern anchor and buoy were moved to one side and served as a shot line for the remainder of the survey. Upon completion of the survey the modern anchor was left in-situ while the buoy and shot line were removed.

5.3.3. The cannons were assigned numbers from west to east, Cannon 1, Cannon 2 and Cannon 3. All three cannon were heavily concreted but the general shape of each, as well as features such as trunnions and cascabels were easily discernable on both of the westernmost cannon.

5.3.4. The dimensions of the cannons are as follows :

	Cannon 1	Cannon 2	Cannon 3
Muzzle face to base ring	2.23m (87.8”)	2.26m (89”)	1.90m (74.9”)
Bore	7cm (2.76”) (may include thickness of concretion)	Bore 5cm (1.97”) (may include thickness of concretion)	Too concreted to measure
Muzzle face diameter	0.27m (10.6”)	0.23m (9.1”)	0.12m (4.72”)
Base ring diameter	0.48m (18.9”)	0.42m (16.5”)	-
Muzzle face to trunnion centre	1.365m (53.7”)	Trunnions hidden	1.15m (45.3”)
Base ring to trunnion centre	5.3.5. 0.865m (34.1”)	Trunnions hidden	0.75m (29.5”)
Trunnion diameter	0.13m (5.1”)	Trunnions hidden	0.14m (5.5”)
Length of cascabel and button	0.14m (5.5”)	0.12m (4.7”)	No cascabel/button visible

5.3.6. Cannon 1 had a total length of 2.23 m. A well-preserved cascabel was noted. No evidence of loops or handles was noted. A raised band around the edge of the breech was clearly discernable. Cannon 2 was similar to Cannon 1 in most respects. Its total length appeared to be slightly longer at 2.26 m and its breech was somewhat smaller at 42 cm although this discrepancy may be a result of concretions. The muzzle face was less concreted. Cannon 2 lay on its side, obscuring the lowermost trunnion. Cannon 3 was significantly smaller than the other two with a muzzle to breech length of 1.9 m. It had a muzzle face diameter of 12cm but was too concreted for a muzzle mouth measurement. The cannon had trunnions but no cascabel or button. Cannon 3 showed evidence of areas of removed concretions around its breech. This was a result of early investigations by the local divers. When no well preserved surface was encountered no further removal of concretions was carried out and the cannon were not moved. The depth of removal is relatively shallow and confined to a small area of the side of the cannon.

5.3.7. To the immediate north of Cannon 1 a highly concreted ferrous object (**Plate 5**) protruded from the seabed adjacent to Cannon 1’s cascabel. The concretion widens, spatula-like to approximately 40 cm with about half the height of Cannon 1’s breech. This object is of uncertain function but appears

to be have a similar level of concretion to the cannons and appears to be part of the wreckage.

5.3.8. Independent cannon expert Charles Trollope was given the opportunity to examine photographs of all three cannons and the above measurements. He stated that, in his opinion, the cannon were 'clearly cast in Sweden' (e-mail dated 26/09/2012). He noted the diagnostic features of the 'straight neck run, followed by the late starting and pronounced swell which even in the concretion shows up well'. Cannon founding was a major industry in Sweden. For example the Swedes supplied most of the Dutch requirements for iron guns from the 1620s onwards. The French and Danes were also major purchasers of Swedish guns. The size of the cannons also provided some evidence in favour of this interpretation. Two of the three cannons are of a very similar size. Trollope also noted that the distances between the base ring and muzzle of Cannon 1 and 3 worked out well in Swedish feet, with Cannon 2 possibly being over length by about an inch (although as mentioned above this inch could be purely concretion).

5.3.9. A photogrammetric survey was carried out of cannons 1 and 2 and processed in Autodesk's 123D Catch (**Plate 6**). Measurements of parts of the cannon were confirmed using the models and they were also use to aid in the production of site plans.

5.3.10. A number of cannonballs have been recorded on the site, both during previous excavation by the local divers and during the WA survey. As described above a total of six cannonballs were removed from the site by the local divers although only one was in good enough condition to survive for long out of the water (**Plate 7**). These were found in a cluster adjacent to, or just below one of the cannons and may have been stored together. This cannonball has been passed to conservators and measures around 75mm in diameter and now weighs 641.2 grams (1.4136 pounds). It appears to be cast-iron rather than lead and in this case its original weight was closer to 4 pounds. Two further cannonballs were noted during the WA survey. These were recorded photographically (**Plate 8** and **Plate 9**) but neither was removed from the site. One of these was highly corroded and was lying in mobile sediments adjacent to the cannons. Cannonball 2 was much better preserved and was found on the seabed several metres to the south. This had a diameter of approximately 100mm.

5.3.11. It is tempting to relate these dimensions back to the two sizes of cannon encountered. Both the 100mm diameter shot and Cannons 1 and 2 could be considered to match quite closely with standard 8-pounder cannon design. If the large shot matches the larger cannon then an obvious possibility is for the smaller 75mm shot to match the smaller cannon. The dimensions of the shot are somewhat small for a 4-pounder (Frank L. Fox, e-mail dated 25/09/2012). However given the varied sizes of guns, particularly in the 17th century (for example in the VOC – see Kist 1988) we cannot confirm a Swedish provenance of the cannons without recovery, careful cleaning, detailed recording and conservation of the guns.

Hull

5.3.12. Evidence of preserved timber was discovered immediately below the cascabels of cannons 1 and 2. A photomosaic of the exposed timbers was created from 48 separate photos using Microsoft's ICE software. The resulting image was scaled using a scale visible in the image and georeferenced in ArcGIS with regard to the recorded position of the cannons (**Plate 4**). This lay below approximately 15 cm of mobile sand which could be removed easily though hand fanning. These were uncovered by hand-fanning in the immediate vicinity of the wreck to a horizontal distance of approximately 5 m. Thereafter exposure of the timbers was restricted to small test areas and it was demonstrated by probing that hull structure remains in-situ for a distance of 10.65m, , all apparently in a single section. It is possible that the structure could continue beyond these limits. The hull lay horizontally with no discernible lateral curvature. It was constructed of three distinct elements of hull structure, held together using treenails and iron nail fastenings. The uppermost structure was formed of thin contiguous planking and extended across most of the exposed hull remains for approximately 9.7 m. Parts of this surface showed signs of degradation and abrasion, in addition to damage by shipworm (**Plate 10**). The typical dimensions of the planking were at least 70 cm (27.5 inches) wide and 11 cm thick (4.3 inches). One section of planking was noted to be raised above its adjoining component by 3 cm. (**Plate 11**) The eastern edge of the surviving hull structure was visible in a small section close to the cannons comprising closely and regularly spaced hull framing, or futtocks (**Plate 12**). At least eight futtocks were noted. Their dimensions were the same, 16 cm (6.2 inches) wide and 12 cm (4.7 inches) thick. The futtocks were very closely spaced and revealed a dense series of wooden fastenings or treenails, which according to their alignment could well suggest the attachment of planking on the outer surfaces; indicated further by the presence of a third layer of timber components beneath the futtocks, possibly outer hull planking. This was not confirmed however due to excessive sand coverage.

5.3.13. At this juncture it is difficult to establish with any certainty what part of the vessel the remains represent. Due to the fact that cannon lay on top of it, the uppermost layer of ship structure has been interpreted as possible ceiling planking, although it may also be collapsed deck planking from relict deck structure. Some diagnostic characteristics from the details highlighted in the construction of the visible hull structure suggest a part of the lower hull. This is supported by the close spacings of the framing, common in wooden vessels from this period and the common characteristics of site formation processes and material survival which lend towards the survival of lower hull remains.

5.3.14. Once recorded photographically and measured the exposed timbers were re-covered with sediment to minimise risk of further exposure. A single loose and degraded timber fragment, apparently the end of a futtock, was found on the seabed in the vicinity of the primary hull remains. This was recovered by hand for further analysis (**Plate 13**).

Bricks

5.3.15. A total of five bricks were recovered in total, one of which was passed on by the local divers and four of which were recovered during the WA survey (**Plate 14**). Four of the bricks are broadly similar, measuring approximately 20 x 10 x 5 cm and of orange colour. The fifth is only a half brick and was found amongst the rocks to the north of the site. It is far more yellow in colour than the others. After their location was recorded these were recovered from the site in order to allow for the possibility of thin-section analysis.

5.3.16. Similar bricks have been found in other wrecks of this period in Scotland but are more commonly described as yellow. Parallels from 17th/18th-century wrecks of international origins include the *Adelaar*, the *Kennemerland*, the *Lastdrager* and the Fuday wreck. Those found in the *Kennemerland* measured 18 x 8 x 3.5 cm (Forster and Higgs 1973, 296); the Lastdrager 17 x 7 x 34cm (Sténuit 1974, 255) and Fuday, 20 x 12 x 6cm. The Fuday bricks resembled those on the *Kennemerland* and were interpreted as being typical of Dutch origin '*overij sselse steen'* (Prescott *et al.* 2008, 11). In other cases these bricks have been interpreted as galley bricks, particularly where evidence of burning on the face of a brick permits such an interpretation (e.g Kinlochbervie). The bricks lack a frog (ie.e a hollow on their upper and lower faces) and as this was relatively common on bricks from the mid-1800s suggests that they are probably earlier..

5.3.17. Although the general dimensions of the bricks are similar to other wrecks in Scotland from this period the bricks are mainly orange rather than the more commonly reported yellow.

Anchors

5.3.18. Two anchors have been discovered in possible association with this wreck. These will be referred to as Anchor 1 and Anchor 2. Anchor 1 (**Plate 15**) was found adjacent to the cannons by the local divers several years before the wreck was reported to Historic Scotland and seems likely to be associated with the wreck. This anchor was removed to a distance of about 350 m to facilitate an unsuccessful attempt at metal detecting on the site. The new site of this anchor was visited by WA divers during the recent survey. The anchor was found to be lightly covered with red seaweed which was not removed. The shank of the anchor measures 3.08 m long and approximately 14 cm in diameter, widening to 20 cm at the junction with the arms. The anchor has a rounded crown and there are no signs of a stock (**Plate 16**). No ring is present at the top of the anchor although the shaft appears to change from a cylindrical to a square cross section here and there is a mark indicating a nut near the terminal. It is probable that a wooden stock consisting of two beams was attached at this point. One of the flukes appears to have been removed or decayed away at some point while the other is quite degraded. The flukes appear to have been 40 cm long on arms with a total length of 85 cm. The total width of the anchor perpendicular to the shank is 1.65 m. A chain is wrapped around the anchor but this is thought to be a modern chain attached by the local divers when they lifted and moved the anchor.

5.3.19. Anchor 2 was not surveyed as part of the 2012 WA survey. The location of the anchor was not known with certainty and it was felt that it would be more productive to conduct further survey in the vicinity of the cannon rather than risk the limited time looking for Anchor 2. However the approximate location of Anchor 2 is known to the local divers and it has been marked on **Figure 1**. According to Mr. Mackay the anchor is of a similar size and design to Anchor 1. One of its flukes is reportedly embedded in the seabed with its shank is orientated towards the main wreck. Associations with the main wreck structure seem likely but remain unproven.

Delft Tile

5.3.20. The broken Delft tile recovered to the north of the cannons appears to be one of the most easily dateable items recovered (**Plate 17**). It is the upper half of a Delft tile depicting a three-masted ship flying the Dutch flag. Only the rigging and upper masts are visible as well as the corner decorations of the upper right and upper left corners. There are several worm casts on both sides of the tile and the edges and back appeared eroded. The break through the centre of the tile does not appear to be fresh.

5.3.21. A local researcher in Drumbeg, Mari Mackay, was able to provide the survey team with a rough date for the tile prior to the completion of fieldwork, placing it between approximately 1650 and 1750. WA Coastal & Marine pottery specialists and Ian Betts of MoLAS were later consulted on the tile. They suggested a likely date in the second half of the17th century and found examples of close parallels for the design which have both the ox-head corner motif and the single-tile three-masted ship design. Dr. Betts uncovered numerous references to tiles of this type, all of which date to the second half of the 17th century. These include Van Dam (1991, 80, no.s 89 and 90), Van Sabben and Hollem (1987, 54, no. 162), Schaap *et al.* (1984, 145, no. 177), and Pluis (1997, 385, A.03.07.10).

5.3.22. Both Dr. Betts and another specialist, Henk Bussink of www.delfttiles.com were keen to stress that the design was in use for a long time, perhaps over 200 years in total and that the only hope of narrowing down the age range would be to examine the tile thickness and material. Dr. Betts provided a reference in Pluis (1997, 71) stating that similar published Dutch ship tiles are around 10-13mm in thickness up to around 1640 and that between 1640 and 1680 the thickness decreases to about 7-8mm where it remained constant. Unfortunately there appears to have been significant erosion of the non-glazed side of the tile as the current thickness is only 6mm. The tile was already partially broken when found in a relatively exposed location among rocks. It would appear that this problem of erosion is likely to prevent any further analysis of the tile. To further complicate matters, it is known that tiles often formed part of ballast and that this ballast might be derived from large dumps of similar material left in ports sometimes for several decades or longer (for example the bricks and tiles found in the ballast of the Fuday wreck still had mortar attached to them – Prescott, Atkinson and Liscoe 2008, 9). Similarly material like this might be carried in personal baggage as trading

material by sailors (Dobbs and Price1991). In this case the tile can only offer us a *terminus post-quem* for the site of around 1650 and a possible connection with Holland.

Dead-Eye

5.3.23. A dead-eye rigging block (**Plate 18**) of approximately 22 cm diameter was recovered by local divers while undertaking small-scale dredging around the cannons. The block was recovered and stored in fresh water at Ewen Mackay's residence and was passed to the WA dive team in Drumbeg at the end of the survey. Deadeyes are a common piece of rigging with a long and ongoing usage., commonly found in an upper and lower row near the base of the near the gunwales of a ship and are used in the hauling and fastening of rigging. They are often made of *Lignum vitae* although no analysis has yet been carried out on this example.

5.4. INTERPRETATION

5.4.1. The investigation has recorded presence of a substantial and apparently well preserved section of wooden hull structure, together with remains of armament, rigging and possible cargo/ballast. The remains are considered most likely to originate from the wreck of an ocean-going ship occurring in Eddrachilis Bay, sometime after 1650.

Wrecking process

5.4.2. Although the location of the wreck is relatively sheltered, the coastline of Eddrachilis Bay is exposed to the Atlantic. Ewen Mackay, the discover of the wreck and a local diver with extensive experience of Eddrachillis Bay has suggested a scenario whereby the vessel may have hit one of two large reefs at the entrance to Dornaidh an Fheoir and then lost an anchor in the outer bay before sinking by the shore. This could have occurred during a storm with the ship limping in to shelter here before sinking. If indeed Anchor 2 is associated, its reported position and orientation would seem to suggest a failed attempt to anchor. This anchor clearly held its position and continues to do so, suggesting that the hawser may have snapped. Given that the site is sheltered and close to shore it is also possible that at least some of the crew might have survived. A more thorough review of historical records may be of great benefit in this regard.

Survival and preservation potential

5.4.3. The section of hull lies on its outer face with its probably inner ceiling planking uppermost although it is not apparent which part of the hull is represented. The fact that the cannon overlie this hull fragment in a small group might suggest that the wreckage has not been significantly disturbed since the ship was wrecked. One possible interpretation is that the ship came to rest on its keel or side and that only the lowermost part was preserved while the rest of the ship gradually eroded away.

5.4.4. The presence of substantial sections of preserved timber and organic artefacts suggests that the seabed here provides a burial environment that is

conducive to the long term survival of archaeological remains. It is therefore equally possible that much more substantial sections of structure remain buried within the sediments around the cannon or perhaps dispersed across a wider area. Given what has already been identified, it seems likely too that further artefacts of organic and non-organic materials will also be preserved within the seabed sediments.

Possible identification

5.4.5. It is probably too early to come to any conclusions about the identity of the wreck. The finds recorded during the survey suggest that the ship dates to between 1650 and 1750. However none of the evidence currently available can narrow down the dates any further with any certainty. The presence of cannon of possible Swedish origin and a Dutch Delft tile all seem to point to an origin on the northern European continent. One possibility is that the ship was an armed East Indiaman from the Low Countries, in-transit around the Scottish coast while following the north-about route favoured by shipowners to avoid the contrary winds and hazards of the English Channel, particularly during times of conflict. The importance of the north-about route to Northern European shipping is clear from the 1667 mission by a Dutch naval squadron of 24 men-of-war to escort a fleet of 150 past Shetland (Murdoch 2010, 248-250) and this was also the route chosen by the fleeing Spanish Armada. As such, the ship may have had little or no intended connection with Eddrachilis Bay. Interestingly the *First Statistical Account of Scotland* (Sinclair 1791-99, 189) mentions in relation to the pleasant climate of the area that natives of the East and West Indies reside in the parish 'enjoying perfect health, acquiring a habit and constitution of body almost equally robust as that of the natives'. It is tempting to surmise that these natives were survivors of a wreck at Drumbeg.

5.4.6. Possible avenues for further research into this line of enquiry would include the highly detailed records of losses and ship movements held in relation to the Dutch East India Company (VOC). For example, a complete list of the Dutch VOC ships is available through the website www.treasurenet.com[1] and this lists only one reported loss in Scotland outside Shetland which has not yet been identified. This is the *Trompetteer*, which was taken by the French off the Scottish coast in 1692 and burned. The other VOC losses in Scottish waters include. The *Zeepaard* (wrecked west of the Shetland Islands - no date given), the *Lastdrager* (1653), the *Kennemerland* (1664), the *Tobias Leidsman* (1688), the *Land Van Schouwen*, the *Kapelle* and the *Pijlswaart* and the *Wapen Van Alkmaar* (all 1690), the *Liefde*, the *Rijnenburg* and the *Weerstein*, (all 1711), the *Amsterdam*, (1742) and the *Nieuwvijvervreugd* (1756). It is however noteworthy that most of these have either been reported as lost off Shetland (e.g *Kennemerland* (Foster and Higgs 1973; Price and Muckelroy 1974; Dobbs and Price 1991 etc.) and the *Lastdrager* (Sténuit 1974)or have already been positively identified such as the *Adelaar,* wrecked in 1728 off Barra in the Outer Hebrides (Martin 2005).

[1] http://www.treasurenet.com/forums/shipwrecks/17237-list-all-653-dutch-voc-shipwrecks-1595-1800-a.html List of all 653 Dutch VOC Shipwrecks. Accessed 03/10/2012

6. INFORMATION RELEVANT TO THE SELECTION, DESIGNATION AND MANAGEMENT OF HISTORIC MARINE PROTECTED AREAS

6.1. SITE SURVIVAL AND CONDITION

6.1.1. Despite the limited area of wreckage that was uncovered during the survey, the current survival and condition of the wreck site appears to be good. In comparison to other wrecks of a similar age found in Scotland, this site is unusual (though not unique) in that significant portions of the hull appear to be intact. The impacts on the site due to natural and anthropogenic processes subsequent to wrecking appear to be limited. Although the cannon are exposed on the seabed within 200 m of another known wreck site, the presence of the cannons suggests recreational divers have not been aware of the site in modern times. The possibility that the site may have been salvaged at an early date is highlighted by references found to 18th century salvages conducted by the Earl of Sutherland (see above) and the fact that there were settlements around Eddrachillis Bay at least as early as the mid-17th century.

6.1.2. It is difficult to assign the site to any one classification as per the scheme in Annex B of *the Historic MPA Guidelines* (Historic Scotland, 2012) given the amount of data available at present. It is impossible to state what percentage of the original site may still be preserved. The site condition is therefore best categorised as 'Unknown'.

6.1.3. The principal cause of damage to the site apart from the initial wrecking event is likely to have been natural in origin. The environment around the visible parts of the wreck is sheltered, with almost no tide discernable at any time and a thin covering of mobile sediment observed over all the timbers with only cannons visible prior to excavation. Periodic exposure of the visible timbers is suggested by the extent to which the uppermost part of the timbers was found to be heavily damaged by shipworm. In addition it was noted that during the survey, timbers could be easily exposed by hand fanning. This was a surprise to Ewen Mackay who had needed a water dredge to uncover timbers. It may be that this initial period of more intrusive investigation penetrated a consolidated layer of sediments that had encapsulated the section of hull structure, helping to preserve it. The looser sediments may be the result of recent back-fill and will be less stable and prone to erosion. Indeed it appears that recent storms have removed a significant depth of sediment within the immediate area of the cannon and possibly across the entire bay, reducing sediment levels by around 15cm.

Risks to Marine Historic Assets

6.1.4. Drumbeg is a small community and word has spread that an old wreck with cannon has been found in the vicinity. Numerous individuals have questioned Ewen Mackay and the WA Coastal & Marine dive team during fieldwork about the wreck and the cannon. The site is not a commonly dived site but the presence of fish farms in the area suggests at least that some diving occurs locally, including for scallops. Although most of the structure is

covered by mobile sediments, there is a risk of the three cannons being removed and of further disturbance occurring to the seabed around the exposed hull structure. The buoy marking the exact site of the cannons was removed at the end of the survey in order to avoid facilitating such a removal.

6.1.5. Although some use of fixed fishing gear (e.g lobster pots) was observed in the vicinity, Mr McIntosh, skipper of MV Nimrod, observed that it was highly unlikely that scallop dredging vessels would venture so far inshore. As such the risk of damage from mobile fishing gear is likely to be negligible.

6.1.6. The site is visible from parts of Drumbeg and almost visible from Mr. Mackay's own land, It is therefore anticipated that the local community may be prepared to play a positive guardianship role in overseeing what goes on at the site were some form of legal protection to be put in place. In summary, it is the opinion of WA Coastal & Marine that there is currently a high risk of man-made impacts on the wreck site, although this would be mitigated by implementation of legal protection.

6.1.7. Further natural damage through erosion is likely to take place at an uncertain pace. However several of the finds were recorded at some distance from the hull fragment on the seabed. It is possible that these are mobile and discussions with Ewen Mackay suggest that the sediment levels appear to be lower at present than they have been for some time. Over time it is therefore likely that more material will become exposed and dispersed. The cannon are also likely to continue to corrode and the hull will suffer further biological degradation, particularly when sediment cover is low. It is the opinion of WA Coastal & Marine that there is currently a high risk of natural impacts on the wreck site. This risk may be reduced to a certain extent through monitoring of the site over time and implementation of site stabilisation initiatives.

7. RECOMMENDATIONS

7.1.1. Further documentary research combined with geophysical survey should be considered as desirable next steps to aid research into the origins of this wreck and the extent of buried material on the site. This could be followed up, if necessary, by a sampling programme to support dendrochronological dating.

7.1.2. The site should also be monitored periodically for the effects of sediment movement. In the event that substantial sections of hull structure and artefacts become exposed, these should be recorded and consideration given to a programme of rescue excavation/in-situ stabilisation as occurred at Duart Point.

Documentary Research

7.1.3. Further documentary research should be carried out on sources relating to shipping activity and losses, as well as early salvage attempts and the presence of natives of the Indies in the parish of Assynt in the 18th century.

Geophysical Survey

7.1.4. It is recommended that a high-resolution geophysical survey of the channel be carried out to help define the extent of buried remains. The preferred methods would be magnetometer (to locate cannons etc) and parametric sonar (to locate wreckage below the mobile sediments). Consideration should also be given to use of 3D Parametric Sonar or 3D Chirp to attempt to reconstruct the shape of timbers below the surface. This survey should initially cover the area immediately around the cannons and should also be extended south-east to the shore of the mainland. It should also include some survey of the area to the west of the causeway between the two islands.

Dendrochronological Analysis

7.1.5. Dendrochronological analysis on well-preserved timbers should be considered in the future. WA recommends sending the timber fragment (SF007) to a dendrochronological specialist for wood identification prior to any further survey at the site to allow for a sampling strategy to be outlined. Although SF007 itself is not likely to be suitable for dendrochronological analysis due to the amount of shipworm damage it may help to inform future sampling strategies. Pending a discussion with specialists, it is the opinion of WA Coastal & Marine that any future dendrochronological sampling should be targeted on the framing timbers and in particular on the broken eastern edge. In order to take samples from this area use of a hand saw or underwater chainsaw may be necessary. A more complete exposure and survey of the timbers in the immediate vicinity would therefore be a prerequisite to any such sampling strategy.

Site monitoring and diver survey

7.1.6. It is recommended that the site should be monitored periodically to check for erosion and any impacts of exposure of hull structure and artefacts. A secondary objective for future diver survey would be to locate and record Anchor 2 in order to verify its association with the main complex of wreck material.

7.1.7. If new hull material and artefacts become exposed, a programme of survey and recording would be desirable. There would also be a case for recovering any artefacts that will otherwise be lost, as happened at Duart Point. In tandem with any recording programme, consideration should also be given to a programme of in-situ stabilisation using sandbags or geotextile membrane, to help restabilise the sediments around the hull structure.

Diver Liaison

7.1.8. It is recommended that all future work carried out at the site including geophysical survey should be done in conjunction with the local divers Ewen Mackay and Michael Errington wherever possible. If the site is protected, there would also be value in promoting protected status by placing an information board on land adjacent to the site.

8. ARCHIVE

8.1.1. The project archive consisting of digitised site records, digital photographs and videos, photogrammetric record is currently stored by WA under project code 83800. The finds recovered during fieldwork and from Ewen Mackay were delivered to AOC Archaeology in Loanhead, Musselburgh under a conservation call-off contract with Historic Scotland where they have been stabilised and desalinated pending further decisions on analysis.

9. REFERENCES

Published sources

Bax, A. and Martin, C. J. M., 1974, 'A Dutch East Indiaman lost on the Out Skerries, Shetland, in 1711', *International Journal of Nautical Archaeology*, Vol. 3, 1, 81–90

Dobbs, C. and Price, R., 1991, 'The Kennermerland site, the Sixth and Seventh Seasons, 1984 and 1987, and the identification of five golf clubs', *The International Journal of Nautical Archaeology*, Vol. 20, 2, 111-22

Foster. W. A. and Higgs, K. B., 1973, 'The Kennermerland, 1971: An Interrim Report', *The International Journal of Nautical Archaeology*, Vol. 2, 2, 291-300

Historic Scotland, 2012, The Marine Historic Environment Strategy for the protection, management and promotion of marine heritage 2012-15, http://www.historic-scotland.gov.uk/marine-strategy-2012-15.pdf Accessed 03/10/2012

Kist, 1988, 'The Dutch East India Company's Ships' Armament in the 17th and 18th centuries: an Overview', *The International Journal of Nautical Archaeology*, Vol. 17, 1, 101-2

Martin, C. J. M., 1992, 'The wreck of the Dutch East-Indiaman Adelaar off Barra in 1728 ' in Mason, R. and Macdougall, N. (eds) *People and Pwer in Scotland: Essays in Honour of T.C. Smout*, Edinburgh, 145-69

Martin, C. J. M., 2005, 'The Adelaar: a Dutch East-Indiaman wrecked in 1728 off Barra, Outer Hebrides, Scotland', *The International Journal of Nautical Archaeology*, Vol.34, 2, 201, 203

Martin, C. J. M., 1998, *Scotland's Historic Shipwrecks*, B.T. Batsford, Ltd., London

Murdoch, S., 2010, The Terror of the Seas?: Scottish Maritime Warfare, 1513-1713, Brill Academic Publishers, Leiden

Pluis, J., 1997, *The Dutch tile: Designs and Names*, Leiden

Price, R. and Muckelroy, K., 1974, 'The Kennermerland, 1971', *The International Journal of Nautical Archaeology*, Vol. 2, 2, 291-300

Price, R. and Muckelroy, K., 1977, 'The Second Season of Work on the Kennermerland site, 1973', *The International Journal of Nautical Archaeology*, Vol. 3, 2, 257-68

Price, R. and Muckelroy, K., 1977, 'The Kennermerland site. The Third and Fourth Seasons 1974 and 1976', *The International Journal of Nautical Archaeology*, Vol. 6, 3, 187-218

Price, R. and Muckelroy, K., 1979, 'The Kennermerland site, the Fifth Season, 1978', *The International Journal of Nautical Archaeology*, Vol. 8, 4, 311-20

Price, R., Muckelroy, K. and Lynn Willes, 1980, 'The Kennermerland site, a report on the Lead Ingots', *The International Journal of Nautical Archaeology*, Vol. 9, 1, 7-25

Price, R., 1975, 'Shetland: 1974 expedition to the Dutch wrecks of Out Skerries, the South Mouth site (Kennemerland 1664), the Benelip site (unidentified Dutch ship) [and] Dregging Geo (Liefde 1711)', *International Journal of Nautical Archaeology Underwater Explorer*, Vol. 4, 388-9

Schaap, E. with Chambers, L. H., Hendrix, M. L., and Pierpoline, J. (eds), 1984 *Dutch Tiles in the Philadelphia Museum of Art*, Philadelphia

Sinclair, J., 1791-99, *First Statistical Account of Scotland*, Vol. 16, Parish of Assynt 163-189).

Sténuit, R., 1974, 'Early Relics of the VOC Trade from Shetland: the wreck of the flute Lastdrager lost off Yell 1653', The International Journal of Nautical Archaeology, Vol. 3, 2, 213-56

Van Dam, J. D., 1991 *Nederlandse Tegels*, Amsterdam

Van Sabben, C., and Hollem, J., 1987, *Antieke Tegels*, Rockanje

Non-published and other written sources

Prescott, Atkinson and Liscoe, 2008, *Preliminary Survey and Assessment of a wreck on the island of Fuday, Barra, Western Isles*, Unpublished report by Headland Archaeology on behalf of Historic Scotland

Internet sources

http://www.delfttiles.com/en/catalogue?category_id=326 Accessed 02/10/2012

APPENDIX 1: DIVE LOG

Dive	Date	Divers	Start time*	Max. Depth (m)	Bottom Time (min.)	Work undertaken
1	18/09/2012	Pascoe, Benjamin	13:42	12	59	Cannon measurement
2	18/09/2012	McCarthy, Stratford	15:45	11	69	Discovery and hand fanning of timbers
3	19/09/2012	McCarthy, Stratford	11:14	14	46	Survey
4	19/09/2012	Pascoe, Benjamin	13:07	13	43	Hull survey
5	20/09/2012	Pascoe, Benjamin	10:22	6	17	Anchor Survey
6	20/09/2012	Pascoe, Benjamin	10:48	14.4	27	Survey and photogrammetry
7	20/09/2012	McCarthy, Stratford	11:49	15	30	Survey
8	20/09/2012	Pascoe, Benjamin	15:00	11.5	49	Covering over timbers, survey and photogrammetry
9	20/09/2012	McCarthy, Stratford	16:20	10.5	49	Survey
10	21/09/2012	McCarthy, Benjamin	09:27	17	36	Wide area survey

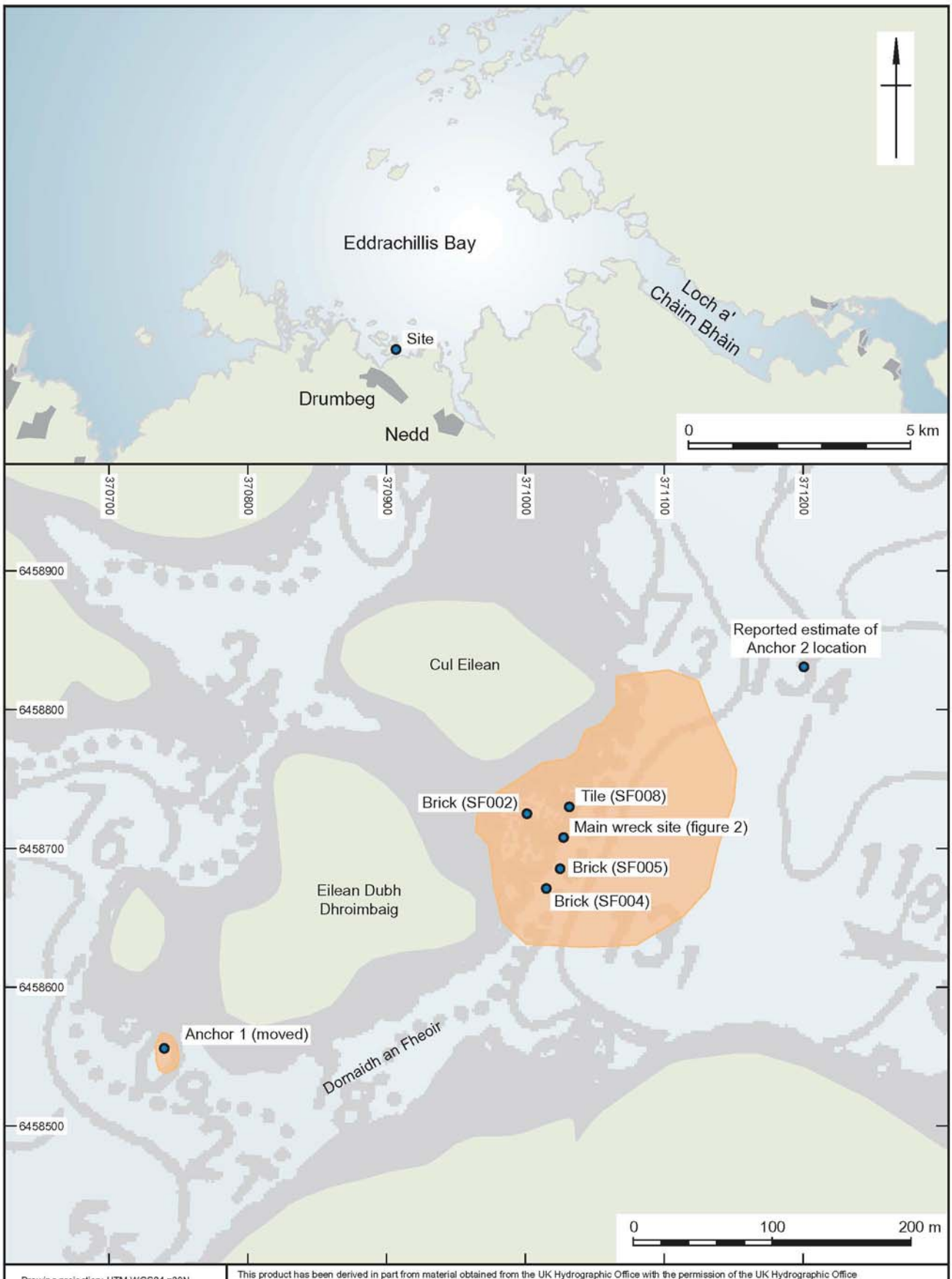
*All times BST

APPENDIX 2: RECORDING LEVELS

Level	Type	Objective	Sub-level	Character	Scope	Description
1	Assessment	A record sufficient to establish the presence, position and type of site.	1a	Indirect (desk-based)	A basic record based on documentary, cartographic or graphic sources, including photographic (incl. AP), geotechnical and geophysical surveys commissioned for purposes other than archaeology.	Documentary assessment / inventory of a site, compiled at the start of work on a site, and updated as work progresses.
			1b	Direct (field)	A basic record based on field observation, walkover survey, diving inspection etc., including surveys commissioned specifically for archaeological purposes.	Typically a 1-2 dive visit to the site (to assess a geophysical anomaly, etc.).
2	Evaluation	A record that provides sufficient data to establish the extent, character, date and importance of the site.	2a	Non-intrusive	A limited record based on investigations that might include light cleaning, probing and spot sampling, but without bulk removal of plant growth, soil, debris etc.	Typically a 2-4 dive visit to assess the site's archaeological potential, backed up by a sketch plan of the site with some key measurements included.
			2b	Intrusive	A limited record based on investigations including vigorous cleaning, test pits and/or trenches. May also include recovery (following recording) of elements at immediate risk, or disturbed by investigation.	Either an assessment of the buried remains present on a site; the recovery of surface artefacts; or cleaning to inform for example a 2a investigation.
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 of the site and a database (or equivalent) entry for all surface artefacts.
			3b	Unexcavated	A detailed record of all elements of the site visible without excavation.	Full site plan (i.e. planning frame or equivalent accuracy) with individual object drawings, and full photo record (possibly including a mosaic).
			3c	Excavated	A detailed record of all elements of the site exposed by open excavation of part or whole of the site.	This may take the form of full or partial excavation of a site.

Level	Type	Objective	Sub-level	Character	Scope	Description
4	Removal	A record sufficient to enable analytical reconstruction and/ or reinterpretation of the site, its components and its matrix.			A complete record of all elements of the site in the course of dismantling and/or excavation.	
5	Intra-site	A record that places the site in the context of its landscape and other comparable sites.			A complete record of all elements of the site, combined with selective recording of comparable sites and investigation of the surrounding area.	

Note: these levels represent guidance formulated by Wessex Archaeology for use during the archaeological investigation of wreck sites. They are currently used by curators, but have not been formally accepted as a standard means of grading archaeological work.



Drawing projection: UTM WGS84 z30N
Admiralty chart: 2502 (dated 2011)

Extent of Diver Survey

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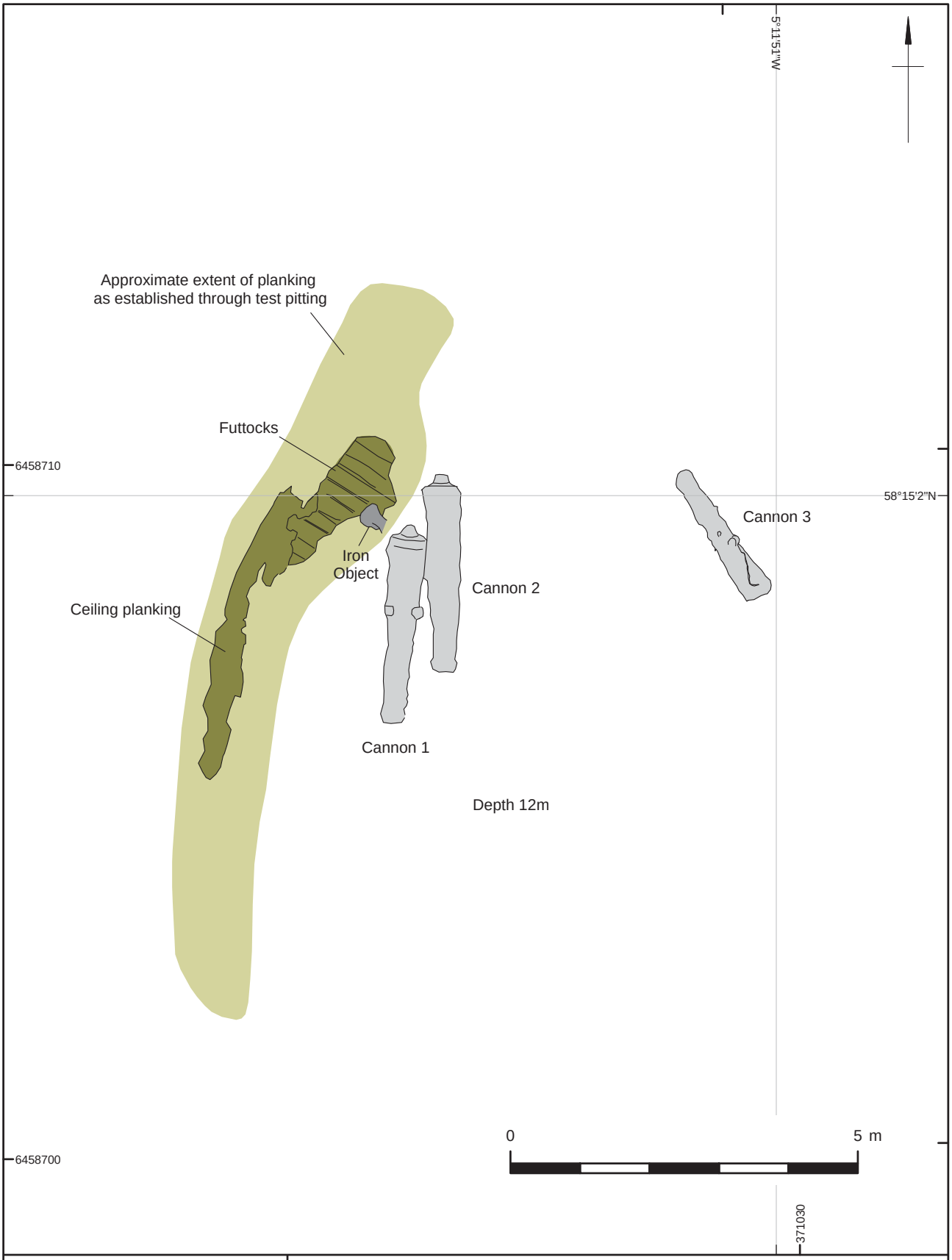
Wessex Archaeology

Site location

Figure 1



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The archaeological features around the cannons

Figure 2

Plate 1: Photograph of Dornaidh an Fheoir looking North

Plate 2: Photographs of cannons 1 and 2

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Plate 3: Photograph of cannon 3

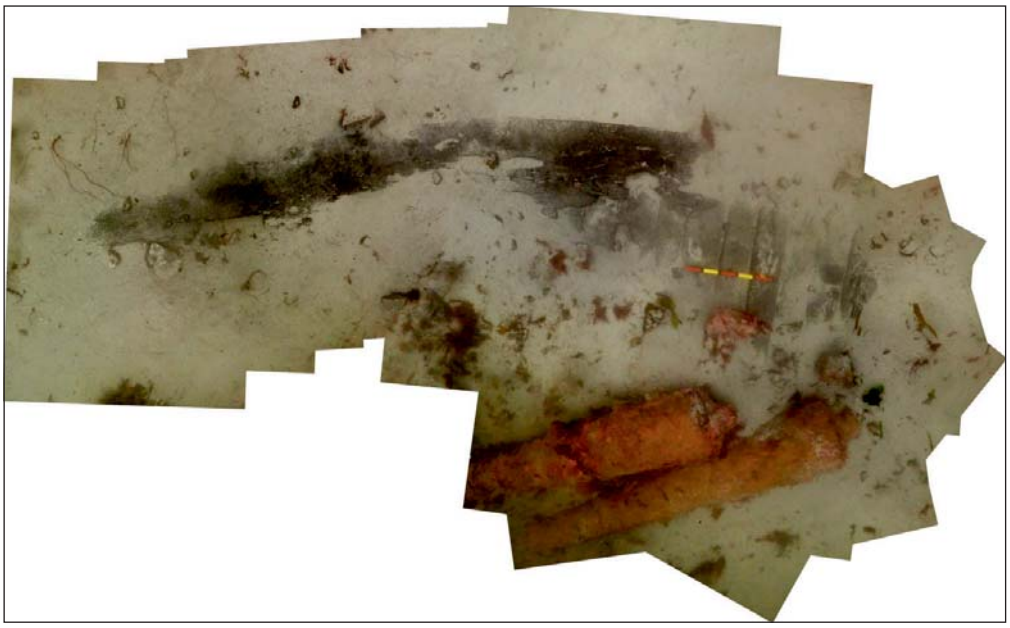

Plate 4: Photomontage of partially exposed timber structure

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Wessex Archaeology

Plate 5: Concreted object beside Cannon 1

Plate 6: Photogrammetric Model of Cannon 1 and 2

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Wessex Archaeology

Plate 7: Cannonball recovered by local divers, with a diameter of 75mm

Plate 8: Cannonball 1, recorded *in-situ*

Plate 9: Cannonball 2 recorded *in-situ*

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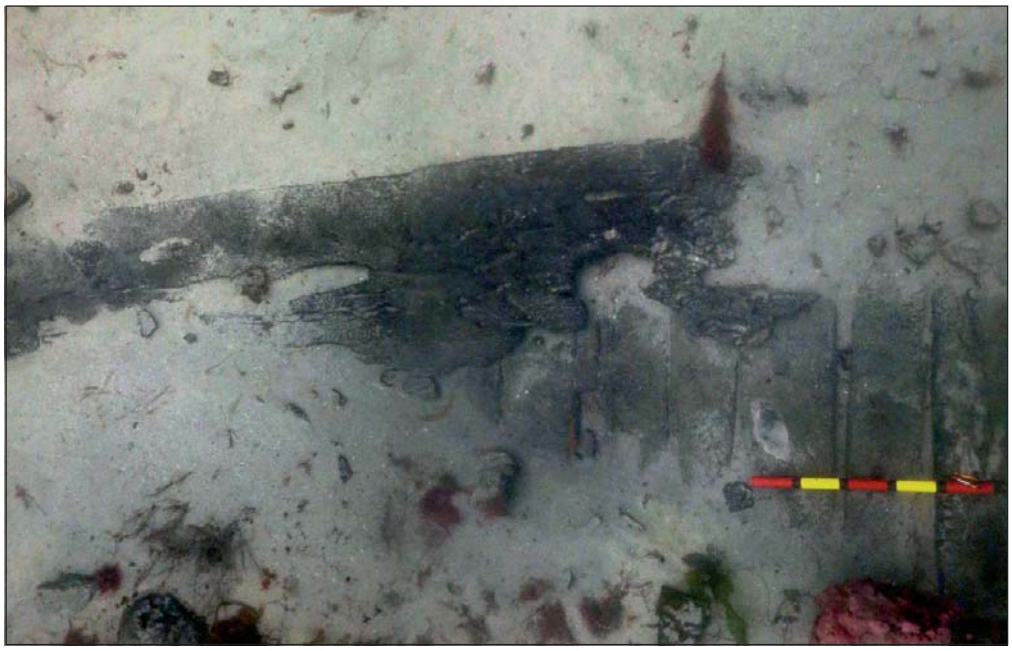

Plate 10: Photograph of ceiling timber framing showing damage by shipworm

Plate 11: Section of timber framing

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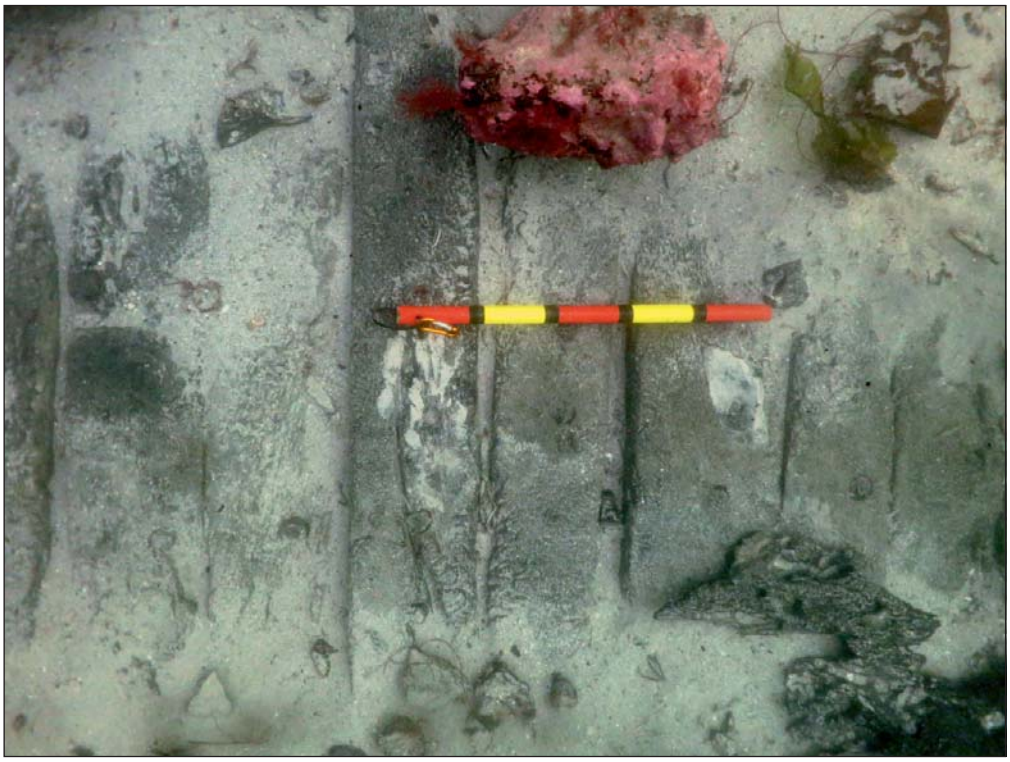

Plate 12: Close-up of futtocks

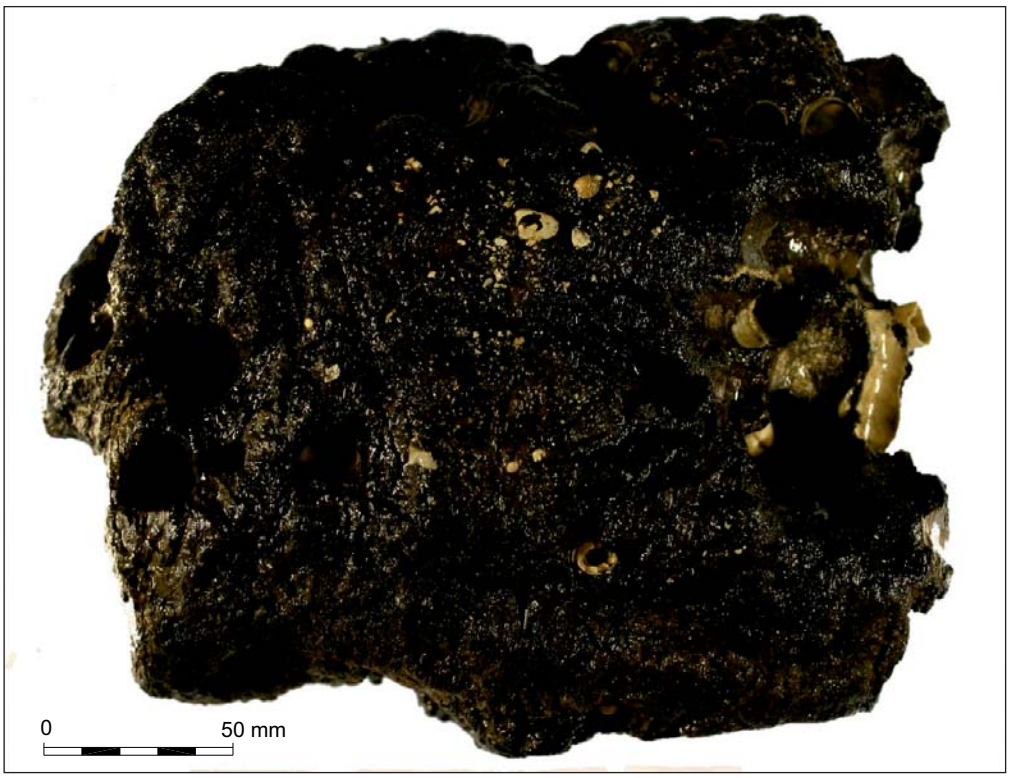

Plate 13: Loose timber fragment (possible futtock) showing damage by shipworm (courtesy of AOC Archaeology)

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Plate 14: Galley-bricks (courtesy of AOC Archaeology)

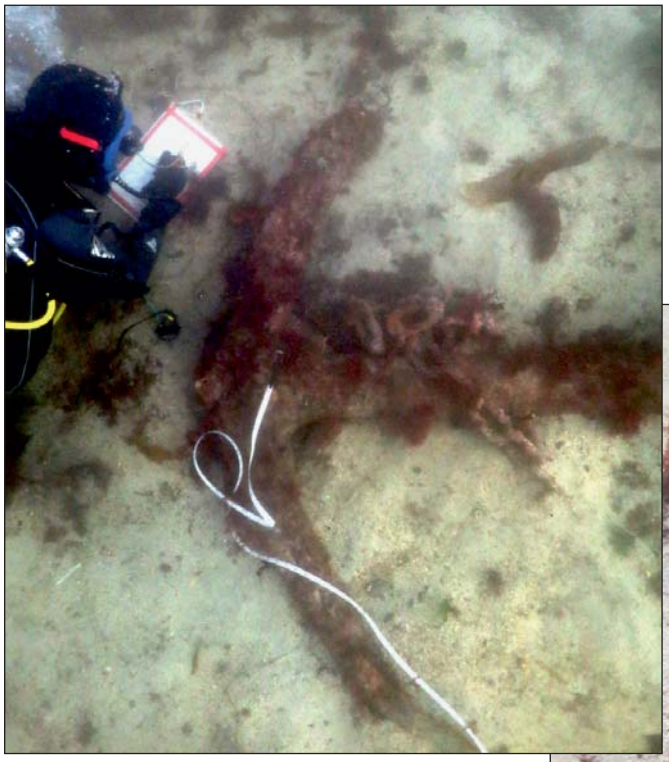

Plate 15: Anchor 1

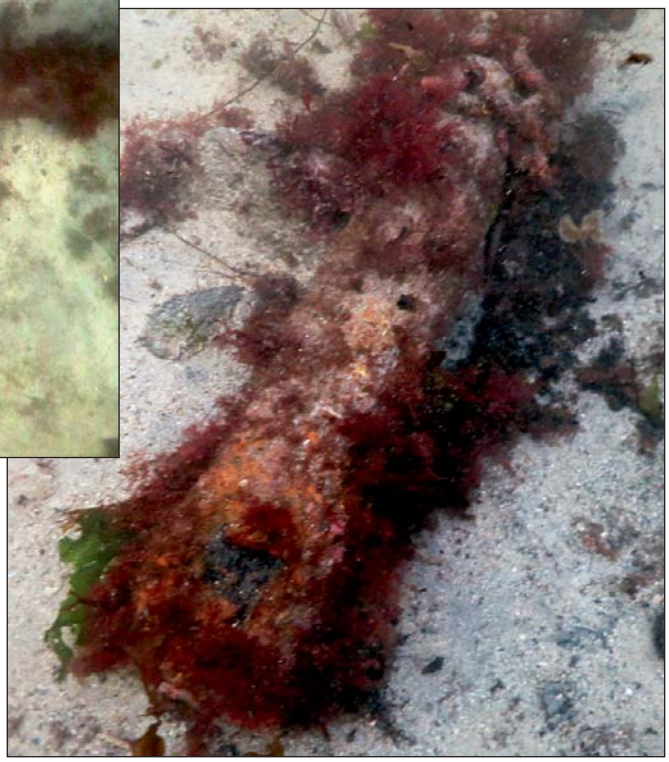

Plate 16: The stock end of Anchor 1

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Plate 17: 17th/18th century Dutch Delft tile depicting three-masted ship *in-situ* on the seabed at the mouth of a gully

Plate 18: Local diver finds: Rigging block

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